

COOPERATIVE AGRICULTURAL OPERATIONS MANAGEMENT
ON A
CUBAN SUGARCANE FARM:
“... AND EVERYTHING GETS DONE ANYWAY”

By

FREDERICK S. ROYCE

A THESIS PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE

UNIVERSITY OF FLORIDA

1996

“A cooperative farm is a place where everybody gives orders, nobody follows orders, and everything gets done anyway.”

(told to the author by a member of the executive committee, “Amistad Cuba Laos” cooperative)

This study is dedicated to the members of Cuba’s agricultural production cooperatives:
pioneers in workplace democracy.

ACKNOWLEDGMENTS

I am very happy to be able to recognize my debts of gratitude to a number of people whose diverse contributions have helped to make this research project the fine, and even enjoyable, experience that it has been.

In Cuba, the members of the "Amistad Cuba Laos" cooperative opened their ledger books and their homes, and gave of their knowledge, time, and trust, as well as their delicious cassava, beans and rice. Indeed, I might never have arrived at the cooperative except for the decisive intervention of Mavis Alvarez of the "Asociación Nacional de Agricultores Pequeños" (ANAP), who also provided me with opportunities to meet members of many other cooperatives. Armando Nova, of the "Centro de Investigaciones de Economía Internacional" (CIEI), was very helpful during my stay in Cuba, even to the point of visiting me in the field on several occasions.

Funding for field research in Cuba was provided by the John D. and Catherine T. MacArthur Foundation, through the University of Florida's, "International Agricultural Trade and Development Center" (IATDC). William Messina and Kamal Dow of the IATDC provided the institutional context for the research, and approved financial support for field research. Carmen Diana Deere, whose excellent seminar at the University of Florida could not have come at a better time for this study, gave advice, information and quiet inspiration. At the Food and Resource Economics Department, Chris Andrew's

insight and close attention greatly improved my research proposal, and Michael Martin has thoughtfully kept me abreast of the relevant economic literature.

My committee chair, Robert Peart, has always found time to help find answers for my questions. His unwavering support greatly facilitated my pursuit of a research theme that was a bit outside the usual lines of inquiry of the Department of Agricultural and Biological Engineering. Neither the study, nor the degree would have been possible without the generous assistantship provided by that department.

And closest to home, Estela, our daughters, and my parents have each contributed to this endeavor in their own ways.

TABLE OF CONTENTS

ACKNOWLEDGMENTS	iii
ABSTRACT.....	vii
CHAPTER 1 INTRODUCTION.....	1
Specific Objectives.....	2
Methodology	3
Brief History of Agricultural Production Cooperatives in Cuba	5
The "Amistad Cuba Laos" Cooperative.....	11
The Role of the Agro-Industrial Complex	14
CHAPTER 2 AGRICULTURAL CYCLE AND TECHNIQUE.....	15
Special Aspects of Sugarcane Management.....	15
Planting	18
Irrigation	23
Cultivation and Weed Control.....	24
Fertilization	31
Re-planting.....	32
Maintenance of Field Borders	34
Harvesting.....	34
CHAPTER 3 EFFECTS OF THE SPECIAL PERIOD ON SUGARCANE	41
Production Declines: Quantitative Aspects and the National Context	41
Production Declines: Specific Causes.....	42
Input Shortages and the National Context.....	48
Cooperative Response to Falling Production and Income	49
CHAPTER 4 COSTS OF PRODUCTION	54
Economic Importance of Sugarcane Cooperatives.....	54
Cooperative Cost Accounting	55
The Cost-to-Income Ratio	57
Terms of Exchange: Farm Input to Output.....	59
Overall Cost Structure	60
CHAPTER 5 WORKFORCE	63
Cooperative Members.....	65
Non-Member Contracted Labor.....	78
Volunteer Labor	82

CHAPTER 6 WORK PERFORMANCE: INCENTIVES, SANCTIONS AND MONITORING.....	83
The “Free Rider” Problem: A Recurrent Theoretical Concern	84
Member Incomes	85
Quantitative Comparison of Income Sources.....	92
Income as a Work Incentive.....	94
Norms	95
New Incentives.....	107
Vinculación del Hombre al Area: Linking of the Man to the Land	109
Participation as Motivation	111
CHAPTER 7 DECISION MAKING	113
Management Autonomy.....	113
Management Objectives.....	122
Member Participation.....	126
Participation and Vinculación	129
Information and Member Participation	130
CHAPTER 8 CONCLUSION	133
General Characteristics	133
Most Important Strengths.....	135
Most Serious Problems	137
Alternative Directions for the Future.....	139
APPENDIX A CASE STUDY PROTOCOL	146
APPENDIX B DIESEL FUEL USE BY MONTH	156
APPENDIX C PRICE TRENDS FOR MAJOR INPUTS	159
APPENDIX D FOOD CROP ALLOTMENT	162
APPENDIX E SUGARCANE HARVEST NORMS	164
APPENDIX F SPENDING PERMIT INCENTIVE SCHEME.....	165
APPENDIX G USEFUL CONVERSION FACTORS	167
LITERATURE CITED	168
BIOGRAPHICAL SKETCH	172

Abstract of Thesis Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Master of Science

COOPERATIVE AGRICULTURAL OPERATIONS MANAGEMENT
ON A
CUBAN SUGARCANE FARM:
“. . . AND EVERYTHING GETS DONE ANYWAY”

By

FREDERICK S. ROYCE

August, 1996

Chairman: Robert Peart

Major Department: Agricultural and Biological Engineering

This case study of a Cuban sugarcane cooperative provides a description of farm operations, and an analysis of the major social and technological factors which shape cooperative management in mid-1990s Cuba. The study is based on field research that included interviews with cooperative members, examination of documents, and direct observation of work, decision making, and relations between members.

After a brief history of agricultural production cooperatives in Cuba, the exposition describes the case farm's agricultural cycle, membership characteristics, and system of work monitoring and incentives. The effects of input shortages on farm output, and the relative movement of input vs. output prices are analyzed over the past 5 years. The various components of member income are investigated, and implications for work

incentives are drawn. The related issues of cooperative autonomy from the government, and member participation within the cooperative are examined.

The farm is found to be a highly mechanized, well organized operation, with basic planning and accounting systems in place. Farm management autonomy is limited by government restrictions, but existing entrepreneurial space may be sufficient to promote on-going improvements in productive efficiency. The cooperative is open to the adoption of new technologies, and sugarcane yields which plummeted as a result of severe input shortages, are now recovering as inputs become available. On the other hand, work quality and intensity appear to be below potential, in part due to an incentive system which has not evolved to meet the country's changing economic conditions. There is very limited use made of the considerable volume of information which the cooperative gathers regarding its own operations. Little of this information is ever processed and reported to the general membership; a practice that limits member participation.

Several distinct, sometimes competing, visions of the cooperative's future were observed. Some of the issues are a return to the industrial-based agriculture of the 1980s versus an emphasis on increasing animal traction and other locally available inputs; greater management autonomy versus continued high levels of government involvement; and whether or not to change the locus of responsibility for production from the collective to the family level. One problem area seemingly not addressed by any of the sides in the strategy debate concerns the relation between information, participation and accountability. Based on the analysis presented in this study, it is chiefly within that broad area that the cooperative has the opportunity, through its own efforts, to significantly improve performance.

CHAPTER 1 INTRODUCTION

The present thesis is a case study of a sugarcane farming cooperative located near the city of Havana, Cuba. One of the justifications for performing a single case study is when “an investigator has the opportunity to observe and analyze a phenomenon previously inaccessible to scientific investigation . . .” (Yin 1994:40). Although the internal dynamics of specific Cuban cooperative farms have been examined by Cuban researchers, the results of their studies are not readily available in the U.S.¹ Furthermore, the Cuban research seems to have been overwhelmingly conducted by economists, sociologists, historians and other social scientists, rather than by agricultural, engineering or management specialists.

A principal purpose of this study is therefore to provide, in a form accessible to the U.S. academic, and especially agricultural sciences community, insights into the management of Cuban cooperative farms. Since the data on which the study is based was collected at a single sugarcane producing cooperative, the conclusions should be only tentatively applied to Cuban sugarcane cooperatives in general, and even more cautiously related to cooperatives which specialize in other crops. On the other hand, the research methodology developed, and issues raised, are probably applicable to any type of Cuban farming cooperative. Therefore, the academic value of the study may lie as much in its

¹ An exception is the ongoing work of Carmen Diana Deere et al, 1992, 1994 and 1995.

methodological aspects as in its conclusions. In addition, it is hoped that the study will be useful to those whose responsibilities include cooperative management, whether members of the "Amistad Cuba Laos" cooperative, or leaders of the cooperative movement at Cuba's National Association of Small Farmers (ANAP).

To those Cubans who, for whatever reasons, are concerned with the success of the agricultural production cooperatives, the potential value of this study is obvious. But of what practical value is a study of the management of Cuban cooperatives for the citizens of Florida? In Cuba today, the production cooperative is the dominant management paradigm in agriculture. The results of cooperative management therefore determine the income and work satisfaction levels of hundreds of thousands of cooperative members, the food availability for millions of Cubans, and the bulk of export earnings for the entire nation. A confluence of history, politics and geography determines that the instability which would result from a failure of agriculture in Florida's closest southern neighbor would in turn generate real problems for the Sunshine State itself. In this sense, it behooves Floridians to understand what is presently unfolding in Cuban agriculture.

Specific Objectives

The study has 6 specific objectives.

1. Provide a case description of the "Amistad Cuba-Laos" cooperative which includes its history; a general inventory of lands, infrastructure and machinery; the agricultural cycle; machine management; membership size and functions; system of work monitoring and payment; and leadership and organization.
2. Determine the extent of input shortages and price changes at the cooperative during the past 5 years. Measure the changes in the relative prices which the cooperative pays for inputs, as compared to prices paid to co-op for the cane produced.
3. Quantify the economic importance of recent liberalization measures, especially the opening of free agricultural markets, for this sugarcane cooperative.

4. Examine the effects of input shortages, price increases, and liberalization, each upon the cooperative's management.
5. Determine relative levels of importance of various components of members' income, the implications for work incentives, and for the stability of the membership over time.
6. Describe the nature of member participation. What practices act for, and against, member participation in management?

Overall, the emphasis is more operational than economic, and more focused on management of the workforce, than on management of the crop. The nature and effects of political affiliations and kinship, important as they may be, are outside the scope of this study.

Methodology

Data gathering was guided by the research protocol, which was in turn based on my research objectives. This protocol, as formulated prior to initiating the field research, is included as Appendix A. Due to time limitations, not all elements included in the protocol could be addressed by the research. Data, or evidence, was collected from four main sources:

1. Interviews with cooperative members, especially, but not exclusively, those on the board of directors.
2. Examination of documents created by, or about, the co-op.
3. Review of archives: member lists, maps, receipts
4. Direct observation of work, decision making, relations between members and leaders and other aspects of co-op life.

As data accumulated, it was cataloged according to its relevance to each protocol theme. A count was kept of the number of references to each section of the protocol, to assure adequate coverage of the most important themes. Through a mixture of necessity

and preference, this was all done manually. I judged that a tape recorder might cause some anxiety for those being interviewed, so all notes were hand-written. Since I had no access to a portable computer, all entries, including frequent consolidation of notes at the end of each day, were on paper. And finally, since photocopiers are unavailable in the town of Bauta, many hours were spent copying archival evidence, number by number.

Beginning August 6th 1995, my 4 weeks at the cooperative were divided among three of the farm's four major administrative areas (see Figure 1-1).² For the first week, I "shadowed," the board member in charge of overall production (jefe de producción), who was also acting president, while the president himself was on vacation. The following week, I was with the agronomist, who directs operations specifically for sugar cane. I began the 3rd week at the co-op's machine repair shop, spending time with the member in charge of co-op machinery ("jefe de maquinaria"), the shop foreman and the mechanics. Towards the end of that week, and during the fourth, last week, I moved into the cooperative administrative offices, where I pursued open-ended interviews with the cooperative's economic officer, and had access to records, from which I copied the figures I sought. After leaving the cooperative, I spent three days at a training center for cooperative members, where a month-long course for the agronomists from nearly 100 cooperatives was in progress. This contact with members of cooperatives from all corners of Cuba provided an excellent opportunity to place my experiences at "Amistad Cuba-

2. The department I did not "enter" was "Procurement." While this function is vital, especially in times of input shortages, its operations are principally oriented outward, while my focus was on cooperative internal dynamics. In any case, the procurement "jefe" was on vacation during nearly my entire stay, as was the cooperative president. I knew that August was a vacation month in Cuba, and so planned my research for June and July. In spite of applying months in advance for necessary documents, both the Cuban visa and the U.S. license were delayed until mid-July.

Laos” into a larger perspective. Finally, on a brief visit to Cuba in June of 1996, I was able to spend a day visiting another sugarcane cooperative in Ciego de Avila province, and later, a few hours at the “Amistad Cuba Laos” cooperative, clarifying a few points regarding their machine use, and taking photographs.

Brief History of Agricultural Production Cooperatives in Cuba

What is an Agricultural Production Cooperative?

Edward Reed has described the agricultural production cooperative as a farm where,

the land and major capital items are held in joint ownership by the farm workers themselves, the bulk of the land is collectively cultivated, and any profits of the enterprise are shared by the cooperative members. Ideally, as joint owners, members of production cooperatives participate in the decision-making process concerning all aspects of production, distribution and investment. Thus, this type of group farm is distinguished from the state farm, where workers are wage employees of the state, and forms of cooperation where farmers cultivate their individual plots while carrying out some operations jointly. (1977 p. 360)

First Period of Cooperative Formation

Since the Cuban revolution of 1959, there have been three periods during which the government has promoted the formation of agricultural production cooperatives. The first period, from 1959 through 1963, saw the formation of 3 types of cooperatives. The earliest, called simply “agricultural cooperatives,” were established on large non-sugarcane farms or ranches, which had been expropriated during the first months of the revolution (Bianchi 1964:105). Between May 1959 and May 1960, 881 of these production cooperatives, mostly in the size range of 200 to 300 hectares, were organized. This first co-op experience was short-lived, however. In January of 1961 these cooperatives were

merged into the centrally managed network of state farms. Meanwhile, in June of 1960 similar cooperatives were established on the “administration lands” of large sugarcane plantations.³ Within 2 months over 600 of these “sugarcane cooperatives” were established, and in May 1961, 622 cooperatives, with a total of 122,000 members controlled 809,000 hectares of land (Bianchi 1964:108). Like the “agricultural cooperatives, the “sugarcane cooperatives” were to be a brief institutional interlude on the road to a centrally managed agriculture. After only 2 harvests, in August 1962, the National Congress of Sugarcane Cooperatives voted almost unanimously to transform their cooperatives into state farms (Domínguez 1978:448; Dumont 1970:48; Bianchi 1964:107-108). A somewhat more enduring effort at cooperative agricultural production was initiated by the National Association of Small Producers (ANAP) in 1961.⁴ Between May of that year and May 1962, ANAP organized 229 “agricultural societies.” These cooperatives differed from those previously discussed in 3 major ways. First, they were composed of small farmers who pooled their land in order to work it collectively, sharing draft animals and implements (Martin Barrios 1987:53). Second, they were much smaller than either the agricultural or sugarcane cooperatives: the average size of the 345 agrarian societies reported in August 1963 was 137 hectares, with a membership just under 13 farmers.⁵ Finally, the agrarian societies were more democratic, with members electing

3. Administration lands were those fields managed directly by the sugarcane mill administration, as opposed to those lands leased to cane farmers.

4. Since 1961 the Asociación Nacional de Agricultores Pequeños, or ANAP, has been the officially sanctioned representative of Cuba’s private agricultural producers.

5. The totals reported in Martin Barrios (1987:53) are 4,429 members and 3,526 caballerías (47,319 ha). It is not stated whether this is total land area, or agricultural lands only.

their own authorities, whereas the government appointed managers to the agricultural and sugarcane cooperatives (Bianchi 1964:106, 127). Although over 500 agrarian societies were organized in 1962 and 1963, these cooperatives failed to generate much interest among the small farmers (Regalado 1979:197). By late 1967 only 126 remained, and four years later, the count had dropped to 41 (Domínguez 1978:449; Martín Barrios 1987:74).

Second Period of Cooperative Formation

The second period of cooperative formation spanned the years 1977 through 1983. The “agricultural production cooperatives” (cooperativa de producción agropecuaria or CPA) organized during this period were fundamentally very similar to the earlier agrarian societies, though usually larger.⁶ Since the cooperative selected for this case study is a CPA, this period will receive a more thorough treatment than the other two.

As a result of the agrarian reform law of 1959, small, independent farmers came to own about 30 percent of Cuba’s farmland (Zimbalist and Eckstein 1987:8). Throughout the late 60s and early 70s, the Cuban government utilized various pressures and incentives to integrate these private farmers into the state’s agricultural planning, production and distribution system, which was a centerpiece of the planned economy (Zimbalist and Eckstein 1987:9). As a result, during this period many peasant farms were either leased or sold to the state.⁷ Beginning in 1975, however, the government began changing official policy towards peasant farmers. The new policy led to a gradual, voluntary process of

6. It may be confusing that the specific name given to these co-ops, “agricultural production cooperatives,” is the same as the generic name. To reduce the possibility of confusion, I will use the Spanish acronym “CPA.”

7. Even leaders of ANAP, the small farmer organization, apparently felt that their membership would gradually disappear, as peasants opted out of private farming. Interview with Mavis Alvarez (7/95), founding member of ANAP, and presently Director of Development Projects of that organization.

attracting farmers into agricultural production cooperatives of their own making, rather than into state owned farms (Deere et al. 1992:120; Zimbalist and Eckstein 1987:13).

The practical task of organizing the CPAs was carried out by the small producer association, ANAP. Beginning in the early 60s, ANAP's membership was gradually organized into mutual aid groups and credit and service cooperatives. This organized, small farmer base proved to be fertile ground for the creation of production cooperatives, over 1000 of which were constituted between 1977 and 1980. A good deal of the long-term success of this effort seems to have been due to the emphasis placed on persuasion, rather than coercion. By pooling their lands, and working collectively, each farmer would no longer be tied to a particular, often isolated, plot of ground. Cooperatives would bring member families together, often closer to towns or villages, and permit access to electricity, improved housing, schools, and medical care. This new form of production would be based on machinery, to lighten the farmer's burden, and to increase productivity. Cooperatives provided for paid vacations and retirement pensions; benefits which small farmers had never known. And in any case, those who entered the cooperatives could, to some extent, "have their cake, and eat it too," since each member would be gradually paid off by the cooperative for the land he or she "contributed" (Deere et al. 1992:121; Ghai et al. 1988:70-83).

During the late 1970s in Cuba, new departures in the economic, political, and even technological spheres seemed to bode well for these relatively autonomous, democratic, profit-making cooperatives. Coincident with the launching the CPAs, a new system of economic planning known as the SDPE (Sistema de Dirección y Planificación de la Economía) was being implemented throughout Cuba. In contrast to official economic

practice since the early 1960s, the new system emphasized the need for cost calculations, self-financing, profit sharing and enterprise autonomy (Fuller 1992:97; Zimbalist and Brundenius 1989:127). Meanwhile, the political space available to the citizenry was expanded somewhat through the incorporation of secret balloting into the local elections known as “poder popular” or people’s power (Pérez-Stable 1993:123). Finally, in 1977, the same year in which the first CPAs were formed, the first Cuban sugarcane combine-harvester factory began production (Sims et al. 1993: 68). Together with the ubiquitous Soviet tractors, these harvesters came to represent the advantages of the large scale operations permitted by production cooperatives (Edquist 1985:133).

Throughout the first few years of CPA development, a typical cooperative would comprise less than 30, socially homogeneous members. Thereafter, due to the entry of new members, and to a tendency to amalgamate smaller cooperatives into fewer, larger units, the average membership size grew to around 50, where it has remained (Deere et al. 1992:123,133).⁸ The social origins of the membership also became more diverse, with new members increasingly from the ranks of landless agricultural laborers, skilled workers (mechanics, welders) and professionals (accountants, agronomists). Although the presence of a core of former small farmers and their family members remains a very important characteristic of the CPAs today, the tendency appears to be for the cooperatives to become numerically dominated by the other groups mentioned.

In 1983, there were 1,474 CPAs, with an average of 637 hectares, and 51

8. The specific importance of the sugarcane combine-harvesters in convincing members of small cooperatives to merge into larger cooperatives was confirmed by this author’s interviews with founding members of the “Antonio Maceo” CPA and the “Amistad Cuba Laos” CPA of Havana province in August of 1995, and of the “Revolución de Etiopia” CPA in Ciego de Avila province, in June of 1996.

members, per cooperative (Deere et al. 1992:123). By December 1994, there were 1155 CPAs, with a total of 61,722 members and 748,000 agricultural hectares, or 11.2% of Cuba's agricultural lands (Figueroa 1995:18-20; ANAP 1994). In spite of the gradual decline in numbers, the CPA has proved to be a much more successful model for cooperatives than were any of the previous attempts.

Third Period of Cooperative Formation

The most recent period of cooperative formation, from September 1993 through early 1995, constitutes a reversal of the early 1960s policies which converted the agricultural and sugarcane cooperatives to state farms. The large, inefficient state managed farms had become increasingly untenable in the early 1990s, and the relatively more efficient CPA provided the organizational model for an extensive agrarian reform (Deere 1995:14; Figueroa 1995:14,15). The process of transformation of state farms into cooperatives, called "basic units of cooperative production" (UBPC), began in September of 1993, and unfolded very rapidly during the following year and a half. As of February of 1995, there were a total of 2866 UBPCs; 1426 in sugarcane, and 1440 in other crops and livestock. These farms, with a total membership of 273,247, occupied 2,709,600 hectares, or 40.6% of Cuba's agricultural lands (Figueroa 1995:19-20). While the UBPCs were patterned after the CPA model, they differ in that the CPAs were formed by small farmers pooling their lands, whereas the UBPCs were initiated by former state farm workers, on lands still owned by the state, with open-ended, rent-free usufruct granted to the cooperative (Deere 1995:14).

The "Amistad Cuba Laos" Cooperative

According to a document developed by the Cuban Ministry of Sugar in 1983,⁹ the "Amistad Cuba Laos" CPA was formally founded on December 9th, 1980, with 10 caballerías (134 hectares) of land, and 18 members.¹⁰ On April 15th, 1983, the original "Amistad Cuba Laos" merged with the nearby "Antonio Maceo Grajales" CPA. That same year, the cooperative reached 60.3 caballerías (809 hectares) and 71 members. At the time of the study in August, 1995, the cooperative possessed a total of 88.5 caballerías (1188 hectares), with the following distribution:

- 65.3 caballerías (876 hectares) in sugarcane.
- 2.9 caballerías (39 hectares) food crops for members.
- 2.9 caballerías (39 hectares) livestock, (mostly milk cows for member consumption).
- 17.4 caballerías (234 hectares) area not useable for agriculture (areas for houses, buildings, access roads, drainage ditches and especially hillsides).

There were 88 members in August 1995, and 96 in June of 1996. The chapter on "workforce" will go into more detail about the members. The cooperative is highly mechanized, with 28 wheel tractors, 4 track-type tractors, 4 sugarcane combine-harvesters and 2 medium-duty trucks.

Figure 1-1 illustrates the organization of authority within the cooperative. There was no similar chart posted anywhere at the co-op, nor was I able to find one among the

⁹ Delegación La Habana, MINAZ-ANAP. 1983. Segunda etapa del plan rector, CPA modelo: Programa de desarrollo y perspectiva de la cooperativa de producción agro pecuario "Amistad Cuba Lao."

¹⁰ When referring to the "Amistad Cuba Laos" cooperative, I have followed the cooperative's usage of Cuban measures for land area (caballerías) and weight of sugarcane (arrobas). Of course I have included hectare and kilogram equivalents, as well as a conversion table (Appendix G).

cooperative documents. In general, the leaders who sketched for me their understanding of the cooperative's organizational structure seemed unfamiliar with applying the concept of an organizational diagram to their own organization. It may be that the responsibilities of each position have been stable for so many years, that they have become accepted as "second nature," and do not require references such as charts, or even a written charter or constitution (which could not be located, either). Interestingly, although the members of the executive council are elected, none of the leaders who drew an organizational chart included the "general assembly of (all) members" in his sketch.¹¹ Referring again to Figure 1-1, each of the four "departments" is presided by an officer called a "jefe." One of these department heads was not included in a list, which the president provided me, of current members of the executive council. The shaded boxes indicate the origin of each of the 9 members of the executive council. There are also 2 "staff" positions: agronomist ("ingeniero agrónomo") and mechanization expert ("ingeniero mecanizador"). Each of these individuals has functional authority over a vital activity, as shown by the dotted lines.

11. Since no election was held during my stay, I had to depend on interviews for information regarding the selection of leaders. Members indicated that elections may involve either choosing between alternative candidates, or (perhaps more commonly) a "referendum" on a single candidate. Voting is secret for all members of the executive council, except for the election of the president, for which there is a show of hands. Terms are nominally 5 years, but officers can be (and are) recalled if circumstances warrant. That the general assembly is the highest authority within the cooperative is stated in article 14 of the Cooperative Law (Consejo de Ministros 9/20/1990:17).

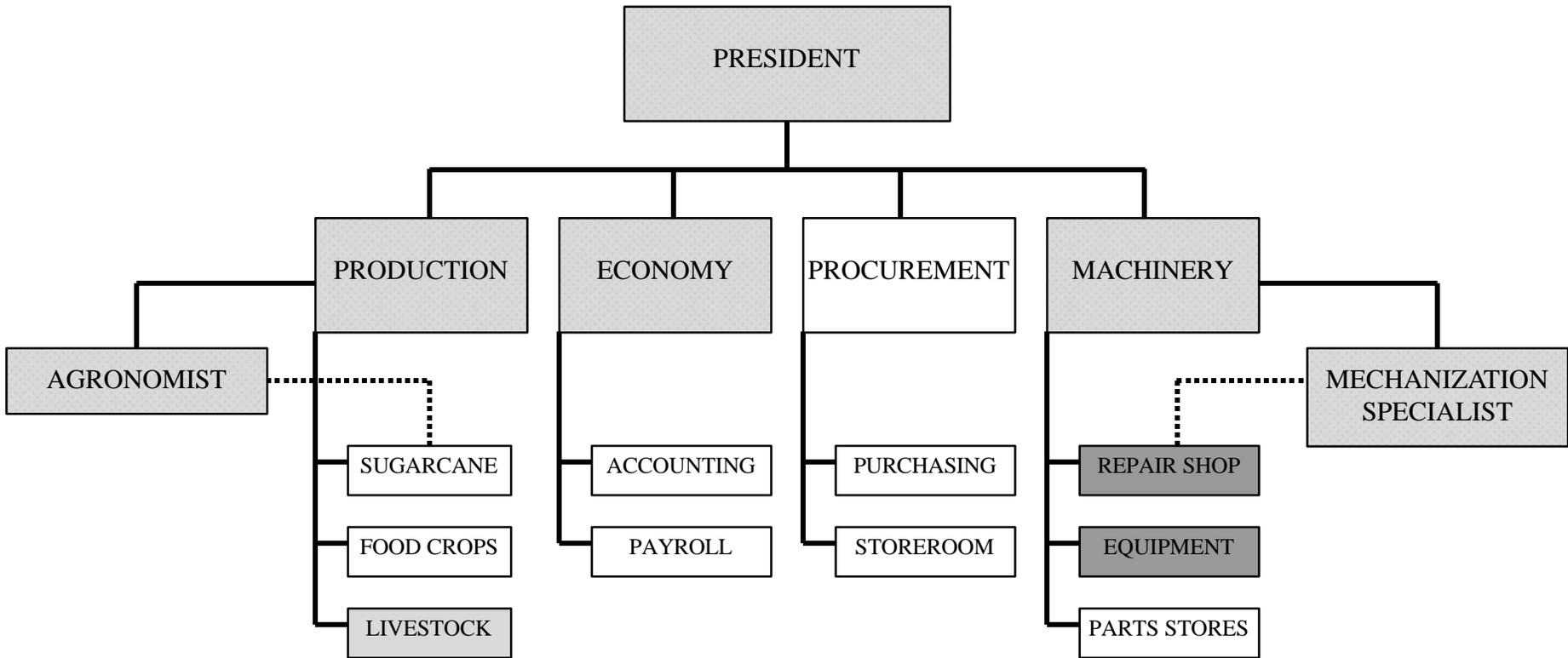


Figure 1-1 "Amistad Cuba Laos" CPA Organizational Diagram

The Role of the Agro-Industrial Complex

Each Cuban sugarcane farm is associated with an agro-industrial complex (“complejo agro-industrial”, or CAI), at the center of which is the sugar mill which purchases the farm’s cane. The CAI is a dependency of the Ministry of Sugar, and is the most visible and active link between the state, and each sugar farm. The "Amistad Cuba Laos" cooperative “belongs” to the Manuel Martínez Prieto CAI.¹² In addition to being the sole purchaser of the cooperative’s cane, the CAI is the sole supplier of major inputs, notably machinery, parts, fuel, lubricants, fertilizer and herbicides. The CAI receives copies of the cooperative’s annual plan, and monitors fulfillment of a variety of activities. This monitoring activity brings CAI personnel to the cooperative at least weekly, and even several times per week. Later chapters will provide more detail on the nature and effects of CAI-cooperative relations.

¹² Formerly “Central Toledo,” now the only sugar mill in metropolitan Havana.

CHAPTER 2 AGRICULTURAL CYCLE AND OPERATIONS

Special Aspects of Sugarcane Management

Compared to many field crops, sugarcane management is complicated by several factors:

- 1) Depending on the variety of cane, and the month in which it is planted, 12 to 22 months are required from planting to harvest.
- 2) Sugarcane is not replanted after every harvest. Rather, it is repeatedly grown from the root and stalk stubble that remains after each harvest. Commercial plantations can thus regenerate for 10 or more years, although yields tend to decline with successive cuttings. Good cultural practices can delay the expensive planting process. A minimum of 12 months should be allowed between the stubble, or “ratoon,” harvests (Alvarez and Peña Castellanos 1995, 17).

According to the co-op agronomist, the cooperative’s cane fields are subject to “demolición,” or being plowed under and re-sown, about every 5 years. In practice, co-op records only distinguish between cane which has never been harvested, cane harvested once, and cane harvested two or more times¹. Therefore, the 5 year figure is an estimate, or perhaps a goal, but not a rule. The cooperative’s record keeping is not detailed enough to use either strict economic criteria, or even documented historical precedent to decide when to plow and plant. It seems that several “rules of thumb”, including thin (small

¹ “Caña planta” is cane which has never been cut, although this cane is usually referred to simply in terms of the season in which it was planted: “primavera” (Jan-June) or “frio” (July - Dec.). After the first cutting, the seasonal reference is dropped, and the term “soca” is used, until the second cutting, following which all plants are called “retoños” until they are plowed under. In conversations, members would speak of second or third “retoño” (not usually “first”, since that is covered by “soca”), but I never found a written reference to anything except a generic “retoño.”

diameter) cane stalks, a visibly low density of cane plants per area in a field, a recollection of the number of times a field has been harvested, and a more-or-less accurate knowledge of that field's yield from the last harvest, all enter into the decision. None of the cooperative's cane lands are deliberately left fallow for periods as long as a full season. Crop rotation is practiced on a limited scale (11% of plowed fields, 1994-95 crop year) for the production of rice, or other food crops.²

What follows is a description of each of the cooperative's major sugarcane operations. Throughout the following discussion, it may be helpful to refer to the charts on the following page. These charts are largely based on the "Amistad Cuba Laos" cooperative's work plan for the 1995 calendar year (Plan Técnico Económico 1995). Figures 2-1 and 2-2 indicate approximately how much land area should be covered by each major operation, during each month. Figure 2-3 plots monthly rainfall, the single most important climatic variable affecting this agricultural cycle. The mean monthly figures used are from the town of Bauta, where the cooperative is located (Alvarez 1994: 7). The cooperative's very high level of mechanization enables completion of the harvest well within the low rainfall "window" from December through April.

² "CPA Cuba Laos: Plan Técnico Económico 1995," Modelo No. 301.

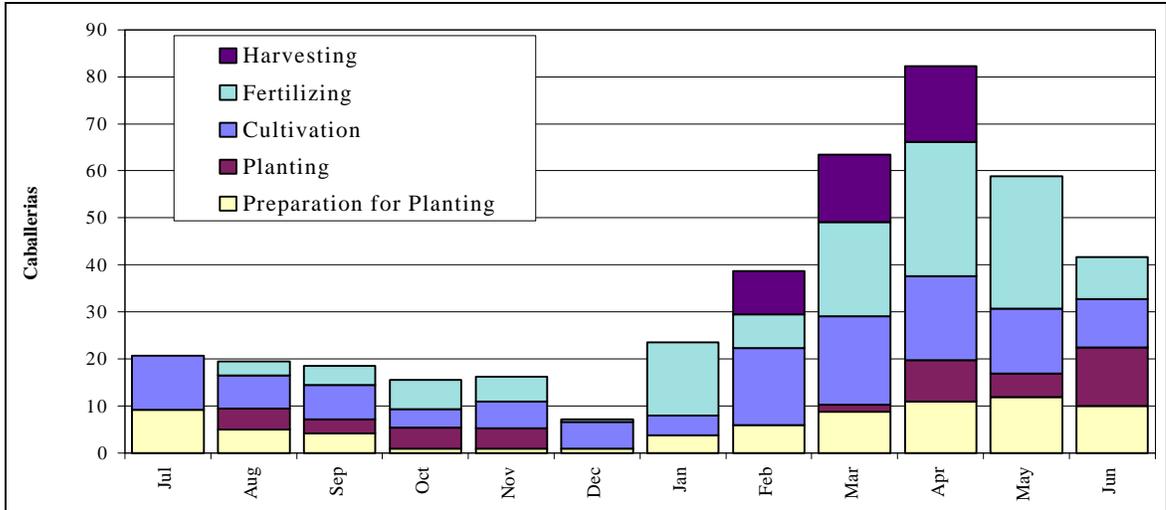


Figure CHAPTER 2 -1 Major mechanized operations scheduling for sugarcane.

