

INFORMATION TO USERS

This reproduction was made from a copy of a document sent to us for microfilming. While the most advanced technology has been used to photograph and reproduce this document, the quality of the reproduction is heavily dependent upon the quality of the material submitted.

The following explanation of techniques is provided to help clarify markings or notations which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting through an image and duplicating adjacent pages to assure complete continuity.
2. When an image on the film is obliterated with a round black mark, it is an indication of either blurred copy because of movement during exposure, duplicate copy, or copyrighted materials that should not have been filmed. For blurred pages, a good image of the page can be found in the adjacent frame. If copyrighted materials were deleted, a target note will appear listing the pages in the adjacent frame.
3. When a map, drawing or chart, etc., is part of the material being photographed, a definite method of "sectioning" the material has been followed. It is customary to begin filming at the upper left hand corner of a large sheet and to continue from left to right in equal sections with small overlaps. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.
4. For illustrations that cannot be satisfactorily reproduced by xerographic means, photographic prints can be purchased at additional cost and inserted into your xerographic copy. These prints are available upon request from the Dissertations Customer Services Department.
5. Some pages in any document may have indistinct print. In all cases the best available copy has been filmed.

**University
Microfilms
International**

300 N. Zeeb Road
Ann Arbor, MI 48106

8323263

Anderson, D. Craig

**OVERVIEW AND ANALYSIS OF AGRICULTURAL PROGRAMS IN HIGHER
EDUCATION IN COSTA RICA**

Iowa State University

Ph.D. 1983

**University
Microfilms
International** 300 N. Zeeb Road, Ann Arbor, MI 48106

Copyright 1983

by

Anderson, D. Craig

All Rights Reserved

**Overview and analysis of agricultural programs in higher
education in Costa Rica**

by

D. Craig Anderson

**A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY**

Major: Agricultural Education

Approved:

Signature was redacted for privacy.

In Charge of Major Work

Signature was redacted for privacy.

For the Major Department

Signature was redacted for privacy.

For the Graduate College

Members of the Committee:

Signature was redacted for privacy.

**Iowa State University
Ames, Iowa**

1983

Copyright © D. Craig Anderson, 1983. All rights reserved.

TABLE OF CONTENTS

	Page
INTRODUCTION	1
Research Justification and Need	1
Origin and Overall Objective of the Study	2
Purposes and Specific Objectives of the Study	3
Overview of Costa Rica	4
Current Status of Agricultural Sector	5
General Education in Costa Rica	11
Explanation of Dissertation Format	14
REVIEW OF LITERATURE	16
Introduction	16
Agriculture Programs in Higher Education in Latin America	17
Use of Methodology and Procedures in Latin America	26
METHODOLOGY AND PROCEDURES	30
Research Situation: An Overview	30
Design of the Research	31
Follow-Up Study	33
Secondary Source Research	43
Data Transformation and Analysis	44
HIGHER EDUCATION AND AGRICULTURAL PROGRAMS IN COSTA RICA: AN OVERVIEW	45
Introduction	45
Legal Basis for Higher Education	45
General Characteristics	47

	Page
The Public Higher Education Institutions and Agricultural Career Programs	48
Summary	58
ARTICLE I. EDUCATION IN AGRICULTURE AT THE UNIVERSITY OF COSTA RICA: PERCEPTIONS AND ATTITUDES OF RECENT GRADUATES	63
Introduction	63
Background	65
Methodology	66
Characteristics of Graduates	67
University Related Experience	71
Perceptions of Educational Programs	72
Perceptions of Course Offerings	78
Physical Facilities	83
Conclusions	84
Literature Cited	87
ARTICLE II. AGRICULTURE GRADUATES OF THE UNIVERSITY OF COSTA RICA: WHAT FOLLOWS GRADUATION?	90
Introduction	90
Background	91
Methodology	92
Characteristics of Graduates	95
Employment Status	96
Employment Positions and Functions	99
Employment Patterns	103
Perceptions of Professional Preparation	105

	Page
Summary and Implications	111
Literature Cited	112
GENERAL SUMMARY	115
Research Purpose and Implications	115
Recommendations for Further Research	118
GENERAL BIBLIOGRAPHY	121
ACKNOWLEDGMENTS	127
APPENDIX A: ESTUDIO DE SEGUIMIENTO FORMULARIO PARA ENTREVISTA	129
APPENDIX B: A SUMMARY OF THE LAWS AND OFFICIAL AGREEMENTS REGARDING HIGHER EDUCATION IN COSTA RICA	132
Coordinating Organisms	132
Fiscal Laws Impacting Higher Education	132
Inter-Institutional Agreements/Pacts	133
APPENDIX C: RESULTS OF VARIOUS STATISTICAL COMPARISONS FROM GRADUATE FOLLOW-UP SURVEY	134
APPENDIX D: SCALES USED IN INTERVIEW SCHEDULE	140

INTRODUCTION

Wedged between Nicaragua on the north and Panama on the south is the democratic republic of Costa Rica. A country of 2.2 million, Costa Rica occupies 51,000 square kilometers, making it the third largest country in the region. Since at least the time of the 1948 revolution, the Costa Rican government has placed one of its highest development priorities on public education. Today, one is hard pressed to find a community of more than a thousand inhabitants that does not have at least a primary school--and increasingly a newly-constructed secondary school. In the last decade, major emphasis has also been placed on higher education.

Research Justification and Need

This dissertation describes and analyzes certain facets of the programs of instruction in agriculture within the system of higher education in Costa Rica. There is little, if any, scientific evidence concerning the quality of these programs and their impact on the preparation of professionals in agricultural disciplines. The literature review section of this dissertation addresses this latter point in more detail. Yet, these programs play a key role in the professional preparation of those individuals who most directly affect the agricultural sector of the nation, outside of policy-makers from the political arena.¹ The agriculture professionals are largely those who manage and direct

¹For a perceptive appraisal of the effects of public policy on the agricultural development of Costa Rica, see Seligson (1977), as referenced in the general bibliography.

rural development projects, extension activities, and agricultural research. As this study will demonstrate, they occupy many crucial positions, both line and staff, within agricultural organizations, and both public and private sectors. As such, they can greatly influence the practices, programs, and the general direction (day-to-day, year-to-year) of the agricultural sector.

Origin and Overall Objective of the Study

The field research for this dissertation was performed in Costa Rica during a six-week period during the summer (July-August) of 1982. Originally conceived by this researcher and his major professor, the research was sponsored by Iowa State University's International Agricultural Programs Office with funding provided by an anonymous donor.

The researcher was a visiting specialist to the Agronomy Faculty (Facultad de Agronomía) of the University of Costa Rica, who cooperated with the research effort to the fullest extent.

The overall objective of this study is to contribute to the body of knowledge concerning programs within higher education which prepare individuals for professional careers in agriculture. Though development of the agricultural sector is deemed to be critical to the overall progress of underdeveloped nations (Malassis, 1975; Cochrane, 1969), little research on the nature of professional level preparation in agriculture has been performed, especially in Latin America (Naranjo, 1966). Consequently, it is fertile ground for viable research inputs.

Purposes and Specific Objectives of the Study

The overall purpose of the research was twofold. Specifically, it proposed to:

- (1) Acquire information about educational programs in agricultural disciplines in institutions of higher education in Costa Rica.
- (2) Conduct a follow-up study of graduates of the Agronomy Faculty (Facultad de Agronomía) of the University of Costa Rica (UCR), to determine their attitudes and perceptions toward their university education in order to provide information for program improvement.

Four (4) specific sub-objectives were further identified to accomplish the follow-up study of UCR graduates. They were:

- (1) Determine and compare graduates' perceptions and attitudes toward overall instruction received at the university.
- (2) Assess the graduates' perceptions of the adequateness of education in their professional disciplines.
- (3) Assess and evaluate the graduates' perceptions of building facilities, tools, and equipment and other facilities utilized by the Agronomy Faculty.
- (4) Determine the occupational status of graduates.

The study also offers some significant secondary benefits. One, no research of this type has previously been carried out among graduates of the Agronomy Faculty of the University of Costa Rica, and no comprehensive description of the agricultural programs of instruction at the

higher education level in Costa Rica is readily available. The research results shed light on these little-known program areas by generating a factual baseline of data, thus providing a source of information heretofore unavailable.

Secondly, the data base generated by the study prepares the groundwork and platform from which future and more refined research can be launched. It provides data pertinent to current program description and assessment which may be used to identify program components requiring more careful study and evaluation.

A third benefit is that this study may well serve as a model for future studies of a similar nature within units of the University of Costa Rica Agronomy Faculty. For example, follow-up studies performed at regular intervals could indicate such things as trends and the effects of program alternatives over time (Wentling, 1980). Or, the basic study may be replicated or adopted by the other institutions of higher education in Costa Rica which offer professional level instruction in agriculture. Finally, it may even serve as a design model for comparative research in other Latin American nations, which could significantly augment the sparse data available on agricultural programs in the hemisphere.

Overview of Costa Rica

A nation of 51,000 square kilometers, approximately one-third the size of Iowa, Costa Rica is one of Latin America's smallest republics. Its population is also relatively small. The government of Costa Rica reports that, as of 1980, the total population of the country was

2,217,800 people, with 53.7 percent residing in rural areas. The economically active population for this same year totaled 770,300 individuals, of which 75.2 percent were male (SEPSA, 1982). The annual rate of population growth has been declining in recent years and is currently approximately 2.7 percent.

Costa Rica's government is founded on a constitution assuring and protecting the civil rights of all citizens. It is one of few political democracies in Latin America, and Costa Ricans take pride in the egalitarian qualities of their society.

Costa Rica enjoys the highest per capita GNP among Central American nations, as well as the highest adult literacy rate and greatest life expectancy (World Bank, 1981). Certainly, the government has been noted for its progressiveness and emphasis on public welfare. In 1980, nearly one-quarter of total central government expenditures were for education, with another 36 percent for health, social security and welfare (IMF, 1982). In spite of notable progress in social life, Costa Rica continues to encounter vexing problems arising from inadequate nutrition levels for many of its citizens, the unavailability of proper health care for the rural population, and the complications of everchanging population movements within the society (Whiteford, 1983; Seligson, 1982).

Current Status of Agricultural Sector

Costa Rica, along with its sibling Central American nations, is to a considerable degree an agricultural society. Since its early beginnings in the colonial period, Costa Rica has relied heavily on agriculture. Seligson (1977) indicates that for many years this reliance

was solely upon subsistence level agriculture, due to two primary factors. First, Costa Rica was not blessed with gold or other precious metals required by the Spanish crown. In the absence of these resources, settlement in Costa Rica was sparse and agriculture was the only means of survival. Second, the Indian labor so commonly utilized throughout other regions of colonial Spanish America was absent in Costa Rica, a fact which greatly inhibited the creation of hacienda based agriculture.¹ This latter phenomenon also served to reinforce the early colonists' dependence on small scale subsistence farming activities. Salazar (1982) and Whiteford (1978) have also documented and described these historical antecedents to modern day agriculture in Costa Rica.

In about 1650, colonists began planting cacao, which was to become Costa Rica's first export crop. In later periods, coffee (circa 1825) and bananas (circa 1885) were to replace cacao as major cash crops for export (Seligson, 1977, 1980; Salazar, 1982).

Today, agricultural exports continue to be vital to the nation's economy. More than two-thirds of the total value for all exports are currently from agriculture--coffee, bananas, sugar cane, and cacao (SEPSA, 1982). While the preceding information demonstrates the rise in reliance on export agriculture, heavy specialization in these labor intensive crops also leaves the exporter vulnerable to the price fluctuations of an unstable and vacillating world market for these products (World Bank, 1981).

¹The agricultural and economic significance of this system and its roots in Latin American culture are discussed in Feder (1971) and Furtado (1970), as referenced in the general bibliography.

Costa Rica's historical dependence on export agriculture has resulted in several unintended yet significant socioeconomic consequences. Agrarian policy analysts such as Salazar (1982) and Seligson (1977, 1980) have documented the direct relationship of government policies encouraging and supporting expansion into export crops on: (1) the unequal distribution of land in the society; (2) the domination and control of agriculture by a small number of socially and economically elite segments of the population; and (3) the division of Costa Rican society into various classes. Of such effects, Seligson states:

Without a doubt, the most influential force in the shaping of that [Costa Rican] development has been agrarian capitalism, since it has provided the elite with economic sustenance, laid the foundations for a nascent middle class, and totally transformed the social order in the countryside (1980, p. 86).

Furthermore, while emphasis on the production of export crops has often stimulated past economic activity and development in Costa Rica, it has also had a negative impact on the production of agriculture for domestic markets resulting in the long-time importation of several food staples. Currently, agricultural goods account for 20 percent of all imports, with the majority of this amount consisting of imported food commodities. Indeed, since 1975 there have been very dramatic increases in the volume of imported wheat, oilseeds, pork, beef, dairy products, eggs, fresh fish, and wine (SEPSA, 1982). Correspondingly, rice is the only imported commodity that has experienced an equally dramatic decrease in volume. The Government reports the volume of imported fertilizers, pesticides, and other commercial agricultural products has also increased, while farm machinery and tool imports actually dropped between

1976 and 1980 (SEPSA, 1982).

Figures in the World Bank Development Report for 1981 demonstrate that during the 1970s, the average annual growth rate for agriculture dropped by more than one-half the average for the previous decade--a decline from 5.7 percent to 2.6 percent. In contrast, the average annual growth rate in overall GDP (Gross Domestic Product) during these same periods was 6.5 percent (1960s) and 6.0 percent (1970s).

A significant percentage of Costa Rica's population is directly engaged in agriculture. The 1973 general census indicates that 36.4 percent of the economically active population was occupied in agriculture (Costa Rica, 1975), a decrease from the 1963 census figure of 49.1 percent (Costa Rica, 1966). More recently reported data indicate this percentage may have continued to decline to somewhere near 30 percent in 1980 (SEPSA, 1982; World Bank, 1981).

One additional characteristic of the agricultural sector has tremendous implications for Costa Rican society. It is the existing pattern of land tenure. To put it succinctly, it is disproportionate in favor of large holders. Data from the 1973 general agricultural census indicate that 43.2 percent of all farm units consist of less than five (5) hectares¹ and together occupy only 1.9 percent of all farm ground. Conversely, farm units of 100 hectares or larger comprise only 6.9 percent of all farm units but occupy 66.9 percent of agricultural land areas (SEPSA, 1982).

¹One (1) hectare (hectárea) equals 2.49 acres.

What is more, Seligson (1980), in comparing 1963 and 1973 agricultural census data, demonstrates that this inequality not only persisted but became even more severe. He concludes that:

While the number of farms for the entire country increased 29.2 percent, the farms in the range of 1.0 to 1.4 manzanas¹ increased 80.1 percent. This finding indicates a clear trend toward an increase in the pattern of minifundia (farms too small to sustain a family). Second, the percentage increases in the medium-sized farms, those 3 to 50 manzanas, is relatively small (averaging 23.8, or less than the overall increase), an indication that the growth of these family sized farms is falling behind the growth of the smallest farms. Third, the growth in the number of the farms in the range of 1,430 to 1,499 manzanas increased by 91.7 percent, and in the largest category, farms 3,500 manzanas and bigger increased by 87 percent. . . (1980, pp. 146-148).

Furthermore, this quantifiable tendency toward more polarization in land holdings occurred during a period in which the Costa Rican Land and Colonization Agency (ITCO) was very actively engaged in land redistribution and colonization programs. Carvajal et al. (1977), Salazar (1982), and Seligson (1977, 1980, 1982) have all addressed the severity and negative impact of this disparity in land holdings in Costa Rica. However, it is a phenomenon predominant throughout most of Latin America (Lipset, 1967; Feder, 1971).

Equally as startling is the pervasive problem of landlessness among rural Costa Rican families. Although definite percentages are difficult to assess, Seligson, in reviewing the work of Céspedes and others, concludes that "somewhere between three-quarters and two-thirds of all economically active Costa Ricans who work in agriculture are landless"

¹One (1) manzana is equivalent to .69 hectares.

(Seligson, 1982, p. 36). The poverty and insecurity resulting from landlessness have given rise to the unlawful occupation by the rural poor of unused land areas. The incidence of squatting on land belonging to another is much in evidence in many regions of the country (Seligson, 1980; Edwards and Anderson, 1983).

The preceding few paragraphs clearly delineate the importance and status of the agricultural sector in Costa Rica. Though it contributes heavily to the economic vitality of the country, it is beset with conditions which are seemingly paradoxical.

On the one hand, there is a tremendous reliance on export cash crops, while on the other the production of foodstuffs for domestic consumption lags and is greatly supplemented by imports from abroad. A significant percentage of the population lives in rural areas and is active in agricultural pursuits, yet many are poor and landless, with an accompanying degree of economic insecurity and social unrest.

Finally, the majority of farm units consist of very small land holdings while a minority of land holders own the greatest percentage of arable land. Yet, both of these groups are dependent on agriculture. In the latter case, it is most often export oriented, while the former group are family subsistence oriented, largely producing for local and in-country consumption. While these conditions are, indeed, characteristic of the state of Costa Rican agriculture, they also pose a tremendous challenge to those who are responsible for managing the development of the overall sector.

General Education in Costa Rica

General overview

General education has long been valued by Costa Rican society. In 1886, La Ley de Educación Común (General Education Law) was created, which charted the course for significant government participation in education at all levels (Monge, 1979). The nation's Constitution (Articles 77 and 78), written in 1949, declares that education is to be an orderly process from pre-school through the university, and makes a "basic general education" both mandatory and free to all (Costa Rica, 1949). Article 78 further states that the State will also financially assist those who pursue higher education who do not possess the necessary monetary resources.

The Education Law of 1886 was replaced by the current Ley Fundamental de Educación (Basic Education Law) enacted by the Legislative Assembly in September, 1957 (Monge, 1979). This law also affirms the public's right to education, and places on the State the burden of providing for such. Somewhat more specific than the Constitution, it states that education is mandatory through the primary grades. This law further "assures equality of opportunity to all, regardless of family origin, economic position, and political or religious beliefs" (Monge, 1979, p. 204).

Costa Rica has, indeed, placed much emphasis on education, accruing an enviable record among Latin American nations. The International Monetary Fund (IMF, 1982) reports that central government expenditures for education represented 24.6 percent of total expenditures for 1980. In

1976, this figure had even reached a high of 29.7 percent. With the exception of Bolivia, these percentages exceed those of other Latin American countries.

Careful analysis of the 1973 general census (Costa Rica, 1975), reveals that for the economically active population (12 years and older), considering all occupations combined, 68 percent had at least some primary education, 15 percent at least some secondary education, and 3.8 percent had university degrees. Approximately 10 percent had received no formal education. Table 1 contains details on these categories. The reported adult literacy rate is 90 percent (World Bank, 1981), one of the highest in Central America.

Table 1. Average education levels for occupations comparing the agricultural sector to national averages^a

	All (9) general occupational areas	All agricultural sub-occupations
No education	10.5	21.0
Incomplete primary	40.8	55.3
Primary	27.4	21.0
Incomplete secondary	9.8	2.0
Secondary	4.8	-- ^b
Post-secondary ^c	6.7	-- ^b

^aSource: 1973 General Census (Costa Rica, 1975), compiled by author.

^bLess than .5 percent.

^cAt least some education at the post-secondary level, even though may not have obtained an academic degree.

Education and the agricultural sector

In spite of Costa Rica's advancements in the education of its populace, a few disparities persist in the system. Table 1 compares the average levels of education for the total economically active population with those of the agricultural sector. It reveals that educational attainments across all agricultural occupations are dramatically lower than national averages.

The census lists nine (9) basic occupation areas, one of which is agriculture. Agriculture is further broken down into six (6) subgroups; i.e., farm administrators (12 percent), farming landowners (27 percent), agricultural laborers (70 percent), and fishermen, hunters, and foresters (1 percent). Farming landowners would tend to be smaller farmers whose principal occupation is agriculture, and does not include landowners whose occupation would be professional, technical, administrative, or commercial in nature. For example, agrónomos (agronomists) and veterinarians are a subgroup under the professional/technical general occupational area, as are lawyers, medical doctors, professors, architects, and engineers.

One item not revealed by Table 1 is that 71.1 percent of all economically active individuals who have no education, as indicated in the 1973 general census, are in the agricultural occupation category. The census data also reveal that 70 percent of those who are active in agricultural pursuits labor for others. This group consists primarily of the peasantry class, the same class that is largely landless and has the lowest per capita income within the agricultural sector (Seligson, 1982). To

further demonstrate their dilemma, Seligson cites the results of a 1973 national survey as reported by John A. Booth (noted authority on Costa Rica), which indicated "that peasant incomes were only 15 percent of urban incomes, and peasants had only one-fourth as many years of education as did their urban counterparts" (1982, p. 35).

Clearly, these disparities are evidence that although Costa Rica has made significant progress in the general education of her populace, there remain segments of the population for whom education is illusive. As reported by Biesanz et al. (1982), many are now questioning the 'myth' of equality in educational opportunity in the country. They prefaced their own analysis of education with this comment: "We explore the myth as both blinder and ideal, as obstacle and as goal" (p. 115). Perhaps these few words best summarize the current status of Costa Rican education.

Explanation of Dissertation Format

This dissertation follows the alternate style format authorized by Iowa State University. As such, the body of the dissertation consists of "sections in the form of a complete paper or papers, suitable for a professional journal" which present research procedures and findings similar to dissertations of the traditional style (Iowa State University, 1981). This first section of the dissertation has been an introduction to the research and a statement of the problem concerning its need and justification. Overviews of agriculture and of education in Costa Rica were also presented. The second and third sections are a review of

literature and description of methodology, respectively.

The fourth section is a descriptive overview and discussion of the current programs of instruction in agriculture operating within Costa Rica's system of higher education. The findings of the follow-up study of graduates of the Agronomy Faculty of the University of Costa Rica are then presented and discussed in two parts designed to be submitted as research articles to scholarly journals. The author plans to submit them to the Journal of Interamerican Studies and World Affairs, with the suggestion that they be published in two successive issues.

The first of these (Article I) explores and discusses the graduates' attitudes and perceptions of their training, preparation, and education while attending the university. The latter (Article II) examines the post graduation activities of graduates and the adequacy of their preparation for professional employment.

The last portion of this dissertation is a brief summary of the research findings and their implications for agricultural programs in higher education in Costa Rica. Suggestions and recommendations for further or additional research in this area are also presented.

The Iowa State University Committee on the Use of Human Subjects in Research reviewed this project and concluded that the rights and welfare of the human subjects were adequately protected, that risks were outweighed by the potential benefits and expected value of the knowledge sought, that confidentiality of data was assured, and that informed consent was obtained by appropriate procedures.

REVIEW OF LITERATURE

Introduction

The literature reviewed in this section covers two primary areas. The first portion pertains to agricultural programs in higher education in Latin America, and Costa Rica in particular. Secondly, literature demonstrating the feasibility and acceptability of performing investigative research in Latin America utilizing methods and procedures similar to those employed in this research will be reviewed.

The introductory section of this dissertation described the status of agriculture in modern Costa Rica. In general, the nations of Central America and, indeed, most of Latin America, are heavily dependent on their agricultural sectors for domestic employment and general economic growth and development (Presidential Mission, 1980; Curle, 1970; Malassis, 1975).

Curle, in assessing the means for enhancing the long-term productivity and growth of the human factor in the agricultural sectors of underdeveloped nations, indicates that education is the key ingredient. He states that the first steps to such education "...concern the training of professional and subprofessional personnel for agriculture" (1970, p. 103). This leads him to further recommend scholarly inquiries into the training received by agricultural scientists and specialists, as well as studies of the teaching of agriculture at various levels.

Furthermore, a U.S. Presidential Commission recently performed an assessment of agricultural development and progress in the Caribbean

and Central American region of Latin America. The Commission's report of findings places significant emphasis on the role of education in agricultural development (Presidential Commission, 1980). This report recommends actions which would "strengthen and expand national and regional institutions with potentials for offering strong education and training programs" (p. 10). It further indicates that current deficiencies in such training represent a serious constraint to agricultural development in the region.

The ensuing review will demonstrate that little information or data about agricultural programs in higher education in Latin America has been compiled to date. Meaningful and up-to-date indications on the quality of such programs is non-existent. Certainly, none for Costa Rica have been encountered. Again, the overall purpose of this doctoral research is to provide benchmark data about programs which train agricultural professionals in Costa Rica, specifically the three major career options offered by the Agronomy Faculty of the University of Costa Rica. Such research is in consonance with the foregoing statements concerning the critical necessity for this type of information in the development of agrarian societies such as Costa Rica.

Agriculture Programs in Higher Education in Latin America

Scholarly literature on academic programs in agricultural subjects in a Latin American setting are few. None have been encountered on such programs in Costa Rica specifically.

In the mid-1960s, Naranjo (1966) conducted a follow-up survey of

graduates of the Tropical Center for Teaching and Research, known by its Spanish acronym, CATIE. CATIE is an international regional center established to perform research and conduct graduate level (master's degree) studies directed toward tropical agriculture.

Naranjo conducted a survey among the total population of 185 masters degree graduates who terminated their programs between January 8, 1946, and December 31, 1964. A total of 128 former graduates responded to the mailed survey.

The information provided by Naranjo, though in part now somewhat dated, is nonetheless revealing and informative for anyone interested in agricultural education systems in Latin America. In beginning chapters, Naranjo presents a fine account of the creation of CATIE and the phases of its development as a research and education center under IICA. He also explains CATIE's educational departments and program offerings in detail.

The results of the survey questionnaire in Naranjo's work reveal several interesting facts. A very high percentage of survey respondents expressed a very favorable opinion of the academic program offered by CATIE. The more dissatisfied graduates tended to be exclusively from one department. Former students also lauded the academic preparation and competence of faculty members in general, and had high opinions of the library facility. However, they indicated that other physical facilities such as married student housing, regular dormitories, and equipment, materials, and supplies were insufficient in number and inadequate. Graduates almost uniformly indicated they would choose the

same field of specialization at CATIE if they were "starting over," and that they could highly recommend the Center's programs to friends and relatives.

During the post-graduate period, nearly 70 percent of the former students had been continuously employed in their speciality areas, and only two graduates had experienced brief periods of unemployment. At the time of the survey, graduates tended to work with some branch of national government (including universities) or with international organizations. Approximately 14 percent worked for private organizations. The primary job responsibilities of those responding fell into four major areas: research, administration, teaching, and agricultural extension activities. Naranjo also notes that 22 percent had continued their studies toward the doctorate, though some had not achieved it. Those who had pursued a doctoral program found their master's degree from CATIE to be acceptable to U.S. universities.

Chaparro (1959) has also written about programs of agriculture at the higher education level in Latin America, though his work is now nearly 25 years old. Chaparro offered a panoramic view of existing agriculture faculties and schools, including their principal characteristics. He also traced the historical development of higher education in agriculture at the undergraduate level. He reported that 45 agriculture faculties at the university level existed in Latin America as of 1955, of which 34 were in South America and 11 scattered throughout Central America, Mexico, and the Caribbean. Twenty (20) of these 45 schools were founded after 1945. Chaparro also noted that 25 of these schools were

operating at no more than 57 percent of their capacity.