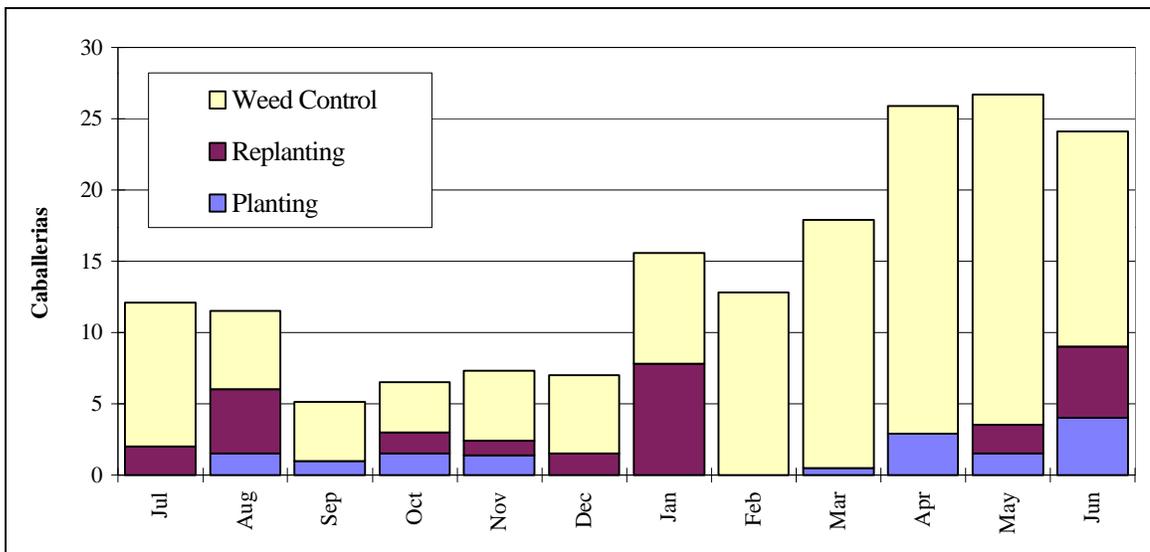


Figure CHAPTER 2 -2 Manual field operations scheduling for sugarcane.

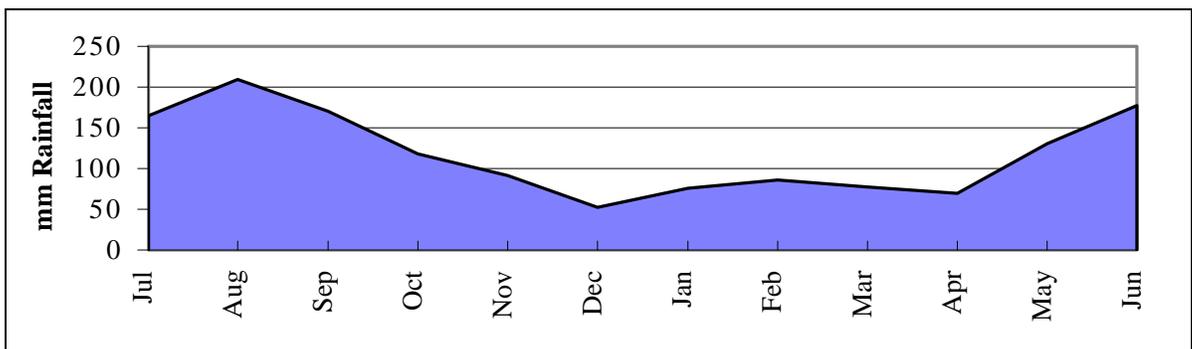


Figure CHAPTER 2 -3 Average monthly rainfall amounts.

Planting

The planting process begins by uprooting the recently cut cane stubble, using a 3-disk, semi-mounted plow (Figure 2-4), drawn by an 80 horsepower tracklaying (crawler type) tractor, model DT-75 (Figure 2-5). Each 66 cm diameter disk makes a 30 cm wide cut. According to an expert from a machine experimental station, plowing speed is 7 km/hr. By preference, a field is plowed immediately after being harvested,³ both in order to plant as soon as possible, and to avoid new growth from the stubble roots. Such growth slows the field preparation, and increases costs.⁴ The principal objective of this first plowing is to uproot and kill the stubble. Plowing is followed by disk harrowing, utilizing either the 80 horsepower wheel tractor, or the previously mentioned DT-75 crawler to pull the offset, notched-bladed, disk harrow (Figure 2-6). The field is then left fallow for 6 to 8 weeks, to allow the soil clods to disintegrate; to permit weed seeds to germinate, and to allow decomposition of the organic matter in the field to proceed. After the fallow period, the two previous operations are repeated, using the same equipment, but now working across the first furrows. Taken together, these 4 operations represent some 80% of the machine related planting expenses. In order to reduce this large expense, the cooperative recently began experimenting with a minimum tillage alternative which ,

³ The government technical recommendations instruct Cuban cane farmers to keep at least one tractor plowing behind the combines 16 hours a day (Plan Técnico Económico CPA Amistad Cuba Laos 1995: 4).

⁴ The danger of waiting was illustrated by the experience of a farm not far from “Amistad Cuba-Laos”, which delayed plowing 3 months, then faced the necessity of cutting and hauling out all the new growth, to enable plowing to proceed. Since this option was too costly, it was decided to let the field grow until the next harvest, even though the harvest itself will almost certainly cost more than the sparse cane will fetch.

according to the co-op agronomist, requires only half as many field passes to achieve the same results. The implement used for the minimum tillage trials, referred to



Figure CHAPTER 2 -4 Three-disk, semi-mounted plow.



Figure CHAPTER 2 -5 DT-75 tractor.



Figure CHAPTER 2 -6 Offset Harrow.

as a “multiarado,” was designed and constructed in Cuba, has only two very small moving parts, and is less expensive than the disk plow it replaces (Figure 2-7). Regardless of whether traditional or minimum tillage is used, the next step is to create the planting furrows. These furrows are 20 to 25 cm deep, with 1.6 meters between furrows, center-to-center. The tractor of choice here is the lightest in the co-op inventory, the 60 horsepower wheel tractor “Jumz-6”⁵ (Figure 2-8), which produces one furrow at a time. If soil tests indicate that the field being planted requires potassium or phosphorus, fertilizer is placed in the furrow as it is opened. Nitrogen fertilizer is never supplied to recently

⁵ According to a Russian text translated for me in Cuba, the maximum engine power ratings for the three tractors used by the co-op are reported as:

MTZ-80 wheel tractor, D-240 engine, 58.9 kW @ 2200 rpm.

Jumz-6 wheel tractor, D-65M engine, 44.3 kW @ 1750 rpm.

DT-75 crawler tractor, CMD-14H engine, 59.5 kW @ 1800 rpm.

planted cane, since the Cuban Ministry of Sugar trials indicate that sugarcane does not show response to N until after the first harvest.⁶

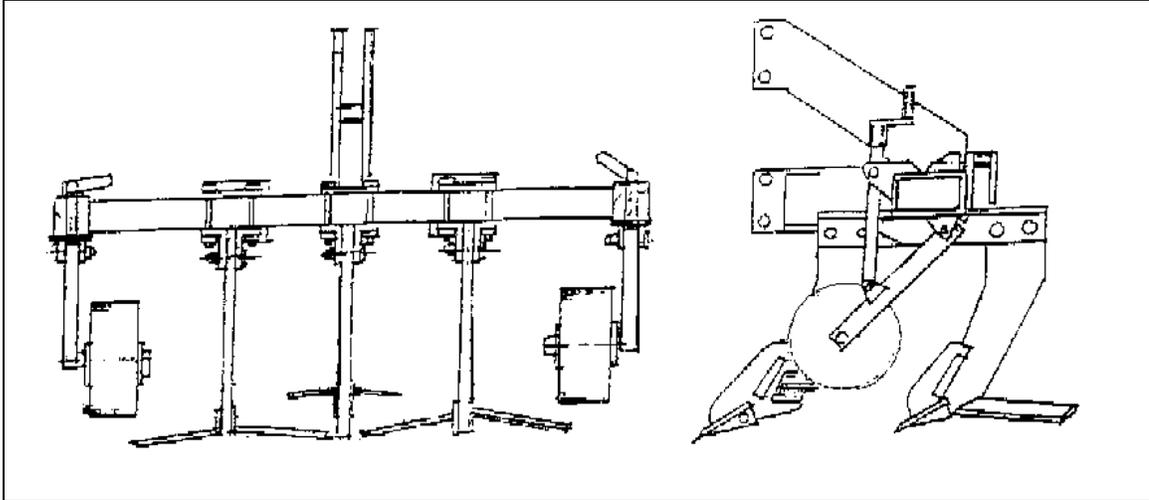


Figure CHAPTER 2 -7 “Multiarado” minimum tillage implement, equipped for uprooting ratoons.

Sketch from “Nueva tecnología de preparación de suelo y cultivo para la caña de azucar.” 1995. Mimeo. Instituto de Investigaciones de la Caña de Azucar. Havana, Cuba.

In 1995, records show that the co-op planted 4 varieties of cane.⁷ The sugarcane is propagated vegetatively from stalks grown on some 7 caballerías (12% of co-op’s total cane lands) of carefully tended fields. For planting, the cane is hand-cut, and loaded onto a tractor-drawn wagon which carries the whole stalks to the field. The wagon is then drawn through the field, with two men aboard throwing cane stalks into 6 furrows. Each furrow is tended by a man on foot, who positions the cane properly in the furrow, then using a machete, chops each stalk into pieces about 45 cm long. Table 2-1 indicates the

⁶ López Blanco, Manuel, J. D. Díaz, , C. Lamela Felipe, A. H. Baez Artiaga, D. Ponce de Leon, J. López, C. N. Rodríguez, and E. Carrasco. 1994. Solución Integral para la mejora de la producción cañera en la CPA "Amistad Cuba-Laos." consulting study done for co-op. Instituto de Investigaciones de Caña de Azucar (study), copy at "Amistad Cuba Laos" co-op, Bauta.

⁷ The varieties were CP 52-43 on 2.6 caballerías, C 323-68 on 5.2 caballerías, B 77418 on 4.3 caballerías and CB 4452 on 3.3 caballerías. Additionally, .9 caballerías of P 313-68 was included in the seed bed, to raise for future planting (“Plan Técnico Económico 1995”).



Figure CHAPTER 2 -8 “Jumz-6” tractor.

timing and intensity of the overall planting process. The first row shows the area to be included in the initial disk plowing, while the second row does the same for placing and covering of the cane in the furrow. These first and last operations effectively bracket the planting process, as it was planned to be carried out in 1995. Note that the area planted sums to 14.3 caballerías, which is 23% of the 61.7 caballerías that the co-op had in cane at the beginning of 1995.

Table CHAPTER 2 -1 First and last operations in planting process, in caballerías by month.

1995	Spring Planting						Cold Planting					
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
First Plowing	1.4	2.5	2.5	2.5	3.0	2.0	1.1	-	-	-	-	-
Planting	-	-	.5	2.9	1.5	4.0	-	1.5	1.0	1.5	1.4	

Figures in caballerías (1 caballería = 13.42 hectares) From CPA Cuba Laos: Plan Técnico Económico '95

Planting which takes place from January through June is referred to as the spring planting, and the planting from July through December is know as the cold planting. Although spring planted cane in Cuba is sometimes harvested the following year, after 10 or 11 months growth, this apparently short sighted practice does not seem to be followed at "Amistad Cuba Laos," where spring cane is harvested after 18 to 20 months.⁸ The cooperative's "cold" planted cane will tend to have a somewhat shorter cycle, of 15 to 17 months. According to the cooperative plan shown in Table 2-1, the CPA "Amistad Cuba Laos" prefers the longer-cycle, spring-planted cane, probably because the somewhat longer growing period provides higher yields, at no additional input cost.

Irrigation

Irrigation is particularly important in the first semester of the calendar year, especially for spring planted cane, during the period before the rainy season begins in May. Theoretically, the "Amistad Cuba Laos" cooperative has the capability to irrigate 17 caballerías, using a system of hand placed aluminum tubes, and large, high pressure rotating "guns." However, the poor mechanical condition of the diesel engines which

⁸ José Alvarez cites a Cuban Sugar Ministry document in qualifying this 11 month cane as "bad quality" (Alvarez and Peña Castellanos 1995: 18).

drive the pumps, the scarcity of spare parts and lubricating oil, and to a lesser extent, the cost of diesel fuel, appear to have brought a halt to cane irrigation at the co-op.⁹

Cultivation and Weed Control

If we assume a life of 4 to 5 years for the cane plants, then a farm with its cane areas divided more or less evenly between ratoons of each age group will, like “Amistad Cuba Laos,” find itself replanting 20 to 25 percent of its cane each year. But what happens on the lands not planted on a given year? The areas harvested, but not ready to be plowed up and re-sown as described above, comprise the “ratoon” fields.



Figure CHAPTER 2 -9 “Bayamo” subsoiler.

⁹ During my stay at the co-op, work was slowly proceeding on the rehabilitation of a very tired looking, six-cylinder diesel of Soviet origin, which appeared to be of about 120 hp. The mechanics said they had very few parts, and that in any case, these engines were characterized by high fuel consumption levels. As they tested the engine, I watched it leak lubricating oil from “every pore.” Oil is another scarce input. The government appears to be concerned about a lack of willingness to irrigate in general, since a specific allotment of fuel has been made available to farms for use only in irrigation. “Amistad Cuba Laos” had not yet touched its irrigation fuel ration.

In these fields, the harvest is followed by subsoiling between the cane rows. The purpose of this operation is to reduce soil compacting caused by the heavy combine harvesters¹⁰. The DT_75 tracklayer tractor pulling a 2-chisel subsoiler, called a “Bayamo” (Figure 2-9), set at a depth of 40 to 60 cm, is generally used to perform this task.

After the harvest of the ratoons, or after planting the new cane, there begins a three month, life-or-death competition between sugarcane and weeds. The competition lasts about three months, because that is the time required for the cane plants’ leaf canopy to cover the area between the rows, and shade out most competitors. The struggle is an unequal one, however, since the cane has the cooperative’s resources on its side, with a battery of weapons against the principal weed species.¹¹

The agronomist decides which method of weed control to use, and when to use it, on each field. His preferences are in the following order: tractor drawn cultivator; tractor-mounted herbicide sprayer; manual backpack herbicide sprayer; manual hoe and/or machete. Although he had no cost data at hand during any of our conversations, and indeed I never found cost comparisons or even calculations at this level of detail, calculations from cooperative data indicate that the agronomist’s preferences are precisely from least to most expensive, per area covered. Several factors beyond cost enter into the decision however, and the agronomist described them to me very clearly. To briefly explain the agronomist’s reasoning: the tractor cannot enter the field if the ground is too wet; herbicide cannot be used on tender young sugarcane shoots; once the cane reaches a

¹⁰ Cuban mechanization expert, Dr. Raúl Pérez Companioni, reports a weight of 11 metric tons.

certain height, the tractor cannot enter the field; and finally, tractor- drawn cultivation is only effective against weeds between the rows of cane, not mixed within the cane rows.

This line of reasoning can be simulated by choosing the appropriate response in each column of Table 2-2, moving left to right, until arriving at the correct “Technique.”

Table CHAPTER 2 -2 Decision Matrix for Weed Control Technique

Soil Condition	Sugarcane Age	Sugarcane Height	Location of Most Weeds	Technique
wet	tender	-	-	Manual hoeing
wet	hardened	-	-	Manual spraying
dry	tender	-	between rows	Tractor cultivation
dry	tender	-	within rows	Manual hoeing
dry	hardened	short	between rows	Tractor cultivation
dry	hardened	short	within rows	Tractor spraying
dry	hardened	tall	-	Manual spraying

Dashes indicate that, for a particular line, defining the attribute is not relevant to the decision.

Source: Agronomist, CPA "Amistad Cuba Laos"

A variety of tractor mounted, “over-the-row,” field cultivators are used. All are basically chisel plows, sometimes fitted with special, wide points. The smallest, known as a “Cubilla,” has a rectangular frame, of square tubular construction, and 4 curved shanks (Figure 2-10). A larger, single-toolbar unit uses 2 straight shanks, each preceded by a disk. The co-op members refer to this implement as a “Fleco” (Figure 2-11). It, like the “Cubilla” is used with either the Jumz-6 or the slightly more rugged, 80 horsepower MTZ-80 wheel tractor (Figure 2-12). The larger “Bayamo,” already described for subsoiling, is fitted with a sweep fabricated from broken combine cutting elements, for cultivation (Figure 2-13). Depending on the implement, the tractor, and the field

¹¹ According to a 1994 study performed by a Ministry of Sugar experimental station at the co-op, the main weed varieties are *Rottboellia cochinchinensis*, *Ipomoea trifida*, *Chamaesyce hyssopifolia*, *Cyperus rotundus* and *Sorghum halepense* (Díaz et al 1994).

conditions, the operator is expected to cultivate between 120 to 150 “cordeles” (5 to 6.2 hectares) per work day.¹²

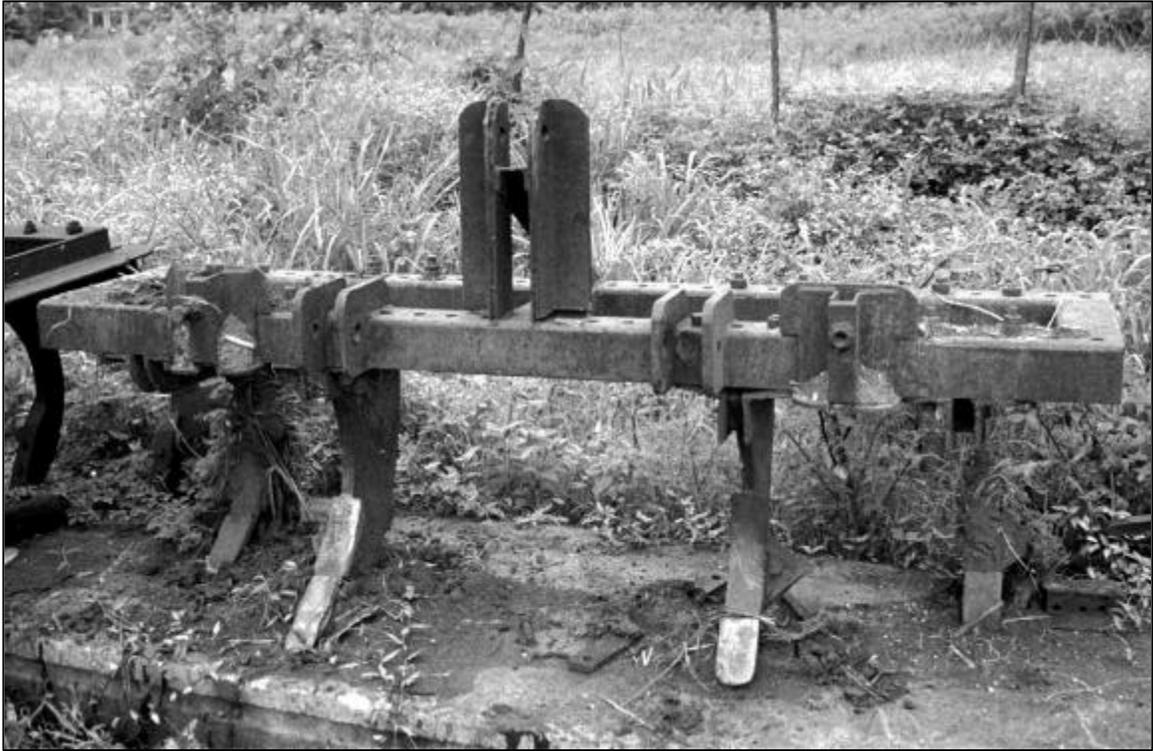


Figure CHAPTER 2 -10 “Cubilla” field cultivator.

Herbicides, both pre and post emergent, are applied by tractor-mounted sprayer when possible, and otherwise by back-pack sprayer. It is felt that the tractor mounted sprayer uses more herbicide per area, since the manual sprayers can more selectively spray weeds. No data was available to substantiate this supposition, however. In any case, the cooperative’s only tractor-mounted unit has been unusable for some time, requiring an unavailable pump part. In August of 1995, the co-op was attempting to have the part made locally, since they consider the sprayer to be one of their most important machine assets.

¹² One caballería equals 324 “cordeles,” and one “cordel” equals .0414 hectare.



Figure CHAPTER 2 -11 “Fleco” field cultivator.

Indeed, one did not have to observe the manual spraying crew for very long, to understand the importance of the mechanical unit. The Chinese manufactured backpack sprayers were nearly new, yet poorly constructed and already leaky. It appeared to be impossible for the workers to avoid more or less constant contact with the herbicide that they were spraying.¹³ According to the co-op’s agronomist, each worker’s cholinesterase level is tested at the beginning and end of the spraying season, which includes the early rainy season months of June, July and August. In part because of toxicity, the spraying crews only work mornings, yet are paid for a full day. As a general

¹³ According to the agronomist, “Aminol” was being applied at a nominal rate of 3 liters per hectare, to control vines. Later, I was told by a field laborer that before the “crisis” began in 1990, herbicides were frequently applied by aircraft.

rule, the application of pre-emergent herbicides is followed by a post emergent application, 2 months later.



Figure CHAPTER 2 -12 “MTZ-80” tractor.

Old-fashioned hoeing is probably the co-op’s most expensive weed control option. Now that the harvest is mechanized, weed control and replanting are the most labor intensive tasks. Not surprisingly, most of this work is performed by temporary, “contract” laborers. As noted previously, a defining characteristic of agricultural production cooperatives such as the Cuban CPA is the identity between labor and capital: the owners

are the workers and visa-versa. In order to avoid ownership from becoming alienated from the actual work of the cooperatives, the state has placed limits on hiring labor. In order to conform with these limits, "Amistad Cuba Laos" makes 3-month contracts with laborers. At the end of that period, the workers who have impressed their supervisors (who are always co-op members) will likely be invited to join the cooperative. In fact,



Figure CHAPTER 2 -13
Sweep fitted to "Bayamo"
subsoiler.

many workers do not last until the end of the contract period, because the work is heavy, pay is not high by Cuban standards, and an accumulation of three absences in a month constitutes grounds for termination by the cooperative. In this way, field labor, especially weeding, has become the entry path to co-op membership for unskilled workers.

Finally, animal traction is being promoted by the Cuban government as a means of replacing diesel power, if only to a very limited extent.¹⁴ Just how

limited that extent may be is shown by the entries in the cooperative's planning form, on which the following tables were based. Even less than this small amount of "ox drawn" cultivation was actually carried out. Table 2-3 indicates the timing and intensity of weed control activities. Table 2-4 totals the yearly figures from Table 2-3. In fact, the

¹⁴ Evidence for the official promotion of animal traction is not hard to find: planning forms which the co-op must file include a line for recording ox-drawn labors, and two central government delegations which visited the co-op during my stay each requested a progress report on the oxen and ox-drivers which the co-op had secured. Most convincingly, one morning a tall, gray-bearded, cigar smoking man named Ramón Castro arrived at the co-op. Bearing considerable resemblance to his better-known, younger sibling, his mission was none other than to promote the use of (believe it or not) oxen!

agronomist attempts to administer 4 to 5 "weedings" of one sort or another, to each area during the first 3 months of growth.

Table CHAPTER 2 -3 Mechanized, Animal Traction and Manual Weed Control.
Caballerías Scheduled Each Month

1995	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Mechanized	-	4	11.3	9.8	8.0	6.2	7.0	6.5	5.0	2.3	3.0	3.7
Ox Drawn	-	-	3.5	3.0	-	-	-	-	-	-	-	-
Manual	7.8	12.8	17.4	23.0	23.2	15.1	10.1	5.5	4.1	3.5	4.9	5.5

Areas in caballerías (1 caballería = 13.42 hectares)

From: CPA Cuba Laos: Plan Técnico Económico 1995

Table CHAPTER 2 -4 Total Weed Control During 1995 (totals from Table 2-3 above)

	Total Caballerías (ha) for Year
Mechanized	66.8 (896)
Ox Drawn	6.5 (87)
Manual	132.9 (1784)
All Forms	206.2 (2767)

Note: Manual figures include both mechanical (hoe, machete) and chemical control.

From: CPA Cuba Laos: Plan Técnico Económico 1995

Fertilization

As the important milestone of 3-months of growth approaches, nitrogen fertilizer is supplied to the "ratoons." In 1994, extensive soil tests were performed at the cooperative to permit more precise applications of fertilizer. Since then, fertilization rates are determined by the recommendations resulting from the study.¹⁵ The ratoon crops for 1995 were located in 17 different areas, or blocks ("bloques") which vary in size from .4 to 3.6 caballerías, while averaging 2 caballerías each. For each block, a "kilogram per hectare" application rate was calculated for each fertilizer component: N, P₂O₅ and K₂O.

¹⁵ López Blanco, Manuel, J. D. Díaz, , C. Lamela Felipe, A. H. Baez Artiaga, D. Ponce de Leon, J. López, C. N. Rodríguez, and E. Carrasco. 1994. Solución Integral para la mejora de la producción cañera en la CPA "Amistad Cuba-Laos." consulting study done for co-op. Instituto de Investigaciones de Caña de Azúcar (study), Copy at "Amistad Cuba Laos" co-op, Bauta.

A tractor mounted, 2-hopper, “F-350” fertilizer drill (Figure 2-14), with a hydraulic-motor driven mechanical metering mechanism, is used to apply dry fertilizer to the ratoons.¹⁶ According to co-op norms, a tractor operator and assistant are expected to fertilize 130 “cordels” (5.4 ha) per day.

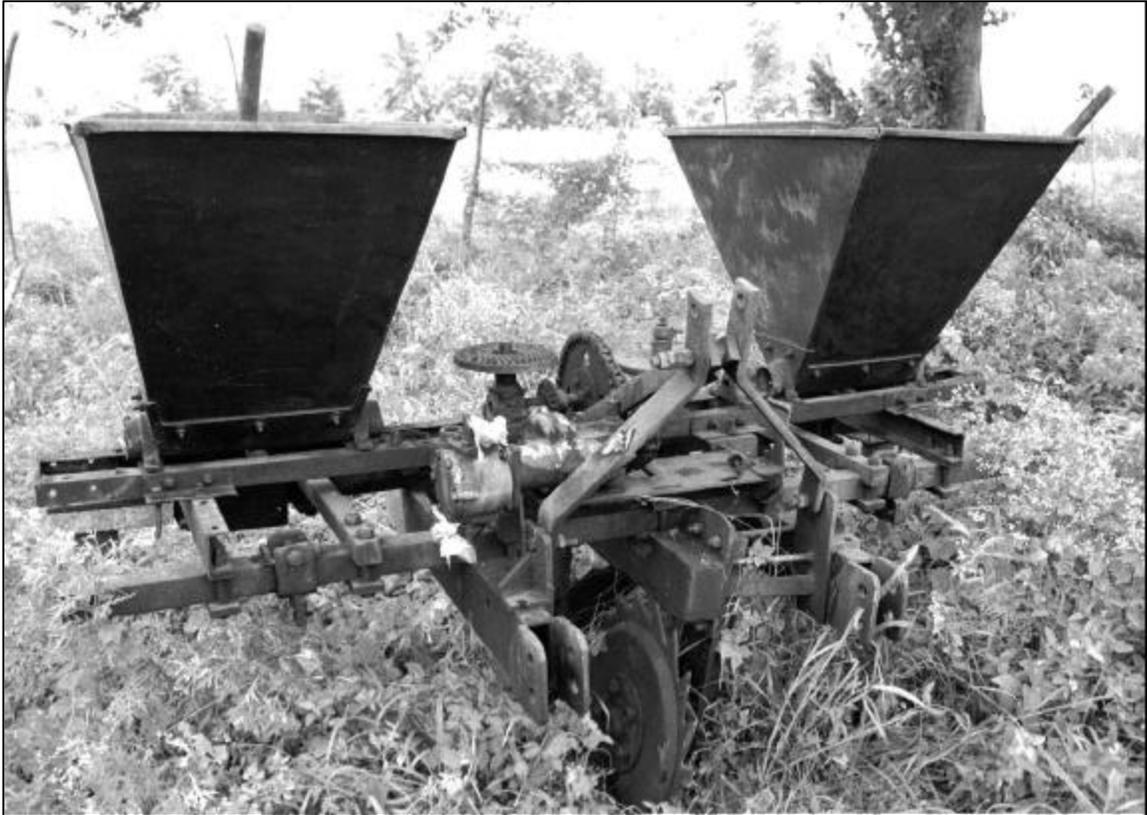


Figure CHAPTER 2 -14 “F-350” hydraulically driven fertilizer drill (this particular example is not complete).

Re-planting

Germination and survival of the young shoots depend on the quality of the seed cane, the care with which it was planted, and the availability of water in the weeks following the planting. Since the sugarcane field will produce for several years on each planting, it behooves the farmer to “fill in” gaps in the field caused by cane which failed to

¹⁶ Although application of the fertilizer directly to the center of the ratoon appears to be a more common practice in Cuba , at "Amistad Cuba Laos," the material is applied at the edge of the ratoon.

germinate or died back while still very young. Sometimes, ratoons simply fail to sprout back after a harvest. If such a field is not being considered for uprooting and planting soon, replanting is undertaken to increase the “cane per area” density. Replanting consists of two separate operations. First, each member of the replanting crew is assigned a row of cane. The worker walks along the row, until coming to a gap of more than about 80 cm between cane plants. The furrow is opened at the point where a properly spaced plant should be growing, and the dead seed cane is found and scooped out of the furrow. This is done because the dead cane is considered a breeding ground for micro-organisms which could very likely harm the new seed cane. When the cane was originally planted, it was laid more-or-less continuously in the furrow. Therefore, the workers are always expected to find and leave visible a piece of old cane. The main job of the supervisor of this operation is to make sure that old seed cane is removed from each place where new seed cane will be deposited: this in itself usually indicates that the furrow has been re-opened to sufficient depth. The second operation requires cutting and hauling seed cane into the field, much as was described for the initial planting, and placing it into the holes opened for that purpose. As soon as possible, the holes are closed, to aid in retaining soil moisture around the seed. The high labor requirements of replanting make it expensive. In fact, if more than 30 percent of a given field appears to require replanting (30% “despoblación”), then as a rule it will be re-plowed, and planted entirely anew.

Maintenance of Field Borders

It is important to note that cultural attention toward the cane plant is concentrated in the first few months of its growth, or re-growth from stubble. This, and the 15 to 22 month growing period until harvest, explain how shortages of fuel, fertilizer or other inputs may not impact yields until a year or more after the shortages themselves have occurred.

By September, there are only a few fields which, due to their late planting dates, are not covered, or “closed”, by the sugarcane canopy. Once the leaf canopy is in place, the cane has generally won the battle with the weeds, and in any case, it is no longer practical for either workers or machines to enter the fields. The only cultural activities which can take place between closing and harvest, are irrigation, and the clearing of weeds from the borders of the fields. Irrigation has already been discussed. The border operation involves mowing and disking the edges of the field, and sending field laborers about 15 meters into the closed fields, to destroy weeds and haul out the brush, from that shallow perimeter. This process is said to serve several purposes: first, it is necessary to maintain access to the fields for inspections, and ultimately for the harvest. Second, brush around the edges of a field is an invitation to destructive fires, which are said to occur both accidentally and deliberately. Finally, there seems to be a certain pride of ownership involved, which values a presentable stand of cane, particularly along the main public thoroughfares.

Harvesting

Sugarcane is not a crop which lends itself readily to mechanical harvesting. The ripe stalks may assume a variety of positions and shapes, from quite erect and straight, to

heavily “lodged” (reclined) and curved. Since the sugar content of the stalk is highest near the base, the cane must be cut as near to the ground as possible, without damaging the root from which the next season’s growth will issue (Edquist 1985: 17). Finally, there may be no other field crop whose harvest involves removing as much biomass per land area as does sugarcane. At the "Amistad Cuba Laos" cooperative, the average yield for all harvested fields in 1991 was 90 metric tons per hectare (40 short tons per acre).¹⁷ Even under the very adverse conditions since 1992, in no year has average yield never fallen below 43 metric tons per hectare (19 short tons per acre). At the most fundamental level, the cooperative’s harvest consists of the cutting, cleaning, loading and hauling of between 25 and 50 thousand metric tons of green cane. Burning the fields before harvesting reduces the amount of extraneous matter (mostly leaves) to be handled, and therefore increases the efficiency of the harvest, whether accomplished manually or mechanically. For that reason, burning is practiced in many countries where sugarcane is grown. During the early 1970s, Cuba’s political leadership decided to adopt pre-harvest burning in order to reduce the amount of labor needed to accomplish the harvest (Edquist 1985: 46). Also, the 430 Australian-built Massey-Ferguson 201 combines imported by Cuba between 1969 and 1974, were designed to harvest burnt cane (Edquist 1985: 50-51). Although burning became widespread in Cuba, today cane in Cuba is generally not burned (Pérez-López 1991:67). According to co-op leaders, burning increases weed problems, and lowers the

¹⁷ Cuban yields have never been high by world standards, which in some areas range up to 300 tons per hectare (Edquist 1985: 16)

quality of the cane delivered to the mill. They also said that beginning with the 1996 harvest, a slightly lower rate will be paid for burned cane.¹⁸



Figure CHAPTER 2 -15 KTP-2 sugarcane combine harvester.