Interviewees who participated in the Chaparro study strongly expressed that faculties should emphasize theoretical principles in their teaching, together with practical training. Yet, few of the professors interviewed in the study utilized student participation in research projects as a method of teaching. Students, however, expressed a preference for more participation in such activities. There appears to have been uniformity among Chaparro's interviewees that faculty libraries were technically obsolete, poorly organized, and inadequately financed. General concern was also expressed for the lack of adequately educated professionals to fill academic positions in faculties, resulting in severe shortages in professors in 18 schools. The Chaparro study also revealed that 54.7 percent of the students in agriculture faculties were of rural origin.

Chaparro briefly mentions a study of higher education and agriculture performed in Brazil in 1954. It was apparently sponsored and conducted under the old Point IV program, the forerunner of the U.S. Agency for International Development (USAID). He offers few additional details concerning this study.

A special commission, under the auspices of the W. K. Kellogg Foundation, reviewed higher education programs of agriculture in Colombia in the early 1960s (Naranjo, 1966). Naranjo reports that ten main problems were noted in this commission's findings. Rather than restate Naranjo's observations on these ten points, they are as follows:

1. A lack of integration between the different levels of education; this problem was especially acute in the rural areas.

2. The vocational educational system in agriculture is insignificant and deficient, especially in those respects dealing with subject matter and teaching methods.
3. There was a lack of buildings and other physical facilities, as well as lack of equipment and supplies in most of the universities and faculties of agriculture, veterinary medicine, and forestry schools.
4. In many instances, thesis presentation at the end of the training period was not a requirement and the course content was based mainly on the straight lectures.
5. There was a high percentage of drop-outs at the first year of university training.
6. Because of a uniform status recognized for all the professors at the university level, a lack of motivation was found in that personnel toward the graduate studies.
7. The Commission reported a high degree of isolation of the faculties and schools in relation to the official and private institutions dealing with agriculture and rural life, as well as with all the graduates from the same educational institutions.
8. The identical pattern was discovered in relation to the research activities which were carried out under the direct responsibility of the Ministry of Agriculture, Departmental Agricultural Agencies and some semi-official institutions.
9. Extension work was also located under the Ministry of Agriculture in various departmental agricultural agencies and some semi-official institutions, but no relationship was found with similar international institutions, as normally happened with the research activity.
10. In 1961 the demand for well-trained personnel in the different fields of agriculture at the various educational levels surpassed the number of well-qualified persons available at that time to work in those fields (Naranjo, 1966, p. 17-19)

Insofar as this researcher has been able to determine, the preceding works are the only scholarly level pieces dedicated to higher education in agriculture which have been prepared to date. Other similar work may have been performed, though the author has not been able to obtain and, therefore, report any additional items. Generally, only glimpses of agricultural programs appear in works designed for other purposes but which refer briefly or indirectly to agriculture as part of a more general

presentation.

For example, Safford (1976) describes the origins and modern results of policies and programs in Colombia designed to create a competent professional corps of practitioners in various technical areas. He briefly relates that in the early 1870s, the National University of Colombia offered some agriculture courses through the School of Natural Resources. However, the nation's first formal agricultural school was established in 1874 in the state of Cundinamarca. In 1880, the National Institute of Agriculture was founded and offered a broad-based curriculum in agronomic sciences. Civil war in 1885 ended agricultural instruction in the country and it was not again firmly established until 1916.

In his essay on university education, Góngora (1979) mentions Chile's creation of mid-level educational institutions for architecture, fine arts, music, arts and crafts, and agriculture in the mid-1880s. They were not part of higher education at that time, however. He also notes the fact that a post-secondary level school of agriculture and veterinary medicine was established in Mexico sometime near 1857, though he is not specific on this point. Both of Góngora's comments are only brief references.

Waggoner (1966), in an article on the university teaching professions in Central America, indicates that at one well-known university, in 1962, the agronomy faculty had no (0) full-time professors, nine (9) half-time, and 22 that were paid by the hour. Incidentally, this was no worse than several other faculties at the same institution.

The preceding examples demonstrate the paucity of scholarly

literature regarding instruction in agriculture within the context of higher education in Latin America. Certainly, individual reports, program descriptions, and similar items have probably been prepared. But they are undoubtedly designed for local use and are generally not available. The accumulation of such materials from the region and their summation into one report, similar to the work of Chaparro, would seem to be a worthy endeavor.

In the search for pertinent literature in the general subject area of this dissertation, this researcher documented his reviews of several scholarly information sources. Following is a presentation and brief discussion of the results.

(1) The "Latin American Research Review" was searched from 1966 to the present, yielding no articles on agricultural education anywhere in the region, nor other articles of relevance to this research.

(2) "Doctoral Dissertations on Pan American Topics Accepted by U.S. and Canadian Colleges and Universities 1961-65" was published by the preceding scholarly journal. There were a number of dissertations written on education or higher education, and several on agriculture. Of the 842 dissertations listed, none (0) were directed at higher education in agriculture. One (1) was prepared concerning secondary agricultural education occupational experiences in Panama. Educational evaluations or follow-up studies were also not addressed in any article.

(3) "The Journal of Latin American Studies" was reviewed from the first volume in 1969 to the present. It yielded no articles pertinent to the subject of higher education in agricultural disciplines.

(4) "Latin American Perspectives" was reviewed from its inception in 1974 to the present. Again, it published no articles on agricultural education, agriculture in higher education, or even higher education.

(5) The "Journal of Interamerican Studies and World Affairs" yielded the most of any journal, though not on agricultural education per se. Since coming into print in 1961 and up to the present, this journal has printed a number of articles on higher education and on agriculture as individual topic areas.

(6) The "Current Index to Journals in Education" was reviewed for the years 1979 through 1982. The subject areas of agricultural education and higher education were the focus of analysis. Under the higher education subject area, there were a total of 1,528 entries for the period. From what this researcher was able to ascertain from the titles given, there were seven (7) entries on higher education in Latin America. None (0) dealt with Costa Rica, education in agriculture, or evaluation/research. To contrast, there were numerous entries on other areas of the world, particularly Western Europe, Africa, Asia, and Scandinavia.

(7) The "Journal of Comparative Education" was reviewed from 1964, the year it came into print, to the present. The researcher found only two (2) articles on higher education in Latin America, one (1) on agricultural education in public schools in Jamaica, and none (0) on programs of agriculture in higher education in Latin America or anywhere else.

(8) The "Comparative Education Review" was reviewed for the period 1972 to the present, and no pertinent articles were encountered.

Additionally, this journal itself indexes 18 other international journals on education. A summary review of those indexed journals was published for 1980-1982 by subject area. Under the heading of higher education, there were a total of 47 articles, of which none (0) dealt with Latin America or with agricultural programs in any context.

(9) "Agricultural Administration" is a relatively new journal and almost exclusively publishes articles relating to developing nations, including many concerning Latin America. A review from its commencement in 1974 to the present reveals not a single article dealing with education in agriculture at any level or in any country.

(10) A recent article appeared in February 1983 issue of the Comparative Education Review titled "Educational Research in Latin America: A Twelve-Year Perspective." The article explains that a computer data system has recently been established that will "analyze, store, and retrieve information regarding the publications on Latin American educational research reviewed in the Handbook of Latin American Studies since 1969" (Egginton, 1983, p. 121). A comprehensive classification system was developed by Egginton, the article's author, and all abstracts in each education section of the Handbook were coded according to this system. There are a total of 2,648 publications thus coded into the system.

Egginton was contacted by the researcher, and in response to the discussion, agreed to generate computer listings which would indicate research on higher education and agriculture in Latin America and Costa Rica. Two such printouts were received, one covering all abstracts

dealing with higher education or universities, regardless of topic, in Costa Rica. The other was a listing of higher education or universities (two classification variables) and rural education for all Latin America. There is no classification for "agriculture" per se. The two listings yielded 21 and 6 abstracts, respectively. A review of these abstracts (only the volume number and abstract number were listed) revealed that none of them deal with agricultural education of any type.

In summary, excepting a few studies performed prior to 1966, the researcher was unable to locate any scholarly literature on higher education in agricultural disciplines in Latin America. Even the early studies mentioned above are relatively unknown and difficult to obtain. The extreme insufficiency of published and recent material in this area signals the urgent need for the collection of data and the scientific presentation of information useful for those who are involved in the agricultural development of these nations. It is evident that such information has not been available to development specialists and program planners or administrators in the past. Certainly, this is sufficient justification for the research presented in this dissertation, for it will be a significant contribution to a field of interest which has received little attention by scholars.

Use of Methodology and Procedures in Latin America

Follow-up studies of agricultural program graduates in Latin America have not been at all common. Naranjo's (1966) research is the only evidence indicating the prior usage of this method of data collection in an educational setting.

Of his own literature review, Naranjo concludes:

"...there was not a single follow-up study similar to this one, carried out at the undergraduate level in any of the 68 faculties or university schools of agriculture, and the same was true of the new graduate schools established long after the Turrialba inauguration" (1966, p. 19).

With the exception of the Naranjo study and the research of this dissertation, this researcher has found no other instances where follow-up studies have been used to evaluate educational programs in agriculture at the higher education level in Latin America. Nor has the researcher encountered any cases where the follow-up study technique has been utilized for the evaluation or research of any other program in Latin American institutions of higher education.

While follow-up studies in particular appear to be rarely used in Latin America, survey-based research using formal data-gathering techniques is not. Naranjo (1966) is an example of the successful use of mailed questionnaires given the parameters of his research. Two other mailed surveys reported by Nett (1971) and Ardila et al. (1982) were less than successful in obtaining an adequate frequency of response, however.

Unmailed questionnaires filled out by respondents themselves have also been utilized by Zschock et al. (1974) and Waggoner (1974), both in the context of higher education.

One of the most popular data collection methods for research in Latin America is the personal interview technique. These interviews may either be structured and formal or more informal in nature. Interview schedules are often filled out by the interviewer in structured

interview sessions. As respondents provide information, it is recorded on the interview instrument.

Various common uses of interview research are employed and described by Whiteford (1980). Hunter and Ternent (1960) used personal interviews in their study of professors and programs of economics in Colombia. Use of this procedure, employing a formal interview schedule completed by the researcher, was the source of information for a recent study of nutrition in rural Honduras (Whiteford, 1982). A similar process was employed by Anderson (1977) in a comparative study of irrigation organizations in the Andean Pact nations of Colombia, Ecuador, Bolivia, and Chile. In a slight modification of the personal interview, Zschock et al. (1974) and Anderson (1977) both report the use of unstructured group interviews to acquire certain types of desired information that individuals interviewed separately may not be able to supply.

The preceding generally recognized procedures for data collection have been used in Costa Rica with success. Prepared questionnaire instruments filled out by respondents in an educational setting were effectively used by Goldrich (1966) in a cross-cultural study of secondary school students in Costa Rica and Panama. Edwards (1967) based his study of social power structures in San Jose on personal interviews. Whiteford (1983) reports employing formal interview schedule techniques similar to his nutritional studies in Honduras. Personal unstructured interviews were used as part of the research carried out by Barlett (1982) in her study of change in an agricultural

community on the meseta central of Costa Rica. On several occasions, Seligson (1980; 1982) has reported research based on information obtained through extensive interviews utilizing a structured interview schedule. His findings provide important insight into the status of agriculture and of the agriculture peasantry class in modern-day Costa Rica. Furthermore, these techniques have been used extensively by Costa Rican research entities such as IDESP0, the Institute of Social and Population Studies (Denton, 1979).

These citations from the literature clearly indicate that the methodology and procedures employed in this research are appropriate and usable in Costa Rica. Furthermore, this review of literature reveals the extreme paucity of published and accessible information or research on higher education agricultural programs in Latin America, a subject that has been severely neglected by scholars in recent years. This signals the need for studies that will enlarge the body of literature on such programs.

METHODOLOGY AND PROCEDURES

Research Situation: An Overview

This section documents, in some detail, the research methods and procedures utilized in acquiring the field data and related information for the dissertation.

Four institutions of higher education in Costa Rica offer degree programs in agriculture (OPES, 1981). The institutions are the University of Costa Rica (University of Costa Rica), the National University of Costa Rica (Universidad Nacional de Costa Rica), the Technical Institute of Costa Rica (Instituto Tecnológico de Costa Rica), and the State University at a Distance (Universidad Estatal a Distancia). All are public financed.

The oldest and most prestigious of these programs is at the University of Costa Rica (UCR) located on the University's main campus in San Jose. At the time the research was performed, this was the only program authorized to grant the academic degree of licenciatura¹ (licentiate), the highest degree available in agricultural disciplines (excepting veterinary medicine) in Costa Rica. Graduates with this degree: (1) have successfully completed all required coursework; (2) have prepared a written research oriented tésis (thesis)² accepted

¹The licenciatura academic degree has only been granted for the past three (3) years. Prior to that time, the degree conferred was that of Ingeniero Agrónomo. These are commensurate degrees, and throughout this section licenciatura will be used to represent both.

²Students have the option of performing a field-oriented practicum in lieu of thesis research. In such cases, a detailed written analysis

by the Agronomy Faculty; and (3) are known by the title of Ingeniero Agrónomo (professional agriculturalist), thereby qualifying for full membership in the nationwide Colegio de Ingenieros Agrónomos, a prestigious nationwide professional association.