During the 1960s and early 1970s, Cuba invested considerable resources to develop machinery which would permit mechanization of the (green) sugarcane harvest, and could be built in Cuba (Pollitt and Hagelberg 1994: 553). The harvest at "Amistad Cuba Laos" is testimony to the success of these efforts: 98 percent of the cooperative's harvest is accomplished using Cuban-built KTP-2 combine harvesters (Figures 2-15 and 2-16), to cut, chop, clean and load the cane.¹⁹ According to the work norms by which the

¹⁸ The co-op agronomist and production manager each agreed that the lower rate for burned cane is justified, and that in any case the cooperative only burns fields for 2 reasons: 1) if infested with a vine called "pica-pica" (said to be a variety of *mucuna*, related to velvet bean) which causes severe itching to combine operators, and 2) sometimes fields are burned before plowing and planting, to reduce the amount of leaf material on the ground.

¹⁹ Since the timing of my research in Cuba did not coincide with the harvest, my description is derived from interviews with participants, and examination of co-op documents, except where otherwise noted.

cooperative calculates pay to combine operators, a machine should cut, clean and load 80 to 120 metric tons of cane per work day, with the specific amount varying according to field conditions. Individual operators assured me that they could typically cut 150 metric tons per day, but this is probably a “best case scenario,” assuming good weather and no mechanical breakdowns. Including time during which a machine is in the field, but not working, a 90 metric tons per day average is more realistic.²⁰

The cooperative’s KTP-2 self-propelled combine harvesters move slowly through the fields, cutting cane from 1 to 3 hectares per day, one row at a time. At the leading edge of the machine are 2 spiral crop lifters, continually turning like enormous corkscrews, which raise the inclined cane as it comes between the “gathering walls”. By the time the two circular cutters reach the cane base, the combined action of the lifters and the walls brings the stalks to a position sufficiently vertical for cutting. Once cut, the stalks are dragged into the machine and chopped into pieces about 30 cm long. The chopping process separates most of the leaves from the stalks, and these, together with weeds and other “trash” are removed by means of fans which blow the extraneous material out the rear of the machine. The chopped, cleaned cane is moved by a conveyer up a chute and discharged over a tractor-drawn trailer traveling beside the harvester. As the trailer fills, with about 6 metric tons (about 520 arrobas) of cane, another tractor pulling an empty trailer falls in behind, ready to receive the cane when the full trailer moves away.

²⁰ In a particularly complete annual report, the cooperative reported a 91 tons per day average, which they proudly contrasted to the 68 tons per day average for all farms in the same “complex” (i.e., which sell to the same factory). Edquist (1985:114) gives 80.1 tons per day as the all-Cuba average for KTP-1 harvesters for 1974 through 1980. The KTP-1 is considered to harvest 10% less per day than the KTP-2 machines which the co-op owns.



Figure CHAPTER 2 -16 KTP-2 sugarcane combine harvester front view. Note spiral crop-lifters, gathering walls, and circular cutters. The discharge chute is visible at upper left.

The tractors which haul the trailers as they receive the cane, are called “movedores.” Positioned along the portion of the field which is being cut, are 3 workers, who prepare each cane row for the arrival of the combine. Loose rocks, metal or other hazards are sought out and removed from the uncut cane, while cane stalks that the combine somehow left behind, are thrown into the standing cane, to be gathered on the machine’s next pass. From this latter function comes the job title, “repasador.” The simultaneous use of three “repasadores” allows each to cover one-third of the length of the field being harvested, and provides time for a through inspection, at a sustainable pace.

Each full trailer is taken to a drop-point outside the field where it is switched for an empty one, and the tractor-trailer unit returns to the harvester to start the process again. The full trailers are hauled three-at-a-time by another tractor (the “tirador”), to the receiving stations (“centros de acopio”) run by the mill which purchases the cane.

Table CHAPTER 2 -5 Composition of the Complete Harvest Platoon

People:		Machines:	
Combine Harvester Operators	4	Combine Harvesters	4
Tractor Operators	15	Wheel Tractors	15
Row Cleaners (“repasadores”)	12	Trailers	32
Trailer-controllers (“enganchadores”)	2	Field Repair Wagon	1
Mechanics	3	Fuel Wagon	1
Mechanics’ Helpers	3	Field Kitchen	1
Fueler	1		
Welders	2		
Field Cook	1		
Record Keeper (“computador”)	1		
Platoon Boss	1		

Source: Interview with cooperative production manager, agronomist and other members.

Here the cane is dumped from the trailers, further cleaned, weighed (for payment) and loaded into rail cars bound for the factory. Since the co-op runs up to four combines

simultaneously, the parking, hitching and unhitching, and assignments of trailers must be well coordinated. This is the function of two workers called “enganchadores,” one of whom focuses on the full trailers, and the other on the empties. To keep the harvest process running as continuously as possible, fuel and lubricating oil are brought to the machines in the fields, and a portable cookhouse makes food for the harvest workers. Mechanics, welders, a mobile shop and a tire repair unit are all in the fields during the harvest. Nearly all those directly involved in the harvest are paid according to productivity, so the role of the “computador”, or record keeper, is vitally important. The harvest begins on fields scheduled to be plowed and planted following the harvest. Since these fields are by definition low-yielding (otherwise they would not be ready for “demolición”), they are considered the best place to “warm up” for the year’s harvest process. In this way, the machines, operators, mechanics and other members of the harvest “platoon” will be performing smoothly when they arrive at the high-yielding fields, where the success or failure of the year’s effort is decided. Also, the sooner that low-yielding fields are harvested, the sooner the spring planting can begin, giving the “plant cane” as much time to grow as possible.

CHAPTER 3
EFFECTS OF THE "SPECIAL PERIOD" ON SUGARCANE PRODUCTION
AT THE CPA "AMISTAD CUBA LAOS"

Production Declines: Quantitative Aspects and the National Context

During the "Special Period in Peacetime" the "Amistad Cuba Laos" cooperative has seen substantial decreases in sugarcane production accompanied by increases in costs of production. Taken together, these trends have resulted in lower member incomes, and reduced opportunities for investments by the cooperative.

Table CHAPTER 3 -1 Indicators of Sugarcane Production: Cuba and CPA "Amistad Cuba Laos"

	<u>Area Harvested</u>		<u>Cane Produced</u>		<u>Yield</u>	
	<u>Cuba</u> 1000 cabs	<u>Co-op</u> cabs	<u>Cuba</u> million mt	<u>Co-op</u> arrobas	<u>Cuba</u> 1000 arrobas/cab	<u>Co-op</u>
1986-87	101.8	62.4	70.7	4,641,700	56.8	75.5
1987-88	97.2	54.8	67.5	3,254,200	61.2	59.4
1988-89	101.0	50	73.9	4,055,300	64.5	81.1
1989-90	106.3	44.1	74.4	4,223,400	61.6	95.7
1990-91	107.5	45.6	71.1	4,848,000	58.1	106.2
1991-92	108.9	41.5	65.4	4,157,000	52.9	100.2
1992-93	90.8	38.7	42.9	2,627,000	41.8	68
1993-94		38.9	43.0	2,001,500	39.7	51.7
1994-95		35.5	33.2	2,242,100	33.4	63.2
1995-96		38.8		2,719,880		70.1

Source: Alvarez 1995: 29,81; "Amistad Cuba Laos" records 1986-95; 1995-96 estimate by co-op agronomist.

An interesting trend in Table 3-1, is the cooperative's reduction of the harvested area, prior to the official beginning of "the special period" in 1990¹. Most of the reduction in that area occurred before the initiation of the "crisis." At the same time, co-op agricultural yields increased substantially into the first year of the crisis, enabling the co-op to achieve in 1990-91 the largest harvest of its history. These trends, up through the first year or two of crisis, contrast to the tendencies in Cuba as a whole, where the land area harvested was maintained, as average yields fell from 1989 onward. All of this suggests an intensification of sugarcane cultivation by the cooperative from the late 1980s, until well into the crisis period. Although the detailed data at my disposal date back only to 1990, the fact that higher yields were accompanied by a large drop in area harvested, suggests that the intensification rested in large measure upon a longer growing cycles. Increased use of chemical inputs may have had a role also, although this will be discussed further, under "Costs" below. In any case, it may not be coincidental that in 1988, a university-trained agronomist joined the cooperative. As the crisis deepened, the more finely tuned operations of the cooperative collapsed, with results paralleling the national average in 1992-93. In that year, cane production for the nation and the cooperative fell by 34% and 37%, respectively, compared to the previous year's harvest.

Production Declines: Specific Causes

What happened to cause such a drastic fall in production at the "Amistad Cuba Laos" cooperative? Each July, at the year-end general assembly meeting, the cooperative executive committee presents the membership with an "annual report." The general

¹ Although the cooperative has some statistics from as early as 1983, 1987 is the first year for which harvested area, and yield are recorded.

assembly can decide to modify the report, but ultimately a narrative document and a financial statement are approved. At the time of my research, the only reports which could be located were 1993-94 and 1994-95 (complete), 1990-91 (financial) and 1991-92 (narrative). In explaining reduced output, these reports all stress the shortages of industrially produced inputs: diesel fuel, lubricating oil, replacement parts, herbicides and fertilizer.

Diesel fuel is most frequently mentioned as a cause of operational difficulties, and is the only shortage which shows up in all three reports. In 1991-92, lack of fuel was said to be the cause of having planted only 10.2 of a planned 26.4 caballerías. The shortfall was mostly due to a failure to plant any cane in the July through December 1991 (frio) planting period. Table 3-2 confirms that total diesel use in 1991-92 was the lowest of all the crisis years to date, yet Figure B-3 (Appendix B) indicates that there was fairly abundant fuel from August through October.

Table CHAPTER 3 -2 Diesel fuel consumption by year (in 1000 liters)

	1990-91	1991-92	1992-93	1993-94	1994-95
1000 Liters	218	163	246	187	323

Source: "Registro de Salida: Almacen de Piezas 1990-91" and "Sub-Mayor Analytico de Cuentas: Materias Primas y Materiales" for 1991-92, 1992-93, 1993-94 and 1994-95

Possibly the field preparation tasks had been neglected during the preceding harvest in May and June of 1990-91, and then with virtually no fuel in July, the land preparation fell even farther behind. Even so, it is surprising that no cane at all was planted. This failure to plant set the stage for the tremendous drop in cane production in the 1992-93 harvest. The 1993-94 report mentions failure to meet previous years' planting targets, and fuel shortages as a factor in the cooperative's "worst harvest in

recent years.”² No reference is made to specific operations affected during 1993-94, although Table 3-2 shows a relatively low supply for the year as a whole. Figure B-5 confirms that supplies were very low from July through November 1993.

In spite of this, the planting plans for 1993-94 were reported as generally fulfilled, and mention made of the improved prospects for the 1995-96 harvest. The most recent document available, the annual report from 1994-95, refers specifically to a lapse in fuel supply in May of that period, which caused a delay in preparation for planting. Figure B-6 cannot confirm such a shortage. In fact, a comparison of Figures B-6 with previous years’ figures shows that consumption in May of 1995 was the highest for that particular month, since 1991. Of course, these figures do not distinguish between the 1st and the 30th of May, which underscores the limitations of even monthly data, in analyzing farming operations. Although fuel deliveries seemed to return to adequate overall levels in 1994-95, the timing of supplies was still causing production problems.

More serious than fuel shortages by 1994-95 was a shortage of lubricating oil, which was first commented on in the 1993-94 report. The 1994-95 report cautions that if this problem is not resolved, the co-op’s equipment will not be in condition for the 1995-96 harvest. Although my data does not include specific quantities of lubricating oil used, it is clear that “savings” generated by skimping on lubricating oil imports are very short term.

Fertilizer was mentioned in the 1991-92 and 1993-94 reports. The earlier report remarks that 30.5 of a planned 36.7 caballerías had received any fertilizer, the relative shortage of which in 1991-92 is captured by Table 3-3.³

² Indeed, the worst shown by records dating back to 1983.

Table CHAPTER 3 -3 Fertilizer Use by "Amistad Cuba Laos," in current Pesos

	1990-91	1991-92	1992-93	1993-94	1994-95
Jul	30,552	0	0	0	0
Aug	0	435	0	0	0
Sep	4,961	0	0	0	0
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	869	0	0	0	5,335
Feb	0	0	0	0	0
Mar	0	0	7,907	0	0
Apr	14,324	0	12,709	0	0
May	3,969	4,382	0	0	3,757
Jun	383	189	10	0	0
Total	\$55,058	\$5,006	\$20,626	\$0	\$9,092

Source: Registro de Salida: Almacen 1990-91 and Sub-Mayor Analytico de Cuentas: Materias Primas y Materiales 1991-92, 1992-93, 1993-94 and 1994-95

The 1993-94 report includes lack of fertilizer among the reasons for the extremely low harvest of that year. Indeed, Table 3-3 confirms that virtually no fertilizer was available for a 20 month span, which included all of the 1993-94 reporting period. Recalling that cane is not fertilized in the months immediately prior to harvest, the 1994-95 crop was probably at least as affected by this absence of fertilizer, as was the 1993-94 harvest.

Although the 1994-95 fertilizer total appears rather low, the report from that year makes no mention of fertilizer shortages, perhaps since by mid-period (January), they seemed to be resolved. In August of 1995, the co-op agronomist expressed satisfaction with recent supplies, both as to the quantity and quality of the product, and was anticipating higher yields in the 1995-96 harvest, as a result.

Herbicide shortages also received attention only in the two earlier reports. For 1991-92, herbicide was applied to only 8.2 caballerías. The report noted that this was far

³ Fertilizer use is recorded in Cuban Peso value, since, unlike diesel fuel, it is not a homogeneous good, for which a given expense corresponds to a given physical quantity, if the unit price is known. The co-op has purchased several formulations over the years in question, and while disaggregating might be possible, it would require considerably more time in the field.

Table CHAPTER 3 -4 Herbicide Use by "Amistad Cuba Laos" (in constant 1990 Pesos, except last line)

	1990-91	1991-92	1992-93	1993-94	1994-95
Jul	12024	14390	3879	11839	0
Aug	0	0	0	6368	0
Sep	2457	0	0	0	0
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	9104	166	0	0
Jan	3315	0	0	0	0
Feb	0	0	300	0	294
Mar	9503	0	0	7148	0
Apr	0	260	179	0	0
May	0	0	0	0	2434
Jun	0	3241	0	9127	0
TOTALS					
1990 Pesos	27,299	26,995	4,523	34,481	2,728
Current Pesos	\$27,299	\$26,995	\$4,071	\$40,798	\$4,637

Source: Cooperative Records, as in Table 3-3

less than required to control the vines, and would surely mean a future reduction in yield.

Table 3-4⁴ does not bear out a herbicide shortage in 1991-92. The specific mention of vines may indicate that the herbicide used specifically to control broad-leaf plants was hard to obtain.

The 1993-94 report includes "herbicide shortage" within its long list of contributors to the low harvest of that year. At first glance, Table 3-4 makes that seem almost ungrateful: 1993-94 saw the highest herbicide use of any year of the period. Recall, however, that weeds are controlled in sugarcane during the first four months from the time of planting. Thus, the cane harvested in 1993-94 would have required

⁴ Herbicide use is expressed in terms of Cuban Pesos, rather than physical quantities, for the same reason as fertilizer. Actually, herbicides are even more varied than fertilizers. Increases in the prices of some widely used herbicides further complicate comparisons on the basis of cost. For that reason, I have created an index with which to adjust prices to approximate a common purchasing power across the period for which herbicide use is presented (see Appendix C).

applications during its early growth in the 1992-93 cycle, when herbicides were evidently scarce.

Scarcity of replacement parts, or spares, was mentioned in the later reports. In both 1993-94 and 1994-95, spares shortages were related to problems in implementing the harvest. This is understandable, given the concentration of machinery involved. The annual totals represented in Table 3-5 may indicate a recovery in spares availability for 1994-95, similar to that found in fuel, and to a lesser extent, fertilizer. However, regarding spare parts, it is much more difficult to make generalizations about relative availability based only on levels of expenditures. In the first place, with spares, the essence is in the details: with only 50% of required fuel or fertilizer, perhaps 50% of the job can be done. But with 50% of the parts required to perform a repair, little or nothing can be done. Equally important, is the effect of an aging fleet of farm machines, on the spare parts budget. With an active fleet of 30 tractors, 4 combine-harvesters and 2 trucks, the cooperative has only acquired 1 machine (on loan) since 1990. Even assuming a generous twelve-year useful life for each machine, the cooperative would need to be purchasing 3 new machines per year to maintain the fleet. The issue here is not that a tractor ceases to function after a certain period of time. Rather, the consumption of spares, and time in the shop, increases, while reliability decreases. All of this raises costs, and the basic requirement in spares for keeping the equipment running becomes

Table CHAPTER 3 -5 Replacement parts purchases by "Amistad Cuba Laos"

	1990-91	1991-92	1992-93	1993-94	1994-95
1990 Pesos	86,726	48,393	39,300	26,549	42,936
Current Pesos	\$86,726	\$53,232	\$43,230	\$34,681	\$63,270

Source: "Registro de Salida: Almacen de Piezas 1990-91" and "Sub-Mayor Analytico de Cuentas: Materias Primas y Materiales" for 1991-92, 1992-93, 1993-94 and 1994-95

substantially greater as time passes. For example, the 1994-95 total of 63,270 pesos in parts used, includes 21,258 for the purchase of complete new engines for two of the cooperative's four combine-harvesters.

Input Shortages and the National Context

Placing the discussion of industrial inputs into the national Cuban context (Figure 3-1)⁵, the decrease in co-op purchases paralleled the drop in Cuba's imports over the years for which data are available. Recently, co-op inputs may be recovering somewhat ahead of national imports. Since availability of inputs of industrial origin depends on state allocation, rather than supply and demand, is this evidence of increased government priority for agriculture? In both the national and co-op cases, the stabilization and slight increase in production was preceded by at least a year, by a similar stabilization of national imports and co-op inputs. This points to the extreme difficulty of recovering from the collapse, without sufficient external credit to supply critical imported inputs. As will be shown later, in the absence of industrial inputs, the cooperative increased the labor-intensity of agricultural operations, but the decline in production was not reversed until industrial inputs increased.

⁵ Inflation complicates these comparisons, especially where the price paid for sugarcane has increased over these years from 11.32 to 21.00 pesos per 100 arrobos. Therefore, cane-based income for all years was calculated using the 1991 price of 15 pesos. The unit prices of co-op inputs also increased across the years shown, but I assume that the imports to which they are being compared increased also, so no adjustment is attempted for inputs. In any case, the tendencies of steep decline, bottoming out, and a tentative recovery, hold across the indicators.

squeezing locally into “guarapo” (fresh cane juice). Although I only have scattered figures for breakdown of the non-industrial cane, or “other” income category (Table 3-6), guarapo sales are an important component. More recently, sales of food crops at the free agricultural market has been an income source of equal, or greater significance. Overall, the “other” income has been more stable than industrial cane income, and has been vital in maintaining the cooperative’s economic viability from 1992-93 forward. What data is available suggests that increases in this income from these sources is the result of increasing prices of guarapo and food crops, rather than increased co-op production. Another tendency is suggested by the last row of Table 3-6. Even as sugarcane

Table CHAPTER 3 -6 Co-op Income, and Non-member Labor Costs, in Current Cuban Pesos.

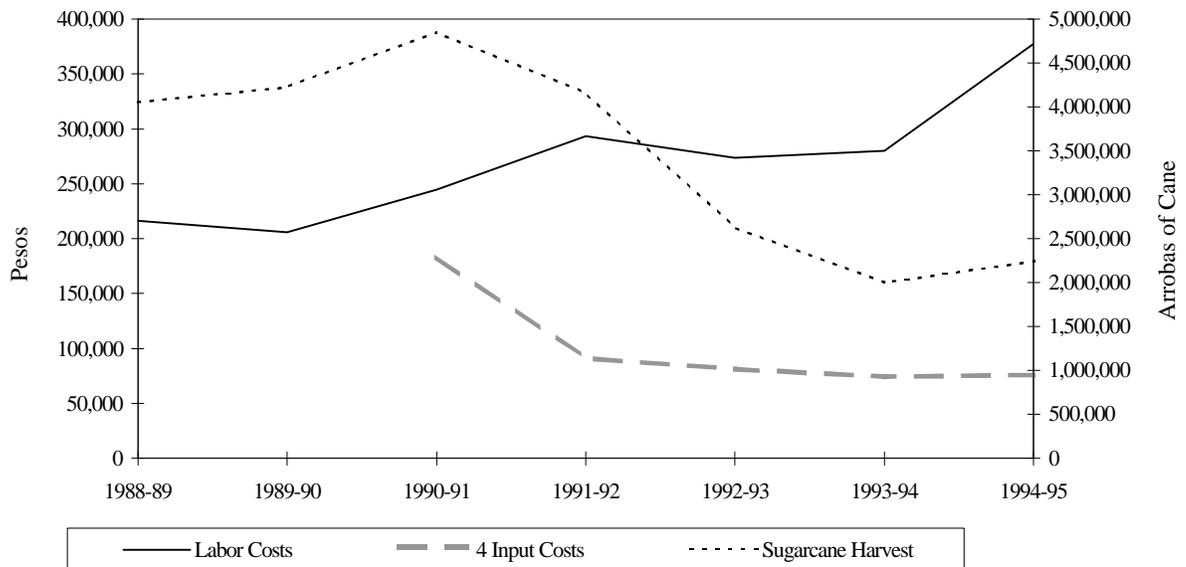
	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95
Gross Income from Industrial Cane	507,318	589,587	727,207	644,933	322,183	433,758	492,480
Net Income from Industrial Cane	223,220	405,079	465,397	322,467	125,651	99,876	153,084
Gross Income from Other Production	101,991	133,311	167,134	83,621	136,320	97,475	296,172
Ratio, Other to Industrial Cane	20%	23%	23%	13%	42%	22%	60%
Contract Labor Costs	n.a.	16,757	40,777	n.a.	66,472	74,532	116,200

Source: Cooperative records. “Datos Historicos de Balance, 1983-1995”; “Informe Anual” for each of 1990-91, 1993-94, 1994-95.

production falls, the contracting of laborers from outside the co-op has increased steadily. To what extent is there a relation between these phenomena? The substitution of scarce industrial inputs with field labor certainly represents such a link. When ten men with backpack applicators replace a broken, tractor-mounted sprayer, or when hoes and ox-drawn cultivators replace fuel-starved tractors for mechanical weed control, then the cooperative is attempting to minimize the drop in production caused by industrial input

shortages. It is difficult to quantify, even in general terms, the extent and effectiveness of these substitutions. Figure 3-2 illustrates the temporal relation between sugarcane production, the 4 industrial inputs, and the amount of labor utilized, by year. The cane harvest is in arrobas, read off the right-hand Y-axis. Labor costs include both the wage-like advance paid to each co-op member, and the wages paid to contract laborers. The 4 inputs (fuel, fertilizer, herbicides and spare parts), and labor costs are measured in pesos, adjusted according to the procedure described in Appendix C, with the baseline period being the 1990-91 agricultural cycle.

Figure CHAPTER 3 -2 Co-op Sugarcane Production, Industrial Inputs and Labor Costs



Note: Figure for Labor costs 1991-92 is an estimate, since no amount is available for the contract labor component of total labor, for that year only.

Source: same as Table 3-6.

In Figure 3-2, the slight upturn in cane production coinciding with a very sharp increase in labor contracting seems to suggest the possibility of at least partially restoring cane yields, even at reduced levels of industrial inputs. Might it be that more labor intensive agricultural techniques, together with the increasing income from sources other than

industrial cane, point to a way out of the crisis for this and other Cuban sugarcane cooperatives?

Even those who regard Cuba's economic dependence on sugar as analogous to a tragic addiction, would probably agree that a sudden, "cold turkey" break with sugarcane agriculture would lead to untenable economic hardship. The "Amistad Cuba Laos" cooperative leadership seems to understand and identify with this national reality, and evinces no interest in moving away from sugarcane. Although the high profits to be earned at the free agricultural markets are attractive at first glance, members undoubtedly realize that their cooperative's permission to sell at the markets could be revoked. Indeed, in a change of policy, the markets themselves could disappear just as suddenly as they sprang up. Not least of all, it should be remembered that the "Amistad Cuba Laos" cooperative is a well developed, highly specialized sugarcane farm: the bulk of their investment in machinery and other infrastructure, as well as their collective knowledge and experience is inseparable from sugarcane agriculture. It is therefore not surprising that I encountered no sentiment among the members, in favor of trying to significantly increase sales at the free agricultural markets. What all members, including the leaders, are expecting, is an increase in the price which the co-op is paid for its cane.⁶

The other element noted as a potential solution to the present difficulties of sugarcane culture, is the substitution of labor for certain industrial inputs. This can be considered as part of a more general substitution of nationally available inputs for imports. Unlike any attempt to abandon sugarcane, this alternative enjoys encouragement

⁶ As of the end of the 1996 harvest, the price paid for cane was still 16.3 pesos per 100 arrobas.

from the government. The use of sugar by-products as soil amendments, to replace some portion of chemical fertilizers; a re-birth of animal (especially oxen) traction; and promotion of weeding by hand, to reduce the need for tractor drawn cultivators and herbicide sprays, are each receiving some degree of official support. In spite of political acceptability, these alternatives seem to be of little interest to cooperative members.

The co-op will certainly hire additional labor if necessary to accomplish a particular task in the face of fuel shortages, or experiment with industrial cane residues to improve the soil, but these are seen as stop-gap measures until the supply of industrial inputs regains a semblance of normalcy. The members who were “aportadores,” i.e. those who combined their lands into the cooperative in early 1980s, recall all too clearly the nature of “pre-industrial” sugarcane farming. The memories of isolation, poor living conditions, drudgery and typically low yields hold little charm for those who formed cooperatives precisely to escape such circumstances. At the same time, co-op members do not seem to expect to return to the cheap and abundant agricultural chemicals, machinery and fuels of the 1980s. To the contrary, there seems to exist a recognition that the co-op in general must learn to do more, with less. This understanding leads the cooperative directly to the issues of costs and efficiency.

CHAPTER 4 COSTS OF PRODUCTION

Economic Importance of Sugarcane Cooperatives

If it is true that hard times make economists of us all, then it is understandable that “the dismal science” is gaining converts in present-day Cuba.

Up until a few years ago, the cooperative president was considered to be much more important than the economist. Now we see things differently. If a cooperative has a good president, and bad economist, it will not function well; whereas with a bad president and a good economist, it will function well.¹

While the end of “politics in command” is not upon us in Cuba, new economic realities have certainly reduced the areas over which politics is able to command. Taken as a whole, the agricultural production cooperatives are one of the key arenas in which a new synergy of the political and the economic is evolving. The economic importance of the cooperatives, especially those producing sugarcane, is hard to overstate. According to economist Jorge Pérez-López, the cost of the sugarcane itself represents over 60% of the total cost of Cuban raw sugar production (Pérez-López 1991: 115). Since virtually all sugarcane in Cuba is now produced on either UBPC or CPA farms (Figuroa 1995:19), the viability of Cuba’s sugar economy today rests to a significant extent upon production decisions taken, and costs generated, at the sugarcane producing cooperatives.

Although the reconstruction of a detailed accounting of the costs of sugarcane production at a well-run Cuban cooperative would be a feasible and worthwhile

¹ Interview with the head of “Projects” of the ANAP Province of Havana regional office, 7/31/95.

undertaking, pulling together that amount of information was far beyond the material limitations of this research project. More modestly, this section attempts to provide an overview of the economic panorama confronting the cooperative members and especially the chief decision makers. After a word on cost accounting, the focus turns to three aspects of costs at the cooperative. First, we will consider the basic Cuban statistic of efficiency, the “costo por peso,” or cost-to-income ratio. Next, we will compare farm input to output prices, and see how those terms of trade within Cuba are changing. Finally, the structure of costs for the cooperative’s production as a whole will be briefly presented.

Cooperative Cost Accounting

Various authors have decried a general paucity of data on costs of production in Cuba (Edquist 1985: xii; Pérez-López 1991: 111). Direct observations at the "Amistad Cuba Laos" cooperative, however, indicate that far more data are collected, than are meaningfully organized, analyzed or used.² There are at least three members whose work is directly related to bookkeeping, and the shelves in their 2 offices sag under the years’ accumulation of ledger-books. Unfortunately, the motivation for compiling these reams of hand-written records was more closely related to government requirements, than to felt cooperative needs, and now the collection of internally generated data itself is widely viewed by co-op members as a symptom of “bureaucratization” (Díaz et al 1995:12, 32, 42) Indeed, often missing from the data collected, are the links between numbers which would permit useful comparisons to be developed. To illustrate, the cooperative regularly

² Whether or not these data are available depends on whether the permission, and the time are available to dig them out them.

records costs generated by agricultural machines. The fuel consumed and operators' salaries are charged to the activity in which the fuel and operators were engaged: for example, cane cultivation; transportation of personnel; or tending the milk-cow herd. Maintenance and repair costs are also recorded: each liter of oil, each belt or gasket. Here, however, the "links" disappear: unlike fuel and operator salaries, maintenance and repair costs are tied neither to a specific machine, nor to a specific activity. Rather, they are taken as indirect costs, lumped together, and redistributed across all productive activities. Since wages are always directly assigned to the productive activity in which they were employed, they are taken as the indicator of the relative weight of each activity, and "indirect" costs, such as maintenance, are assigned in direct proportion to the relative amount of wages attributable to each activity. The cooperative's economic officer complained that because of this system, the heavily mechanized sugar crop appears to be somewhat less costly than it actually is, since much of the sugar-generated machine expense is distributed to other activities. But there may be even worse consequences, resulting from the cooperative's inability to compare repair costs between machines, or between time periods for the same machine, or to trace specific repair jobs back to an individual mechanic. Agricultural machinery is an important example, because machine costs dominate industrial input costs (Table 4-1).

Table CHAPTER 4 -1 Percent of 4 Main Industrial Inputs, by Input and Year

	1990-91	1991-92	1992-93	1993-94	1994-95
Diesel	8%	11%	20%	30%	43%
Spares	47%	55%	51%	32%	47%
Fertilizer	30%	5%	24%	0%	7%
Herbicide	15%	28%	5%	38%	3%
Total	100%	100%	100%	100%	100%

Note: calculated from absolute pesos.

Source: "Registro de Salida: Almacen de Piezas 1990-91", "Registro de Salida: Almacen 1990-91" and "Sub-Mayor Analytico de Cuentas: Materias Primas y Materiales" for 1991-92, 1992-93, 1993-94 and 1994-95.

The Cost-to-Income Ratio

The most common application of cost of production data at the "Amistad Cuba Laos" cooperative, and indeed in much of the Cuban economy, is the "costo por peso" statistic. This ubiquitous ratio, which results from dividing costs by gross income, appears in cooperative records at least as far back as 1983. It is applied to various productive activities, and always figures prominently in co-op annual reports.

Table CHAPTER 4 -2 Some Cost-to-Income Ratios

	1990-91	1991-92	1992-93	1993-94	1994-95
All Income	0.44	0.58	0.85	0.89	0.72
All Production	0.38			1.01	0.79
Industrial Cane	0.36	0.50	0.61	1.04	0.93
Guarapo Cane	0.37			0.47	0.50
Boniato	0.41			0.72	
Rice	0.98			9.59	
Beans	0.55			8.00	

Source: "Informe Anual, CPA Amistad Cuba Laos" years 1990-91, 1993-94, 1994-95
"Datos Historicos de Balance 1983-1995"

Table 4-2 gives the 1993-94 figures as they were recorded, before the state paid a retroactive price increase of approximately 35% on the cane sold to it by the co-op.³ The

³ From 16.30 to 22.00 pesos per 100 arrobas (2500 lbs), paid in February 1995, nearly a year after the harvest. If re-calculated, the new price improves the industrial cane cost-to-income ratio from 1.04 to .77, while the "all production" and "all income" ratios also improve, since they each include the industrial cane figure. The co-op members were anticipating a similar retroactive price increase after the 1994-95 season, but 2 months into the 1995-96 fiscal year, nothing was known for certain. These large retroactive

“pre-bonus” figures are shown, since they are what the co-op members worked with as they evaluated 1993-94 and moved into 1994-95. Interestingly, even with increasing prices for inputs, and without considering any increase in the price paid for cane, 1994-95 showed definite improvement as compared to the previous year. This reinforces the tendency toward recovery, which was noted in the previous chapter.

The cost-to-income ratio is mainly useful to compare overall economic performance between similar productive entities or activities within a single entity, particularly if the accounting procedures behind the cost component are known to be similar across the productive units compared. For example, in Table 4-2, the analyst quickly realizes that the bean and rice crops of 1993-94 presented serious problems. Theoretically, the ratio might also be useful in comparing overall performance within the same unit, or grouping of units, across time. Unfortunately, the experience of the "Amistad Cuba Laos" cooperative, which has changed accounting systems 3 times during the past 5 years, may not be unusual. While the cost-to-income ratio has survived each of those changes, it may not represent strictly comparable quantities. The terse evaluation by Zimbalist and Brundenius (1989), of the low cost-to-income ratios reported for many cooperatives in the early 1980s, still rings true:

Here again, it is difficult to decipher what these figures imply about efficiency. While they suggest high profit-sales ratios, they are skewed by non-scarcity

price increases may be the result of world market price fluctuations beyond the control of the Cuban government, and they are certainly welcomed by the cooperative members. Even so, they have several negative side-effects. First, they re-enforce a tendency to believe that the state will ultimately bail the cooperative out of financial insolvency, precisely as the state's ability to deliver on such an unspoken promise diminishes. Second, they make many key economic data, and therefore the results of analyzing those data, *tentative*, until a final price is established, perhaps many months later. This is particularly problematic since the principal economic indicator is the cost-to-income ratio, which can be transformed by a retroactive price increase, from a frog into a prince. Perhaps in part for this reason, the price increase for the 1993-94 crop, which arrived during the 1994-95 harvest, was entered into “other income” for 1994-95.

pricing, subsidies, and shifting accounting practices. The cooperatives also suffer from a lack of experience with practical accounting, making much of the microperformance data suspect, particularly for financial indicators.

To the extent that management is concerned with increasing efficiency, detailed information is required. Yet the cost-to-income ratio hides all the details, and is therefore of limited use as a farm-level management tool.

Terms of Exchange: Farm Input to Output

A fundamental economic question for cooperative management is the relation between the prices they must pay for inputs, and those they receive for outputs, especially sugarcane. Of course, under the conditions of input scarcity which were previously described, the price is seldom a factor in deciding whether to purchase. It may well be a factor in deciding how much of a certain input to use, or how to substitute inputs for each other. In a more general sense, the cooperative members, including the leaders, sense that input prices may be rising faster than the prices they receive for sugarcane. Table 4-3 checks this perception by listing the quantity of each input which can be purchased with the income from the sale of a metric ton of cane. Since the 1989-90 season is generally considered a “pre-crisis” year, it can be used as a kind of “control.”

Table CHAPTER 4 -3 Rates of Exchange Between Farm Inputs and Outputs

	1989-90		1993-94		1994-95	
	Pesos	M Ton Cane	Pesos	M Ton Cane	Pesos	M Ton Cane
Arroba of Cane	0.1251	88.2	0.163	88.2	0.220	88.2
Diesel Fuel (ltr)	0.065	169	0.170	85	0.179	109
Labor per day	8.26	1.34	7.55	1.90	7.56	2.57
Lube oil (ltr)	0.24	46.5	0.58	24.79	0.65	29.9
N Fertilizer (metric ton) 33-0-0	174	0.06	na		187	0.10
Herbicide (ltr)						
azulox	4.09	2.70	na		7.71	2.52
sal amina	0.99	11.15	3.06	4.70	3.62	5.36

Source: Cooperative records.

The first row states the average price that the cooperative received per arroba of cane for the harvest in each given year.⁴ The shaded column then indicates that there are about 88.2 arrobas in a metric ton. That relation obviously remains constant across the years! Each of the following entries in the shaded column is derived by dividing the product of pesos per arroba and arrobas per metric ton, by the unit cost of the input in question. For example, the calculation for diesel fuel in 1989-90 was:

$$\frac{.1251 * 88.2}{.065} = 169$$

Worth noting is the relative decrease in the cost of labor, over the time span. Might this help explain the increase in hired, contract labor which has characterized the period? It appears that the cooperative members are correct in thinking that input costs have risen faster than output prices. Given the changes in the international terms of trade which Cuba has experienced during the time span, this is hardly surprising. Indeed, it is surprising how little change there has been, especially if the government maintains the .22 peso per arroba price.

Overall Cost Structure

Finally, what amount of costs are generated by each of the major ingredients that the cooperative combines to produce sugarcane and food crops? Although this report focuses on sugarcane production, the difficulty of assigning discreet amounts from each category of input data, to corresponding productive activities, prohibits a strict focus on sugarcane at this point in the study. In Table 4-4, each of the first 6 rows indicates

⁴ "Average," because in some years, several different rates of pay were used, in order to stimulate above-plan production.

absolute yearly expenses for a major input category, with the 5-year total of expenditures for each input appearing in the last column.

Table CHAPTER 4 -4 Major Costs of Production by Item and All Crops, In Pesos

	1990-91	1991-92	1992-93	1993-94	1994-95	Input Total
Diesel	14,292	10,696	16,782	32,597	57,551	131,918
Spares	86,726	53,232	43,230	34,681	63,270	281,139
Fertilizer	55,058	5,006	20,626	0	9,092	89,782
Herbicide	27,299	26,995	4,071	40,798	4,637	103,800
Member Advances	204,098	234,376	191,566	179,572	226,245	1,035,857
Contract Labor	40,777	na	66,472	74,532	116,200	297,981
Yearly Total	428,250	330,305	342,747	362,180	476,995	1,940,477
Cost of All Production	335,847	384,193	393,183	422,179	522,636	2,058,038

Source: 4 industrial inputs from "Registro de Salida: Almacen de Piezas 1990-91" and "Sub-Mayor Analytico de Cuentas: Materias Primas y Materiales" for 1991-92, 1992-93, 1993-94 and 1994-95. Member Advances and Cost of All Production from "Datos Historicos de Balance", Contract labor from "Informe Anual" from each of 1990-91, 1993-94 and 1994-95. CPA "Amistad Cuba Laos"

The 7th, or "Yearly Total," row reports the annual sum of all major inputs. Since sugarcane, which usually accounts for over 70% of the total production costs, is not an annual crop, costs of production of a particular harvest are spread over several years. For this reason, annual expenditures are not the same as cost of crop production expenditures for a given year. Of course, over a several year period, these figures will tend to converge, as is demonstrated by the two final lines of the last column. Assuming that some amount was spent on contract labor in 1991-92, the only year for which that information could not be located, the convergence would be closer.

From this overview of costs during the "special period," some of the events and processes previously discussed are clearly visible:

- The input shortages, most notably of diesel and fertilizer in 1991-92, and again of fertilizer in 1993-94.
- The continual dominance of machine related costs (diesel fuel plus spares), among the industrial inputs.

- The increase in contract labor throughout the period, and the related increase in costs of production.
- The large increase in fuel costs, stemming from a near-tripling of the price of diesel during the period.

The largest of the expenses, “Member Advances,” deserves special mention. This amount is what the cooperative members pay themselves for working. It is generally the same daily rate as the cooperative pays wage workers for the same work, but since the members are the farm owners, it is considered an advance against the cooperative net income, as tabulated after the harvest. Member profits (“utilidades,” which will be discussed in Chapter 6) accrue only after all expenses, including advances, are deducted from gross income. The most important point is that this large category of cost is not directly comparable to the other expenses shown, since it is paid to the owners of the farm.

CHAPTER 5 WORKFORCE

The "Amistad Cuba Laos" cooperative distinguishes between 4 categories of workers: cooperative members, individually contracted workers, labor brigades and volunteer labor.

By definition, the work at an agricultural production cooperative is carried out principally by the owners (i.e. members) themselves.¹ The number of hired workers at "Amistad Cuba Laos," though definitely a minority when compared to members, is growing. Furthermore, neither the membership nor the hired workers represent homogeneous groups, either in terms of social origins or function within the cooperative farm. The outline below is provided as a guide to the discussion which follows.

¹ This is one of the characteristics which distinguishes the production cooperative from a "partnership", where there may be 2 or more owners, but where hired non-partners typically form a majority of the workforce.

- I. Cooperative Members
 - A. Origin
 - 1. contributors or poolers of land
 - 2. specialized skills
 - 3. laborer
 - B. Gender
 - C. Function
 - 1. managerial
 - 2. repair shop specialist or helper
 - 3. administrative
 - 4. machine operation
 - 5. livestock tending
 - 6. co-op kitchen
 - 7. field labor
 - 8. other (guard duty, odd jobs)
- II. Individually Hired Workers
 - A. Origin
 - 1. landless and jobless
 - 2. retired
 - B. Type of contract
 - 1. 3 month
 - 2. unlimited
 - C. Function
 - 1. field labor
 - a) sugarcane
 - b) autoconsumo
 - 2. guard duty
- III. Collectively Hired Workers (Brigade or “Contingente”)
 - A. Origin
 - 1. urban workers
 - B. Function
 - 1. sugarcane
- IV. Volunteer Workers
 - A. Origin
 - 1. Ariguanabo Textile Factory
 - 2. Complejo Agro Industrial
 - B. Function

Cooperative Members

Rights and Obligations

The manner by which an individual achieves cooperative membership differs somewhat depending upon whether that person has land to “contribute” to the cooperative pool. If the applicant has land, admission appears to consist of negotiations over what the cooperative will offer the farmer. For example, besides payment for his or her land, the prospective entrant may sometimes hold out for the promise of a new house constructed close to town,² or permission to maintain a small portion of the land for personal use. On the other hand, applicants without land are generally contracted for a limited period of time, usually 3 months, to perform the job for which the co-op needs them. Most entrants begin as field laborers, with a lesser number filling positions requiring technical or professional skills.³ If they perform well during this contract period, the general assembly (all members) will vote on whether to admit them.

A member who does not abide by cooperative rules, particularly with regard to work attendance, can be expelled. Like admission, this requires a vote by the membership. Members can, of course, withdraw from the cooperative if they so desire. The decision to transfer one’s land to the cooperative is irrevocable, but payments still due for property contributed will be made by the cooperative whether the former owner remains a member or not. Aside from pensions for those who reach legal retirement age, this is the only

² The co-op president reported that 25 small farmers, with a total of 19 caballerías (255 ha) of land, will enter the co-op as soon as they can be assured houses.

³ Economic hard times have drastically curtailed the co-op’s ability to procure cement and other building materials. The last house fully constructed, just as materials “dried up,” belongs to the agronomist. This may indicate that a person with no land, but highly valued skills, can also bargain for housing.

type of payment made to those who leave, since no liquidation of “equity” in the cooperative seems to exist.

Besides payments for the sale of land to the co-op, members receive a wage-like advance on profits, and a portion of profits after each harvest. Whereas advances may be paid either on the basis of time worked, work performance, or a combination of the two, after-harvest profits are paid only according to number of days worked. Each member is also entitled to receive a share of milk and food crop production, at very low prices. These and other issues related to payment will be discussed in greater detail in Chapter 6. Members who wish to work a plot of land for their own family consumption are encouraged to do so. This practice has only existed since the 1993-94 fiscal year. During that year, as well as 1994-95, rice was planted by the cooperative on a sugarcane field from which old ratoons had been uprooted (see Chapter 2), but which was not scheduled to be planted for several months. Plots were then assigned by the agronomist to each interested cooperative member, and many workers. The plots can only be tended after work, or on weekends, and the production belongs entirely to the individual.

Finally, members have the right to participate in decision making through electing the members of the executive committee (“*junta directiva*,”), voicing opinions, and voting on major decisions at meetings of the general assembly.

Origins

The founding members of the "Amistad Cuba Laos" cooperative were small farmers. According to the cooperative's first president, the original collective was

founded in December of 1979 by 12 members.⁴ Eleven were to work in the fields, while one kept the books. The former president himself reports having contributed the 23.5 hectares (1.75 caballerías) of land on which he farmed sugarcane, root crops and rice. In 1983, the original "Amistad Cuba Laos" merged with the "Antonio Maceo Grajales" cooperative. Although the records from this early period are sketchy, it appears that after the merger only 19 of 51 members were "aportadores" (contributors of land), with the balance having entered without any means of production.⁵ The most recent entry of a farmer with land was in 1985.⁶ The ideological concerns and relatively high incomes of Cuba's remaining individual farmers provide at least partial explanations for their apparent lack of interest in joining the cooperatives during the past decade (Deere 1992:137-138). Another factor that may contribute at "Amistad Cuba Laos," and probably elsewhere, is the seniority system through which jobs are assigned (see Table 5-1). The farmers who joined the cooperative in the early years did so in part to escape the drudgery of non-mechanized farm life. Now however, a new member without special skills is almost certain to spend years doing field work, before a machine-operating job becomes available. The cooperative does not offer an escape from field work as it once did. Thus, it may be that few if any land-pooling farmers can be expected to enter, except perhaps to trade their land for a house and/or a cash payment, and retire.

⁴ As mentioned in Chapter 1, documentary evidence indicates that the "original" (pre-merger) "Amistad Cuba Laos" cooperative was formally begun in December of 1980, with 18 members.

⁵ Although "aportador" is often translated as "contributor," the latter does not clearly convey what occurred: each farmer was paid by the cooperative, in installments, for the land he or she "contributed". Thus "poolers of land" is probably a better translation.

⁶ Three sons of land-owners entered after 1985, but none actually possessed land upon joining.

Of the 162 people who joined the cooperative from 1984 through July 1995, only 7 are listed as “aportadores,” and 3 of those are sons of farmers who had been among the original contributors of land. During the first years, the motivation for taking on non-landed members was the need for more field labor. Hence, the typical member without land was admitted in order to do work much like the small land-owning members had done. Several factors operating during the 1980s caused the management of cooperatives to become more complex. First, the scale of operations increased, as average cooperative land holdings of sugarcane producing CPAs grew from 271.1 hectares (20.2 caballerías) in 1980 to 953.1 hectares (71 caballerías) in 1985 (Pollitt and Hagelberg 1994: 556). Meanwhile, the cooperatives became increasingly mechanized: whereas no cooperatives owned harvester combines prior to 1980, in 1990 approximately 400 sugarcane cooperatives owned 506 combines (Pollitt and Hagelberg 1994: 556-7). Finally, various government measures taken in 1986 and 1987 tended to increase the need for cooperative record keeping, planning and reporting to state entities (Deere et al 1992: 136-137, 139; Meurs 1989: 196-199). At the same time, enrollment in Cuban universities grew from 35,137 in the 1970-71 school year, to 212,155 in 1984-85 (Zimbalist and Brundenius 1989: 100). Within this increase were many students from rural backgrounds, who were not adverse to returning to work, as professionals, in agriculture.

Each of these elements played a role in the gradual increase in the number of specialists who were admitted to the "Amistad Cuba Laos" cooperative. Unlike the landless workers who became members, the specialists were brought in to carry out functions quite different from what the small farmers could accomplish on their own. At present, the cooperative counts among its membership mechanics, welders, bookkeepers,

an accountant, agronomists, a veterinarian and an agricultural engineer. Predictably, many “professionals” tend to assume management, as well as technical functions.

Women Members

During 1986, 14 women constituted a “peak” 18% of the total cooperative membership. By July of 1995, 11 women comprised less than 13% of membership. Both of these figures are well below the national mean for women’s participation in all CPA’s: 25.4% of membership in 1985, and 22% in 1994. (Stubbs and Alvarez 1987; ANAP 1994). In general, women’s limited participation in the cooperatives has been explained by several factors, including:

- the difficulty of the “dual role,” i.e., running the home plus full-time work.
- the administrative and economic difficulty for the co-ops to pay for casual, non-full time “family” labor.
- a consequent tendency by women to renounce field work, and concentrate on the home (Stubbs and Alvarez 1987).

In addition to these factors, at the "Amistad Cuba Laos" cooperative, the nature of available work itself seems to limit the involvement of women. Nearly all of those without land who become members fall into one of three categories:

- field laborers.
- machine related workers, particularly mechanics and welders, and to a lesser extent, machine operators.
- a limited number of professionals such as accountants, engineers, agronomists.

Field labor in sugarcane is heavy work, and is not considered appropriate for women by either men or women co-op members. Neither have women become significantly involved in machine-related skilled trades, such as mechanical repair, welding or even

tractor driving. This leaves only the last “entry-path,” that of office or other professional work, plus an occasional opening in the kitchen, as available for women. In fact, the woman most recently admitted to membership, in February of 1991, is an experienced bookkeeper.

Functions

Production at the "Amistad Cuba Laos" cooperative involves considerable work specialization, ranging from extremely repetitious field labor, to agricultural and financial decision-making which clearly benefits from university education. Between these extremes are jobs, mostly in equipment operation and maintenance, which require knowledge and skills beyond those needed for field work, but which are achievable by nearly any cooperative member who makes an effort to learn. These mid-level jobs are usually filled from within the co-op, according to seniority of membership, and competence to handle the job. The relatively few jobs requiring considerable training or experience (mechanics, welders), or higher education (agronomist, economist) are filled by admitting people specifically for those positions. Table 5-1 illustrates how this

Table CHAPTER 5 -1 Present Members in Each Work Category, by Period When Admitted

	1979-83	1984-86	1987-89	1990-92	1993-95	Total
Managerial	2	0	1	3	2	8
Repair shop	0	0	2	4	5	11
Administrative	1	2	1	2	2	8
Machine operation	13	3	2	3	2	23
Livestock tending	2	1	0	1	1	5
Co-op Kitchen	2	1	1	0	0	4
Field	3	5	1	0	16	25
Other	2	2	0	0	0	4
Total	25	14	8	12	27	88

Source: “Lista Consolidada de Socios de Cooperativa ‘Amistad Cuba Laos’ ” ; interviews with members; observation of work.

process has shaped the cooperative's present division of labor, by associating the period during which a member was admitted, with the type of work that member performs. Each row enumerates all members whose primary function falls within a particular category of work,⁷ while each column contains all current (July 1995) members who were admitted to the cooperative during a given period. Job categories are listed in descending order, from higher to lower levels of complexity. The life experience of most able-bodied rural dwellers (particularly men, as explained above) would prepare them to carry out most jobs within the last 4 categories. "Machine operation" is not so universally practiced, so members wishing to exchange a life of manual labor for tractor driving might need to find a tutor among the farm's equipment operators.⁸ Although some members "move up"

⁷ The jobs in each category are as follows:

- Managerial: Co-op president, economist, agronomist, and heads of areas such as repair shop, procurement and production in general. Generally participate in executive committee meetings, and most have received higher education.
- Repair shop: Mechanics, welders and their helpers. Helpers are usually harvester operators who spend much of the non-harvest season preparing their harvester for the next harvest, or doing other jobs around the shop.
- Administrative: A wide variety including storeroom attendants, payroll and book keeping, and technical specialists who advise and supervise, but who are not on the board of directors.
- Machine operation: Members who spend most of the year driving track-type or wheel tractors. Does not include combine operators, or those who drive tractors only during the cane harvest, since they spend most of the year doing other work.
- Livestock tending: Those who directly tend the milk herd, the pigs, rabbits and chickens.
- Co-op kitchen: Three cooks and a server, who prepare lunch daily for co-op members.
- Field: Manual field laborers.
- Other: Guards who watch for stealing of cattle, food crops or other goods; those who perform other, low skill jobs which do not fall into previous categories.

⁸ An entry from my field notebook (8-16-95) illustrates the point: "Emilio entered the co-op as a field hand. Within a year and a half, his number came up for a tractor driver position. Fortunately, he had been watching and practicing, and was able to get his license, in order to become a "movedor de caña" [pulling wagons along side the combines, to be loaded with cane: an entry level tractor-driving position]. He and [the repair shop supervisor] explained that had he not been able to get his license, the co-op might have had to hire, then admit, an experienced driver. In that case, if he did eventually get the license, he could "reclaim" the tractor driving position, due to his lower number."

into the first three categories, the majority of these positions are filled by members who join specifically to fill them.

Job openings are filled according to seniority among interested, and qualified, members.⁹ Given the heavy concentration of field labor among those with least seniority (the “class,” or column, of 1993-95), it is fair to conclude that members prefer almost any job over field work. At the other end of the spectrum, most of the full-time machine operators are members who joined prior to 1984, and have sufficient seniority to acquire “plum” jobs. This means that field labor is the entry path for membership among those who possess no special skills needed by the cooperative.¹⁰

Stability of Membership

Another tendency evidenced by Table 5-1 is the heavy representation in the two highest skilled job categories, “managerial” and “repair shop”, among those entering since 1990. This is partly due to an increasing demand by the co-op for skilled and educated members. At the same time, these skilled “outsiders” tend to be men, who enter the

⁹ Beginning with the first member as #1, each member is assigned a consecutive number upon admission. Seniority is then determined by the magnitude of the member’s number, with the lower number indicating greater seniority. Numbers are retired when members leave, which leaves “gaps” in the member numbers, but permits maintaining the same number throughout one’s permanence. At “Amistad Cuba Laos,” the numbers corresponding to the 88 members as of 7-95 ranged from 1 to 216. This numbering system (which is used at many, but not all CPAs), facilitates tracking of demographic trends within the cooperative.

¹⁰ The qualifier “needed by the cooperative” is important: one field laborer hired on a contract basis and hoping to be admitted to the cooperative was said to have several years of post-secondary education in agronomy, and to have previously worked at an agricultural research center. The cooperative had an experienced agronomist, however, so that applicant’s qualifications were irrelevant at the time: his “entry path” remained field labor.

cooperative without land, and as Table 5-2 indicates, this a category with a relatively high likelihood of leaving the cooperative.¹¹

Table CHAPTER 5 -2 Years of Membership, by Origin

Origin of Member	Aportadores	Women	Men (non-aportadores)
Mean Years of Membership	12.6	12.4	4.9

Source: "Lista Consolidada de Socios de Cooperativa 'Amistad Cuba Laos'"

In July of 1995, the "Amistad Cuba Laos" cooperative consisted of 88 members, including 21 "aportadores," 11 women (4 of whom were "aportadores"), and 60 men who did not bring land to the cooperative. Table 5-3 further demonstrates that instability does not affect all types of members equally. As of mid-1995, two-thirds of the non-land contributing men who had ever joined the cooperative, had also left. With 66% of the membership in this "high turnover" population, it is not surprising that membership instability has been a source of preoccupation for the cooperative's leadership.¹²

¹¹ In order to gauge whether the stability of the aportador group was merely a function of the period during which men joined, I looked at current (7-95) membership for men entering 1979-1983, and distinguished between aportador and non-aportador. Of the 31 men non-aportadores who entered the co-op prior to 1984, only 6 (19%) remained in July of 1995, whereas of 16 male aportadores who entered during the same period, 13 (81%) remained.

¹² As part of the explanation for the cooperative's 1993-94 worst-ever sugarcane harvest, the annual report notes that 75% of those who participated in the harvest were new to the cooperative, or at least new in the job they performed. This even included the combine-harvester operators, who had never driven combines before that harvest!

Table CHAPTER 5 -3 Members Entering and Leaving During Each Period

	1979-83	1984-86	1987-89	1990-92	1993-95	Total
<u>Aportadores</u>						
Join	19	4	1	1	1	26
Leave	0	0	2	0	3	5
<u>Women</u>						
Join	7	7	0	1	0	15
Leave	0	0	2	1	1	4
<u>Men (not aportadores)</u>						
Join	32	41	32	32	42	179
Leave	3	27	24	21	44	119

Source: "Lista Consolidada de Socios de Cooperativa 'Amistad Cuba Laos' "

Table 5-4 examines average length of membership of present members, by job category. Here again, the more complex areas of management and repair shop show some of the lowest accumulations of time in the cooperative. The repair shop is particularly interesting, because, as implied by Table 5-1, it is an area with virtually no participation by aportadores. The short "collective memory" of the shop personnel may be a factor in recurring criticisms of the shop organization, by cooperative leadership.¹³

Table CHAPTER 5 -4 Mean Years of Membership of All Members in Job Categories

Type of Work	Manage	Shop	Admin	Machine operator	Livestock	Kitchen	Field	All members
Qty of Members in Category	8	11	8	23	5	4	25	88
Mean Years of Membership	5.7	3.3	6.7	10.8	8.9	11.8	4.5	7.3

Source: "Lista Consolidada de Socios de Cooperativa 'Amistad Cuba Laos' "; Interviews with members.

Note: The "Other" category is not included, although those members are included in All column.

But why has turnover been so prevalent? Although it cannot provide a causal answer that question, Table 5-5 does indicate that the reasons may have changed over

¹³ For example, ". . . in the period under evaluation, there were major problems with management in this [repair shop] area, which led to the impression of unsightliness, disorganization and lack of supervision over repair jobs" (Cooperative Annual Report for 1994-95, pg 3). Similar comments are found in the 1993-94 annual report. Interestingly, in both years the reports went on to commend the shop personnel for doing an apparently good job in keeping machinery running, in the face of shortages of spare parts.

time. In the early years, nearly all withdrawals were voluntary resignations, apparently initiated by the member. Although the amount of detail included in these records varies greatly from year to year, a number of entries recorded members leaving to obtain industrial employment. Over the years, a shift occurred, and by 1993 most who left did so involuntarily, through forced separations, i.e. expulsions.

Table CHAPTER 5 -5 Reasons for Leaving "Amistad Cuba Laos" Cooperative, for Selected Years

	Resignations	Separations	Retirements	Other	Unknown	Total
1984	5 100%	0 0%	0 0%	0 0%	0 0%	5 100%
1986	12 86%	0 0%	0 0%	1 7%	1 7%	14 100%
1987	1 20%	2 40%	1 20%	1 20%	0 0%	5 100%
1988	4 44%	2 22%	1 11%	2 22%	0 0%	9 100%
1993	0 0%	22 88%	3 12%	0 0%	0 0%	25 100%
1994	0 0%	11 85%	1 8%	1 8%	0 0%	13 100%

Source: "Lista Consolidada de Socios de Cooperativa 'Amistad Cuba Laos' "

During the first half of the 1980s the Cuban economy was indeed growing, with a large textile mill near the cooperative employing thousands of workers. In the later 80s however the economy was stagnating, and with the collapse of socialism in Eastern Europe and the USSR, stagnation turned into crisis in Cuba (Pastor and Zimbalist 1995:8). Thus it may be that hard times at the co-op led to a tightening of labor discipline, and an elimination of those who were not felt to be "pulling their weight." On the other hand, the interplay of national economic conditions and the cooperative's incentive system may also have played a role (Chapter 6 will examine this in more depth).

Table 5-6 offers national level statistics on reasons for leaving cooperatives. Although the span of years is not identical, the tendencies here are very different from those apparent at the "Amistad Cuba Laos" cooperative. Nationally, high numbers of members entering retirement in the early and mid-1980s seriously affected the growth of cooperatives (Deere et al 1992: 131). Somewhat paradoxically, the percentage and absolute numbers of those leaving the CPAs through retirement *decreased* substantially over the 6 year period. From this, it appears that many older farmers joined the cooperatives largely to obtain retirement benefits unavailable to farmers outside the CPAs. The data do not show this phenomena to have occurred to any significant extent at the "Amistad Cuba Laos" co-op. Also in contrast to "Amistad Cuba Laos," the national figures show voluntary resignations increasing dramatically, while forced separations maintain a low, and fairly constant level. If nothing else, these dramatically different trends underline the limitations of making assumptions about the cooperative movement as a whole from a few specific cases, or visa-versa.

Table CHAPTER 5 -6 Reasons for Leaving CPAs, all Cuba

	Resignations	Separations	Retirements
1985	34%	9%	57%
1986	51%	9%	40%
1987	48%	16%	36%
1988	57%	11%	32%
1989	58%	13%	30%
1990	73%	11%	16%

Source: Deere et al 1992: Table 4, pg 131

According to Table 5-7, the number of members and rates of growth achieved by "Amistad Cuba Laos" appear much more typical when compared to CPA cooperatives in the province of Havana alone, rather than for Cuba as a whole.¹⁴

Table CHAPTER 5 -7 Average Number of Members (mean), by Year

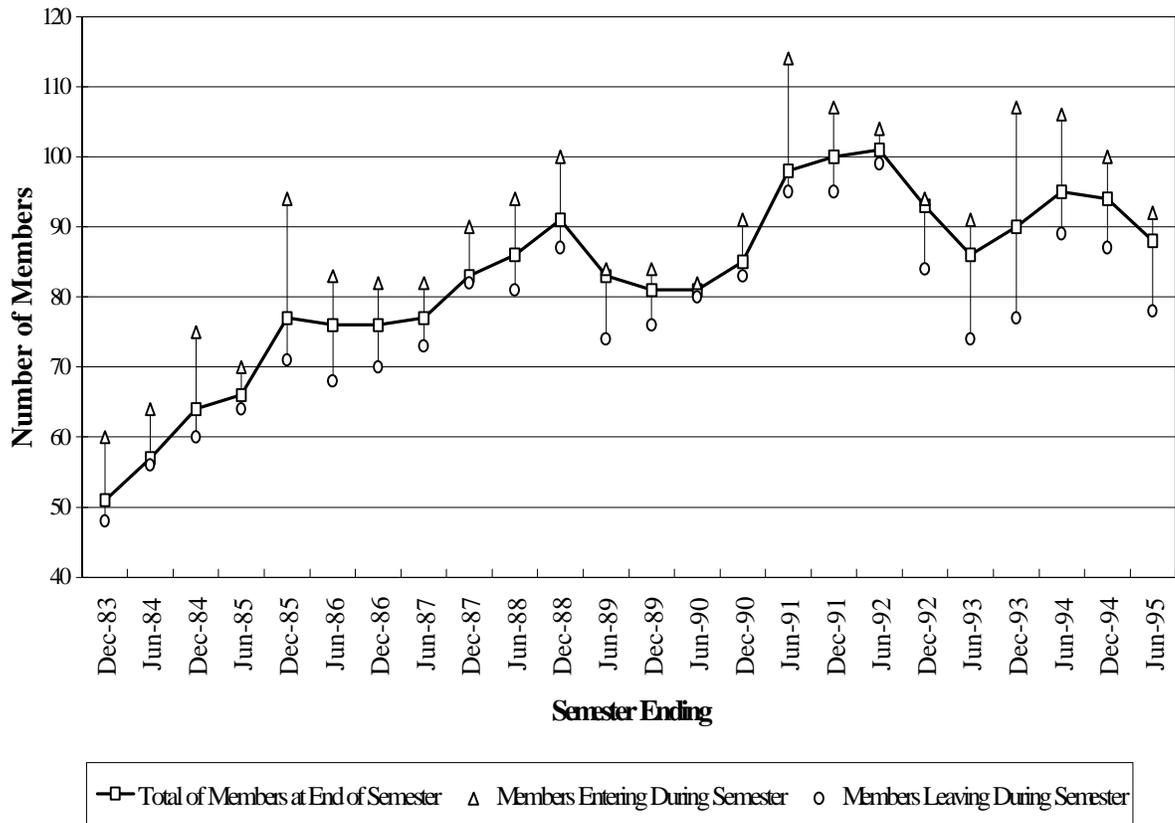
	1980	1985	1990	1991	1992
Cuba	29	51	48	48	50
Havana Province	28	79	90	94	97
ACL Co-op	24	77	85	100	93

Source: for Cuba 1980-1990, Deere et al 1992 pg. 123; for Cuba 1991-92 Nova 1994 pg 63; for Havana Province, Nova 1994 pg. 66; for ACL Co-op, "Lista Consolidada de Socios de Cooperativa 'Amistad Cuba Laos' "

Bringing some of the previous details together, Figure 5-1 displays membership growth and turnover graphically. The solid line charts the number of members at the end of each semester. The vertical lines indicate the number of members entering (above the

¹⁴ Since the number of "Amistad Cuba Laos" members varies throughout the year, the co-op has a statistic which they call "average of members during the year," which I used for Table 5-7. It may not be a mean.

Figure CHAPTER 5 -1 Total Membership, and Those Entering and Leaving, by Semester



Source: "Lista Consolidada de Socios de Cooperativa 'Amistad Cuba Laos' "

membership line) or leaving (below the membership line) during the semester. Thus, the net change in membership from one semester to the next, is the result of member entrances minus member exits. Since a longer vertical "arrow" means more comings and/or goings during the previous six months, mid-1992 through mid-1995 indeed stands out as an extended period of relative instability. Recalling Table 5-5, available data for the 1990s shows that members who left during those years were generally expelled. This contrasts to previous years, when the impetus for turnover was voluntary resignation from the cooperative. During the economic crisis, the co-op seems to have become relatively more attractive, compared to available alternatives. But the same nation-wide economic

conditions which made the cooperative more attractive, also made profitable production more difficult for the co-op to achieve. As already suggested, requiring greater labor discipline may have been one management response to a deteriorating economic environment. Unfortunately, the threat of expulsion is probably an inappropriate tool for eliciting work discipline within a cooperative,¹⁵ and may indicate serious problems with work incentives. The issue of co-op incentives will be discussed further in Chapter 6.

Non-Member, Contracted Labor

Individually Contracted Workers

Rights and obligations. Although there are several types of individual contracts, the most prominent is a three-month agreement that is the main entry route for cooperative membership. When seen as a probationary period, the similarities and differences as compared to membership are comprehensible. Gaining employment of this sort with the cooperative is not difficult: the cooperative leaders complain that it is hard to find workers, and seem willing to hire almost any able-bodied applicant for a three-month contract. The individually contracted worker's wage is the same as the cooperative member "advance" for the same work, but the contract worker is not entitled to share in the profits.¹⁶ Like members, contracted workers are provided very inexpensive lunches, and a share of food crop production at nominal prices. If sufficient land is available, they will be offered a plot to tend during their free time, on which to grow rice for their

¹⁵ Unlike the traditional investor-owned firm, in which labor discipline is typically based on workers' fear of being fired, a cooperative requires the existence of social solidarity among its members. This feeling of solidarity is not compatible with frequent forced separations.

¹⁶ Profits corresponding to the three contracted months are paid, if the worker is accepted as a member.

families. Contract workers are permitted to attend general assembly meetings, though not to vote. Although the work rules for contract workers are the same as for members, in practice the probationary nature of the three-month contract is emphasized in rather strict enforcement. Only the decision of the management committee is required to terminate the contract, and through a combination of attrition and firing, the vast majority of those contracted are never offered membership.

Origins. Workers on an “entry-path” contract are generally young men from the area, many of whom seem to have less-than-excellent employment records, and limited options. The cooperative offers a somewhat different type of individual contract to retired workers, either to perform relatively light work in the food crop (as opposed to sugarcane) production, or to perform guard duty as night watchmen. Unlike the entry-path contracts which must either offer the worker membership, or terminate the contract after 3 months, the contracts for already retired workers, and for night watchmen of any age, are not constrained by time limitations, nor are they intended to lead to cooperative membership.

Functions. At the end of July 1995, the cooperative economic officer reported the following breakdown of individually contracted workers:

- 17 in the sugarcane area performing mechanical (hoe) and chemical (backpack sprayer) weed control, plus some replanting.
- 18 night watchmen, including one man hired to coordinate their activities.¹⁷
- 11 food crop field workers, including 7 retired men.
- 5 in assorted non-agricultural, unskilled jobs.

¹⁷ The co-op’s proximity to Havana seems to make it a high risk for thievery, particularly cattle rustling. The placement of 2 watchmen at key points each night has reportedly halted these losses.

Notice that the 17 sugarcane workers plus 11 food crop workers hired by the cooperative constitute a larger group than all the members classified as field laborers in Table 5-1. It is not unusual therefore that field work be accomplished by groups comprised of contract workers, overseen by a cooperative member.