The Faculty (Agronomy Faculty) of the UCR offers the licenciatura degree in three schools or basic disciplines--Plant Science (Fitotecnia), Animal Science (Zootecnia), and Agricultural Economics (Economía Agrícola). More detail on these programs as well as those of the other three higher education institutions is found in following sections of this dissertation.

Design of the Research

The research activities conducted in support of the objectives of this dissertation primarily fall under the category of descriptive research, as defined by Borg (1981) and Van Dalen (1979). These scholars identify survey studies as a means for acquiring data for descriptive research. For example, Borg states that "survey research typically employs questionnaires and interviews in order to determine the opinions, attitudes, preferences, and perceptions of persons of interest to the research" (1981, p. 130). Van Dalen (1979) indicates that survey studies are one of the primary means for performing descriptive research. Survey studies can both describe and explain phenomena, conditions, and practices.

of the practicum experience is presented. For purposes of this section, no distinction is made, and the term "thesis" shall include both options.

One technique commonly employed in educational survey research is the follow-up study of former students. It was selected as the primary data gathering tool for this study. Wentling (1980) indicates that the follow-up study is a procedure specifically designed to evaluate the product of educational programs--the graduates. He further adds that former students are in the best position to judge the strengths and weaknesses of an educational program and are, therefore, very important sources of information. Murphy (1980) supports this philosophy, indicating that descriptive studies benefit from the information provided by those closely associated with a program.

Van Dalen (1979) and Murphy (1980) both indicate that another form of information gathering for survey studies is termed documentary analysis. This entails the collection of facts and data from documents, records, reports, and other such sources from which researchers ". . . often unearth pertinent data or get ideas about relationships . . ." (Van Dalen, 1979, p. 290).

The follow-up study and documentary analysis techniques were selected for utilization in this research, considering that they are both viable means for acquiring data about educational programs. The procedures followed for each of these methods are discussed in following subsections.

Follow-Up Study

Basis for the follow-up study

The UCR Agronomy Faculty program was selected for in-depth research in consideration of its prestige and the licenciatura degree it offers. The Dean of the Agronomy Faculty had also pledged full support of the effort, which he felt would yield valuable data for the Faculty's benefit (Luis Carlos González, Dean, Agronomy Faculty, University of Costa Rica, personal letter, 1982). Therefore, this became one of the primary purposes of the overall research effort. A previously signed contract between the Faculty and the College of Agriculture, Iowa State University, providing for a mutual faculty member exchange program provided the inter-institutional commitment and financial means required to conduct the study.

Similar intensive research with the other institutions of higher education was not possible due to time and fiscal constraints, and the lack of sufficient contact with these entities to establish a strong working relationship. However, general information on their agricultural academic programs was obtained via other procedures. In addition, none of these programs had graduates holding the licenciatura degree, thereby eliminating the possibility for comparative data collection.

Follow-up study procedure

The procedure selected for conducting the follow-up study of graduates was the personal interview method utilizing a prepared interview schedule. All responses were systematically recorded on the interview schedule by the researcher, who performed all interviews. No

other interviewers were used in data collection activities, and all interviews were conducted in Spanish. The feasibility of successfully using this method of data collection was enhanced by the researcher's fluency in Spanish and extensive previous interview experience in Latin America.

Population

For purposes of the follow-up study, the population consisted of graduates of the Facultad de Agronomía of the University of Costa Rica: (1) who had been awarded the degree of licenciado; (2) who presented a thesis in 1979, 1980, or 1981; (3) who completed degree coursework requirements in 1976 or thereafter; and (4) who resided in Costa Rica during the time period in which the research was conducted.

A few explanations of the preceding definition are required. First, those holding the licenciatura degree are considered to be full program completers. This distinction is necessary since the Agronomy Faculty can also award the degree of bachillerato (bachelor) to individuals who successfully complete a required number of course credit hours. The qualification termed "year in which the thesis was presented and accepted" was chosen in lieu of "year degree was received." Under the UCR system, it is possible for an individual to present an acceptable thesis near the end of one calendar year and not actually receive the degree until early the next year. Furthermore, it was found that official University records utilize the thesis presentation date.

Second, only recent graduates were included in the population. The "treatment" under investigation in this study was the adequacy of

the current program, which could best be measured by obtaining the perceptions of the most recent program completers. Their responses would be more consistent with current programs than would the perceptions of graduates from previous periods. The research assumed that the treatment (program) was fairly constant for all those terminating during the 1979-81 time period. This assumption would become weakened if the measurement period were lengthened, for there is danger that more than one treatment could be measured through the survey.

The third delimitation on the population was added after discussions with the Dean of the Agronomy Faculty and the Directors of the three schools. The data of coursework completion had to be considered since it was possible that an individual could have completed the requisite coursework some years earlier, yet not actually finish and present the thesis until the 1979-1981 period. Again, to eliminate the possibility of studying a treatment that preceded the most current program, it was necessary to fix a date for coursework completion. The year 1976 was proposed by members of the Agronomy Faculty since that would allow for a three-year delay from end of coursework to thesis presentation in 1979 (two years is the average for this process).

The fourth requirement, that of residency in Costa Rica at the time the research was conducted, was designed to keep the research manageable. It eliminated individuals, both Costa Rican and non-Costa Rican, who could not possibly be located and personally interviewed.

Accurate identification of the population was problematic, more so than was anticipated. Two major complications were encountered.

For one, pre-prepared listings of thesis presenters by calendar year and by school (escuela) of study do not exist. Such a listing had to be generated especially for the study. After considerable time and deliberation with counterparts in the Agronomy Faculty, and at the suggestion of the Dean's clerical staff, it was determined that the only accurate source was the Faculty's official records (actas oficiales) kept in the Dean's office (decanato). This record is a handwritten (preprinted forms have been used since 1981) log revealing the names of thesis presenters, the date of their presentation, their school, and other pertinent data. Therefore, a listing was prepared indicating the names, by year and by school, of those individuals who had presented theses in 1979, 1980, and 1981. Preparation of this listing required the efforts of two office clerks over a two-day period.

The second problem associated with accurate population identification concerns the course completion date qualification. Only one record of such dates exists, and that is the class plaque (placa de promoción) on which the name of a particular individual appears along with the names of fellow classmates. Such a placa is prepared for each school and for each group of students terminating coursework concurrently within that school. These are metal placas and are affixed to the walls of the corridors in the Faculty's building complex. For some calendar years, there are as many as three such placas for one school since various groups complete formal coursework during the transcourse of the year.

At the suggestion of an ISU professor of statistics,¹ the decision was made to check the placas only for the names of those individuals who were selected in the population sample, thus eliminating the awesome task of checking all members in the population. A further shortcut utilized by the researcher consisted of having the sample selection for each school reviewed by that school's director (director--similar to a department chairman) and staff. In most instances, these people were able to readily identify those individuals who had terminated coursework in fairly recent years or, conversely, those who had finished prior to 1976. They were also able to indicate many of those who were no longer residing in the country. Only the names of individuals for whom the course completion date was unclear or questionable were cross-checked with class placas.

The procedures followed for verifying thesis presentation dates, acquiring an accurate listing of the study population, and verifying course completion dates proved to be successful. As the research progressed, only two (2) respondents had to be eliminated from the sample when the interviewer detected some uncertainty regarding the date of thesis presentation. After completing each of these interviews, further investigation revealed that, in both cases, they had indeed presented their theses near the end of 1981. This was recorded correctly in the actas. The actas did not record, however, that the

¹Dr. Donald K. Hotchkiss was teaching a course in statistics at the Agronomy Faculty during the initial stages of the research, and was consulted often during the population identification and sample selection process.

theses had been rejected by the Faculty and another presentation had been rescheduled for 1982.

Sampling procedures

The stratified random sample procedure was utilized for sample selection. The strata in the study were the three schools or academic disciplines of the Agronomy Faculty. Listings were made of the population for each stratum and a table of random numbers was employed in actual sample selection.

The size of the sample drawn from each stratum was based on the proportional size of the stratum. The researcher had estimated that the study could not exceed 75 respondents, primarily due to time limitations imposed by the personal interview procedure. This figure became the base number for the total sample and represented 31 percent of the total population of 239 graduates. Each stratum was to have a minimum sample size of 20 cases. Since the school of Agricultural Economics would have only been permitted 18 cases under strict proportions (it being the smallest school in number of graduates), a sample of 20 was selected for this stratum. The remaining number of 55 was then proportioned between Plant Science and Animal Science, resulting in a sample size of 33 and 22, respectively. Tables 2 and 3 give more detail on the population and sample.

As the follow-up survey progressed, the researcher tried to maintain proportionality among male and female respondents. Overall, males represented 87.3 percent of the population and females 12.7 percent.

Table 2. Number of graduates by school and by year

Year	Plant Science	Animal Science	Agricultural Economics	Total
1979	33	29	19	81
1980	37	26	18	81
1981	<u>39</u>	<u>18</u>	<u>20</u>	<u>77</u>
Total	109	73	57	239

Table 3. Target samples and actual number of interviews by school

School	Target	Actual
Plant Science	33	31
Animal Science	22	20
Agricultural Economics	<u>20</u>	<u>20</u>
Total	75	71

Survey results indicate that 84.5 percent of respondents were male, and 15.5 percent female.

Data collection

After sample selection, a number of means were utilized to contact respondents for interviews. School directors and staff members were helpful in reviewing sample lists and providing the most current address, telephone number, or current work location possible for potential respondents. Often, respondents themselves were able to identify the location of friends who had also been included in the sample. The professional organization for ingenieros agrónomos was reluctant to provide personal information on its members, as one might expect. Nevertheless, toward the end of the research period, when only a small number of potential respondents had not yet been located, the Colegio did consent to assist at the request of the Agronomy Faculty Dean. This proved to be of immeasurable help in solving difficult cases.

The excellent telephone system in Costa Rica was a significant factor in the timely completion of the data gathering process. It was relatively easy to contact most graduates by telephone, though it often required persistence and evening calls. Several individuals assisted in the location of respondents, particularly in the initial stages of the research. Later, the researcher performed this function. Most generally, respondents were first contacted by telephone and arrangements made for a personal interview. Once graduates became aware of the purpose of the study, through a brief explanation, and that it was being conducted with the full cooperation of the Agronomy Faculty, they readily

agreed to participate. Indeed, in many instances they were willing to come to the researcher to be interviewed.

In 13 of the 71 interviews composing the follow-up study, the interview was performed over the telephone. These were instances when no other alternative was available, primarily when the respondent resided in a fairly remote area and in-person contact was impractical. The type of interview procedure was coded and statistical tests were performed to compare the two groups. These tests revealed no significant differences in the responses of telephone and non-telephone interviews for selected variables (see Appendix Table C1).

The effective use of the telephone for contacting, and in some cases interviewing, respondents is mentioned because the use of this communication medium in many other countries of Latin America would be severely limited. For example, daytime telephone communication even between the two principal cities of Ecuador is nearly impossible. Where good telephone service exists, it can certainly be effectively utilized, however.

Interview schedule preparation

"The primary considerations in developing questionnaires and interview schedules are: (1) keep the questions simple and concrete, (2) questions should not be open to subjective evaluation, and (3) do not bias the response" (Denton, 1973, p. 18).

Bearing in mind the preceding guidelines, the following is an outline of the steps employed in the development of the interview schedule for the follow-up study.

- a. A preliminary instrument was prepared by the researcher, with items directed toward acquiring information pertinent to follow-up study objectives.
- b. This was reviewed by a three-person review team and their comments were solicited.
- c. A second draft of the interview schedule was prepared as a result of the first review, incorporating the suggestions of the review team.
- d. The second draft was translated into Spanish and became the working draft in that language. The researcher, with the excellent assistance of several Costa Rican graduate students at Iowa State University (all graduates of the program to be studied) further refined the instrument to its final form.
- e. The instrument, after step (d) above, was typed in Spanish in final camera-ready fashion. This version was duplicated and utilized in the follow-up interviews.
- f. Upon arriving in Costa Rica, the researcher requested that the Dean of the Agronomy Faculty and other faculty staff review the document. Only a few minor alterations were suggested, and these were accepted and incorporated in all copies of the instrument.
- g. The first eight (8) interviews became, in effect, a field trial for the instrument. It was apparent that respondents had difficulty understanding one item. Consequently, it was altered and the first 8 respondents contacted to obtain their

response to the "new" item. No other difficulties were encountered.

The preceding steps were followed in order to assure instrument validity and appropriateness to the particular set of circumstances under study. Five (5) different Likert-type scales were utilized in the instrument and fairly large, readable cards clearly showing these scales were prepared to facilitate accuracy and ease of response. A listing of the items as they appeared on the follow-up study instrument has been prepared and is located in Appendix A.

Secondary Source Research

The follow-up study of UCR Agronomy Faculty graduates provided only one source of information about one program. Therefore, the acquisition of general data and information from other sources was required, both for the UCR Agronomy Faculty program as well as the programs of the other institutions of higher education. The first purpose of the study demanded that this be a primary research thrust.

This phase of the research consisted of two basic activities:

- (1) The acquisition of printed material such as books, articles, theses, factual reports, and the like; and
- (2) Conducting informal personal interviews with faculty members and other knowledgeable resource persons.

Both of these activities yielded a significant amount of very valuable and useful information. In addition to the collection of numerous volumes of printed matter, eighteen (18) informal interviews were conducted.

Data Transformation and Analysis

All data transformation and analysis was conducted at Iowa State University. Many items on the interview schedule were of the open-end response variety. Responses to these items were reviewed by the researcher and categories were developed for coding purposes. All data were coded from interview schedules by the researcher, and key punched with verification by the Iowa State University Computation Center. All data analysis was performed utilizing the Statistical Package for the Social Sciences, SPSS (Nie et al., 1975; Hull and Nie, 1979).