Labor “Contingents”: Collectively Hired Workers

Another source of labor for the cooperative is known as the contingent (“contingente”). The agricultural labor contingents are groups of urban workers, first organized in 1990, as a mechanism for transferring excess urban labor into food crop production in the areas around the major cities of Havana and Santiago. To attract these workers, they are guaranteed either a relatively high minimum wage (225 pesos/month), or the same salary they were earning in the city, whichever is higher. They are also supplied good lodging, and abundant food. For this, they volunteer for 2 years of service, and work every day, 12 days on 2 days off, often in excess of 60 hours per week (Deere et al 1994: 199). The "Amistad Cuba Laos" cooperative utilizes contingent labor for weed control in sugarcane. This form of labor organization offers some advantages for the cooperative, as compared to individually contracted workers. The co-op deals directly with the organizers, or bosses: to a large extent, supervision is part of the “package.” Although the agronomist or production manager will have to spend some time verifying the work accomplished, they emphasized that the contingent is made up of good, hard workers. The drawback however is that the contingent is expensive. Once they are contracted, the cooperative must pay 40% of their salary expense, plus a stipend for living expenses, every day. These costs must be paid even if weather conditions prevent any

work from being done: not an unusual situation in the rainy tropics. On the days worked, there is an additional, established amount paid for the task accomplished that day. The co-op calculates the cost of contingent labor at 20 to 25 pesos per day per laborer. This can be contrasted with the individually contracted workers, who receive 7 or 8 pesos per day, plus a partially subsidized lunch. On days for which weather conditions cause work to be canceled, they are not paid. The relative cost of individually contracted workers is increased somewhat by the limited food crop ration they receive, and the supervision they require. Furthermore, their daily output is said to be less than that of the contingent workers. Even so, the co-op leadership considers the overall cost of individually contracted labor to be less than contingent labor.

Volunteer Labor

According to Cuban mass media accounts¹⁸, during critical moments in the sugarcane cycle, volunteers from all around Cuba are mobilized to work in the cane fields, usually hoeing weeds. The concept is that since the Cuban economic progress depends heavily on the success of the sugarcane harvest, all Cubans have a stake, and even a duty, to contribute directly to the effort. The cooperative managers confirm that such groups occasionally arrive at the cooperative. The co-op perspective is that, while the volunteers might not work terribly well, they cost little or nothing, and are therefore worthwhile. On two occasions I observed groups of volunteer workers who spent a day at "Amistad Cuba Laos." One group of 12 men came from the sugar mill to which the co-op sells its cane.

¹⁸ In particular, the evening news regularly features reports involving volunteers laboring in the cane fields. Newspaper accounts are not unusual either: "The Cuban Youth plans a nationwide mobilization

The other consisted of about 30 textile workers from a factory located only 5 kilometers from the cooperative base of operations. This latter group was almost evenly divided between men and women. In both cases, I was told that the participants had nothing to do at their respective workplaces, and were therefore working in the cane fields. To what extent either group qualified as “volunteers,” or how typical these groups are of the volunteer phenomenon in Cuba as a whole, I cannot say.¹⁹ What is clear, is that only a very small proportion of work at the cooperative is performed by such groups.

into the cane fields tomorrow, where they will work for the economic recovery of the country” (Granma 08-12-95:1)

¹⁹ Jorge Pérez-López mentions that sugarcane cutters are drawn from several sources, including “workers who are temporarily assigned to sugarcane harvesting activities by their workplaces. These workers fall into two categories: “habitual” cane cutters, who have cut cane in previous campaigns, and “volunteer” cane cutters, who most likely have not engaged in the task previously;” (1991: 61). Although Pérez-López refers only to cane “cutters,” his description seems to apply to those who work in weed control as well.

CHAPTER 6
WORK PERFORMANCE: INCENTIVES, SANCTIONS AND MONITORING

From the simplest exercise in game theory, such as the “prisoners’ dilemma,”¹ to the striking real-world success of Hutterite collective farms,² there are many indications of the superiority of cooperative problem solving, if individuals are capable of sufficiently identifying with, or adopting, group goals. Cuban policy-makers evidently believe that a considerable degree of individual-to-group identification is plausible: with the conversion of most state farms into UBPCs beginning in 1993, Cuba’s agriculture became heavily dominated by cooperative farms. Yet, referring to this reform of the state agricultural sector, a prominent Cuban economist warns,

“A key problem confronting the viability of the reform comes down to its capacity to produce sufficient incentives to attract and stabilize the rural workforce . . .”

This chapter examines the incentive structure at the “Amistad Cuba Laos” cooperative. In particular, it focuses on the ways in which the incentives succeed or fail in harmonizing individual and group interests.

¹ For a discussion of the prisoner’s dilemma game and other models of institutional choice in relation to collective action see Ostrom 1990.

² These little-known collective farmers are located on the Canadian and U.S. northern Great Plains. Their willingness to work, plan and participate as a community “baffles those who see individual gain as the motivating force of all activities” (Peter 1987: 43). See also Bennett 1967.

The "Free Rider" Problem: A Recurrent Theoretical Concern

Within the literature concerning production cooperatives, the "free rider," i.e. the individual who reduces output while maintaining income, is a commonly recognized problem (Denninger 1993 p.10). On the other hand, a recent study based on data from Nicaraguan and Honduran cooperatives, suggests that the free rider problem is neither as universal, nor as intractable as is commonly assumed (Carter et al. 1993: 189).

Observations at "Amistad Cuba Laos" indicate that the incidence of free riding may vary from nil to highly significant within the same cooperative.

Alexander Chayanov, writing in the mid 1920s, provided several suggestions for minimizing the free rider problem, all of which are utilized in some degree by "Amistad Cuba Laos," and other Cuban CPA's. First, Chayanov counseled, activities which are the least amenable to collective execution, should be placed under the responsibility of individuals, or families. Tasks which are not mechanized, and require particularly close attention, tend to fall into this category. As will be described, raising of pigs and poultry, as well as some food crop production are examples of this at "Amistad Cuba Laos." Next, Chayanov asserted that payment to each member should be based on work done, rather than merely on membership. A wage should be paid at the time work is performed, then after selling the harvest, profits which are not re-invested should be divided among members according to the amount of work done by each of them. Finally, the management body must have the institutional authority and personal will to enforce work rules (Chayanov 1991: 218-220).

Member Incomes

Members, and to a lesser extent individually contracted workers, at "Amistad Cuba Laos" receive a variety of material benefits as a result of their affiliation with the cooperative. All of these will all be considered here as a type of income, whether in cash or in-kind.

Wage, or Advance on Profits

The wage received by hired workers is analogous to the advance on profits received by the cooperative members. Even though the member's advance and non-member's wage are of the same amount for the same work, it is important to recognize that they are not synonymous. A wage is paid by an owner to a worker: since the members are all owners, they share profits, not wages. Since with sugarcane, profit can only be determined after the annual harvest, an advance is provided for members to live on between harvests. In the event that income from the harvest does not cover all expenses, the members will obviously not have profits to distribute. Although they are, as members, collectively responsible for paying of debts, this would involve a debt rescheduling with the bank, rather than requiring that members somehow return or repay the advance on profits which never materialized. The "Amistad Cuba Laos" cooperative is quite proud of the fact they have never failed to have at least a small profit at year's end.

The payment to each member is made every 15 days, in cash. The actual tabulation and obtaining of the correct quantities of bills and coins of each denomination is quite time consuming, as is the placing of each exact amount into small envelopes for distribution. But cash is more convenient for the members, and the members are the owners, so that is how things are done.

The advance is nearly always expressed in an amount “per day.” The only exception I noticed to this rule was for the repair shop personnel (mechanics and welders), who earn 1 peso per hour. This may be due to the absence of norms for maintenance and repair work, so that when a mechanic puts in more than 8 hours in a day, there is no “above norm” amount of production by which to determine the extra payment. At the time data was collected, in the summer of 1995, tractor drivers earned 8 pesos per day, and field hands earned 7 to 7.5. The nine members of the co-op executive council are each paid an amount equal to the average of the 5 highest paid members for each period.

Overall, the range of advance-based earning differences among the members is not large. Table 6-1 provides an indication of the range of annual advance payments across most of the life of the co-op. The random sample of 8 current members who

Table CHAPTER 6 -1 Advances to Members: Descriptive Statistics from Sample (current Pesos)

Year Ending July	Mean	Minimum	Maximum	Range	Standard Deviation	Range/ Mean
1984	1835	1622	2150	528	188	29%
1985	2174	1770	2528	758	300	35%
1986	2372	2215	2647	432	164	18%
1987	2439	2002	2895	893	278	37%
1988	2365	1996	2729	733	255	31%
1989	2498	2275	2728	453	164	18%
1990	2747	2152	3093	941	334	34%
1991	2726	2416	3020	604	229	22%
1992	2765	2501	3016	515	169	19%
1993	2647	2496	2940	444	160	17%
1994	2669	2348	2799	451	158	17%
1995	2525	2081	3177	1096	383	43%

Source: “Registro de Anticipos Amistad Cuba Laos.” Sample of 8 randomly selected from current members entering co-op prior to 1983-84 fiscal year.

entered the co-op prior to the 1983-84 crop year, includes 5 machine operators, and 3 field hands, but no executive committee members.³ Selecting from among long-time members permits following trends over time using the same set of members, but has the disadvantage of eliminating all the professionals, since none of those currently at the co-op joined prior to 1983-84.

Profits

Each July, the co-op economist develops a financial statement for the July 1 through June 30 fiscal year. Among other things, this statement records the distribution of cooperative profits, as shown in Table 6-2. The proportions fall within limits set by national, legal guidelines (Consejo de Ministros 9-20-1990: 22).⁴

Table CHAPTER 6 -2 Distribution of Profits, Selected Years

	1985	1987	1989	1991	1993	1994	1995
Divided among the members	50%	50%	50%	50%	50%	50%	50%
Equipment, buildings and other investments	10%	10%	10%	17%	15%	15%	15%
Social welfare	10%	10%	10%	3%	0%	0%	5%
Sports, recreation and culture fund	5%	5%	5%	5%	5%	10%	5%
Payment for pooled lands	25%	25%	0%	0%	0%	0%	0%
Operational Inputs	0%	0%	25%	25%	30%	25%	25%

Source: calculated from Datos Historicos de Balance cooperative "Amistad Cuba Laos"

Note: In 1988, the cooperative finished paying off members for land which had been pooled, for that reason, there are no "Payments for pooled land" after that year.

The portion of the profits which goes to the membership creates a direct connection between the efficiency of the collective, and the income of each member. The profits distributed also reward those who work, or at least are present during working hours, since the profits are assigned based solely on days worked during the year, without regard to either the nature, quality or intensity of the work. A day spent cleaning the pig sty

³ The entire payroll for these years was available, but time constraints prevented me from hand-copying more than a limited sample.

⁴ The legislation governing cooperatives lists ranges for each of the categories.

earns precisely the same amount of profit as a day scheduling the deployment of machines and drivers for the harvest. This implies that there might be less variability of profit income among the membership, than of advance income; a suspicion confirmed by comparing the last columns of Tables 6-1 and 6-3. It also means that there is a less tangible connection between profit income, and the quality and intensity of work, than is the case with advance income, where work norms have a role. In most years, the total amount dedicated to advances has been larger, and sometimes much larger, than the portion of profits distributed to the membership.

Table CHAPTER 6 -3 Year End Profits to Members:
Descriptive Statistics from Sample (current Pesos)

Year Ending July	Mean	Minimum	Maximum	Range	Standard Deviation	Range/ Mean
1984	1516	1435	1545	110	37	7%
1985	1525	1390	1560	170	59	11%
1986	1726	1675	1744	69	24	4%
1987	1740	1600	1793	193	59	11%
1988	981	888	1023	135	46	14%
1989	1824	1782	1899	117	41	6%
1990	2747	2460	2904	444	150	16%
1991	3372	3260	3579	319	115	9%
1992	2049	1765	2250	485	157	24%
1993	646	621	693	72	25	11%
1994	366	340	406	66	23	18%
1995	1350	1255	1490	235	84	17%

Source: "Registro de Utilidades Amistad Cuba Laos." Sample of 8 randomly selected from current members entering co-op prior to 1983-84 fiscal year.

Food Crop Allotment

During 1995, the "Amistad Cuba Laos" cooperative dedicated 39 hectares (2.9 caballerías) to the production of food crops, and another similar size area to grazing animals, mainly milk cows. The production from this 8% of the farm's agriculturally productive lands is overwhelmingly destined for consumption by the cooperative membership, and to a smaller extent, the individually contracted workers. Food crop

("autoconsumo") production, and the livestock operation are each organized as stable work groups. The supervisors of each of these areas are men with particular expertise, and those who work in these areas do not generally work in sugarcane, with the occasional exception of participating in the harvest.

Production from the food crop area represents a very important part of the income received by each cooperative member. Each Friday, an allotment which, during the 1994-95 fiscal year, averaged 25 pounds of root crops, 12 pounds of rice, and 22 pounds of vegetables, is supplied to each member, apparently regardless of family size. A similar amount is supplied to each individually contracted worker. For the majority of members who live close to the cooperative, the food is delivered door-to-door. This is an important detail, since most members live a distance from the local market where similar items could be purchased, and transportation to and from shopping would be a problem. From the milk herd comes 1.5 liters of milk per day per member.⁵ The members pay a nominal fee for this food, which is only rarely as high as 10% of the free market value (with no home delivery!). The only requirement for receiving a full allotment is membership in the cooperative; the amount of food received bears no relation to days worked, much less to work norms.

Individual Family Plots

The 1994-95 fiscal year was the second year that the "Amistad Cuba Laos" cooperative had assigned land to each member for family rice production. This rice is produced in rotation with sugarcane, in a field chosen because of its poor drainage. The

old cane ratoons were uprooted (“demolidos”) after the harvest, and the ground was prepared for planting. Most of the co-op’s cane is planted during April, May and June, in part to take advantage of the first rains. If cane is planted during the rainy season on ill-drained fields however, waterlogged soil conditions reduce the probability of germination. Therefore, even though the field is prepared by June at the latest, it will not be planted until after the rains diminish, in November. Rice, on the other hand, is suitable for areas of poor drainage, and if planted in June will have plenty of time to mature for harvest in October. The co-op plants the rice area as a unit, by machine, and then each member is assigned a specific “strip,” 14 rows wide, of the 525 meter long field. The rows are 30 cm apart, so the standard area is 4.2 meters by 525 meters, or .22 hectares. Individually contracted workers are assigned somewhat smaller plots. Once planted and assigned, the rice plot is the responsibility of the individual owner. It must be worked, which basically means weeded and harvested, during one’s free time, and/or by family members. Members sometimes organize after-work trips from the co-op staging area, to the rice field, with co-op a tractor and trailer. The previous year, a number of members with contiguous plots arranged among themselves to rent a rice harvester (which the "Amistad Cuba Laos" cooperative does not own). According to the agronomist, a well tended, fertilized plot should yield about 2000 pounds of rice, or perhaps 1300 pounds without fertilizer.⁶ Fertilizer is quite scarce, and the cooperative does not have a fertilizer allotment for this purpose, so little is applied. The harvested rice can be “hulled” using co-

⁵ One informant told me that the original contributors of land receive 2 liters per day. This was the only overt perquisite for the “landed founders” which I noticed, although there may well be others.

⁶ Production could be considerably less, depending on the effort invested. One member contacted after the harvest said she had done little or no weeding, and harvested 490 lbs of rice, before hulling.

op machinery, at no charge to the individual. The final product belongs exclusively to the individual member, and the co-op does not retain any portion in exchange for the use of land, or machinery used in land preparation, planting, and transportation.

Over the years, attention has often been focused on the differences in appearance and productivity of private versus collective areas within state farms or cooperatives, usually in the former “eastern block” countries. In the case of the "Amistad Cuba Laos" cooperative, my visit found over half the individual plots (including that of the agronomist) nearly over-run with weeds. Although some were meticulously attended, overall, these plots appeared considerably less well cared for than the collective food-producing areas of the co-op. On the other hand, by working these plots, members can direct family labor towards improvement of the family standard of living. The co-op leadership seemed to look upon this as a learning experience, to be continued, modified or abandoned, depending on member response and results.

Backyard Animal Raising

Prior to the collapse of Cuba’s eastern block trading partners, the cooperative was able to purchase sufficient feed for animals, to regularly provide members with pork and chicken. Feed is no longer available in sufficient quantities to maintain production on the previous scale, so now the cooperative breeds piglets, and to a lesser extent rabbits, and provides each member with a piglet, at about nine-month intervals. The member then raises the pig in a backyard pen, using table scraps, residue from banana plants, or other sources of food. Several times per year, the co-op also purchases a large quantity of chicks from a state managed production facility, and sells them, at cost, to members. Although the implications of this “take home” policy on neighborhood sanitation may be

negative, as a solution to the animal feed shortage, it works well. Invariably, when I visited members' homes I would immediately be shown through the living room, past the television set, the refrigerator and other furnishings, and out the back door to view the true pride of the household: the "patio pig". Neither pig breeding (as opposed to fattening), nor chick procurement would be feasible for the individual. As with the individual rice plots, a suitable combination of collective and individual activities and inputs appears to be evolving, in response to changing economic conditions.

Quantitative Comparison of Income Sources

Nearly all co-op members own their homes, and have no housing-related expenses except maintenance. Medical care and schooling is free of charge to the population, and a ration card partially fulfills the demand for certain staple foods, like bread, and dried beans, which the co-op supplies inadequately, or not at all. The co-op obtains and distributes rum and cigarettes at very affordable prices. Some clothing and shoes are also available either through government or co-op channels. Cash income is therefore spent on complementing the various goods and services received for nominal charges, or no charge at all. To return to the pig example, a pig or two per year supplies sufficient lard for family needs, plus considerable meat. If the pig is sold, however, then where would the family obtain a similarly abundant supply of cooking oil? On the other hand, goods beyond "the basic necessities" are expensive, and available principally in dollars at special, government run stores. While nearly all of these stores are now open to Cubans, and there are two located near the co-op, the hard-working farmers do not seem nearly as attracted to these stores as is a set of youngish town-dwellers. For all of these reasons, and probably others, the co-op members do not seem to instinctively render all things down to

a common, cash denominator the way we often do, for exchange and comparison.⁷

Sharing of food with relatives and friends, especially those from urban areas, may be more common than actual sales. Nevertheless, each member undoubtedly does have a sense of the relative importance of the various components of his or her total income. Utilizing free market prices, Table 6-4 provides a general idea of the relative magnitude of each income component already described, for an average cooperative member.

Table CHAPTER 6 -4 Income Equivalent in Pesos

Income component	Amount	Percentage of Total
Advance on Profits	2,236	16%
End of Year Profits	1,271	9%
Food Crops Allotment	6,075	43%
Individual Plot Production	2,000	14%
Patio Pigs	2,700	19%
Total	14,282	100%

Source: See Appendix D

The monetary equivalents for the food crop and individual plot production are based on prices at the Bauta agricultural market, which is located near the cooperative.⁸ I have

⁷ An apparent exception to this rule is the valuation of their prized pigs. Yet even in the case of the pigs, whose cash value is well the equivalent of several months' salary, the cases of an actual sale appear to be the exception. Rather, references I heard to cash value were probably intended only to underline the magnificence of the creatures, and enhance their appreciation by a guest who may have seemed a bit distracted by the flies.

⁸ It is widely recognized that prices at the Cuban agricultural markets are not fixed in any way by the government (Pastor and Zimbalist 1995: 709; 18; Deere 1995: 16-17). There is a tax of 5% in Havana, 15% elsewhere (Pérez and Torres 1996). The government does attempt to exert some downward pressure on market prices by either directly selling products below the going rate, or by encouraging co-ops to do so. This appears to be the case at "Amistad Cuba Laos", which, according to those who go to the market to sell for the co-op, regularly prices its offerings around 20% below the general price. Although I know of no study of prices at the Bauta market, I collected prices during a visit. The cooperative members who handle sales at the market also gave me their estimates, and finally I compared prices from those sources with results of an unpublished survey done in Havana markets by C.D. Deere, N. Pérez and C. Torres, Jan. 1996).

purposely used the lowest available estimate for each food item, to avoid exaggerating the dominance of the in-kind portions of income. Even so, the cash income received by the average member, 3,507 pesos, is only a quarter of the estimated 14,282 peso value of all (cash plus non-cash) income. See Appendix D for more detail regarding these calculations.

Income as a Work Incentive

Each of these 5 income sources bears a specific relation to work motivation for cooperative members.

- “Advance on Profits” is the only income category which can, at least sometimes, be directly related to the quality and intensity of work within the cooperative. I emphasize “sometimes” since on many occasions advances are paid strictly on the basis of days worked.
- “End of Year Profits” is the only category directly related to the farm’s profitability. Since profits are distributed according to days worked, no element of work quality or intensity enters into the calculation of each member’s share. Therefore, “profit sharing rewards quality of individual work and participation only very indirectly . . . due to the large number of intervening variables” (Meurs 1989: 154).
- “Food Crop Allotment,” apparently the largest single category of income received by members, is distributed solely on the basis of membership, regardless of the level of responsibility, quality, intensity or any other aspect of the work performed.
- “Individual Plot Production” depends on the quality and intensity of work, but that work is within the family, and not within the cooperative. All co-op member are eligible for plots.
- “Patio Pigs” depend on the piglets supplied by the co-op, for which the criterion is simply cooperative membership.

Only in the case of “advance on profits” is there any direct relation between work quality, and income, and only “end of year profits” varies directly with farm profitability. All other income sources depend solely on membership. Strictly speaking, a member need not even show up for work, yet would remain eligible for these benefits. In order for

these portions of income to serve any direct motivational purpose, the condition of membership itself must be strictly linked to some minimal indicator of productive activity.

At the very least, this implies a credible threat of expulsion for work absenteeism.

Recalling Table 5-5 in Chapter 5, the cooperative has indeed been utilizing separation, or expulsion, as a form of discipline to a much greater in recent years. This overall situation may be related to the relative scarcity of food during the same period, which increased the importance of in-kind member income, as compared to the advance and profit distribution.

As the latter declined in relative importance, the link between work and income weakened, and new methods of discipline were invoked. The problem of using expulsion as a common disciplinary technique within a cooperative has already been mentioned.

Additionally, the in-kind, membership-based portion of the incentive system which has developed permits no income differentiation, and specifically no rewards, within the cooperative according to either the nature and requirements of the job, or job performance. In this sense, these incentives violate the precepts of Chayanov, that payment to each member should be based on work done, and may invite “free riding.”

Norms

To the extent that cooperative members’ income is linked to performance, the work norm is the basis of measurement. According to economists Zimbalist and Brundenius, there are over 3 million work norms in Cuba, and 20,000 trained “normers” (1989: 132). The CPA’s receive at least some agricultural work norms from the Ministry of Sugar, but these are considered guidelines, to be modified as experience accumulates, and situations change.

The Work Day

If the concept of the norm is understood in its broadest sense, as a pattern or standard which is regarded as typical, then the most basic work norm is that which requires each worker to be willing and able to work, each work day. The day is the standard unit of work time, and is therefore used to calculate the member's advance and end of year profit share. It also figures prominently in the determination of bonuses and sanctions, as will be detailed below.

At the "Amistad Cuba Laos" cooperative, for most workers, whether members or hired, the work day begins rather promptly at 7 a.m.. Around 9 a.m. there is a 15 to 30 minute break during which the cooperative provides a snack, or "merienda." Since this snack is the only breakfast some workers eat, it is taken very seriously, and considerable effort is made to assure that it arrives to all corners of the farm where work is underway. The menu is simple: a rather hard, white bread bun, carefully split, spread with an unidentified paste,⁹ and served with either coffee, cane juice ("guarapo") or yogurt. The snack is prepared by the kitchen staff, at the same time they peel root vegetables, boil beans, and otherwise ready the noon meal.

At mid-day, workers return from the fields for lunch, which is held in the cooperative's dining hall. The food is tasty, abundant and the serving costs each consumer ½ peso.¹⁰ Though fairly heavy on the tubers and other carbohydrates, the meal usually includes some animal protein: pork, eggs or chicken, and okra or other fresh vegetable. There is often a rice pudding or sweet bread dessert. Many workers are not

⁹ Even my curiosity has its limits. In fairness, the coffee and yogurt were very good.

able to finish their servings, so there are plenty of table scraps for the cooperative's breeder pigs (which produce the piglets for each member).

The hours of the afternoon work session seem to be slightly less fixed than those of the morning. For example, to limit exposure to chemicals, and to take advantage of the less windy hours, the workers who spray herbicides only work mornings. Work-stopping thunderstorms are also more common in the afternoons. Usually however, workers return to their labors from 1 to 4 p.m., to complete 8 hours. Saturday is a workday, although sometimes only the morning shift is worked.

Each worker's supervisor maintains a count of days absent, each of which will be classified as either justified (by sickness or other special circumstances) or unjustified. Depending on the type of work done, the supervisor may also keep a record of how much was accomplished by each worker, to be compared with the norms.

Manual Labor Norms, and Their Application

Table 6-5 lists the norms for the most common types of manual field labor. Field norms are usually expressed in "cordels" per day: a cordel is $1/324^{\text{th}}$ of a caballería (see Appendix G). Since a caballería equals 13.42 ha., the cordel is only .041 ha., or 414.2 square meters (.1023 acres).

¹⁰ This is below what it costs the co-op to prepare the meal, and so in effect represents a subsidy from members' year-end profits, to the individually contracted workers.

Table CHAPTER 6 -5 Manual Sugarcane Labor Norms

Task	Field Conditions	Cordels per Day	Hectares per Day
Weed removal with hoe	Light growth	6	0.25
	Medium growth	5	0.21
	Heavy growth	3	0.12
Weed clearing with machete	Light growth	10	0.41
	Medium growth	9	0.37
	Heavy growth	4	0.17
Weed spraying with backpack sprayer	Light growth	20	0.83
	Medium growth	17	0.70
	Heavy growth	14	0.58
Replanting cane (where young stalks have died, and must be replaced to improve plant population, or density, in field)	< 5% vacant	15	0.62
	6 to 10 % vacant	11	0.46
	11 to 15 % vacant	9	0.37
	16 to 24% vacant	7	0.29
	25 to 30% vacant	6	0.25

Source: Interview with agronomist, "Amistad Cuba Laos" cooperative, 08-14-95

As is the rule for Cuban production cooperatives,¹¹ manual field labor at the "Amistad Cuba Laos" co-op is always performed in groups called brigades. Each group travels together to the field, usually in a tractor-drawn trailer which is assigned to the brigade supervisor. Although the workers in a brigade may be either cooperative members or hired hands, the supervisors are always co-op members. Once in the field, the supervisor organizes the workers, perhaps assigning each person a particular row on which to begin. In the weeding and replanting brigades that I observed, the supervisor worked as another brigade member, except that he managed to keep an eye on the 10 or 12 brigade members and occasionally called attention to unsatisfactory work. He also left to get the morning snack, and kept track of the total number of rows worked. Among the

¹¹ Both Meurs (1989:151-152) and Ghai (1988: 79) have descriptions of brigades in Cuban CPA's.

workers, some brigade members seem to match their work rhythms and stay within talking distance of their companions, while others work more rapidly, or more slowly. The cooperative agronomist is the keeper of the norms, and has previously informed the brigade supervisor how long the brigade has to finish the field. The supervisor then decides whether to value the work individually, or as a group. Individual valuation requires much better record keeping by the supervisor, and in fact the usual practice seems to be to simply make sure that the brigade as a whole finishes the area in the allotted time period. My impression was that if the group ends up a bit early, they take the afternoon off, perhaps to work in their rice plots, rather than rush into the next job in hopes of earning an extra peso or two. By meeting the norm, each member earns the “standard” field labor wage of 7.5 pesos per day, as set by the co-op for members and hired hands alike. The supervisors earn 15% more.

Since only about 12 co-op members (including supervisors) regularly perform manual work in the cane fields, the system described mainly involves individually contracted workers. “Free riding” is limited by the small size of the work group, the fact that everyone realizes that they must finish a defined task within the allotted time, and by the nature of the cane field itself, where there is literally nowhere to hide.

Mechanized Labor Norms, and Their Application

When a member is “promoted” to machine operator (usually tractor driver, since most co-op machines are tractors) he is assigned a specific machine, which will thereafter seldom be driven by anyone else. This is considered an important factor in developing a sense of ownership of the machine, and maintaining it in good condition.

Unlike manual labor, there is usually no reason for non-harvest mechanized field operations to be carried out in groups. The tractor operator works alone, or with a helper, depending on the task. Those which involve loading, such as fertilizer application or herbicide spraying, permit the assigning of a helper.¹² Once the area and task are determined, the agronomist sets the norm. In this, he is guided by the norms listed in Table 6-6, but also takes into account specific conditions such as soil texture and moisture, and the presence of rocks.

Table CHAPTER 6 -6 Mechanized Sugarcane Norms (not including harvest operations)

Task	Machinery	Cordels per Day	Hectares per Day
Cane Planting Operations			
Disking out old ratoons	DT-75 and 3 disk plow	36 - 40	1.5 - 1.7
Disk harrowing of field	MTZ-80 and 4500 lb harrow	120	5.0
2nd plow pass	DT-75 and 3 disk plow	45-55	1.9 - 2.3
2nd harrow pass	MTZ-80 and 4500 lb harrow	120	5.0
Open furrows	MTZ-80 or Jumz-60	90	3.7
Close furrows	MTZ-80 or Jumz-60	80	3.3
Cultivation (weed control and subsoiling)			
1st cultivation	MTZ-80 and 'raque' cultivator	180 - 200	7.5 - 8.3
2nd cultivation	MTZ-80 and 'cubilla' cultivator	120 - 130	5.0 - 5.4
Subsoiling (ratoons only)	DT-75 and subsoiler	140	5.8
Mowing	Jumz-60	80 - 120	3.3 - 5.0
Herbicide spraying	Jumz-60	150	6.213
Fertilizer application	Jumz-60	130	5.4

Source: Interview with agronomist, "Amistad Cuba Laos" cooperative, 08-14-95

At 8 pesos per day for achieving the norm, the advance, or wage, of the tractor drivers is only slightly higher than that of field hands. Among tractor drivers, there are indications that norms are sometimes exceeded, for extra pay. It should be pointed out however, that when there is no work for a particular tractor driver, that person becomes

¹² Recall from Chapter 2 that the seeding operation requires a larger crew.

available for field labor, until his tractor and driving skills are required again. In fact, at least 5 of the co-op members who do field work most of the year, drive tractors only during the harvest months.¹³

The tractor drivers' work is supervised directly by the agronomist, who spends much (probably most) of each day visiting the fields being worked. The co-op has provided him with a worn-out tractor to move quickly (though not too efficiently) around the farm. In considering the motivation and supervision of the tractor drivers, recall from Table 5-4 that machine operators as a category average over 11 years as co-op members. These are "old-timers," most of whom (13 of 22) are peasant land contributors, or sons of land contributors. As a group, they know farming, know their machines, and tend to be among the most ideologically committed to the cooperative.

Fuel is dispatched according to fuel consumption norms for each activity and machine.

With the increase in price, and the limited availability of fuel during the past several years, the allocation of fuel for each task has become standard operating procedure at the co-op.

The members contrast this to the "fill 'er up" attitude prevalent during the 1980s. Table 6-7 is interesting in that it was provided to the co-op by the CAI (sugar mill), in gallons per hour, although fuel is purchased and dispensed in liters. It is also the only commonly used

¹³ The member of the executive council in charge of machinery ("jefe de maquinaria") told me that, at least in theory, nearly all male members are subject to field labor, if there is no work in their usual area, or if there a critical need for field work at a certain moment. He listed the following hierarchy:

- Harvest tractor drivers ("movedores" and "tiradores"): usually go to the fields after the harvest.
 - Cultivation tractor drivers: drive tractors during the harvest, and afterwards for the planting, cultivating, spraying and other tasks. Occasionally go to fields, if mechanized work gets "caught up."
 - Combine operators: after the harvest, each goes with his combine to the repair shop, as an assistant to the mechanics and welders who will invest hundreds of hours in readying the machine for the next harvest. When the combine is ready, other non-field jobs will be found if at all possible.
 - Shop mechanics and welders: Could be called upon for field work, in times of dire necessity.
- My impression was that, in practice, only those in the first category seem to go to the fields.

list of norms stated in hours. Fuel consumption is recorded for each machine, and forms the basis for scheduling of periodic maintenance.

Table CHAPTER 6 -7 Fuel Consumption Norms by Operation and Machine, in Gallons per Hour

	Jumz-60	MTZ-80	DT-75	KTP-2
Disking out old ratoons	1.9	2.3	3.2	
Disk harrowing of field	1.8	2.1	2.8	
2nd disk plow pass	1.7	2.8	2.8	
Open furrows	1.5	2.0		
Close furrows	1.4	1.9		
1st cultivation (raque)	1.9	2.1		
2nd cultivation (cubilla)	1.6	2.0		
Subsoiling (ratoons only)	1.9	2.3	3.2	
Mowing	1.5	2.0		
Herbicide spraying	1.5	2.0		
Fertilizer application	1.4	1.9		
Harvest	1.4	1.9		6

Source: Table provided to co-op by "Complejo Agro-Industrial M.M.Prieto"

The Harvest

The sugarcane harvest itself is the most developed example of payment according to norms. This is because it is the one major operation where output is always measured, and officially recorded (for payment by the sugar mill to the co-op). Each wagon-load is weighed, and a receipt is issued which includes the wagon number. Based on this documentation from the cane receiving station, the cooperative develops its own documentation in order to assign each wagon-load to the small group of people responsible for harvesting and moving that output.

Not all members are offered the opportunity to participate directly in the harvest, although some workers, like the combine drivers, invariably take part. But not all the mechanics or welders are required in the fields during the harvest, so only a few are chosen. The selection is said to be based on good work and especially on low

absenteeism. Whatever criteria are used by the cooperative executive board, the list of those who implement the harvest must be submitted to the general assembly for approval. Whether this measure is designed to affirm the importance of this task to those entrusted with the harvest, or to simply deter favoritism on the part of leaders, in assigning coveted opportunities, I cannot judge. Although my research did not overlap with the harvest months, it was apparent from many interactions with co-op members that the usual enthusiasm, and even mystique which agriculturists reserve for the harvest is alive and well at "Amistad Cuba Laos."

Chapter 2 described the harvest activities, and touched on the role of the record keeper ("computador"). This member maintains a record of the movements of each of the 32 trailers which circulate from field to weighing and receiving station, and back. Each trailer is hauled alongside a combine harvester which fills it with harvested, chopped cane. When full, the trailer is hauled to a staging area, where it is hooked with two other trailers and towed to the receiving station. When the tractor returns with the empty trailers, the driver has a receipt showing the weight of cane unloaded from each trailer. The receipts are later matched up with each of the combine and tractor drivers who handled the trailer, and the amount of cane shown is added to the day's total for each operator. A detailed table of norms, reproduced in Appendix E, lists the expected amount to be harvested daily, by one combine, under various field conditions. This table is used to evaluate each day's performance. Although the table refers directly to the combine, the norms for other machine operators are easy to derive: there are 2 tractors which haul trailers as they are filled ("movedores"). The norm for each of these two operators is one half the norm for the combine. There are 5 other tractors ("tiradores"), which haul the full trailers, three-at-

a-time, from the staging area to the receiving station and back empty. Since these 5 operators serve all 4 combines, the norm for each of them is the combine norm multiplied by 4, and then divided by 5. In this fashion, most of the participants in the harvest have the satisfaction of knowing precisely their own (and each others') productivity. The heroes of the process are the combine drivers, who each aspire to harvest a million arrobas of cane in a season. In former times, "millionaire" status brought a material reward, such as a motorcycle, in addition to the moral status. Usually, individuals from each harvest job category are selected as outstanding workers, and receive recognition for their efforts. As a group, the members of "Amistad Cuba Laos" are proud that they have on various occasions won recognition as the best harvest "peloton" in Havana province. Overall, the compensation for harvest activities is a good example of the implementation of Chayanov's advice that payment be based on work done, rather than on membership alone.

The Repair Shop

Repairs and maintenance of agricultural machinery are carried out within the cooperative's shop structure. Open on three sides, the shop is well lighted (during the day) and has good ventilation. Its concrete floor and high, pitched roof can accommodate six tractors and two harvesters at the same time. There is an area for welding, and another for secure storage for technical manuals, tools, supplies and spare parts. The staff consists of about ten mechanics, welders and helpers, plus a fuel dispatcher who is considered part of the shop staff. The precise number varies, since some shop helpers are combine operators who are not always attached to the shop. A young college-trained mechanization specialist has recently assumed day-to-day supervision, and there is a

member assigned to hand out tools, parts, and materials, to keep records, and to handle other administrative tasks.

While mention of the harvest brings a smile to nearly any co-op member, reference to the mechanical repair shop is likely to cause a look of puzzlement, or even concern. Of course, as work environments, these two situations could not be any less similar. The harvest is a glorious battle, with a precise beginning and ending, and a sweet victory if the co-op's planned harvest is exceeded. The shop is an unending series of guerrilla skirmishes against aging machinery, with victory impossible, and defeat unthinkable. Related to the inherent differences between these activities, there is another difference which is not inevitable. Among all major co-op activities, the harvest produces the most complete record of individual and group productivity, while the shop produces hardly any record which ties people to work performance.

The problem is not one of basic organization. Several factors have contributed to an emphasis on improving shop organization. First, recall the criticisms of the shop reflected in the 1993-93 and 1994-95 Annual Reports (footnote 13, page 74, Chapter 5). Related to this is the high cost of replacement parts which in itself generates close oversight. Finally, the government, through the "Agro-Industrial Complex" or CAI, requires an annual repair plan, in order to supply spare parts. Parts are scarce, and the co-op makes a considerable effort to develop and follow a repair plan, in order to be entitled to whatever parts are available.¹⁴ So, the shop works according to a post-harvest plan

¹⁴ The CAI sends a representative to the cooperative every 2 weeks to confirm the progress of the repair plan. Even so, many, if not most, of requested items are unavailable.

for major repairs, tracks machine fuel consumption for periodic maintenance, and maintains a well organized store room for spare parts.

The mechanization specialist, who recently replaced an empirically-trained mechanic as shop supervisor, initiated a system of record keeping based on work orders. Each repair job is assigned a work order number, which is recorded along with the date, machine identification number, parts and materials used, and the names of the shop personnel who performed the repair. The purpose of the new system was to better track expenses, especially for spare parts. The supervisor had folders ready, one for each machine, in which to file the finished work orders. At the time of this research, the system had only been in operation for a few weeks. The folders were still empty, and a query regarding the recent maintenance history of a particular tractor could not be answered. Furthermore, the inclusion of the mechanic's or welder's name on the work order may be a formality, since no one indicated that the new system would be used to verify the job performance of shop personnel, and the time invested in each repair was not recorded.

Observations and interviews in the shop revealed poor morale, and generalized "free riding" in the form of low quality and quantity of work. Neither the low levels of work, nor low morale could be justified either by inadequate knowledge and skills among the workers, or by poor working conditions. Rather, the problem was motivational, probably related to the excessively egalitarian payment system already discussed, and compounded by the relative difficulty (though certainly not impossibility) of applying norms to maintenance and repair work.¹⁵

¹⁵ Although norms for repairing machinery probably exist in Cuba, they may be of little relevance under the conditions prevailing at the co-op.

This is not in any way an inevitable situation. The repair shop personnel possess sufficient technical knowledge and experience to develop a performance based system of rewards and sanctions, utilizing a modified version of their current work orders. The new form would add descriptions of the work to be done, the work actually done, the time spent at each repair job, and signatures of both the mechanic and the supervisor. This documentation would link each job to a specific mechanic, as well as account for the hours worked each day. The data collected would eventually form the basis of developing the shop's own set of norms for time spent on common repairs. Within this lax, co-op shop environment, there is no question that the implementation of such a system would require a good measure of the "institutional authority and personal will" mentioned on page 84. The large question is, should such a system of accountability be implemented, to what extent might the problematic work ambiance of the repair shop be replaced by harvest-like smiles and productivity?

New Incentives

In June of 1995, the "Amistad Cuba Laos" cooperative began offering a new type of incentive to the membership. The incentive is based on permission to spend pesos at government stores, that are well stocked with items normally sold for dollars. The items are priced well below what the same items would cost at the open-access dollar stores which exist throughout Cuba.¹⁶ Access to these stores is limited to those workers in the sugar sector who have been awarded special permits.

The functioning of the incentive program is somewhat complex. Basically, the government offers purchasing permits to workplaces for fulfilling certain planned

activities, and the workplace distributes the permits among the workers. These permits (in Cuba called “bonos”) entitle the holder to spend pesos at the restricted access stores. For example, the holder of 50 permits, can spend up to 50 pesos at the store. Note that nothing can be purchased with the permits: they only “permit” spending of Cuban currency. Permits can be accumulated to buy a relatively expensive item, like a large oscillating pedestal fan or a 13 inch color TV (see Table 1, Appendix F).

There are three ways in which permits are awarded by the government to the cooperative. Each of these corresponds to a distinct manner of distribution within the cooperative, among the members.

- 1) At the end of each fiscal year, the CAI will issue a quantity of permits equal to the cane-derived profits for that year. Like profits themselves, these permits are distributed among the members (not workers), regardless of absences.
- 2) Each month the CAI determines a certain quantity of permits to award the co-op, for each caballería of land on which specific labors are performed (see Table F-2, Appendix F). The quantity of permits assigned seems to generally reflect the CAI’s priority activities for that month. The co-op then awards the permits to the membership, 70% to be divided among direct cane workers and 30% among non-cane workers: administrators, food crop workers, kitchen staff, etc. Only workers with no absences can collect. The shares of those with one or more absences are retained by the co-op, perhaps to be awarded at the end of the year to exemplary workers.
- 3) For each month during which planned targets are met in three key areas (as defined by the CAI), the CAI gives the co-op sufficient permits to allow the following distribution: the cooperative president, 60; the rest of the executive committee, 40 each; all other members and workers, 30 each. Only those with no absences during the month may collect, however, with remainder pooled as in method 2 above.

Depending on the factors above, a typical member, with no absences for the month, might receive from 50 to 100 permits each month.

¹⁶ A conservative estimate would be one-half the price of dollar stores. For more details, see Appendix F.

A close reading of the “rules” of this incentive program reveals an apparent concern with some of the motivational issues already discussed.

- By providing many of the types of items the workers want, and yet could not purchase in pesos, these stores contribute to the re-valuation of Cuban currency, and hence the cash component of income. Recall that the cash component is more closely tied to work performance, than the now-dominant in-kind component.
- The linking of a large block of permits with year-end profits make possible the purchase of a small kitchen appliance, tape player or color television when profits are distributed. This should increase interest in year-end profits.
- Sales of food crops in the agricultural markets are now much more profitable than sale of cane to the state. By awarding permits for year-end profits derived from sugarcane only, those profits are in some measure magnified, making sugarcane production a bit more attractive (or at least less onerous).
- Finally, the “zero tolerance” for absenteeism provides a way to reward positive performance, instead of only threatening (and punishing) unproductive behavior.

Of course the success of this complicated incentive scheme depends on holding prices well below those at the dollar stores, while consistently maintaining good stocks of the items people want to buy. Even should these conditions be met, the program has the appearance of an *ad hoc*, and some might say paternalistic, fix to problems which require more fundamental solutions.

Vinculación del Hombre al Area: Linking of the Man to the Land

Within the Cuban cooperative movement, a more fundamental solution to the motivational problems is indeed underway. In many cooperatives, the lands are being subdivided, and responsibility for production from each unit is assigned to a small group, which might range from 2 to 10 members. These members make the operational decisions regarding their field, and the inputs which they require are noted by the co-op administration. During the harvest, the quantity of production and income from the sales

are recorded from each field. The income of each group is then related to result of the harvest sales minus input expenses. In order to reduce the differences associated with varying quality of land, vinculación schemes usually tie income to group performance vis-à-vis the production plan for the period. Since the groups are very small, free riding becomes virtually impossible to hide, and there is considerable opportunity for participation in decision making. The small group size, and the group's "ownership" of their harvest, makes the incorporation of family labor much more attractive and feasible than it has previously been in the cooperatives.

It appears that vinculación is something which the Cuban government believes would benefit virtually all cooperatives. Every co-op with which I came into contact in Cuba was either implementing, or planning to implement the policy. My impression was that whereas some food producing cooperatives (with large volumes of sales at the agricultural markets) were happy with the results, I found less satisfaction among members of sugarcane cooperatives. At "Amistad Cuba Laos," the leaders explained the concept to me, and mentioned that they had visited a sugarcane co-op which had successfully begun the vinculación. Although they voiced no overt opinions against the vinculación concept, as of August 1995, their cooperative was severely behind schedule in adopting the new policy. One major stumbling block for the cane producing cooperatives is the difficulty of machine administration within an organizational structure dominated by more or less autonomous small groups.

In a farming system based on managing and working a small area, with a minimum of mechanization, the direct linking of families or small groups to specific plots should indeed lead to efficiency gains, especially where family labor becomes an unpaid bonus.

Within the Cuban context, this is probably the case in tobacco, and in some coffee production. On the other hand, to the extent that machinery has significantly improved the productive process, whether in cultural operations, irrigation or harvest, the fragmentation implied by vinculación becomes problematic. This is because the scale of efficient mechanized operations is much larger than the scale of direct family, or small group, production. Even in those cases where operations are technically feasible across many small plots, then scheduling and proper billing for services within the co-op become very complicated. And what of the large percentage of cooperative members who are machine operators, mechanics, welders or professionals? For the highly mechanized cooperatives, it is hard to see how vinculación is not a rather complicated step backwards.

Participation as Motivation

Much of the impulse for vinculación comes from the difficulties many cooperatives have experienced in eliciting acceptable levels of productivity from their memberships. This chapter has detailed some of the incentive-related factors which leave many members delivering far less than their full measure, even at a cooperative demonstrating above average levels of performance.

As important as the relation between income and work is, other motivational mechanisms exist. Many observers maintain that worker participation in decision making generally translates into greater involvement with the work process. Might the motivational potential of enhanced participation, combined with reforms of dysfunctional incentives, begin to reduce the barriers between the individual and the collective without fragmenting the cooperative? Rather than attempting to link each member to a small piece of the cooperative, why not enhance the information and decision making opportunities

available to the general assembly, and create a stronger link between the member and the cooperative as a whole?

CHAPTER 7 DECISION MAKING

Although the issue of member participation is one of the most important issues of cooperative decision making, it is not the only issue. Member participation in decision making presupposes the existence of meaningful choices to be made by the cooperative. A prior question then, is the degree to which the cooperative itself is an autonomous, decision making entity.

Management Autonomy

The essence of autonomy for the cooperative is the ability to make decisions. These decisions lead to results, and results (positive or negative) modify future decisions. Autonomy thus forms a link between cooperative inputs, and cooperative outputs and returns.

By Cuban law, a cooperative such as “Amistad Cuba Laos” constitutes “an economic and social organization, which functions autonomously from the State” (Consejo de Ministros 1990: 1). Of equal relevance here, the law states that the Ministry of Sugar will determine the norms and methods to be utilized by the sugarcane producing cooperatives, and that the permission of the territorial delegate of the Ministry of Sugar is required in order to vary the crops produced by the cooperative. At "Amistad Cuba

Laos", and probably at most sugarcane CPAs, this translates into an autonomy that is limited in fundamental ways:

- Land in sugarcane must remain so. The co-op cannot decide to switch to other crops, even though they may offer much higher profits than cane.
- Land cannot be sold or rented. It can be acquired, if the co-op can convince a landowner to join, or to sell land to the co-op.
- The state is the only buyer of cane. All cane from "Amistad Cuba Laos" is sold to the "M.M. Prieto" CAI. The co-op cannot "shop around" for the best price on its cane. During some years, a small amount of cane has been sold outside normal state channels, for consumption as guarapo (fresh cane juice), but even those sales have been prohibited during the 1995-96 fiscal year.
- The state is the only supplier of agricultural inputs. The co-op therefore has a very limited capacity to choose, vary, or often to even acquire the inputs it needs. The products which the state offers are either purchased or not, and if a needed input is not available through the CAI, it is very difficult for the co-op to obtain it at all. In practical terms, this is probably the single most severe limitation that the cooperative faces.

Except for the last mentioned point, to which we will return, neither the co-op leadership nor the general membership, seems to be particularly concerned about these restrictions on their autonomy. What does bother leaders and members alike, is the close supervision, by the CAI of the cooperative's day-to-day operations. The CAI's involvement begins with the annual plan ("plan técnico económico") which the cooperative elaborates on a standardized format from the Ministry of Sugar, and submits to the CAI.¹ In any case, the plan appears to be a serious document, which for the most part represents an honest attempt by the co-op to present an accurate, if optimistic, plan of

¹ Although I was not present at the time of the year when this plan was being elaborated, it seems probable that negotiations with the CAI take place over critical parameters, such as area to be harvested, estimated yields, and amounts of inputs.

action.² From this annual plan, flow monthly plans. The progress toward implementation of the monthly plans is closely monitored by the CAI. Personnel from the CAI schedule numerous visits to the co-op, to review all cane related operations, as well as machine repair and even the care with which idle machinery has been prepared for storage. Visits by one or another team from the CAI occur up to several times per week. It is this aspect of the cooperative's relation to the state which is roundly condemned by many members, who claim that these visits demand large amounts of co-op leaders' time, and serve no purpose beyond justifying the employment of CAI personnel. Recalling the discussion in Chapter 3, for years, the CAI guaranteed a steady supply of all industrial inputs, at prices which permitted good profits within prevailing standards of efficiency. At the same time, CAI personnel kept a close eye on cooperative operations, perhaps to assure that inputs provided for sugar would not be diverted to other crops, or that the relatively cheap inputs would not be wasted. In effect, the cooperative traded a certain amount of autonomy for security. Since the beginning of the Special Period, the ability of the CAI to maintain its half of the bargain as a reliable supplier has diminished significantly. Now the co-op must make considerable efforts to obtain even a fraction of the many inputs which the CAI can no longer regularly supply. The implicit agreement has broken down, yet close oversight by the CAI continues unabated.

² There are a few operations, the planned levels of which appear to be highly exaggerated as compared to the actual amounts carried out. These activities, which include organic fertilizer application, cultivation with oxen, and irrigation, seem to be higher priorities for the government than they are for the co-op, and may be included in the plan for appearances.

Influence of International Creditors

On two occasions during my data gathering in August 1995 another visitor arrived with the usual CAI representatives. A Latin American agronomist, this visitor was employed by European interests that were providing credit for the 1994-95 sugar crop.³ As a representative of the creditors, he was monitoring the progress of the sugar crop; not only the co-op's role, but also that of the CAI. Beyond the technical evaluations and suggestions he presented to the co-op, this visitor's efforts appeared to be directed at persuading the CAI to allow the co-op manage its own farm. He asked the co-op leaders to present a budget proposal, or at least a list of inputs needed, so that they could be assigned an amount to spend. He urged the CAI to permit the co-op to spend the credit as they saw fit, insisting that the farmers themselves know their crop best. Finally, he expressed the hope that the CAI would not insist on harvesting the cooperative's long-season cane ("primavera quedada," scheduled for the 1997 harvest) during the 1996 harvest.⁴ During the encounter between the cooperative leaders, the CAI team, and the representative of the creditors, there emerged a striking coincidence of perspectives between the latter, and the co-op producers. Might this be an indication of the potential of the cooperative to function within an increasingly market-oriented economy? More generally, might the same cooperatives which functioned so well within the highly centralized economy of the late 1980s, return to prosperity within a mixed economy in the late 1990s?

³ According to the London "Economist," "Several European banks and commodity houses have extended more than \$200m linked to sugar production. The interest rate, at 14%, is steep; but at least there is money now for fuel, pesticide and parts." (Wroe 1996: 10).

⁴ By harvesting the "primavera quedada" cane early, at 10 or 11 months growth instead of its full 18 to 20, a small immediate gain is achieved, but only by sacrificing the next harvest.

Sugar and Beyond

About one of every seven Cuban workers is employed in the sugar industry (Wroe 1996: 9).⁵ This is not a new phenomenon: sugar has been Cuba's most important industry for many decades. Seen this way, perhaps it is not surprising that, in spite of very low returns on sugarcane for the past few years, there is no perceptible sentiment among the membership to move away from sugarcane farming. Farming sugarcane is what the members know how to do, it is what they are set up to do, it is what the government insists they do, and it is what the country needs them to do.⁶ But it is not all they do. Another facet of cooperative management is revealed by looking at their non-sugar, or more accurately, non *industrial* sugar, commercial dealings.

Guarapo sales. The sale of specially prepared sugarcane to establishments that sell the fresh-squeezed juice, called "guarapo," has been an important source of income for "Amistad Cuba Laos."

Mechanized services. The provision of agricultural machine services for other farms, or in U.S. farm parlance "custom work," has been a common source of income for the cooperative. In 1994-95 this consisted of harvesting cane at a farm within the jurisdiction of the same CAI as the cooperative, whereas the Annual Report for 1993-94 mentions only "tractor rentals." The request for these services usually comes from the CAI. The cooperative claims to always accede to these requests, and in years past, the

⁵ This is around 400,000 workers (Salomón 1995: 2; Pérez-López 1991: 56).

⁶ It is worth emphasizing that I detected no resentment or even criticism of the restrictions on choice of crop, renting or selling land, or deciding where to sell the production. These form the basis of a broad state control over the agricultural production system. That control does not appear to be significantly questioned by the cooperative members.

payment received for the work made it attractive. Recently however, the difficulty of maintaining machinery in running condition seems to be causing co-op leaders to have second thoughts about the advisability of performing these services.

Sales of food crops. The cooperative has always sold production from its food, dairy and livestock area. Until recently, the sales were only to the members and workers for family consumption, and to the state purchasing agency, "acopio," to fulfill the quota determined within each yearly plan. Even as recently as 1991, the officially set prices which the cooperative received were more than enough to cover costs of production.

Table CHAPTER 7 -1 Principal Income Sources, in Current Pesos, for Selected Fiscal Years

Activity	1990-91	1993-94	1994-95
<u>Industrial Sugarcane</u>			
gross income	727,205	319,672	365,480
cost	261,810	333,882	339,396
net income	465,395	(14,210)	26,084
cost-to-income ratio	0.36	1.04	0.93
<u>Guarapo Sugarcane</u>			
gross income	68,737	63,584	37,277
cost	25,685	29,936	18,561
net income	43,052	33,648	18,716
cost-to-income ratio	0.37	0.47	0.50
<u>Mechanization Services</u>			
gross income	34,691	21,263	40,066
cost	10,337	17,952	33,657
net income	24,354	3,311	6,409
cost-to-income ratio	0.30	0.84	0.84
<u>Food Crops, Dairy, Livestock</u>			
gross income	63,708	33,891	218,829
cost	38,035	58,361	130,522
net income	25,673	(24,470)	88,307
cost-to-income ratio	0.60	1.72	0.60

Source: "Amistad Cuba Laos" documents: Informe del Balance Económico 1990-91; Informe Anual 1993-94; Informe Anual 1994-95.

By 1994 however, the official prices no longer even approached the costs of production. The free agricultural markets were opened in October of 1994, during the cooperative's 1994-95 fiscal year. Although the cooperative sold only about 10% of that year's total food production at the market,⁷ the profits obtained were sufficient to return the activity as a whole to the same cost-to-income ratio which it had in 1991.⁸ As seen in Table 7-1, the food crop, dairy and livestock is the only of the 4 major activities which has even approached the 1990-91 cost-to-income ratio, and has become the most important non-sugarcane source of income for the cooperative.

Two other sources of income are being developed:

Passenger bus. The cooperative has obtained a "pre-owned" passenger bus, which they are gradually returning to operating condition. The concept is to provide members and hired laborers with free, comfortable transportation to work, while charging a moderate fee for carrying passengers not affiliated with the cooperative.

Special market for sugar. Under an agreement with a European non-governmental agency, arrangements have been made to market sugar produced from "Amistad Cuba Laos" cane, in Europe. The sugar will be sold at above-market prices, within stores which specialize in cooperatively produced goods. The proceeds will then be used to purchase agricultural inputs in Europe, thus ameliorating some of the critical shortages affecting the cooperative. At the time of this research, the program had not yet begun to function.

⁷ Although significant amounts of a few products were sold (27% of the boniato, 23% of the yuca and 31% of the fresh corn-on-the-cob), for most products, including rice, beans, milk, potatoes and malanga, none was sold.

Non-official Sources of Consumer Items

The state-run CAI is the cooperative's only source of agricultural chemicals, petroleum products, machinery and almost all spare parts. When these inputs are not available from the CAI, the cooperative can only substitute (as when laborers with hoes take the place of herbicides), or, more commonly, do without. However, besides these agricultural inputs, the cooperative purchases a wide variety of items, including inputs, shop materials, work clothes, building materials, and especially food and other consumer items for members. Prior to the Special Period, all items were supplied through official channels. As the official suppliers' ability to reliably supply the cooperative has diminished, the co-op has developed alternative suppliers for some goods.⁹ Cooperative records for 1994-95 show that somewhat less than 10% of the food production went to "organizations." These organizations are said to be none other than the outside suppliers, who are themselves looking for scarce goods (in this case, staple foods). The provision of food to these suppliers seems to be a "good will gesture" to which the supply houses respond by permitting the cooperative to purchase from them.¹⁰

⁸ None of the documents provided to me by the cooperative separated market derived income, from other sources, but since approximate prices, and specific quantities are known, the economic importance of the market sales is apparent.

⁹ With one exception (a neighboring UBPC), these suppliers are also instances of municipal, regional or national government, although they are not within the official line of supply to the cooperative.

¹⁰ Although co-op members were not too eager to discuss the specific arrangements they have with these suppliers, it is clear that produce supplied to certain state entities is related to sales to the co-op of a wide variety of goods. Often the entries in the co-op books associated with these purchases involve a percentage "discount " which I believe may represent payment for the produce.

A sample of purchases from 1990 revealed that purchases were made at 10 different supply houses, all managed by the CAI.¹¹ Samples from 1994 and 1995 found 26 and 34 suppliers respectively, with most of the increase consisting of suppliers not controlled by the CAI, and thus under no obligation to sell to the "Amistad Cuba Laos" cooperative. The limited magnitude of these "extra-official" purchases is shown by Table 7-2. The important figure is the percentage, since the absolute peso amounts are totals from each year's sample, not from the whole year. Several trends discussed in previous

Table CHAPTER 7 -2 Purchases from Official vs. Outside Supplier, in Current Pesos

Year of Sample: March thru June	Suppliers:		Purchase Amounts:		Percent:
	Official	Outside	Total	Outside	Outside/Total
1990	10	0	68,101	0	0%
1994	10	16	107,947	13,016	12%
1995	17	17	160,805	10,879	7%

Source: Entradas del Almacen 1989-90; Entradas del Almacen de Piezas 1989-90; Vales de Entrada del Almacen de Insumos 1993-94; Vales de Entrada del Almacen de Piezas 1993-94; Vales de Entrada del Almacen de Insumos 1994-95; Vales de Entrada del Almacen de Piezas 1994-95; interviews with cooperative accountant, 8-95.

chapters are also confirmed by Table 7-2. The purchase amount during the sample period of 1990 was much smaller than in more recent years, reflecting increases in input prices. The increasing number of official suppliers, as well as the decreasing percentage of purchases made outside the official channels tend to confirm the assessment of 1993-94 as the worst period for shortages, and a renewed emphasis by the state on supplying agricultural inputs, after mid-1994.

¹¹ Sufficient time was not available to copy all purchases for these years, so only the purchases during March, April, May and June from each year were recorded. Since many items are purchased periodically, this sample should have captured a representative cross section.

Table 7-3 breaks the outside purchases down into 4 categories. The category of “food and other consumer items” where these outside purchases are concentrated, includes certain vital items: salt, bread, work clothes, and coffee, among others.

Table CHAPTER 7 -3 Outside Purchases by Category and Year, in Current Pesos

Category of Outside Purchase	1994		1995	
	Amount	Percent	Amount	Percent
Food & other consumer items	4,896	38%	5,295	49%
Inputs for food crops, dairy	1,692	13%	2,586	24%
Cane production inputs	2,614	20%	1,565	14%
Other items	3,814	29%	1,434	13%
Total	13,016	100%	10,879	100%

Source: Vales de Entrada del Almacen de Insumos 1993-94; Vales de Entrada del Almacen de Piezas 1993-94; Vales de Entrada del Almacen de Insumos 1994-95; Vales de Entrada del Almacen de Piezas 1994-95; interviews with cooperative accountant, 8-95.

Management Objectives

The supplementary sources of income, and complementary sources of supply developed by the cooperative management seem to demonstrate an ability to adapt and survive economically, without transgressing the limits set by political authorities. To a large extent the leaders apparently accept the limits as justified. However, the loss of the favorable terms of trade which Cuba enjoyed with the socialist block, is leading to institutional changes at the local level. The inability of the CAI to guarantee inputs and the relatively high cost of those inputs when available, the influence of capitalist lending institutions, and the opening of free markets are some indicators of this gradual change. The "Amistad Cuba Laos" cooperative management appears capable, and even eager, to navigate these and future changes.

Yet at the same time, there are indications that the entrepreneurial objectives of the cooperative management are somewhat different from those to which we are accustomed.

These managers seem to accept severe prohibitions on the sale and rental of land, on choosing of crops, and even of a ban on the sale of their most profitable product: cane for guarapo. Furthermore, they uncomplainingly participate in joint planning with the state, and do not even seem to make a serious attempt to maximize income at the free, and highly profitable, agricultural markets. Much of this behavior could be offered as evidence that the cooperative management is little more than an appendage of the state agricultural bureaucracy. There is no doubt that the cooperative managers are careful to avoid confrontations with government. As the only dispenser of scarce inputs, the CAI receives courtesy, though not always respect. For this reason, it is not particularly useful to attempt to draw conclusions from the cooperative's deference to state authority: the rules are well known, and playing within those rules is a precondition to achieving more substantial objectives, which may include an official bending of the rules in one's favor.

The specific objective which flows from this dependence on the state, is maximization of cane yields. By consistently achieving some of the highest yields of any farm attached to the M.M.P. CAI, "Amistad Cuba Laos" gains prestige, and, they believe, priority access to scarce inputs. At the same time, maximizing arrobas per caballería, i.e., production per harvested area is not the same as maximizing production (a more usual government objective). Maximizing production by harvesting fields which should be left another season, is in fact, a reliable method for reducing per area yield. Judging by Table 3-1 (page 41), this is an area where the cooperative has, to a significant degree, held to its own criteria, refusing to be persuaded to sacrifice future yields for immediate production.

Securing adequate inputs involves more than just maintaining good relations with the government authorities. As described above, the cooperative managers devote

considerable resources to obtaining needed items, for which official channels are no longer reliable. Many of these items are for members' direct consumption, or for the production of food crops. This points toward what may be the most critical management objective: assuring the food supply of the membership. This objective is pursued in a variety of ways. Although they have each been mentioned already, they are grouped here, and listed in order of importance.

- 1) Collective food-crop production
- 2) Collective animal husbandry (especially dairy herd)
- 3) Individual food-crop (rice) area
- 4) Individual animal (especially pig and chicken) raising
- 5) Collective purchases of food products (mostly consumed during the morning snack and lunch)
- 6) Individual purchases authorized by the cooperative (at special products store).

Cost control is a fourth management objective. As the cost-to-income ratios have climbed higher over the past few years, the concept of cost control has, according to co-op leaders, assumed greater importance. Several cost-cutting measures have been initiated.

- A new tillage system, which promises greatly reduced machine use in the overall planting operation, is being introduced.
- The mixing and application of fertilizer is now carried out according to a field-by-field analysis of soil requirements, instead of traditional, blanket coverage.
- Closer coordination between the head of machinery, and the accountant to control repair costs, especially the use of spare parts and other shop materials.

The cost-awareness has not, however, penetrated to the level of attempting to deal with expensive habits such as individual travel by tractor, lack of accountability in the repair shop, or any serious tracking of costs and output of cane fields, to gauge when to uproot and re-plant them. The accountant contends that the general membership is neither capable nor willing to sustain the increase in paperwork which information gathering requires. Under the conditions prevailing until about 1991, the combination of a single supplier of cheap inputs, and favorable prices, made close attention to costs irrelevant. As long as workers were fulfilling norms, and yields were at acceptable levels, why invest in elaborate cost accounting systems? What decisions would be informed by the results? With the current production environment characterized by input scarcity, higher production costs, and slightly more options for buying and selling, cost accounting and control are themselves becoming “cost effective.”

Conspicuous by its absence among principal management objectives, is “profit maximization.” This does not imply that the cooperative managers are unaware or indifferent to it. To the contrary, they are proud of the fact that their cooperative has never ended the year with a loss. Certainly, part of their motivation for controlling costs and seeking high sugarcane yields is profitability, which serves as an indicator of, and reward for success in pursuing these objectives.

Although an often assumed economic ideology tends to identify entrepreneurial activity with a profit maximizing motivation, a distinction between the concepts is probably required in order to understand production cooperatives, particularly in Cuba. In an excellent introduction to their Producer Cooperatives and Labor-Managed Systems (1996: xiv), editors Prychitko and Vanek point out the importance of not assuming that producer cooperatives follow the operating principle of a traditional capitalist firm:

MAXIMIZE Profit = Revenue minus Labor Cost minus All Other Costs.

Rather, the cooperative has its own operating principle, which corresponds to the condition of the workers as owners:

**MAXIMIZE Net Income Per Worker = (Revenue minus All Other Costs)
divided by the number of workers**

Understanding “income” in its broad, rather than strictly monetary sense, this construct begins to explain the cooperative management’s objectives. For example, as shown in Chapter 6, the most significant portion of member income is the food allotment, and assuring that food is indeed a high management objective.

Member Participation

The formal organizational system of the Cuban CPA provides the opportunity for a democratically managed economic and social community, with decision making based on member participation. Building on cooperative autonomy, which links cooperative inputs to cooperative outputs and results, member participation in cooperative decision making links the member’s own inputs to cooperative outputs. Not surprisingly, a broad range of managerial experts and economists maintain that such participation in decision making can elicit greater efficiency and effort from workers (Carnoy and Shearer 1980; Koont and Zimbalist 1984; Manz and Sims 1987; Prychitko and Vanek 1996). To what extent is "Amistad Cuba Laos," taking advantage of this potential source of strength? To answer this question in a precise way would require at minimum the observation of one or more regularly scheduled general assembly meetings, and the study of the minutes of several

others, the more the better. I had neither of these opportunities.¹² Nevertheless, my time at the cooperative did provide me with general indications that member participation is not nearly as developed as it should, and could, be.¹³ Some apparent limitations to greater participation are readily identified, and can be classified according to the ability the cooperative has to affect that limitation.

First, there are the government limitations on the cooperative's autonomy. These have been described above, and there is little the cooperative can do to effect change here. On the other hand, should the government change policies, these limitations could vary or disappear literally overnight.¹⁴

Next, there are limitations resulting from broadly shared experiences, attitudes or beliefs of the members. Three examples, which probably hinder greater member participation, are:

- The top-down leadership style, and a tendency to centralize information and decision making which are apparent in Cuban political institutions, have not created a climate favorable to participatory management. To illustrate, the best result of the government's own efforts, during more than a decade, to engender citizen and worker participation, is consistently reported to be "enthusiastic involvement" (Pérez-Stable

¹² The only general assembly meeting held during my stay was an unplanned event, the day I arrived, mainly to introduce me to the cooperative. A few days before leaving the cooperative, I found that minutes of previous meetings were filed at the local offices of ANAP, but the person who handles them, and who would have to authorize my access, was out of town for several weeks.