HIGHER EDUCATION AND AGRICULTURAL PROGRAMS IN COSTA RICA: AN OVERVIEW

Introduction

The literature review section of this dissertation documents the limited extent of up-to-date information on agricultural careers in higher education throughout Latin America. The paucity of such information warrants the following description and discussion of these programs in Costa Rica, a highly agrarian society which maintains agricultural career programs at several state-supported institutions.

There are four (4) institutions of higher learning in the Costa Rican system of public education (OPES, 1979b; 1980). Each of these entities is discussed in following subsections, particularly the characteristics of their agricultural instructional programs. This section, then, is designed to acquaint the reader with higher education in Costa Rica and provide a framework for understanding post-secondary agricultural instruction leading to professional careers.

The information for this section has been compiled from numerous documents, both official and unofficial, collected during the in-country research effort. In addition, personal interviews with a number of knowledgeable individuals also contributed valuable insight and information.

Legal Basis for Higher Education

The legal foundation for all public education in Costa Rica rests in the nation's Constitution. Title VII, comprising Articles 77 through

89 is titled La Educación y La Cultura (Education and Culture). Article 77 places the responsibility for organized education from pre-school through the university on the State. Article 81 establishes the coordination of all public funded education through a council to be headed by the Minister of Education (Costa Rica, 1949).

Beginning with Article 84, higher education is specifically addressed. This article in the Constitution indicates that the State will collaborate in the financing of higher education. Article 85, as revised by Law No. 6580 in 1981, is of major importance. In it, the four public institutions of higher education are guaranteed fiscal endowments from the public treasury. A special higher education fund is also established and percentages are fixed for its distribution among the four institutions. For the current five-year period (1981-1985), the percentages are: (1) the University of Costa Rica, 59 percent; (2) the Technological Institute of Costa Rica, 11.5 percent; (3) the National University, 23.5 percent; and (4) the State University at a Distance, 6 percent (OPES, 1980).

In addition to the Constitution, there are several other legislative enactments and inter-institutional agreements relating to higher education. Too numerous to discuss separately, they have been summarized in Appendix B. They are divided into three primary areas: (1) those dealing with the coordination of higher learning; (2) those directed toward the financing of higher education; and (3) those which are inter-institutional arrangements.

General Characteristics

Higher education in Costa Rica, as reviewed above, is carried out by four public funded university level institutions.¹ They comprise what is termed the "higher education system" of the nation (OPES, 1979a). Thus, it is distinguished from the purely "postsecondary education system" which consists of all schools, including the universities, which are authorized to grant the bachillerato (bachelor) degree or above. This would include institutions such as the normal schools, the School of Nursing, and the vocationally oriented Colegios Universitarios (university colleges) at Cartago and Alajuela (OPES, 1979a).

Though referred to as a "system" of higher education, each of the four institutions operates independently of the others. Coordination among these entities is accomplished through the National Council of Rectors (Consejo Nacional de Rectores) and the Higher Education Planning Office (Oficina de Planificación de la Educación Superior), both created in 1974 (OPES, 1979a). The Planning Office, known as OPES, states that the fundamental objective behind the establishment of these coordinating entities was to discuss and seek to resolve problems which confront both the individual institutions as well as common problems encountered by the institutions as a group (OPES, 1979a).

OPES (1979a) describes and categorizes the institutions of higher

¹The Universidad Autónoma de Centro América (UACA), located in San Jose, is a private institution. Though it is not financed by public monies, it nonetheless operates under Costa Rican law and could, therefore, be considered as a fifth institution in the higher education system. This section, however, focuses exclusively on those institutions financed through public means.

education into three types. The first type is the standard university, one which is academically oriented, performs research, and imparts a high level of education. The University of Costa Rica and National University fall into this group. The second type imparts professional training in technological fields at the university level. The Technological Institute of Costa Rica is of this type. The State University at a Distance is in the third category. The distinguishing characteristics of this type are the nature of its clientele and instructional programs offered. It is of the non-traditional "open" university variety, with instruction directed primarily at those who never had the opportunity of pursuing post-secondary education in a formal setting.

Enrollment in higher education is increasing. Figures published by the World Bank (1978, 1981) indicate that higher education enrollment, as a percentage of the population aged 20-24 years, increased from 5.0 percent in 1960 to close to 19 percent in 1977. This does not mean that all higher education enrollees complete their career programs, for many do not. The latest general census, performed in 1973, indicates that 3.8 percent of the economically active population were university graduates (Costa Rica, 1975).

The Public Higher Education Institutions and Agricultural Career Programs

University of Costa Rica

Founded by Law No. 362 in 1940, the University of Costa Rica (UCR) is the nation's oldest and most prestigious institution of higher learning (UCR, 1981; OPES, 1979b). It is also the largest, currently with

somewhere near 30,000 students and offering more than 200 different programs of study. In addition to the main campus in San Jose, the UCR operates programs in four University Regional Centers, some of which even have sub-centers for particular programs at various locations. Table 4 presents basic information concerning the main/central campus of UCR and its regional centers.

Table 4. Characteristics of units of the University of Costa Rica^a

Unit name	Primary location	Year created	No. students ^b
UCR - Main Campus	San Jose	1940	24,575
Western Regional	San Ramon	1968	2,495
Atlantic Regional	Turrialba	1973	582
Guanacaste Regional	Liberia	1972	1,016
Limon Regional	Limon	1979	209
Total Enrollment			28,873

^aOPES (1979b; 1982).

^bRepresents initial registration figures for 1981.

The Agronomy Faculty (Facultad de Agronomía), which is referred to at times simply as the "Faculty" of the University of Costa Rica is located at the main campus in San José. One of 11 academic faculties, it is organized into three (3) escuelas (schools); i.e., Plant Science (fitotecnia), Animal Science (zootecnia), and Agricultural Economics (economía agrícola). These schools, in their respective areas of specialization in agricultural sciences, offer two (2) academic degree options--bachillerato (bachelor) and licenciatura (licenciate). The first of these basically requires the acceptable completion of a given

set of courses. It is a relatively new degree for the university, having been granted as of 1979 (Luis Carlos González, Dean of Agronomy Faculty, UCR, personal communication, 1982). Traditionally in Costa Rica, the bachillerato has been used in reference to the diploma awarded at the completion of secondary school.

The licenciatura degree requires the completion of a specified number of coursework hours (four more courses than the bachillerato), and the successful completion and subsequent presentation of a written research thesis (tésis) or practicum report. Either of these options is open to those pursuing the licenciatura degree. The licenciatura degree, per se, was instituted in the Agronomy Faculty as of 1979. Prior to that time, graduates who had met all academic requirements were awarded the degree of Ingeniero Agrónomo (Professional Agriculturalist). Except for the degree name, the old and new programs are virtually identical in their program requirements. Licenciados from the Agronomy Faculty are generally known by the title of ingeniero agrónomo and are allowed full membership in the national association of this profession.

The Agronomy Faculty also participates with other faculties in two interdisciplinary professional degree programs. One is a licenciatura level program in food technology and the other is a bachillerato degree in agricultural engineering (Facultad de Agronomía, 1982). In addition, it is involved administratively in the post-graduate studies program conducted by CATIE, which shall be described in a following section.

Administratively, the Agronomy Faculty is directed by the Dean, who

is elected for a four-year term by the Faculty Assembly. The three schools are headed by directores (directors), similar to department chairman. They, too, are elected to fixed terms by the faculty assembly of their respective escuelas (asamblea de escuela). Following well-established precedence at the UCR, each school in the Faculty operates with budgetary autonomy, and the faculty member assemblies, both at the escuela and facultad levels, are the real loci of power (Luís Carlos González, Dean, Agronomy Faculty, UCR, personal interview, 1982).

The total number of faculty members of the three escuelas is 134. Of these, 79 (59 percent) are employed full-time and 55 (41 percent) are part-time professors whose hours sum to 12.7 full-time equivalents. All faculty members, regardless of academic rank, belong to one of the three escuelas, though many are assigned to research tasks at the Faculty's experiment stations or affiliate research centers (Facultad de Agronomía, 1982).

The largest of the three escuelas is Plant Science. For many years it was the only specialization offered. Animal Science is the next largest in number of students and faculty members, and Agricultural Economics is the smallest, and youngest, of the three.

The Agronomy Faculty maintains two primary experiment stations, one each for Plant Science and Animal Science. Two additional experiment station sites are currently in development. These experiment stations are used in support of the Faculty and its overall research and instructional programs. The Faculty is also directly affiliated

with three (3) research centers, all located near its own physical facilities. These centers are funded by various sources and were established to carry out cooperative research in conjunction with the Agronomy Faculty. All faculty personnel assigned to these centers are responsible to the Faculty in matters pertaining to instruction, if they teach courses. For administrative and budgetary purposes, the centers operate independently of the Faculty.

There are some 1,419 students enrolled in career programs in the UCR Agronomy Faculty. Further breakdown of this figure shows 615 (43 percent) in Plant Science, 337 (24 percent) in Animal Science, 307 (22 percent) in Agricultural Economics, and 160 (11 percent) in Food Technology (Facultad de Agronomía, 1982). Another 136 are in the Agricultural Engineering program.

The University of Costa Rica, in addition to the Agronomy Faculty at the main campus in San Jose, also offers programs in agronomy at three of the four Regional Centers. With the exception of Limon, each regional center offers the licenciatura degree in general agronomic sciences, with no area specialization as at the Agronomy Faculty. To the present, these three programs have operated independently of one another. In addition, they have no firm relationship to the Dean nor the Agronomy Faculty. The regional centers were purposely established as units under the direct responsibility of the Rector through the Vice-Rectories (OPES, 1979b). Concern for the general lack of program direction and coordination has led to a recent resolution in the University Assembly designed to create stronger bonds among the regional centers,

and between the regional centers and the central university. The hope is to establish better program coordination and improve the academic quality of programs at the regional centers (Facultad de Agronomía, 1982). The student population currently enrolled in agronomy programs at the three regional centers is 671.

National University

Created by legislative law in 1973, the National University is the second largest, in student enrollment, of the public institutions of higher learning (OPES, 1979b). Initial enrollment for 1981 was reported at 10,632 students (OPES, 1982). The central location of the National University, referred to as UNA, is in the city of Heredia. There are also two small regional centers servicing a total of near 500 students.

The UNA offers the associate degree (diplomado) in various short career areas. In addition, both the bachillerato and/or the licenciatura can be obtained in a number of careers. UNA also provides extension and training courses in several subject areas. As of 1978, there were 1,260 faculty members, five (5) academic faculties, and three (3) special research and teaching centers (OPES, 1979b).

There are three agriculture programs available at UNA. One is the school of veterinary medicine, from which graduates obtain the licenciatura degree. This program graduated a total of 13 students in 1981, and had a total 1982 enrollment of 120 (Decanos, 1982).

The Earth and Sea Sciences Faculty (Facultad de Ciencias de la Tierra y el Mar) conducts the remaining two agriculture related programs

through its School of Agricultural Sciences (Escuela Ciencias Agrarias). These consist of a licenciatura program in general agricultural sciences and a bachillerato degree program in agricultural sciences teaching. The latter program is designed to prepare individuals for teaching agriculture at the secondary school level. Students in this program take many of the same courses as their fellow students plus core courses in educational philosophy, curriculum and teaching. Due to the lack of qualified teacher educators in the escuela, students take these courses from the School of Education, jointly with students from that discipline area, and from CIPET, a public funded technical education and training agency (Universidad Nacional, 1978; Fernando Mojica B., Director, School of Agricultural Sciences, UNA, personal communication, 1982).

The UNA has been authorized to grant the licenciatura degree in 'general agricultural sciences as of 1981 (Universidad Nacional, 1981). Prior to that time, only the bachillerato was offered. Similar to UCR's Agronomy faculty, students pursuing the licenciatura degree may select to perform either a t  sis or a directed practicum option to meet graduation requirements (Universidad Nacional, 1981).

In 1981, there were 23 graduates from UNA agricultural programs, all with the degree of bachillerato (Decanos, 1982). Current total enrollment is approaching 400 students (Fernando Mojica B., Director, School of Agricultural Sciences, UNA, personal letter, 1982).

Technical Institute of Costa Rica

Known by its Spanish acronym, ITCR, the Technical Institute of Costa Rica was created by law in 1971 and initiated coursework in 1973 (OPES, 1979b). Though it maintains some programs at two smaller sub-sites, the ITCR is located primarily in Cartago. Academic programs at ITCR are organized into five (5) divisions, analogous to the faculties of the UCR and UNA. Enrollment has grown from 87 students in 1973, to 2,229 students registered in 1981 (OPES, 1979b; 1982).

One of ITCR's academic divisions is the División de Carreras Agrícolas (Agricultural Careers Division). This division is headed by a division director appointed by the rector of ITCR. It offers three (3) agricultural career programs at the level of bachillerato, the highest degree it is authorized to award. Each of these is an area specialization and is conducted by a departamento (department) within the division. The programs are in general agronomy, agricultural engineering, and agribusiness administration (Decanos, 1982).

This same source indicates that the total initial enrollment of these programs in 1982 was 410 students, and that in 1981 there were 66 graduates.

According to the Division Director, up to 90 percent of ITCR agriculture graduates appear to find ready employment with both public and private sector entities, though there are no firm figures available. Also, graduates with the degree of bachillerato can be associate members of the national professional agronomists' association. This level of membership is of a lesser category than the full membership available

to those with the licenciatura or ingeniero agrónomo degrees, but, nonetheless, offers these individuals the prestige and benefits of the association (Javier Flores G., Director, Agricultural Careers Division, ITCR, personal interview, 1982).