¹³ At least one other study indicates that this situation may be common among Cuban CPAs: "Moreover, it seems that even within the degree of autonomy retained by cooperatives, many have failed to consolidate participatory management styles and collective decision making." (Deere et al. 1992: 139).

¹⁴ A question which arises here is whether the existing space for autonomous decision making by the cooperative is sufficient to elicit meaningful participation at all. There are differing opinions on this issue (see Zimbalist and Brundenius 1989:121; Deere et al. 1992:139; Nova 1994:98; Prychitco and Vanek 1996:xiii), but since nearly everyone agrees that change toward a more market-oriented economy is most probable in Cuba, the issue may not be especially important.

1993:125-126) or democratic beginnings “overshadowed by the center” (Fuller 1992:95), rather than substantive input into decision making.

- Many members of the "Amistad Cuba Laos" cooperative, and apparently many other Cubans, view the vital management activity of gathering and analyzing data as a bureaucratic vice.
- Compared to most Cuban work-places, urban or rural, the cooperatives function quite efficiently. This leads cooperative members, including leaders, into a sense of security, which blunts the impetus for improvement and change.

There is no reason that the cooperative cannot confront these attitudes and attempt to change them, although change in attitudes is hardly ever rapid.

Finally, the cooperative itself has practices which inhibit member participation in decision making. One of the most glaring may be the way that information is handled at the general assembly meetings themselves. Several cooperative members (including some members of the executive committee) claim that the information presented is “inaccurate” and “embellished” to make the cooperative’s situation appear more favorable than reality warrants. At the crucial, year-end meetings in July, the draft annual report is presented to the membership. This report is a multi-page document which includes narrative and columns of 5 and 6 digit figures referring to each of the cooperative’s areas of activity. After the economic officer reads the report aloud, the floor is opened for discussion and possible modification, and the document, as modified, is eventually approved by a show of hands. According to the economic officer himself, no written materials, either handouts or wall charts, are prepared to aid the membership in the analysis and evaluation of “their” annual report.¹⁵ There are indications that cooperative members would respond well to

¹⁵ Although I questioned members of several other cooperatives regarding their year-end general assembly meetings, I did not find an exception to these procedures.

such written materials. When the results of the first distribution of “permits” (see pages 108-109) were posted in the lunch room, the response by the members was so energetic that the executive council had to meet immediately, to resolve some of the (very legitimate) objections of the members.¹⁶

Participation and Vinculación

In Chapter 6, the “Vinculación” policy was introduced as a fundamental solution to motivational problems. By assigning the responsibility for cultivation of a piece of land to a very few individuals, who also share the income generated by “their” production, vinculación reproduces the “autonomy” concept at the level of the individual: decisions lead to results, and results (positive or negative) modify future decisions. Individual input is linked to individual output. In tying the individual inputs and rewards to production, it also partially achieves the objective of member participation in co-op decision making, but only partially: the cooperative component is no longer present.

- Autonomy: links Cooperative Input to Cooperative Output
- Vinculación: links Individual Input to Individual Output
- Member participation
 in co-op decision making: links Individual Input to Cooperative Output

¹⁶ I asked the co-op economic officer and the bookkeeper whether they saw any value in distributing a copy of the draft annual report to each member a few days prior to the year-end meeting. Neither needed but a moment to respond enthusiastically, but they clearly saw such an immense use of paper (a ream, perhaps) as an almost sinful extravagance. After leaving the cooperative, I sent the economist 4 reams of photocopy-grade paper from Havana, where it cost \$6.00 per ream. A month later, word came back to me that the co-op purchased an electric typewriter for the accounting section . . .

It therefore seems probable that implementing vinculación at a highly mechanized cooperative would impair the *sine qua non* of successful cooperative production: identification of individual with group goals.

As a solution to low motivation, expanded member participation in cooperative decision making may represent an alternative to vinculación, which is more compatible with the cooperative's current organization of production. If expanded participation can indeed create a strong link between individual input and cooperative output, then the integrity, and advantages, of mechanized operations and member specialization would be retained. The following outline attempts to clarify the fundamental characteristics and inter-relationships of the autonomy, vinculación and participation concepts:

Cooperative Autonomy

- Depends on "space" available for decision making, vis-à-vis government.
- Key is that decisions are made at the farm; decisions lead to results; results modify future decisions.
- Links cooperative inputs to cooperative outputs and returns.
- Who at cooperative makes decisions, and on what basis, leads to question of participation.

Vinculación del Hombre al Area

- Presupposes a meaningful level of cooperative autonomy.
- Being implemented at many cooperatives.
- Application of autonomy concept to small groups within the cooperative.
- Links individual member inputs to individual outputs and returns, through a specific plot of land.
- Incorporates family labor.
- Requires good record keeping for fertilizer, machine use or other non-family inputs.
- Appropriate for labor-intensive farming.
- Difficult to mesh with mechanization and labor specialization.
- Does not tend to link the member to the cooperative, and may even cause divisions.

Member Participation in Cooperative Decision Making

- Presupposes a meaningful level of cooperative autonomy.
- Apparently deficient at most cooperatives.
- Links the individual's inputs to cooperative outputs and returns.

- Does not incorporate family labor.
- Requires improved gathering and sharing of information, on which to base decisions.
- Compatible with current cooperative organization, mechanized farm operations, labor specialization, adoption of new technologies.

Information and Member Participation

The role of information is so central to decision making that it is worthwhile to enumerate the major purposes for which information is collected.

- Inventory control. According to the cooperative's economic officer, the design and implementation of a secure system of inventory control had been his major accomplishment since joining the cooperative less than a year prior to my research.
- Assigning costs to the activity which generated those costs, or at least distributing costs across activities according to some workable rule. This encompasses differentiating between expenses incurred by the corn crop, the milk herd, this year's cane harvest and next year's cane harvest (which is a bit complicated since the two harvests grow concurrently, at different stages).
- Preparation of annual reports. The figures emphasized here are the sugarcane yield per caballería and cost-to-income ratio, the percentage completion or production of planned activities, the earnings to distribute, and the report on the food crops distribution and costs.
- Comparison to norms. The most developed instance of this is the sugarcane harvest, where the amount harvested each day by each machine is accurately monitored.
- Reports to the CAI. The frequent visits by CAI personnel for monitoring of cooperative progress toward planned goals require the cooperative to have written documentation ready. Each month, this documentation is consolidated and presented to the CAI for the assignment of the "permits" which form the basis of the new incentive scheme. The CAI also reportedly performs an annual audit of the cooperative.
- Audits by the bank. The bank audits the cooperative's financial reports annually, as part of their determination of the farm's creditworthiness. The cooperative must also submit an annual credit application detailing the expenditures necessary for the sugarcane crop.
- Determination of fertilizer requirements. In 1994, the cooperative secured the services of a research station to perform a study of the conditions affecting the farm's

sugarcane production. The study included soil samples which the cooperative has employed since then in calculating fertilizer formulas and application rates.

- Supplying budget information to departments. With the new economic officer, a greater effort is being made to work within a planned budget. For example, the “head of machinery” who compiles orders for spare parts was very pleased with the fact that he now receives a report from accounting, informing him of the balance he may spend on replacement parts. Formerly, he simply spent until he was told that there was nothing left.

With the exception of the awarding of purchase permits, the fulfilling of norms in the cane harvest, and the annual report, the information collected seems to hold little of practical interest for most members. There are no regular reports on the financial, productive or organizational events within each of the cooperative’s departments, no efficiency or cost comparisons between alternative technologies, little evidence of analysis of the data gathered by anyone outside the accounting office. On the other hand, there is no organized effort to take advantage of the information gathering capability of members, through monitoring of weeds or other pests, crop density or maturity, soil moisture or any other factor.

CHAPTER 8 CONCLUSION

Several researchers have focused on the effects which Cuban government policies, and international political and economic developments have had on Cuban agricultural production cooperatives (Deere 1995; Deere et al. 1992; Figueroa 1995; Meurs 1989; Nova 1994; Pollitt and Hagelberg 1994). Much less work has centered on the internal dynamics of cooperative management (Deere, et al 1994). This case study provides an exploratory mapping out of the major factors, social and technological, directly affecting farm management, as well as the particular form which management has assumed at a sugarcane cooperative in the mid 1990s. Although this text includes some implicit recommendations regarding cooperative management, its primary purpose is to provide guidance for applied research dedicated to improving the functioning of these remarkable farms. Accordingly, this conclusion is organized into “General Characteristics,” “Strengths” and “Weaknesses,” all with reference to internal, cooperative controlled factors. The conclusion ends with a section on possible future directions. Each section incorporates a list, to emphasize the main points.

General Characteristics

- Increasing diversity of membership.
- Organization and discipline are adequate for successful farming operations.
- Basic planning and accounting systems are in place.

- High level of mechanization.
- Considerable autonomy.
- Sugarcane yields recovering.
- Increased attention to efficient use of inputs.
- Increasing use of individually contracted workers.
- Importance of food-crop production.
- Entering members are mostly field laborers.

A cooperative which began as a handful of small farmers still includes most of those farmers, but has grown to comprise laborers, skilled workers, and professionals. While the loss of homogeneity is lamented by some of the original members, the cooperative today draws on an impressive diversity of training, talent, and experience, within its own membership. This diversity has developed as a result of state policies requiring the use of rather complicated planning and accounting systems at the cooperative, and due to the high level of mechanization desired, and achieved, by the members.

In spite of tight government regulation of some fundamental production and marketing decisions, the "Amistad Cuba Laos" cooperative is not run by the Cuban government. An indication of this is the consistently lower performance of state run farms, when compared to cooperatives in general (Puerta and Alvarez 1993: 15, 24-27), and "Amistad Cuba Laos" in particular. Sugarcane yields at this and other farms tumbled due to the input shortages which hit hardest from 1991 through 1994. With renewed availability of many industrial inputs, yields have increased for the past 2 years. Machine related shortages continue, however. The severe shortages appear to have had other

effects on cooperative management. First, there are several indications that more attention is dedicated to efficient use of industrial inputs. Also, hired field labor seems to have been substituted for unavailable inputs, increasing the non-member percentage of the cooperative workforce.

Another result of Cuba's economic crisis was food scarcity. Although production of food for the workforce had always been a cooperative priority, generalized food scarcity caused the in-kind portion of member income to become much more important than the cash portion. Since only the cash portion is tied to individual productivity, this change had significant effects on the system of incentives, and sanctions.

Since the early 1980s, an gradually increasing majority of members have never been individual land owners. This is significant, because the CPA-type cooperatives were founded on the basis of farmers pooling their land. Although still of historical importance, that pooling of private land becomes less practically relevant with each old farmer who retires, and each young laborer who enters. In this sense, the composition of "Amistad Cuba Laos" and other CPAs is converging with the former state farms, now UBPCs.

Most Important Strengths

- Confidence.
- Technical capacity.
- Willingness to adopt new technologies.
- Skillful handling of state control vs. autonomy issue.
- Adaptability.

All but the most recent arrivals at the "Amistad Cuba Laos" cooperative have known the feeling of being part of a very successful farming operation. During the past 2

years, "Amistad Cuba Laos" members have watched their production begin to recover much faster than other local producers. This relative success, based on the technical capacity, discipline and adaptability of a diverse membership, has produced substantial confidence. Probably as a result of this confidence, the cooperative is open to the adoption of new technologies. This applies even where apparently sound, traditional techniques are challenged, as was the case in introducing a minimum tillage method for removing old ratoons.

It appears that the cooperative's prestige as a productive operation, plus skillful handling of relations with local authorities, has enabled the cooperative to avoid some of the most harmful state policies (early harvest of long season cane; accelerated adoption of vinculación or of oxen), and even negotiate uncommon concessions (selling excess food production at agricultural markets instead of to state purchasing agency). In fact, technology adoption and handling of relations with the state may be specific examples of a broad adaptability. Whether in shifting certain production activities from cooperative to family, or in simply surviving the very hard times of 1993-94 when nearly all the state farms disappeared, "Amistad Cuba Laos" and most other cooperatives have proven capable of adapting to changing situations. There are some problems on the horizon, however, which threaten to truly put this capability to the test.

Most Serious Problems

- Machine deterioration.

- Problems in mechanical repair shop.
- Increasingly membership-based income.
- Dysfunctional incentive system.
- Weak sense of ownership.
- Barriers to member participation in decision making.
- Poor use of information.
- No farmer with land has joined since 1985.
- Few women members.

The most serious threat to the continued existence of the "Amistad Cuba Laos" cooperative may lie in the deterioration of its agricultural equipment. The cooperative has acquired only 1 major piece of equipment since 1990; the machine inventory is aging rapidly. Lack of replacement parts, and especially lubricating oil during certain periods, has certainly contributed to higher than normal rates of wear. Older, worn machines are demanding more parts, oil and fuel, and returning lower power and reliability. Meanwhile, there is no sign of new machinery from state suppliers. Under these circumstances, all the cooperative can do is assure the best preventative and corrective maintenance possible. Unfortunately, the chronic problems of accountability and motivation in the mechanical repair shop dramatically limit the quality of the cooperative's best efforts in this critical area.

To the extent that the in-kind portion of member income has come to outweigh the cash portion, income becomes increasingly based on the simple condition of membership, as opposed to individual or group performance. The increased preponderance of membership-based income, appears to have generated the need for a membership related sanction, i.e. expulsion, as a quotidian inducement to labor discipline. Expulsion has

indeed replaced voluntary separation as the main cause of members leaving the cooperative before retirement. Unfortunately, it is difficult to see how the threat of expulsion based on work absences could elevate the quality of work, although it almost certainly undermines cooperative morale. An important aspect of cooperative morale is the "sense of ownership." While some members clearly feel the cooperative to be "theirs," it seems that for many others it is only a place to work. Although the connection is speculative, this is precisely the lack of member commitment to be expected as a result of the use of expulsion as a common sanction. After all, what is the threat of expulsion but an institutionalized limit on the cooperative's commitment to the member?

The degree of membership participation in cooperative decision making is a difficult condition to judge. It is not so difficult however to identify one of the key factors that limits the development of greater participation: the cooperative's limited use of information regarding its own operations. Little of the considerable volume of information gathered is ever processed and reported to the general membership.

In the early 1980s, considerable emphasis was placed on incorporating small farmers and women into the agricultural production cooperatives. Nevertheless, each of those groups today represents a small and shrinking percentage of overall membership at "Amistad Cuba Laos." While this problem may not threaten the existence of this or other cooperatives, it is an area of concern for the future health of the cooperative movement. At "Amistad Cuba Laos," there is evidence that both groups are held away by the seniority system of job assignments, which virtually guarantees that the new member will spend years laboring in the fields before a more agreeable job opens up.

Alternative Directions for the Future

From the meetings, interviews and documents made available to me at the cooperative, it appears that there exist in Cuba today, several distinct visions of the direction that a cooperative such as "Amistad Cuba Laos" should take over the next few years. The institutional positions which follow were deduced from "who said what." None of these policies were presented to me as "official," and therefore should not be taken as anything beyond observations from this single case.

The most clearly and frequently articulated strategy for the cooperative comes from the "Complejo Agroindustrial," or CAI. This vision proposes the least change with respect to the cooperative's "traditional," or pre-1990, operations. Its objective appears to be to increase cane deliveries to the mill as soon as possible. This is to be accomplished fundamentally through renewed access to fuel and agricultural chemicals. The CAI also seemed to place a special emphasis on improved soil water management, including drainage projects and irrigation, with extra fuel allotments for the latter. Other measures that the CAI promotes are reduction of absenteeism, use of non-member field workers, and the application of sugar mill by-products as soil amendments. As of late 1995, the weakest link in this strategy for the longer term was the lack of any new agricultural machinery.

The most radical departure from usual cooperative methods and organization is advocated during the visits of representatives from fairly high levels of government outside the Ministry of Sugar - CAI structure.¹ This seems to be the main source of pressure to

¹ Recall the visit by Ramón Castro, mentioned in footnote 14, Chapter 2.

implement the policy of vinculación, to significantly increase the employment of animal traction, and the use of sugar mill by-products, particularly ash and “cachaza,” as soil amendments. I cannot say whether these methods are intended to replace, or to merely complement industrial farming methods. It does appear however, that the fragmentation of the cooperative operations implied by the vinculación policy represents an organizational adaptation compatible with smaller scale, pre-industrial technologies.

The strategy being implemented by the cooperative leadership has much in common with that supported by the CAI. This is not surprising, given the amount of control which the CAI exerts over the cooperative. Nevertheless, areas of agreement seem to reflect a genuine commonality of interest between the cooperative and CAI, whereas those aspects of more interest to the CAI than cooperative, are not accomplished. Like the CAI, the cooperative leadership is interested in increasing sugar production rapidly, and welcomes the renewed availability of fuel and agricultural chemicals. The cooperative has even been held up as an example by the CAI for having found various ways to economize the use of scarce inputs. The cooperative also seems fairly enthusiastic about the CAI absenteeism reduction scheme involving shopping “permits.” Where the cooperative diverges from the CAI is on the yield vs. gross production issue, where the cooperative is more interested in high per area yields than in the size of the next harvest. The cooperative is also focusing increased attention on alternative forms of income generation, and looking beyond the CAI for suppliers. Even in areas where there is considerable agreement with the CAI, the cooperative leaders feel that they can manage the cooperative just fine, without the interruption of frequent on-site supervision by CAI personnel. Regarding the vinculación and pre-industrial input strategy, the cooperative

leaders as of late 1995, had provided attention and assurances that they were working on implementation, without actually making significant progress. It should be remembered that the farmers who formed the cooperative did so in large part to escape the small scale, animal traction, family-labor based farm, and are showing no signs of nostalgia for a return.

The Asociación Nacional de Agricultores Pequeños (ANAP) is the organization which represents the small farmers, including CPA members, in Cuba. ANAP has been very active in promoting the formation of cooperatives, and continues to offer courses for cooperative leaders and specialists. At this juncture, however, their presence does not seem to be nearly as strongly felt as that of the other non-cooperative actors already discussed.

One critical problem area not addressed by either the cooperative or the CAI strategy is that found within the information-participation-accountability nexus. Based on the analysis presented in this study, it is within that broad, yet clearly defined, area that the cooperative has the opportunity, through its own efforts, to significantly improve performance. To not confront this challenge abandons the field to the competing vinculación policy, whose appeal lies precisely in its promise to resolve these intertwined problems with a single, Alexander-like stroke.

The following suggestions are therefore intended to fill a perceived gap in the cooperative's strategy. Each conforms to several criteria:

- addresses the principal problems enumerated above
- applicable within current cooperative organizational structure

- complementary to existing, industrial farming technologies
- realizable by cooperative within present degree of autonomy ²

Please note that these ideas are intended to be illustrative rather than comprehensive; they do not in themselves constitute a plan. They are presented in an annotated outline format to emphasize their provisional nature, and to invite reorganization and revision by the reader.

1. Information. An information system is at the heart of improving cooperative performance. Information will stimulate improved member participation, and provide the foundation for performance based accountability.
 - a) Procure Data On: Improved data collection will be hampered by a strong member aversion to more paperwork. An antidote to this may reside in broad involvement of the membership in the collection of data.
 - i) Environmental Factors Affecting Production. Pests, weather, soil water, soil samples, plant density, and maturity of cane are some examples of information useful in crop management. Source will be members working as “scouts.”
 - ii) Field Operations. Areas worked during time period; problems and solutions.
 - iii) Costs. Source will be accounting department. This data is already collected; the challenge here is to improve analysis.
 - b) Organize, Analyze and Store Data The cooperative economist feels that little can be done here without a computer. Overall, he is certainly correct, yet a in a specific, critical area, such as the repair shop, a very detailed system could be developed without automation. That would be the type of place to begin. If a limited system shows positive results, the outlay required for a computerized system will be recognized as minimal.
 - c) Report Generation.
 - i) Content. A few examples only:
 - a) Traditional Economic Reports. Particularly as required by the CAI, the bank or other external entities.
 - b) Detailed Economic Reports. For evaluation of cost-effectiveness of alternative technologies, when to replant fields, replace machinery.
 - c) Achievements by Individual or Work Group.

² Implementation of the suggestions regarding agricultural implements or machinery would probably require cooperation from entities with the capacity to develop or import equipment.

- d) Progress Toward Goals Field operations, cost reductions, crop production or other goals. The basis of individual or group evaluations, bonuses and awards.
 - ii) Scope. Scope of reports could be any level, from individual to overall farm.
 - d) Delivery of Reports.
 - i) When. Information should be available well before decisions are to be made.
 - ii) Who. To each member involved in decision, or reflected in report.
 - a) Executive Committee.
 - b) Area (Department) Supervisor.
 - c) Work Group.
 - d) General Assembly.
 - iii) How.
 - a) Public Display
 - (1) Periodic Progress Reports.
 - (2) Operational Overview. A “tactical” display for planning, work assignments and resource scheduling.³
 - b) Printed Reports to Individuals.
2. Participation.
 - a) Manner of Obtaining Information. Although participation is most relevant in decision making, member participation, or involvement, in information gathering would seem to be a good use of the large cooperative workforce.
 - i) Members As “Scouts”. With minimal training, members who already know how to identify weeds, abnormal growth, etc, could become proficient collectors of field data. This work could provide an attractive alternative to field labor for women, land owning farmers, or retired members who wish to continue to work part-time.
 - ii) Group Reports. Produced by work groups regarding their area. The very act of producing a report could become a motivating factor for the group.
 - a) Ideas For Improving Techniques. Economizing on labor or materials.
 - b) Need For Timely Actions In Specific Locations. Particularly regarding pests, stocks of inputs, or dangerous conditions.
 - iii) Area Supervisor Reports.

³ Here I am inspired by the sugarcane management concepts of Harry Clements, of the University of Hawaii. His techniques included “crop logging” as well as large, mural-like wall maps of the sugarcane plantations which were updated regularly, and used to organize and control irrigation and other activities, in a very visual, “public” manner (Clements 1980: 1-5, 220). Although they pre-dated personal computer, the emphasis on site-specific information, periodic updating and graphing of crop growth and highly visual representations of results attempted to inform management in ways similar to today’s computer-based decision support systems.

- b) Use Of Information. It is probable that the mere availability of information will increase participation to some extent, particularly since the legal framework of worker ownership, authority of the general assembly, monthly meetings and other participatory mechanisms already exists. This will be particularly true if reports are supplied to members at least a day before the meeting takes place.
 - i) Formalization Of Work Group Meetings. Presently, meetings within work groups appear to be almost entirely social (around the mid-morning snack) or operational, for the supervisor to assign specific jobs. With an agenda, information and some motivation, meetings could solve problems.
3. Accountability.
- a) More Precise Controls In Shop. This example was developed in Chapter 6.
 - b) Incentives Tied To Productivity. Information regarding individual or group productivity is a necessary step towards rewarding that productivity, but the incentive mechanisms must still be worked out. This will be particularly challenging while the cash portion of income is small compared to in-kind, food portion.
 - c) Development Of Norms. There is no better way to develop important norms, whether tractor fuel consumption or time required to weed an area, than to maintain and analyze one's own farm records.
4. Field Labor Reduction. For the reasons cited in the section on problems above, the reduction of field labor should probably remain on the agenda for the cooperative. Some ideas for easing field drudgery follow.
- a) Semi-Automatic Implements. Typical of this type of implement are tractor-drawn planters which open a furrow and apply fertilizer, but use one or more people who ride upon the implement to lay large, irregular or otherwise hard to handle seed into the furrow before the machine closes it. Sugarcane and some of the root crops grown by the cooperative are suitable for this type of technology, which exists in Cuba. Another task adaptable to this type of hybridizing is herbicide spraying, where a tractor-mounted herbicide sprayer feeds several lances, each of which is handled by a worker, who follows the tractor through the field, directly spraying the weeds, instead of crop and weeds indiscriminately, as does a conventional tractor mounted sprayer.
 - b) High-Clearance Tractor Although these machines are far from common in Cuba, the head of machinery from a cooperative not too far from "Amistad Cuba Laos" told of the advantages of having a high-clearance tractor, for entering sugarcane fields after the cane is too high to permit a conventional tractor from entering without damaging the stalks. The advantage of this system from a labor perspective is that it extends the time available for weed control, especially the pica-pica vine, and permits more to be done with the help of a machine.
 - c) Smaller Machinery For Specialized Tasks Considering the large size of the fleet, the cooperative has a very narrow range of tractor sizes (60 - 80 HP).

Whereas this may be an appropriate range for many tasks, a smaller machine could very likely be adapted to help with certain special jobs, which are presently done exclusively by hand. Re-planting the areas which didn't germinate in a new, or recently cut cane field might be such a task.

APPENDIX A
CASE STUDY PROTOCOL
for
"COOPERATIVE AGRICULTURAL MANAGEMENT:
A CASE STUDY OF A CUBAN FARM"

A) BASIC INFORMATION

1) Cooperative Census

Sources of data:

- Coop census documents
- Payroll documents
- Records of entry of members
- Individual interviews

Specific information to include:

- Date joined
- Sex
- Family status
- Age
- Educational level
- Former work situation (small farmer, ag laborer, other)
- Family relationships to other members
- Amounts and sources of family income
- Positions held within cooperative, with dates.

2) History of cooperative

Sources of data:

- Coop census documents
- Records of entry of members
- Annual reports
- Interviews

Specific indicators:

- Number of members, by year
- Dates of elections
- Names of officers elected
- Dates of general assembly meetings
- Level of production of principal crops each year
- Amounts of wages and profits distributed

- 3) Inventory of Cooperative's Productive Resources
Sources of data:
 -Prepared inventories
 -Annual, or other reports
 -Interviews with those in charge of each sector
 -Direct observation and inspection
Specific indicators:
 -Map of co-op holdings
 -Area dedicated to each crop
 -Description of:
 machinery
 buildings
 wells
 electrical service
 hand tools
 -Livestock
- 4) Description of Cooperative's Typical Agricultural Cycle
Sources of data:
 -Interviews
Specific information to include:
 -Approximate beginning dates and durations of each phase of cane production
- 5) Cooperative Organization
Sources of data:
 -National legislation.
 -Charter or constitution of Amistad cooperative.
 -Interviews with members: leaders and general members.
 -Organizational chart.
 -Descriptions of duties of coop officers.
 -Observation of meetings.
Specific questions and indicators:
 -Are indicated positions actually filled?
 -Org chart sketches by leaders and non-leaders.
 -What are duties of cooperative officers?
- 6) How are Leaders Selected?
Sources of data:
 -Charter or constitution
 -Interviews
 -Observation of meetings
- 7) Is Voting Secret?
Sources of data:
 -Charter or constitution

- Interviews
- Observation of meetings

8) What Economic and Production Data is Recorded at Co-op?

Sources of data:

- Co-op records themselves
- Observation of work
- Interviews

9) What Happens to Data after it Is Collected?

Sources of data:

- Reports and other documents
- Observation of meetings
- Casual observation
- Interviews

Specific questions:

- What data goes beyond its original place of recording?
- What documents are produced using data?
- How informed are members?
- How do members' impressions compare to info in docs?

10) Accounting System Structure and Procedures

Sources of data:

- Records
- Accounting documents
- Reports
- Job descriptions of individuals involved
- Interviews with those who collect and process data
- Observations of those who collect and process data

Specific questions:

- Why has accounting system been frequently changed?
- Who chooses the system?
- Is the same system used by all cooperatives?
- What formats are used?
- What commissions and individuals are involved in accounting?
- What does each do?
- Is professional assistance required to periodically consolidate basic data into a more formal system?

- 11) Relevant prices during periods under examination, and especially the terms of trade between rural and urban products.

Sources of the data:

- Receipts
- Coop accounting documents
- Documents on general prices

Specific indicators:

- Prices received for coop production.
- Prices paid for inputs.
- Prices paid for non-food consumer items purchased by coop members:
 - clothes
 - shoes
 - transportation
 - radios

B) MANAGEMENT AUTONOMY

- 1) With whom and in what amounts has the coop carried out economic transactions during the periods of time in question?

Sources of data:

- Receipts and bills
- Reports
- Interviews
- Observation of marketing

- 2) To what degree does the coop itself decide what to produce?

Sources of data:

- National legislation regarding coops
- Coop documents, meeting minutes
- Interviews with leaders

Specific questions:

- Degree probably varies among crops:
 - sugar quota mandated, but variety open?
 - auto-consumo completely discretionary?
 - other crops in-between?

- 3) Have changes taken place in distribution of coop income?

Sources of data:

- Legal parameters
- Accounting documents
- Reports
- Interviews

Specific questions:

- How is the distribution determined?
- If the distribution is mandated by law, to what extent is law obeyed.
- What has been before-and-after distribution among investments, amortization, saving, maintenance (esp of machines), social expenditures, wages and dividends?

C) CONCERN FOR PROFITABILITY

1) How has opening of markets affected sugarcane production at co-op?

Sources of Data:

- annual and other reports
- technical reports, if available
- interviews
- observation

Specific Questions:

- prices paid for sugarcane
- prices and availability of inputs for sugarcane
- are there alternative, or competing purchasers?
esp for "guarapo"
- is price related to quality?
- cane cultivation:
 - % of "despoblación" (low density) of cane fields
 - planting style
 - to burn or not to burn
 - hand vs machine harvesting

2) What procedures and criteria govern major operational decisions?

Sources of data:

- Technical reports
 - internal coop reports
 - by extensionists or other outside experts
- Meeting minutes
- Interviews
- Observation of meetings and work

Specific areas to examine: who, when and how:

- labor distribution and scheduling
- machine use and maintenance
- chemical types and applications
- irrigation scheduling

3) How are agricultural technologies applied within the cooperative specifically to compliment the large, permanent labor force?

Source of data:

- Meeting minutes
- Interviews
- Observation of meetings and work

Specific indicators:

- Evidence that labor force utilization is prime consideration in selection and use of machinery, plant varieties, chemicals
- Members' labor channeled into areas which are productive, yet difficult to mechanize:
 - reporting & analyzing production data
 - "scouting" for pests

soil samples and mapping
 tending high-value produce, livestock, etc.
 interplanting

D) MEMBER PARTICIPATION

- 1) What information is available, in what form, as a basis of decisions made by the membership?

Sources of data:

- Reports
- Meeting minutes
- Observation of meetings
- Observation of work
- Interviews

Specific indicators:

- Identify issues on which members feel strongly, and then ask why.
- Seek examples of documents in possession of members.

- 2) What forms of monitoring of work are used?

Sources of data:

- National legislation
- Coop rules
- Meeting minutes
- Observation of work and meetings
- Interviews

Specific indicators:

- vertical monitoring (specific supervisor)
- horizontal monitoring (members monitor each other)
- rewards and sanctions for over and under performance
 - nature of reward or sanction
 - frequency of actual application, when warranted

- 3) Describe the system of payment of members.

Sources of data:

- Coop rules and regulations
- Payroll documents
- Distribution of profits
- reports
- Observation of work and meetings
- Interviews at all levels

Specific Indicators:

- Different types of payment:
in kind

- for consumption
- for sale

- in cash

- wages
- profit (loss?)

- Distinguish between work-based and membership based portions of payment.

- Existence of different pay scales according to division of labor.

- Relation of payment to quantity (intensity, productivity) of work (as in piece-rates), as opposed to simple presence (time-rate).

4) Rate of turn-over among membership.

Sources of data:

- Membership lists, payrolls

- Interviews

Specific questions:

- What is an index for turn-over?

- non-growth change in membership?

5) What is the situation regarding family plots in the cooperative?

Sources of data:

- Documentation of assignment of family plots.

- Minutes from meetings.

- Interviews

- Observation

Specific questions:

- Is (was) lack of family plots seen as a disincentive to co-op membership?

- How are plots assigned?

- Origin of inputs on family plots (who pays: coop or family)?

- What is done with production?

- Self provisioning vs. sale for cash.

E) LEVELS OF FACTOR PRODUCTIVITY AND ECONOMIC EFFICIENCY.

1) Does the "costo por peso" appear to be a useful indicator of efficiency?

Sources of data:

- Records

- Documents (esp. accounting)

- Interviews

- 3) Does corruption appear to be a concern of rank-and-file members?
Sources of data:
 -Meeting minutes
 -Observation of meetings
 -Interviews
 -Observation of informal conversations between members.
Specific indicators:
 -What sorts of "opportunistic individual behavior" is considered corruption?
 slacking, or misrepresenting work really accomplished
 unauthorized use of coop goods
- 4) Pilferage of cooperative goods as a problem.
Sources of data:
 -Documents
 -Interviews
 -Observation of meetings
 -Observation of work
 -Observation of casual behavior (locking things up, etc)
Specific indicators:
 -Suspected source of pilferage:
 members and families
 hired workers
 outsiders
 -Willingness to involve outside authorities (police, etc)
 -Means taken to confront or limit "pilferage"
- F) INCREASED DIVERSITY OF PRODUCTION
- 1) Regarding each crop:
Sources of data:
 -Reports
 -Interviews
 -Observation of cultivated areas
Specific indicators:
 -quantity and quality of land dedicated to each crop
 -production level of each, per hectare
 -profits associated with each
- G) STATUS OF SELF-PROVISIONING EFFORT
- 1) How is effort managed?
Sources of data
 -Minutes of meetings
 -Reports
 -Observation
 -Interviews
Specific indicators:
 -Family or collective?

- Percent of cooperative lands dedicated.
- Distinct from commercial operations?
 - use of different criteria for decision-making?
 - are similar records of inputs kept?
- Is production from areas ever sold?
 - under what conditions
 - in what ratio to total production
 - sold by coop as a whole, or by families who receive food?

H) STATUS OF COOP MEMBERS VIS-A-VIS INDIVIDUAL FARMERS

- 1) Do members perceive themselves as better or worse off as compared to individual farmers?