One of the most distinguishing features of the career programs at the ITCR is that the seventh semester (one semester is equal to 20 weeks) of career preparation is spent in an actual practical experience program called práctica especialidad. This is a long-term specialty practicum designed to provide meaningful work experience. Students then return to the ITCR to complete their final semester of study prior to graduation (ITCR, 1981).

State University at a Distance

This university, known as UNED, was created by law in 1977 (OPES, 1979b). Ochoa (1981) reports that UNED primarily utilizes non-traditional instructional methods, relying heavily on modern communication media. Therefore, there is no central campus location and the university is not organized into schools or departments. Instruction is given via television, bookcassettes, lecture cassettes, and prepared texts. While self-study is the primary means of learning, students meet once each week with a professor-tutor. Currently there are 19 locations dispersed throughout the country where students convene for this purpose (Ochoa, 1981). Initial enrollments for 1981 show a total of 7,191 students taking courses with UNED, an increase of 22.5 percent over 1980 (OPES, 1982).

UNED offers both a diplomado and a bachillerato degree program in agribusiness administration, utilizing the services of 80 part-time professor-tutors. Due to the recent installment of these career programs, as of 1981 there were no graduates. Apparently, UNED has a total of 438 students currently studying agribusiness administration (Decanos, 1982).

Other agriculture programs

Previous portions of this dissertation have made reference to CATIE, in particular Naranjo's research among a group of graduates from that institution. CATIE is an internationally funded center for the Central America region and is located at Turrialba, Costa Rica. It was originally established in 1942 under the auspices of IICA, the Inter-American Institute of Agricultural Sciences. In addition to conducting a variety of research efforts, CATIE maintains a graduate-level academic program offering master's degrees in three agricultural subject areas. Member nations at present are Panama, Nicaragua, Honduras, Guatemala, and Costa Rica. The Agronomy Faculty of the UCR participates directly in the administration of CATIE's graduate program (Decanos, 1982). Nevertheless, it cannot be considered as a program of the UCR or of the system of higher education in Costa Rica. Its presence, however, is viewed as an asset and it contributes to the stature of advanced learning in agricultural disciplines.

National Commission of Higher Agricultural Education

A recent development is the establishment of an advisory group to CONARE and OPES on matters pertaining to the planning of higher agricultural education. This advisory group, or commission, is composed of one representative from each institution, generally the person of the highest rank in agricultural subject areas for that institution (Decanos, 1982). This commission is in its initial stages of development and has not as yet made any official recommendations concerning agricultural programs (Javier Flores G., Director, Agriculture Careers Division, ITCR, personal interview, 1982). The initiative for such a commission arose from a project concerning the organization and planning of agricultural education in Costa Rica in which the institutions of higher education, the Ministry of Public Education, and IICA participated (Decanos, 1982).

Summary

The foregoing has been a brief review of programs of agriculture operating within the public institutions of higher education in Costa Rica. The information presented documents certain features of each program, providing the reader with a general understanding of the structure for higher education in agriculture.

Some of the primary information concerning these programs has been summarized in Table 5. The table lists each basic program by institution, and indicates its share of students, graduates, and the types of degrees offered at present. As indicated by the table, there are 15

Table 5. Programs of agriculture in public higher education in Costa Rica^a

Institutions/program(s)	Students enrolled 1982	Students graduated 1981	Number basic programs	Degrees offered		
				Licenciatura	Bachillerato	Diplomado
<u>University of Costa Rica</u>						
Agronomy Faculty -						
Plant Science	615	115	1	✓	✓	
Animal Science	337	10	1	✓	✓	
Agricultural Economics	307	39		✓	✓	
Interdisciplinary Programs						
Food Science	160	6	1	✓		
Agricultural Engineering	136	9			✓	
Regional Centers						
General Agronomy	671	8	3	✓		
<u>National University</u>						
Earth & Sea Sciences Faculty -						
Agricultural Sciences	} 376	} 23	1	✓ ^b	✓	
Ag. Sciences Teaching			1		✓	
Health Sciences Faculty -						
Veterinary Medicine	120	13	1	✓		
<u>Technical Institute</u>						
Agricultural Careers Division -						
Agronomy	204	30	1		✓	
Agricultural Engineering	120	25	1		✓	
Agribusiness Administration	86	11	1		✓	
<u>State University at a Distance</u>						
Agribusiness Administration	438	-- ^c	1	—	✓	✓
Totals	3,570	289	15	9	10	1

^aVarious sources cited in this section.^bNo licenciatura degrees actually awarded in this program until 1982.^cAs of 1981, no degrees had been awarded due to recent program installment.

basic programs of agriculture in the higher education system, four (4) of which offer dual degree options. The table also shows nine (9) programs offering the licenciatura degree, but does not reveal that there are basic inter-institutional differences between the graduation requirements and the academic quality of these programs. Not enough specific information about the variations in these requirements was gathered to warrant a more comprehensive discussion at this point. However, there is a movement to try to coordinate degree requirements more closely to assure uniformity in educational quality (Facultad de Agronomía, 1982; Javier Flores G., Director, Agricultural Careers Division, ITCR, personal interview, 1982).

Analysis of the figures presented clearly indicates the predominance of the University of Costa Rica in agricultural instruction, and especially the lead position of the Agronomy Faculty. Programs at the central campus site account for 43.6 percent of all agriculture students and 62 percent of all graduates for 1981. Though not revealed in Table 5, more than 83 percent of all graduates at the licenciatura level in 1981, were from the UCR Agronomy Faculty, including Food Technology (Decanos, 1982).

UCR programs tend to be much more specific in orientation than most, and offer the highest academic degree available. A number of very informal interviews with many individuals involved in the agricultural sector led this author to conclude that the UCR main campus licenciatura level programs are almost universally accorded the highest prestige among all agricultural programs. In addition, of the 71

graduates interviewed in the follow-up study, 74.6 percent indicated that program reputation or uniqueness of program offerings was the primary factor influencing their selection of the UCR Agronomy Faculty for professional studies.

Table 5 also indicates that the three regional programs in general agriculture belonging to the UCR account for nearly 19 percent of all agriculture students, yet only 2.8 percent of all graduates. Several interviewees remarked about the attrition rates at these centers but there are no concrete data explaining this phenomenon. The National University, excluding veterinary medicine, and ITCR programs have 10.5 percent and 11.5 percent of total student enrollment, respectively, and in 1981, were responsible for eight (8) percent and 22.8 percent of all graduates--all at the bachillerato level. Considering that the agribusiness administration program of the UNED was not instituted until 1980 (Ochoa, 1981), the number of students enrolled in this program, equalling 12.3 percent of the total, represents a rapid growth rate.

The preceding general discussion represents most of what information is readily available about programs of instruction in agriculture in higher education. There are, of course, a few additional items which could document or describe in more detail the peculiarities of each individual program. This would include simple descriptive information such as the academic preparation of faculty members, the inter-workings of the various methods of administration and control, or types of research and special projects under way in each program. Yet, little

or no data of the type required for systematically assessing or comparing program strengths, weaknesses, effectiveness, or relative worth is available. In view of this circumstance, the information presented seems sufficient to provide one with a "bird's eye view" of public programs in agricultural subjects in Costa Rica's system of higher education.

ARTICLE I. EDUCATION IN AGRICULTURE AT THE UNIVERSITY
OF COSTA RICA: PERCEPTIONS AND ATTITUDES
OF RECENT GRADUATES

Introduction

In recent years, a growing volume of research on higher education in Latin America has occurred. Most of this research tends to center on the role of the university as a force for change, and student politics and activism (Egginton, 1983). Remarkably, the topic of agriculture in higher education in Latin America has seldom been studied in the last decade.

Chaparro (1959) was the first to produce a comprehensive review of agricultural faculties and their academic programs as existed in Latin America in the mid-1950s. His study was jointly sponsored by the Food and Agriculture Organization of the United Nations (FAO) and the Inter-American Institute for Agricultural Sciences (IICA). Naranjo (1966) conducted a follow-up study of graduates of the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), a regional center originally founded by IICA in 1946 to perform agricultural research and conduct academic studies at the master's degree level. This, too, was the first educational oriented research of the academic program of that institution. Chaparro (1959) and Naranjo (1966) also refer briefly to lesser known reviews of higher education agricultural programs in Brazil and Colombia which were performed in 1954 and 1961, respectively.

A review of literature, including educational research abstracts referenced in the Handbook of Latin American Studies since 1969,

indicates that little additional information or data about agricultural programs in higher education in Latin America has been compiled or presented since these early studies.

Curle (1970), Malassis (1975), and others (Presidential Mission, 1980) have described the important role of education in agriculture in developing societies, which are heavily dependent on their agricultural sectors for domestic employment and general economic growth. Curle (1970) suggests that the first steps to such education consist in the training of professional and subprofessional personnel for agriculture. He further recommends scholarly inquiries into the training received by agricultural scientists and specialists. Referring specifically to Central America, a recent study recommends that national and regional institutions with potentials for offering strong education and training programs in agriculture ought to be strengthened, thus eliminating a constraint to agricultural development in the region (Presidential Mission, 1980).

The purpose of this paper is to report a portion of the results of an exploratory study conducted among recent graduates of the Facultad de Agronomía (Agronomy Faculty) of the Universidad de Costa Rica (University of Costa Rica). Such research has not heretofore been performed in Costa Rica. As a benchmark study, these findings provide some understanding of the academic programs offered by the Agronomy Faculty (at times referred to simply as the Faculty), information which should be of interest to a wide range of individuals concerned with enhancement of agriculture and education.

Background

Currently, there are some 53,000 university students in Costa Rica (OPES, 1982), enrolled at either of five (5) institutions of higher education. Most (92 percent) of these students attend public supported entities, including the Universidad de Costa Rica (UCR). The UCR is the oldest university in Costa Rica, having been founded in 1940 (OPES, 1979). Its enrollment for 1981 was 28,873, approximately 54 percent of all university students in the country (OPES, 1982).

Students may matriculate in any one of 15 agricultural career programs available among the four public institutions.

UCR, particularly the Agronomy Faculty operating at the main campus in San Jose, is clearly the leader in agricultural instruction in Costa Rica. Programs at the central campus site accounted for 43.6 percent of all agriculture students and 62 percent of all agriculture career graduates in 1981. Even more indicative of its prominence, 83 percent of all graduates at the licenciatura level in 1981 were from the Agronomy Faculty (Decanos, 1982). Factors contributing to the prominence of the programs at UCR's Agronomy Faculty are perhaps (1) it is the oldest of all programs of agriculture, (2) its career programs are much more specific in orientation, while at the same time, (3) offering students the highest academic degree available, the licenciatura.

Three (3) major career area specialities are offered by the Agronomy Faculty, each under the direction of a Faculty escuela (school), analogous to a department in U.S. universities. These are Plant Science, Animal Science, and Agricultural Economics. Either the

bachillerato (bachelor) or licenciatura (licentiate) degrees can be obtained from these escuelas. Graduates of these three programs, at the licenciatura level, were the focus of the research.

Methodology

The follow-up study of graduates was performed by the author in Costa Rica during the summer of 1982. Personal interviews were conducted in Spanish utilizing a prepared interview schedule. All responses were systematically recorded on the schedule by the researcher.

The interview schedule was developed based on a review of literature and refined with the able assistance of several Costa Rican graduate students at Iowa State University, all graduates of UCR Agronomy Faculty programs. The instrument was also reviewed by the Faculty's dean and school directors prior to data collection activities. Of the 71 interviews completed in the study, 58 were performed in person, and the remaining 13 by telephone. Statistical tests indicate no significant differences between the two interview procedures on selected variables (see Appendix Table C1).

For purposes of the research, the population consisted of graduates of the UCR Facultad de Agronomía: (1) who had been awarded the licenciatura degree; (2) who presented a thesis in 1979, 1980, or 1981; (3) who completed degree coursework requirements in 1976 or thereafter; and (4) who resided in Costa Rica during the period in which the research was conducted.

A stratified random procedure was utilized for sample selection, the

strata being the three schools. A proportional sample was drawn from each stratum based on its size in numbers of graduates for the period under investigation, with no stratum represented by fewer than 20 respondents. Table 1 indicates the total population size and number of survey respondents by school and by year. The data in Table 1 demonstrate that the respondent group represented 29.7 percent of all graduates for the period under study.

Table 1. Total population and sample size by school and by year of graduation

Year	Plant Science		Animal Science		Agricultural Economics		Total	
	N ^a	n ^b	N ^a	n ^b	N ^a	n ^b	N ^a	n ^b
1979	33	12	29	10	19	8	81	30
1980	37	13	26	5	18	7	81	25
1981	39	6	18	5	20	5	77	16
Total	109	31	73	20	57	20	239	71

^aPopulation/All graduates.

^bSample/Respondents.

Characteristics of Graduates

Respondents varied in age from 25 to 40 years, with 28 being the average age. The most frequently identified age was 27 years. At the time of the survey, 31 respondents were married, 28 were single, and 1 was separated. Table 2 shows the distribution of interviewees by age, gender, and year of graduation.

Participants consisted of 60 (84.5%) males and 11 (15.5%) females. This distribution of respondents was consistent with the graduate

Table 2. Age by year of graduation and sex of respondents (n=71)

Age	1979		1980		1981		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
25-27	8	1	13	4	8	3	29	8
28-30	13	1	5	1	5	0	23	2
31-33	5	0	1	1	0	0	6	1
36-40	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>
Total	28	2	19	6	13	3	60	11

population, which was composed of 87.3 percent males (212 individuals) and 12.7 percent females (27 individuals), in the aggregate. Figure 1 compares male and female sample size with the male and female populations by school for the period 1979-1981. The proportion of females in the survey group was somewhat greater in Agricultural Economics (25.0%) than in Plant Science (9.7%) and Animal Science (15.0%). A series of t-tests was performed on selected variables and revealed no differences in the responses of males and females interviewed (see Appendix Table C2).

Survey results indicate that 85.9 percent of those interviewed were employed full-time, with two (2) respondents working part-time. Only five (5) declared themselves as unemployed at the time of the study. The data also reveal that the public sector was the largest employer of those interviewed. Indeed, of those employed, 85.7 percent worked for the Costa Rican government. The system of higher education (primarily UCR) and the Ministry of Agriculture together employed

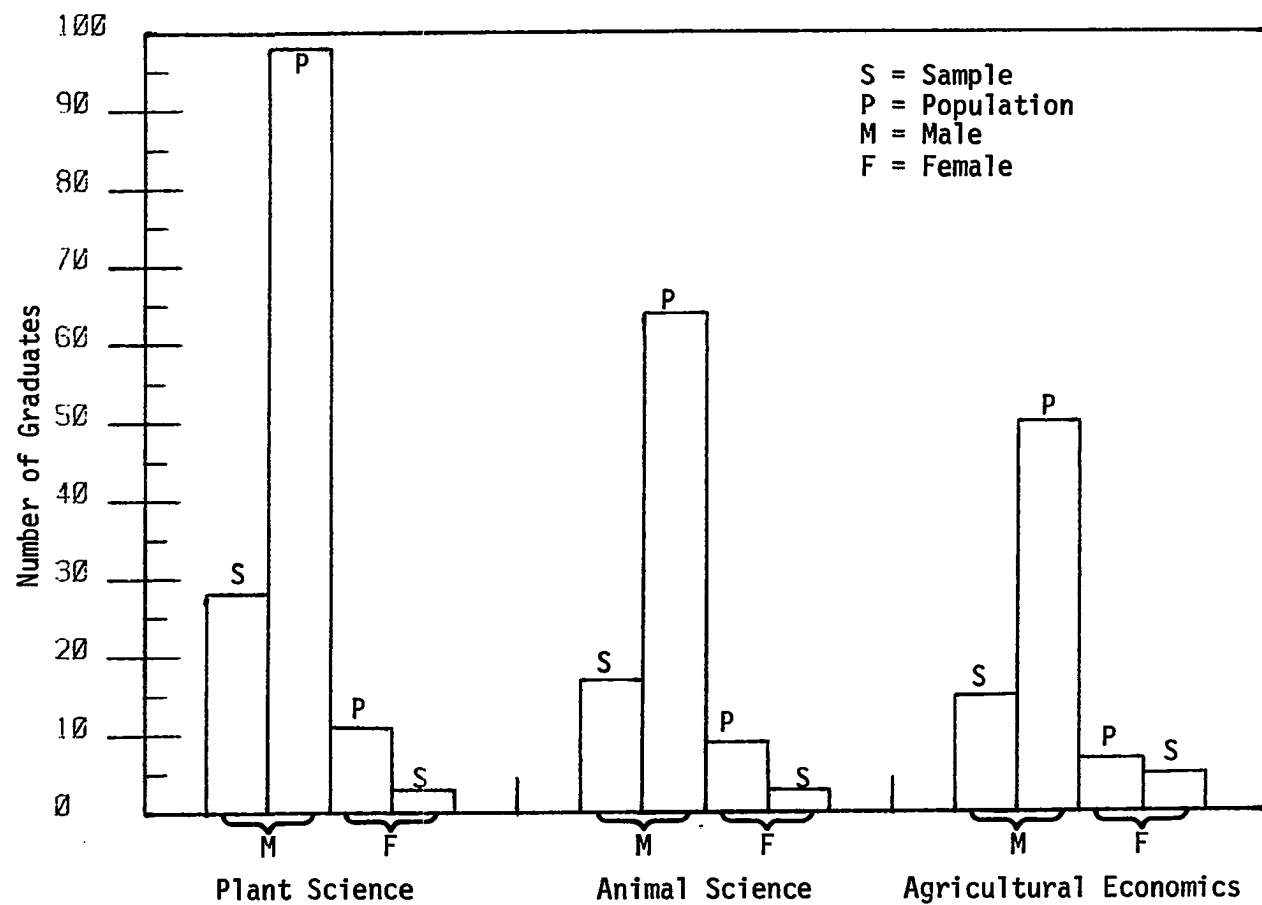


Figure 1. Sex of population and sample size by school

over 50 percent of all those in public service, the remainder working for a wide variety of public agencies.

Respondents resided in each of the seven (7) provinces in the country, though 43.7 percent resided in San Jose province alone. Canton of origin and residence were coded into a categorization of San Jose Metropolitan Area (Area Metropolitana de San José [AMJS]) and Non-San Jose Metropolitan Area, utilizing the guidelines of the Dirección General de Estadística y Censo (National Census and Statistics Bureau) as described by Bermudez and Fernandez (1975).¹ The survey data indicate that 29 (40.8%) of all respondents resided in the San Jose Metropolitan Area, and that 27 (38.0%) were born in this area. Though these figures are nearly identical, analysis of the data showed some movement between birthplace and current residence. Nearly 30 percent of all respondents indicated they resided in the city of San Jose. The preceding figures are not surprising when one considers that 60 percent of the nation's population currently resides in the central plateau region surrounding the capital city (Whiteford, 1983).

Data on the occupation of respondents' fathers were also taken, and reveal that 56.9 percent were small or medium businessmen or skilled workers of various types. Another 22.5 percent were small or medium farmers. The remaining 20.6 percent were primarily distributed among such occupations as school teachers, economists, and farm administrators.

¹The San Jose Metropolitan Area consists of the following cantons of San Jose province: Cantón Central, Escazú, Goioechea, Tibás, Montes de Oca, Curridabat, Moravia, Alajuelita, and Descamparados.

These findings are very similar to those reported by Chaparro (1959) and Zschock et al. (1974).

University Related Experience

Respondents were questioned concerning the dates they began their university education, completed coursework in their career program, and the year of completion (thesis/practicum presentation). Analysis of this information shows that the average number of years from the first year of university to career completion was 7.3 years. Somewhat more than 80 percent of the respondents terminated within eight (8) years. Furthermore, respondents averaged 1.9 years from the end of regular coursework to thesis presentation, although 32 (45.1%) finished in one (1) year. Analysis of variance tests applied to the data show no differences between either the school of study or the year of graduation with respect to these time periods.

Eight (8) respondents began their career at one of the three regional centers of UCR, generally to perform their "pre-career" studies. These programs, though part of the UCR system, operate independently of the Agronomy Faculty at the central campus site. Five (5) of these "transfer" students were graduates of Animal Science, with Plant Science and Agricultural Economics accounting for two (2) and one (1), respectively. None of the respondents were transferees from agricultural programs of other institutions within the public system of higher education in the country.

When asked what was the most influential factor in their selection

of UCR, and in particular the Agronomy Faculty, nearly three (3) in every four (4) respondents indicated either program reputation or that UCR was the only institution offering specialty programs in their field of interest. Some 11.3 percent responded that parents or other family members most influenced their decision to attend UCR, similar to what has been demonstrated in other studies of university students (Zschock et al., 1974).

The Agronomy Faculty offers students at the licenciatura level the option of completing a research project and a written thesis, or a practicum experience and written report. In the latter case, the written results must be prepared and presented to the Faculty in the same fashion as a thesis. Survey results indicate that nine (9) in every ten (10) respondents selected the more traditional thesis option. This pattern was constant for both males and females and for year of graduation. Interestingly, no (0) respondents who had graduated from Plant Science had participated in the practicum option. One should also note that program option type did not appear to make a difference in the responses of participants to selected survey items (see Appendix Table C3).

Perceptions of Educational Programs

Several items in the survey were directed at ascertaining the graduates' attitudes and perceptions of educational programs in the Agronomy Faculty. For some of these items, scales of 1 to 5 were utilized. Large readable cards were prepared to facilitate easy

response, and these cards bearing scale numbers and accompanying word descriptions. Each of the five (5) scales used in the research were constructed so that one (1) represented the lower extreme and five (5) the upper extreme on the scale. These scales can be found in Appendix D. Scaled items were used to compare responses by school and by year of graduation. Table 3 shows the statistical results of school comparisons. Results of analysis of variance comparisons by year of graduation revealed no differences and are found in Appendix Table C4.

The graduates surveyed appear to have generally favorable attitudes toward their education at UCR and the Agronomy Faculty. The mean rating on the quality of education offered by each was 4.0 and 3.97, respectively. Very dissimilar findings were reported by Zschock et al. (1974), who found that students tended to evaluate their university education as inadequate preparation for their professions.

Respondents also tended to rate as "good" the assistance received from their major professors. However, an analysis of variance test revealed a significant F-value and found that Animal Science graduates surveyed gave a significantly higher value to the assistance than did those from Agricultural Economics.

Graduates who rated this item at less than five (5) were generally asked to suggest ways for improving the degree of help from major professors. Of the 37 who responded to this inquiry, more than one-half indicated that there should be more time devoted to students as they prepare for, and progress through, their research and thesis preparation. In a subsequent survey item, respondents were also asked for suggestions

Table 3. Analysis of variance of selected items by school

Survey Item	Plant Science	Animal Science	Agri- cultural Eco- nomics	F Value	F Prob.
	(n) Mean S.D.	(n) Mean S.D.	(n) Mean S.D.		
Quality of education from UCR	(31) 4.161 0.638	(20) 3.800 0.410	(20) 3.950 0.510	2.768	0.070
Quality of education from Agronomy Faculty	(31) 4.129 0.619	(20) 3.900 0.447	(20) 3.800 0.696	2.027	0.140
Practical portion of educa- tion from Agronomy Faculty	(31) 3.323 0.541	(20) 3.000 0.726	(20) 3.150 0.745	1.502	0.230
Importance of practical education in career	(31) 4.807 0.402	(20) 4.700 0.571	(20) 4.900 0.308	1.061	0.352
Assistance from major professor	(30) 4.067 0.868	(20) 4.500 0.607	(20) 3.700 1.218	3.768* (2>3)	0.028
Use of qualities gained in thesis/practicum	(25) 3.560 1.083	(15) 2.933 1.033	(16) 3.563 1.315	1.661	0.200
Importance of thesis/practicum	(31) 4.420 0.807	(20) 4.100 1.021	(20) 4.100 1.071	0.990	0.377

*Significant at the .05 level.

for improving and enhancing the general thesis/practicum process in the Faculty. Again, several mentioned the need for more meaningful professor-to-student contact. Similarly, students in a Venezuelan study, while generally admiring faculty members, wished their professors had more time for personal encounters (Zschock et al., 1974). And, Hunter and Ternent (1960) reported inadequate thesis supervision as a major problem in their research in Colombia.

The Agronomy Faculty recognizes that many of its staff cannot devote adequate time to students and is working to increase the number of full-time faculty members. Currently there are 79 full-time and 55 part-time professors (equalling 12.7 FTE) in the Faculty's three schools (Facultad de Agronomía, 1982).¹

The lack of sufficient opportunity for practical experiences resulted in an "average" rating on the adequacy of such experiences provided by the Agronomy Faculty. In contrast, respondents indicated that practical experiences are "very important" for adequate preparation in their disciplines. Such experience, in their opinions, must complement classroom instruction and provide opportunities for "learning and doing." Many expressed that in agriculture, in particular, there is no substitute for field experience, allowing students to fortify theoretical principles and to identify with rural life.

Some representative responses from interviewees on the importance of practical experience were:

¹For a general discussion of the implications of part-time versus full-time faculty in Latin American universities, see Waggoner (1966).

To acquire more self-assurance

To complement theoretical learning, and to balance theory
with reality

To learn how to do things

Many things can only be learned by doing them

To aid student learning and retention

To develop a relationship with rural areas and to identify
with the realities of the campo (countryside)

Further substantiating these sentiments, when asked to identify areas of inadequate professional preparation, respondents indicated the absence of practical education nearly twice as often as any other item.

The need for increased practical oriented training in university professional career preparation has been addressed in other studies (Safford, 1976; Waggoner, 1974; Albornoz, 1977). Zschock et al. (1974) report attitudes parallel to those identified above among Venezuelan university students. They summarize their findings by stating that "An overwhelmingly strong consensus among all students was found in their desire for more practical experience as part of their professional training" (p. 105).

Naranjo (1966) and Chaparro (1959) have also noted this phenomenon in the training of agriculturalists. Chaparro, in particular, emphasizes the seriousness and the universality of this problem in his work among agronomy faculties. Naranjo, in recounting the results of a study of agriculture in higher education in Colombia, writes that students received little or no practical experience as part of their formal

training.

Questions were also directed at ascertaining respondents' perceptions of the thesis/practicum component of their career preparation. The average rating on the importance of the thesis/practicum was 4.2; i.e., "important." On the other hand, survey participants rated as 3.4 the average degree to which qualities or skills acquired through the thesis/practicum were utilized in current employment, the most common indication being 3; i.e., "sometimes." Respondents were given the opportunity of suggesting ways in which the thesis/practicum process could be enhanced. Table 4 contains the information they provided. The most

Table 4. Suggested improvements for thesis/practicum process ranked (n=52)

Suggested action	Number	Percent
Make it more applicable to national needs	19	36.5
Seek ways to apply findings	7	13.5
Coordinate with other institutions in agricultural sector	7	13.5
A more practical and less theoretical orientation	6	11.5
Eliminate or replace thesis with practicum	6	11.5
Help arrange financial assistance to adequately perform thesis/practicum	5	9.6
More programmed/pre-planned research	5	9.6

notable conclusion to be drawn is that respondents tended to feel their thesis or practicum research and results go unnoticed and unused by the Faculty and the agricultural sector in general. Their responses

suggest actions which would rectify this situation and give more real meaning and worth to the educational process. They would like to see the thesis/practicum exercise make a viable contribution to the advancement of agriculture in the nation.