Sources of data:

- Reports
- Observation of conversations
- Interviews

Specific indicators:

- Income
- Personal satisfaction
- Security
- Opportunities for children
- Does this seem to have varied with opening of markets?
- Possibly ask some individual farmers about their view of cooperatives.

I) RELATIONS WITH STATE PURCHASING AGENCY, "ACOPIO"

- 1) Have rules regarding, or behavior of "acopio" changed?

Sources of data:

- Official documents
- Interviews
- Observation

Specific indicators:

- What are rules for cooperatives?
- Extent of enforcing power
- Efficiency with which acopio operates
- Prices paid by acopio, especially compared to:
 - same product at free market
 - other products which could be grown
- Does acopio offer premiums (sanctions) for high (low) quality?
- How are quotas decided for each cooperative?

APPENDIX B
DIESEL FUEL USE BY MONTH

JULY 1990 - JUNE 1995

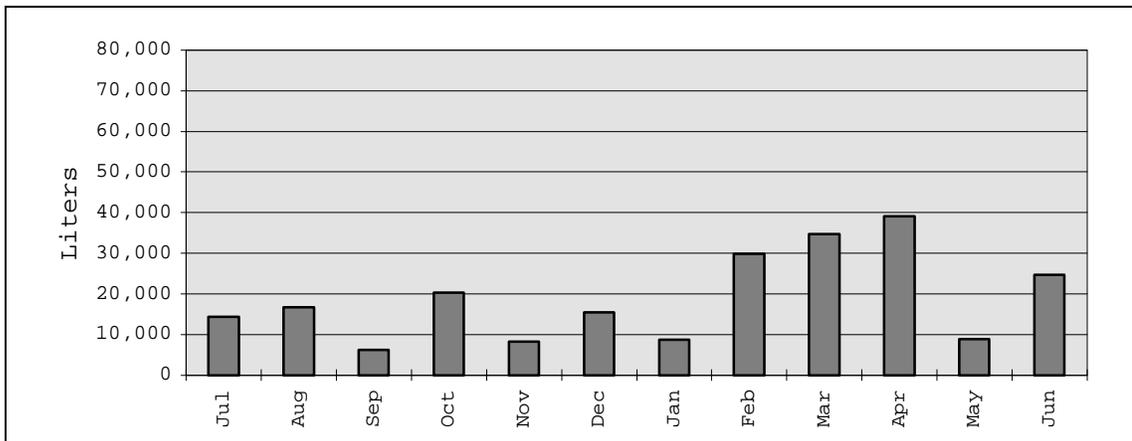


Figure APPENDIX B -1 Mean diesel fuel use by month July 90 - June 95.

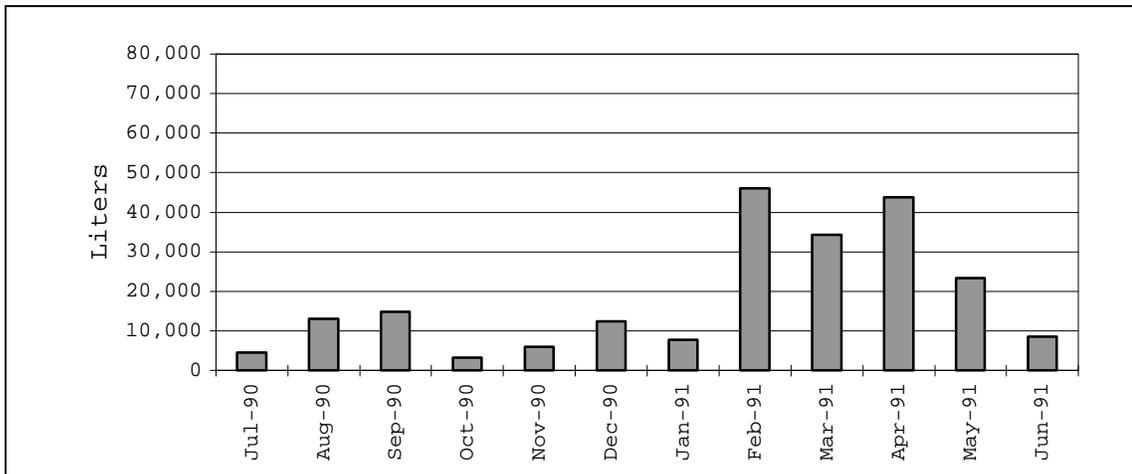


Figure APPENDIX B -2 Diesel fuel use by month 1990-91.

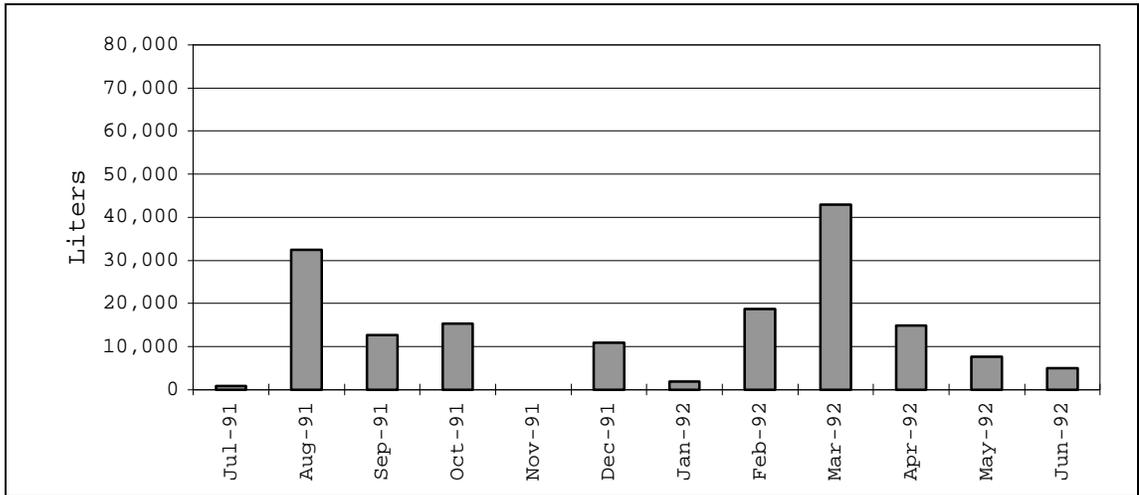


Figure APPENDIX B -3 Diesel fuel use by month 1991-92.

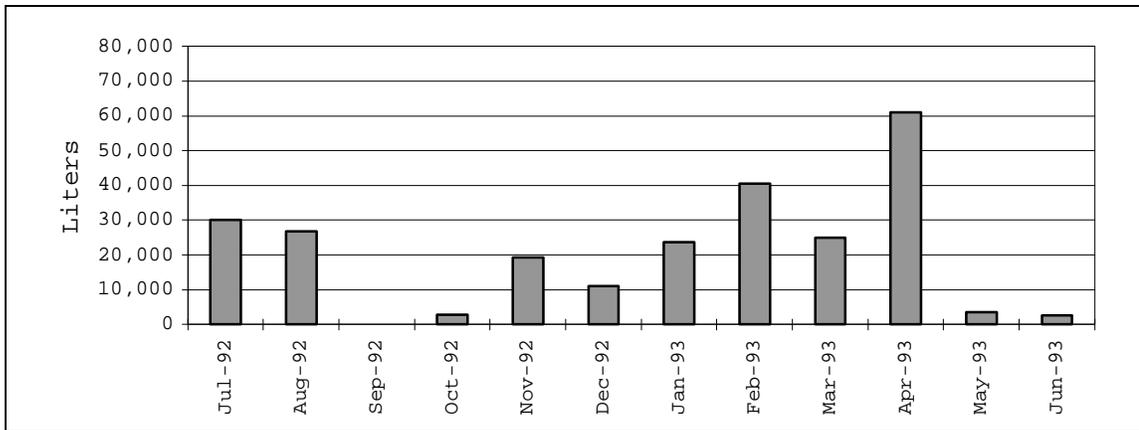


Figure APPENDIX B -4 Diesel fuel use by month 1992-93.

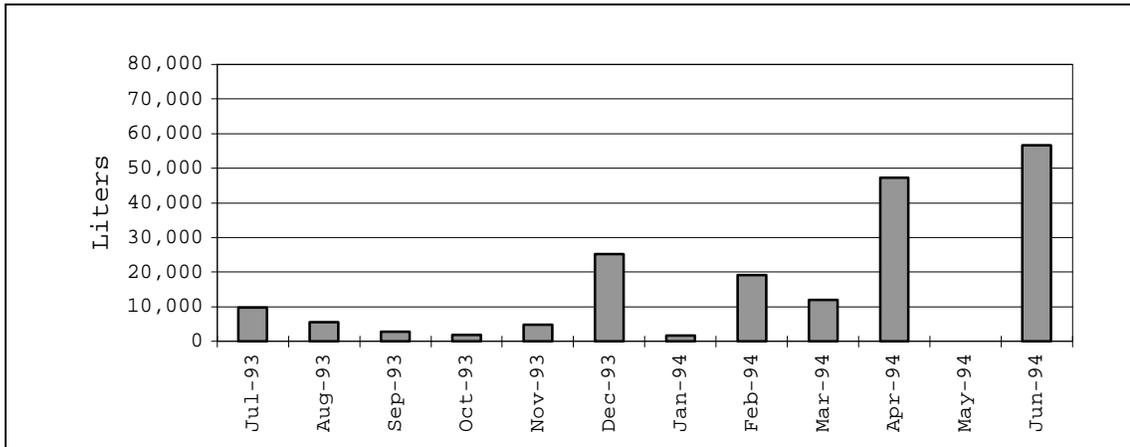


Figure APPENDIX B -5 Diesel fuel use by month 1993-94.

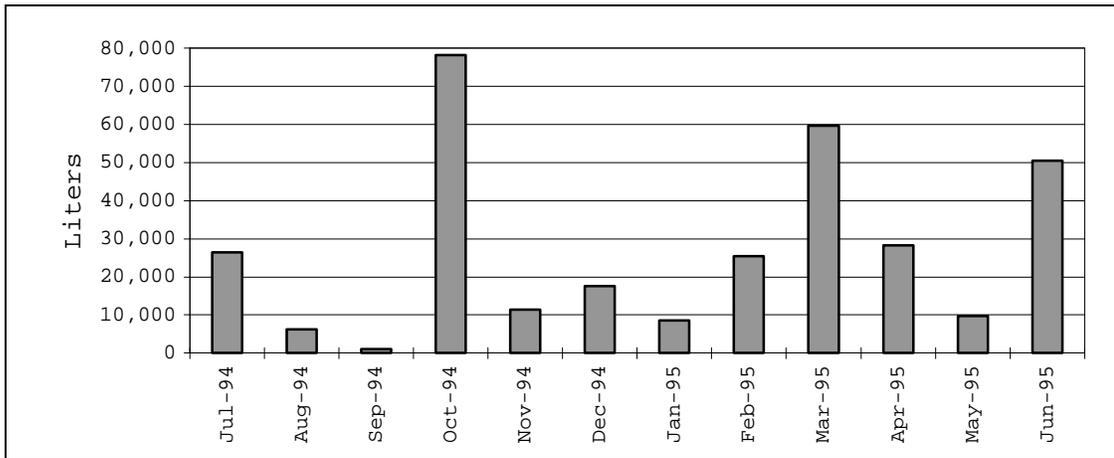


Figure APPENDIX B -6 Diesel fuel use by month 1994-95.

Source for Appendix A Figures: CPA "Amistad Cuba Laos" records: Registro de Salida: Almacen de Piezas 1990-91; Sub-Mayor Analytico de Cuentas: Materias Primas y Materiales 1991-92, 1992-93, 1993-94 and 1994-95.

APPENDIX C

In order to compare costs and efficiency of production across time, physical amounts as well as prices of inputs should be available. This is particularly true where there have been significant changes in prices during the period examined. In the case of the "Amistad Cuba Laos" cooperative, the monthly data which I obtained includes neither physical quantities nor descriptions, beyond a generic "fertilizer" or "spare parts," of the inputs purchased. By tallying the record of each individual item which entered or left the co-op storerooms, physical quantities and descriptions could probably be established, but the investment in person-hours required to accomplish this task was far beyond my resource budget. Nevertheless, the problem remains. My partial solution was to obtain unit prices for specific inputs at intervals throughout the relevant time period, and to thereby establish price references for inputs at specific times. Since inputs are all supplied by state agencies at standard prices, changes are not frequent, and tend to be uniform from one specific outlet to another. For a homogeneous good like diesel fuel, this procedure works very well. For fertilizer, where there are 3 basic components which may be purchased individually or pre-mixed, and in a variety of concentrations, things are a bit more complicated. To the extent that I located unit prices of specific formulations, I compared these across the time period, to develop an index of price changes. This index was then applied to all expenditures for fertilizer within the time interval for which the

index was representative. This produces a more constant relation between amount spent and amount of fertilizer acquired, and permits comparisons across a period that may span several price changes. Of course, the estimate assumes away changes in relative proportions of N, P and K, but to some extent that assumption is justified, since the soil being fertilized is always the same, and soil fertility tends to change gradually.

Symbolically, let:

$$P_i = \text{Price of fertilizer during period } i$$

$$P_j = \text{Price of fertilizer during period } j$$

$$Q_j = \text{Total amount spent for fertilizer during period } j$$

then

$$\frac{P_j}{P_i} = \text{Price change index corresponding to period } j$$

and

$$\frac{Q_j \div \frac{P_j}{P_i}}{\quad} = \text{Adjusted amount spent for fertilizer during period } j$$

With some variations, the same process was carried out for herbicides and spare parts.

Since the possibilities in these areas are much more diverse, less accuracy is assumed. The prices in Table C-1 are the best representative for each input, during each semester for which documentation could be located. To avoid additional clutter, price detail for spare parts is not included here.

Table APPENDIX C -1 Unit Prices for Industrial Inputs, In Pesos, by Semester

	1990		1991		1992		1993		1994		1995	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Diesel Fuel (ltr)	0.065	0.065		0.066	0.066	0.066	0.066	0.170	0.179		0.179	0.181
Herbicidas (kg)												
azulox	4.09					3.72			7.71			
gramoxone	4.87						4.29		4.16			
MSMA solar	0.00				7.39				4.48			
sal amina		0.99			0.99				3.03		3.58	
Fertilizante (ton)												
33-0-0	174	174									187	

Source: Cooperative records: Vales de Entrada, Almacen de Insumos for years 1989-90, 1993-94 and 1994-95 and Vales de Entrada, Almacen de Piezas for same years.

The data in Table C-1 were processed as described above, to derive price change indices for each semester, shown in Table C-2. Where there were gaps in the data, it was assumed that no change had taken place, unless (as in the case of fertilizer) there was reason to assume some change over a long period.

Table APPENDIX C -2 Price Change Index for Industrial Inputs

	1990		1991		1992		1993		1994		1995	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Diesel Fuel	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.6	2.7	2.7	2.7	2.8
Herbicidas	1	1	1	1	1	0.9	0.9	0.9	1.5	1.6	1.7	
Fertilizante	1	1	1	1	1	1	1	1.05	1.05	1.07	1.08	
Spare Parts	1	1	1	1.1	1.1	1.1	1.1	1.1	1.4	1.4	1.5	

Source: Same as Table C-2

As explained above, these indices are used to adjust prices to a common representation of purchasing power, for each of the 4 imported inputs. By leaving the inputs in monetary terms, they can be combined with, and compared to other monetary quantities (such as labor costs) more easily than they could as physical quantities.

APPENDIX D
FOOD CROP ALLOTMENT

The quantity of food crops distributed is well documented by the cooperative. The market values are more difficult to establish with precision, not least of all because they often vary even over the course of a day. The price paid by cooperative members to the co-op for the food was not included in the co-op documentation I obtained, but by interviewing a member involved with accounting for payment, I was able to ascertain the most important values. Some figures are available from the 1993-94 report, and those filled out my estimates. The total 1994-95 was divided among 88 members and 40 contracted workers and retired members. Each “claimant” was assumed to be entitled to the same, full share, although some members said contract workers actually receive less.

Table APPENDIX D -1 Monetary Value of 1994-95 Food Allotments, in Pesos

Crop	Units	Quantity Distributed to Members	Estimated Market Value	Approximate Price Paid by Members	Net Value to Members
Boniato	lb	99,434	0.60	0.05	54,689
Corn on the Cob	ear	72,652	0.20	0.05	10,898
Dried Beans	lb	1,958	10.00	0.28	19,032
Lima Beans	lb	428	2.00	0.30	728
Malanga	lb	6,710	3.00	0.13	19,258
Milk	liter	48,372	3.00	0.25	133,023
Other Vegetables	lb	19,016	3.00	0.30	51,343
Potato	lb	12,317	1.75	0.30	17,860
Rice	lb	70,000	5.00	0.21	335,412
Squash	lb	94,500	1.00	0.03	91,665
Tomato	lb	14,366	2.00	0.30	24,422
Yuca	lb	42,810	0.50	0.05	19,265

Source: Quantities from a table developed by the co-op production manager for 1994-95. Market Value estimated from observed market prices, interviews with frequent sellers and surveys performed in Havana markets (Deere et al 1996). Price Paid by Members from interviews and "Amistad Cuba Laos" 1993-94 Annual Report.

Number of members	88
Full allotment per member	1
Number of indiv. contracted workers	40
Full allotment per worker	1
Total number of allotments	128
Net value of each full allotment	6,075

An alternative method of calculating monetary value of the food allotment was used by Deere et al (1993: 19). Where I have used free market prices, that team used the official government retail price for each item. This is the price which Cuban citizens pay for their rationed quota of each product. At the time of that research, the only alternative to the official price was the black market price, which was undoubtedly distorted by being illegal. Unfortunately, I did not obtain the official prices, which would have been interesting for comparison. Nevertheless, since October 1st, 1994, when legal agricultural markets were opened around Cuba, there would seem to be little justification for using official prices to estimate the value of in-kind food income. With the exception of milk and potatoes, which are not authorized to be sold at the markets, all the items in Table C-1 were actually being sold at the prices shown, or higher. This implies that co-op members could exchange their food allotment for approximately this amount of cash. On the other hand, official prices are fixed at levels which everyone agrees are far below free market prices, and therefore a ration booklet is required to purchase goods at official prices. In many cases, the rationed goods are not available, even with the booklet.

Patio pig income equivalent was estimated based on the fattening of 1 pig per year, a finished weight of 180 lbs, and a live pig price of 15 pesos per lb. All these amounts came out of discussions with co-op members. The estimate of rice plot income assumes a rather modest production of 400 lbs of cleaned rice for the season, and a market price of 5 pesos per lb. Neither the pig nor the rice estimates contemplates cash expenditures: it is assumed that the opportunity cost of "leisure time" is the only outlay.

APPENDIX E
SUGARCANE HARVEST NORMS

Table APPENDIX E -1 KTP-2 Sugarcane Combine Harvest Norms

Less than 18 months growth, not lodged				
Density in Arrobas per Caballeria	<u>Green Cane</u>		<u>Burned Cane</u>	
	Field Length		Field Length	
	< 300 m.	> 300 m.	< 300 m.	> 300 m.
< 40	6820	7150	8690	9020
40 to 60	7810	8250	10010	10450
60 to 80	8360	8800	12540	13200
80 to 100	9240	9680	14740	15400
> 100	9900	10340		

More than 18 months growth, lodged				
Density in Arrobas per Caballeria	<u>Green Cane</u>		<u>Burned Cane</u>	
	Field Length		Field Length	
	< 300 m.	> 300 m.	< 300 m.	> 300 m.
80 to 120	5940	6270	9460	9900
> 120	7150	7480	10670	11220

Source: Accounting office, "Amistad Cuba Laos" cooperative.

Table APPENDIX E -2 Harvest Participants' Base Pay, 1994-95

Function	Advance
Combine Harvester Operators	10.49
Tractor Operators:	
Movers ("movedores")	7.69
Followers ("tiradores")	7.81
Row Cleaners ("repasadores")	7.36
Trailer-controllers ("enganchadores")	7.66
Mechanics	10.49
Mechanics' Helpers	9.12
Fueler ("noviero")	7.40
Welders	10.49
Field Cook	6.14
Record Keeper ("computador")	7.06
Platoon Boss	10.49

Source: Accounting office, "Amistad Cuba Laos" cooperative.

APPENDIX F
SPENDING PERMIT INCENTIVE SCHEME

I accompanied the first group of members and workers from the "Amistad Cuba Laos" cooperative to go shopping with their permits at the restricted access store. The "country folk" were appropriately wide-eyed at the shelves of deodorants, vegetable oils, televisions and children's shoes. The staff was courteous and well organized. The store management keeps a "running tab" of each patron's remaining permits via an up-to-date Intel 486 equipped desktop computer.

Although I did not attempt a formal price comparison, I did by chance record 2 items at a large dollar supermarket in Havana, which also appear in Table F-1 below: a can of cola for \$.55 and a can of "Lagarto" brand beer for \$.85. The rate of exchange for a dollar was around 25 pesos per dollar when the "La Suprema" store opened, so, for Cubans without the benefit of the special stores, that cola and beer would have cost 13.75 and 21.25 pesos respectively.

Table APPENDIX F -1 Selected Prices, "La Suprema" Store

Item	Price in Peso
Can of carbonated cola	5
Can of Hatuey brand beer	7
60 watt lightbulb	9
Clothes washing detergent, 500g	11
Toothpaste, 50 ml tube	11
Bicycle tire, 28 X 1.5	101
Kitchen Blender	300
Rice cooker	300
Oscillating pedistal fan	320
Daewoo 13" Color TV	1355

Source: Visit 8-18-1995 to CAI store

Table APPENDIX F -2 Spending Permits Issued to "Amistad Cuba Laos" by CAI, July 1995

Activity	Plan for Month (caballerias)	Completed in Month (caballarias)	Permits per Caballeria	Permits Issued
Open furrows	6.5	6.5	80	520
Plant and close furrows	6.5	6.5	145	943
Manual weeding	10.1	18.6	110	2046
Herbicide application	16.5	21.1	40	844
Cultivation	15.0	15.9	35	557
Chemical Fertilizer Applicaton	8.9	0	80	0
Organic Fertilizer application	0	0	100	0
Irrigation	3.0	0	90	0
Replanting	7.9	5.2	50.0	260
Total				5169

Source: Cooperative records.

APPENDIX G
USEFUL CONVERSION FACTORS

Table APPENDIX G -1 Conversion Factors for Traditional Cuban Measures

US lb.	times	453.592	equals grams
Spanish lb.	times	460.093	equals grams
arobas	times	0.012679153	equals short tons
arobas	times	11.5023	equals kilograms
arobas	times	0.011502325	equals metric tons
arobas	times	25	equals Spanish lbs
arobas	times	25.358	equals US lbs
cordels	times	414.204	equals square meters
acres	times	4046.84	equals square meters
caballerías	times	324	equals cordels
caballerías	times	33.162	equals acres
caballerías	times	13.4202	equals hectares
gallons	times	3.785	equals liters
quarts	times	0.946	equals liters

Source: MINAZ (Cuban Ministry of Sugar) publication, “Cañaveral” vol. 2, no. 1, January-March 1996.

LITERATURE CITED

- Alvarez, J. 1994. Total annual rainfall at selected Cuban weather stations. *International Working Papers*, vol. IW94-6. IFAS, University of Florida, Gainesville, Florida.
- Alvarez, J., and L. Peña Castellanos. 1995. Preliminary study of the sugar industries in Cuba and Florida within the context of the world sugar market. *International Working Papers*, vol. IW95-6. IFAS, University of Florida, Gainesville, Florida.
- Bennett, J. W. 1967. *The agricultural economy and social organization of a communal people*. Stanford University Press, Stanford, California.
- Bianchi, A. 1964. Agriculture: post revolutionary development. *In* D. Seers, A. Bianchi, R. Jolly, and M. Nolf (eds.) *Cuba: The economic and social revolution*. University of North Carolina Press, Chapel Hill, North Carolina.
- Carnoy, M., and D. Shearer. 1980. *Economic democracy*. M.E. Sharpe Inc., White Plains, New York.
- Carter, M. R., J. Melmed-Sanjak, and K. A. Luz. 1993. Can production cooperatives resolve the conundrum of "exclusionary growth?". p. 175-204. *In* Csaki, C. and Y. Kislev (eds.) *Agricultural cooperatives in transition*. Westview Press, Boulder, Colorado.
- Chayanov, A. V. *The theory of peasant co-operatives*. (translation from Russian edition published 1927). I.B. Tauris & Company, London.
- Clements, H. F. 1980. *Sugarcane crop logging and crop control*. University Press of Hawaii, Hawaii.
- Consejo de Ministros. 1990. Reglamento general de las cooperativas de produccion agropecuaria. *Gaceta Oficial de la Republica de Cuba* (8, 20/9/90):15-28.
- Crane, D. R., T. H. Spreen, J. Alvarez, and G. Kidder. 1982. An analysis of the stubble replacement decision for Florida sugarcane growers. *Bulletin*, vol. 822. Agricultural Experiment Stations, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, Florida. 74 pages.
- Deere, C. D. 1995. The new agrarian reforms. *NACLA report on the Americas* 29(2, Sept/Oct):13-17.

- Deere, C. D., E. Gonzales, and N. Pérez. 1995. Household incomes in Cuban agriculture. *Development and Change* 26(2):209-234.
- Deere, C. D., and M. Meurs. 1992. Markets, markets everywhere? Understanding the Cuban anomaly. *World Development* 20(6):825-839.
- Deere, C. D., M. Meurs, and N. Pérez. 1992. Toward a periodization of the Cuban collectivization process: Changing incentives and peasant response. *Cuban Studies* 22:115-149.
- Deere, C. D., N. Pérez, and E. González. 1994. The view from below: Cuban agriculture in the 'special period in peacetime.' *The Journal of Peasant Studies* 21(2, January):194-234.
- Deininger, K. W. 1993. Cooperatives and the breakup of large mechanized farms: Theoretical perspectives and empirical evidence. *World Bank Discussion Paper* 218. IBRD, Washington D.C.
- Díaz, B., R. Almaguer, J. Bell, T. Caram, M. Castillo, E. Díaz, R. Jiménez, M. Muñoz, S. Porro, M. Sablón, and M del C Zabala. 1995. Cooperativización agrícola: Retos y alternativas. Estudio de caso en UBPC de cultivos varios "Marcos Marti," Quivicán. Description of an ongoing study. p. 31-36. *In* Polo Científico de Humanidades. Tema: Colectivos laborales de nuevo tipo. Resúmenes de investigaciones sobre las UBPC. Programa Flacso, University of Havana, Cuba.
- Díaz González, B., and M. R. Muñoz. 1995. Agricultural biotechnology and the environment in the Cuban special period. *CartaCuba*. University of Havana, Cuba.
- Dominguez, J. I. 1978. *Cuba: Order and revolution*. Belknap Press of Harvard University, Cambridge, Massachusetts.
- Dumont, R. 1970. *Cuba: socialism and development*. Grove Press, New York.
- Edquist, C. 1985. *Capitalism, socialism and technology: a comparative study of Cuba and Jamaica*. Zed Books, Ltd., London.
- Figuroa, V. M. 1995. La reforma de la tenencia de la tierra en Cuba y la formación de un nuevo modelo mixto de economía agrícola. Grupo de Desarrollo Rural y Cooperativismo, Universidad Central de Las Villas, Cuba. 33 pages.
- Fuller, L. 1992. *Work and democracy in socialist Cuba*. Temple University Press, Philadelphia.

- Ghai, D., C. Kay, and P. Peek. 1988. *Labour and development in rural Cuba*. St. Martin's Press, New York.
- Kay, C. 1988. Economic reforms and collectivisation in Cuban agriculture. *Third World Quarterly* 10(3, July):1239-1266.
- Koont, S., and A. Zimbalist. 1984. Incentives and elicitation schemes: A critique and an extension. p. 159-175. *In* A. Zimbalist (ed.) *Comparative economic systems: An assessment of knowledge, theory and method*. Kluwer-Nijhoff Publishing, Boston.
- Manz, C. C., and H. P. Sims. 1987. Leading workers to lead themselves: The external leadership of self-managing work teams. *Administrative Science Quarterly* 32.
- Martin Barrios, A. 1987. *La ANAP: 25 años de trabajo*. Editora Política, Havana, Cuba.
- Meurs, M. E. 1989. *Participation, planning and material incentives: The case of Cuban agriculture in the 1980's*. (Ph.D. dissertation). University of Massachusetts, Amherst.
- Nova González, A. 1994. *Cuba: Modificación o transformación agrícola?* Distributed by author. Havana, Cuba.
- Ostrom, E. 1990. *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press, New York.
- Pastor, M. J., and A. Zimbalist. 1995. Cuba's economic conundrum. *NACLA report on the Americas* 29(2, Sept/Oct):7-12.
- Peter, K. A. 1987. *The dynamics of Hutterite society: An analytical approach*. University of Alberta Press, Edmonton, Canada.
- Pérez-López, J. F. 1991. *The economics of Cuban sugar*. University of Pittsburgh, Pittsburgh.
- Pérez Rojas, N., and C. Torres Vila. 1994. *UBPCs: Towards a new project for participation*. Rural Research Team. University of Havana Faculty of Philosophy and History; Department of Sociology, Havana. 16 pages.
- Pérez Rojas, N., and C. Torres Vila. 1995. *La apertura de los mercados agropecuarios: Impacto y valorizaciones*. paper presented at Latin American Studies Association Conference, September 1995. Rural Research Team. University of Havana Faculty of Philosophy and History; Department of Sociology, Havana. 25 pages.
- Pérez-Stable, M. 1993. *The Cuban revolution*. Oxford University Press, Inc., New York.

- Pollitt, B. H., and G. B. Hagelberg. 1994. The Cuban sugar economy in the Soviet era and after. *Cambridge Journal of Economics* 18:547-569.
- Prychitko, D. L., and J. Vanek. 1996. *Producer cooperatives and labor-managed systems: Theory*. Edward Elgar Publishing, Ltd., Cheltenham, UK.
- Puerta, R. A., J. Alvarez. 1993. Organization and performance of Cuban agriculture at different levels of state intervention. *International Working Paper Series*, vol. IW93-14. IFAS, University of Florida, Gainesville, Florida.
- Reed, E. P. 1977. Introducing group farming in less developed countries: Some issues. p. 359-379. *In* P. Dorner (ed.) *Cooperative and commune*. University of Wisconsin, Madison, Wisconsin.
- Regalado, A. 1979. *Las luchas campesinas en Cuba*. Editorial Orbe, Havana.
- Salomón, R. 1995. *Todo comenzó con los "trapiches" : Pasado, presente y futuro del principal renglón exportable de Cuba*. Agencia de Información Nacional, Havana, Cuba.
- Sexto, L. 1995. Ser o no ser autónomas, esa es la cuestión. *Bohemia* 87(8, 9/95):B27 - B29.
- Sims, B. G., R. Ventot, and A. Rivera. 1993. Cooperatives as a solution to small farm mechanization problems in Cuba. *Agricultural Mechanization in Asia, Africa and Latin America* 24(4):63-72.
- Stubbs, J., and M. Alvarez. 1987. Women on the agenda: The cooperative movement in rural Cuba. p. 142-161. *In* C. D. Deere (ed.) *Rural women and state policy*. Westview Press, Boulder, Colorado.
- Torres Vila, C., and N. Pérez Rojas. 1995. Apuntes sobre el problema de la fluctuación laboral in las UBPC. given to me by C.D. Deere, Mar 1996;. Equipo de Estudios Rurales de la Universidad de La Habana, Havana. 13 pages.
- Wroe, A. 1996. Survey Cuba. *The Economist*, April 6, p. 3-16.
- Yin, R. K. 1994. *Case study research: Design and methods*. Sage Publications, Inc., Thousand Oaks, California.
- Zimbalist, A., and C. Brundenius. 1989. *The Cuban economy: Measurement and analysis of socialist performance*. Johns Hopkins University Press, Baltimore, Maryland
- Zimbalist, A., and S. Eckstein. 1987. Patterns of Cuban development: the first twentyfive years. *World Development* 15(1):5-22.

BIOGRAPHICAL SKETCH

Frederick Royce was born in Jacksonville, Florida in 1952. In 1978 he obtained an Associate in Science degree in diesel and heavy equipment mechanics at San Jose City College in San Jose, California, and spent several years performing maintenance and repair of heavy-duty trucks, and earth-moving equipment in California and Florida.

Beginning in 1981, he participated in the founding and subsequent development of a rural, technical training center in northern Nicaragua. The “School of Agricultural Mechanization” provided training for farm workers and cooperative members in machine operation and maintenance, welding, and other machine-related skills.

From 1989 through 1991, as a project coordinator for CARE International in Nicaragua, Mr. Royce directed the initial planning and implementation of a rural development project aimed at improving poor farmers' abilities to profitably manage their cooperatively owned machinery. In each of 50 participating agricultural production cooperatives, the project provided the training, mechanic's tools and extension support required for the farmers to effect preventive maintenance and simple repairs, and to establish basic administrative and financial systems for their agricultural and transportation machine use.

Returning to the U.S. in December 1991, Mr. Royce enrolled in the University of Florida's agricultural operations management program in the Department of Agricultural and Biological Engineering. There, he earned a Bachelor of Science degree in 1994, and a Master of Science in the same program in 1996. Upon completion of the latter degree, Mr. Royce plans to continue towards a doctoral degree in agricultural operations management at the University of Florida.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Robert Peart, Chair
Graduate Research Professor of
Agricultural and Biological Engineering

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Richard Fluck
Professor of Agricultural and Biological
Engineering

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Kamal Dow
Professor of Food and Resource
Economics

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Terry McCoy
Professor of Latin American Studies

This thesis was submitted to the College of Agriculture and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Master of Science.

August, 1996

Dean, College of Agriculture

Dean, Graduate School