Perceptions of Course Offerings

A block of items on the interview schedule was directed at obtaining perceptions of coursework benefit from the perspective of program completers. Survey respondents were asked to identify: (1) the courses of most benefit in their preparation; (2) those of least benefit; (3) those courses which ought to be improved, for any reason; and (4) those courses or subject areas which ought to be included in curriculum offerings. For each of the first three areas, participants were allowed multiple responses. In data transformation, up to four course indications per area per respondent were coded. Rarely were more than four courses mentioned. The courses most frequently identified by the respondents from each school and from each year of graduation are found in Tables 5 through 10.

Multiple responses were also allowed for suggested curriculum additions, though these were not tabulated by school and year of graduation due to a relatively limited number of indications. Table 11 summarizes the information for this category.

The results shown in Table 5 through 10 are largely self-explanatory. However, respondents voluntarily offered comments as to why some courses were of lesser benefit and why those they indicated ought to be improved. The two complaints most often registered were related to

Table 5. Most beneficial courses by school ranked

Plant Science (n=31)			Animal Science (n=19)			Agricultural Economics (n=20)		
Course	No.	%	Course	No.	%	Course	No.	%
Plant Pathology	24	77.4	Pork Production	12	63.2	Proj. Prep. & Eval.	13	65.0
Plant Breeding	10	32.3	Beef Production	11	57.9	Econ Anal. I	7	35.0
Weed Control	9	29.0	Feeding Practices	10	52.6	Econ Anal. II	7	35.0
Soil Fertility	7	22.6	Dairy Production	6	31.6	Ag Marketing	7	35.0
Plant Physiology	7	22.6	Agrostology	5	26.3	Land Economics	7	35.0
Edafology	7	22.6	Animal Nutrition	5	26.3	Rural Admin. I	7	35.0
			Poultry Production	5	26.3	Rural Admin. II	5	25.0

Table 6. Least beneficial courses by school ranked

Plant Science (n=28)			Animal Science (n=15)			Agricultural Economics (n=16)		
Course	No.	%	Course	No.	%	Course	No.	%
Ag Econ Service	10	35.7	Ag Econ Service	6	40.0	Ag Institutions	6	37.5
Ag Machinery	6	21.4	Poultry Production	4	26.7	Ag Credit	5	31.3
Rural Engineering	5	17.9	Dairy Production	2	13.3	Ag Legis-Policies	3	18.8
Basic Grains Prod.	5	17.9	Ag Cooperatives	2	13.3	Ag Extension	2	12.5
Acarology	4	14.3						

Table 7. Most beneficial courses by year of graduation ranked

1979 (n=29)			1980 (n=25)			1981 (n=16)		
Course	No.	%	Course	No.	%	Course	No.	%
Plant Pathology	11	37.9	Plant Pathology	9	36.0	Plant Pathology	4	25.0
Pork Production	5	17.2	Plant Breeding	6	24.0	Feeding Practices	4	25.0
Proj. Prep. & Eval.	5	17.2	Econ. Entomology	4	16.0	Beef Production	4	25.0
Rural Admin. I	5	17.2	Ag Marketing	4	16.0	Pork Production	4	25.0
Weed Control	4	13.8	Proj. Prep. & Eval.	4	16.0	Proj. Prep. & Eval.	4	25.0
Beef Production	4	13.8						
Rural Admin. II								

Table 8. Least beneficial courses by year of graduation ranked

1979 (n=24)			1980 (n=22)			1981 (n=13)		
Course	No.	%	Course	No.	%	Course	No.	%
Ag Econ. Service	8	33.3	Ag Econ. Service	7	31.8	Ag Machinery	2	15.4
Ag Credit	4	16.7	Basic Grains	3	13.6	Pork Production	2	15.4
Ag Machinery	3	12.5	Ag Institutions	3	13.6	Rural Sociology	2	15.4
Rural Engineering	3	12.5	Geology	3	13.6			
Acarology	3	12.5						
Ag Legis-Policies	3	12.5						

Table 9. Courses to be improved by school ranked

Plant Science (n=27)			Animal Science (n=15)			Agricultural Economics (n=19)		
Course	No.	%	Course	No.	%	Course	No.	%
Ag Econ Service	7	25.9	Poultry Production	5	33.3	Ag Marketing	5	26.3
Econ Entomology	6	22.2	Dairy Production	4	26.7	Ag Credit	5	26.3
Ag Machinery	5	18.5	Beef Production	3	20.0	Ag Legis-Policies	4	21.1
Rural Engineering	4	14.8	Ag Econ Service	3	20.0	Ag Planning	3	15.8
Basic Grains	4	14.8				Ag Accounting	3	15.8
Irrig. Drainage	4	14.8						

Table 10. Courses to be improved by year of graduation ranked

1979 (n=28)			1980 (n=18)			1981 (n=15)		
Course	No.	%	Course	No.	%	Course	No.	%
Ag Econ Service	6	21.4	Rural Admin. I	4	22.2	Econ Entomology	3	20.0
Dairy Production	4	14.3	Ag Econ Service	3	16.7	Ag Machinery	2	13.3
Ag Legis-Policies	4	14.3				Irrig. Drainage	2	13.3
						Ag Credit	2	13.3
						Rural Sociology	2	13.3

inadequate or inappropriate course content and poor teaching. In the former case, course content was either too elementary and nothing was learned, or too theoretical and of little practical value to respondents. Professors were also criticized for inadequate preparation and poor teaching methods.

Regarding the listings of least beneficial courses and courses to be improved, in many instances interviewees indicated that the subject matter, per se, was of importance. What was needed was a general improvement to make these courses more meaningful to career preparation and more informative and interesting to students. In a few cases, the courses to be improved even included courses also identified in the most beneficial course listing, for those respondents felt that, although of importance, they ought to be enhanced to make them even better.

The listing of courses to be added (Table 11) contained a wide range of single items. Consequently, only those items indicated three (3) or more times have been noted. In addition, since some graduates surveyed completed coursework several years ago (but not prior to 1976), some suggested subject offerings may have already been added, or may be available in another faculty of UCR.

The two most notable suggestions for courses are in small animal production and administration and management. Those mentioning small animals felt they were inadequately prepared in this area, yet they often encountered small animal-related problems in their work. The animals referred to are primarily rabbits, goats, and sheep. Those

Table 11. Courses or subjects to be added ranked (n=49)

Items mentioned	Frequency	Percent
Small Animal Production	8	16.3
Administration and Management	8	16.3
Practical Soil Conservation	4	8.2
Financial Analysis	4	8.2
Pasture/Forage Management	3	6.1
Computer Programming	3	6.1
Aqua/Fish Culture	3	6.1
Forestry	3	6.1

namely management or administration also felt ill prepared when they were placed in supervisory capacities in their work, wishing they could have taken more coursework in this area.

Physical Facilities

Respondents were asked to rate the adequacy of three (3) general types of physical facilities controlled by the Agronomy Faculty, and analysis of variance tests by school and year of graduation were applied to these ratings. The test results are found in Appendix Tables C5 and C6. The first of these indicates a significant F-value for the category of laboratories, greenhouses, and experiment stations in that survey graduates from Agricultural Economics rated these facilities as significantly more adequate than their counterparts from the school of Animal Science. This difference may be of limited practical significance, however, in that Agricultural Economics students utilize these facilities far less than students from the other two schools.

Appendix Table C6 shows a difference in the rating of the adequacy

of buildings and classrooms at the Faculty's central campus site. Respondents who terminated in 1979 and 1980 rated these facilities significantly higher than 1981 graduates surveyed.

The grand mean for each of the facility groupings was: (1) buildings and classrooms (3.76); (2) equipment, tools, transportation, etc. for student use (3.06); and laboratories, greenhouses, and experiment stations (3.32). In aggregate, survey participants seemed to indicate facility adequacy as about "average."

Respondents were asked to identify which specific facilities ought to be improved, and how. The facilities most frequently mentioned and a synopsis of the most common types of suggested corrective actions for each are found in Table 12.

In general, Table 12 shows that participants were dissatisfied with the limited number or inavailability of most items mentioned. They did not appear to criticize the Faculty directly. Many of the inadequacies identified are beyond the immediate control of the Faculty, such as the apparent transportation problem, as are fiscal constraints which limit the ability to renovate, modernize and equip facilities. The inadequate availability or distribution of certain items may also be attributable to increases in student enrollment in the Faculty in recent years, a phenomenon occurring as a result of reductions in university entrance requirements.

Conclusions

The foregoing are a portion of the results of a study of graduates of University of Costa Rica's Agronomy Faculty, the first research of

Table 12. Facilities to be improved and frequent recommendations ranked (n=66)

Facilities identified	Frequency	Per-cent	Recommended actions
Experiment Stations	26	39.4	Modernize equipment/ more machinery/ increased use for practical experience/ improved management/ stations for specific animal species
Laboratories	21	31.8	Modernize equipment/ greater number of instruments/ increased space
Transportation (to experiment stations and for field trips)	18	27.3	More efficient and dependable service/ greater availability/ Faculty to own and control vehicles
Tools, equipment, etc. for student use	15	22.7	Sufficient number to allow participation by all students/ greater access and availability
Greenhouses	14	21.2	Increase size and space/ use for more practical experiments
Audio-Visual Materials	8	12.1	More equipment availability/ greater use in instruction

its kind to be carried out in Costa Rica among completers of agricultural programs. Graduates who participated in the survey did so willingly. In most cases, though they represented different specialty programs at the Faculty, and graduated in different years, their responses were remarkably consistent.

Graduates surveyed had very favorable impressions of their professional preparation by the Agronomy Faculty. They did, however, express constructive concern over some aspects of that preparation. For one, there was unanimity of concern that their programs of study needed more opportunities for practical or field-related experience. This, they felt, was extremely important to adequate preparation. Relatedly, many felt their thesis research or practicum results, while important, were not put to any beneficial use. They also expressed a desire to have more, and more frequent, contact with and direction from their major professors.

Regarding courses, survey participants were generally praiseworthy of many. Nevertheless, they listed others which needed improvement either in content or method of instructional delivery. They also named several subject areas which ought, in their opinions, to be added to curriculum offerings. Most common among these were small animal production (rabbits, goats, etc.) and courses dealing with administration and management methods and techniques.

Participants, when queried concerning the adequacy of physical facilities controlled by the Faculty, generally indicated a slightly above average rating. Most pinpointed the source of the problem as

either the outdated or insufficient number of equipment or instrument items which did not permit full student use and experience. Graduates were also critical of transportation arrangements for field trips and other excursions.

Perhaps the most concrete conclusion to be deduced is this. Former students of UCR Agronomy Faculty are praiseworthy of the Faculty and of their professional preparation. For this reason, and to see even more adequate and appropriate preparation for future students, survey participants willingly offered their frank appraisal and evaluation of their own programs of study. Their one desire, though neither asked for nor tabulated, was to perhaps contribute information that would benefit their Alma Mater. The preceding survey results are the joint manifestation of their individual hopes and concerns.

Literature Cited

- Albornoz, Orlando. 1977. Higher education and the politics of development in Venezuela. *Journal of Interamerican Studies and World Affairs* 19(3):291-314.
- Bermudez, V. and M. Fernandez. 1975. Informe de la encuesta de inmigración en la ciudad de San José, 1972. Ciudad Universitaria Rodrigo Facio: Centro de Estudios Sociales y a Población - CESPO, Universidad de Costa Rica, San José, Costa Rica.
- Chaparro, Alvaro. 1959. Un estudio de la educación agrícola universitaria en América Latina. Food and Agriculture Organization of the United Nations, Rome. 208 pp.
- Curle, Adam. 1970. Educational strategy for developing societies: A study of educational and social factors in relation to economic growth. 2nd edition, Tavistock Publications Limited, London. 180 pp.

- Decanos de Facultades de Ciencia y Tecnología Agropecuaria de Costa Rica. 1982. La educación agrícola en Costa Rica. (mimeo). Author. División de Carreras Agrícolas, Instituto Tecnológico de Costa Rica, Cartago, Costa Rica. 9 pp.
- Egginton, Everett. 1983. Educational research in Latin America: A twelve-year perspective. *Comparative Education Review* 27(1): 119-127.
- Facultad de Agronomía. 1982. Reseña de la Facultad de Agronomía de la Universidad de Costa Rica (mimeo). Author, San José, Costa Rica. 4 pp.
- Hunter, John M. and James Anthony Short Ternent. 1960. Teaching of economics in Colombia. *Journal of Inter-American Studies* 2(2): 189-196.
- Malassis, Louis. 1975. Agriculture and the development process: Tentative guidelines for teaching. The UNESCO Press, Paris. 284 pp.
- Naranjo, Gerardo B. 1966. The graduate program of the Inter-American Institute of Agricultural Sciences: An evaluation of certain aspects through a follow-up of graduates. Ph.D. Thesis. Michigan State University. 204 pp.
- OPES (Oficina de Planificación de la Educación Superior). 1979. Las instituciones de educación superior públicas en Costa Rica. Consejo Nacional de Rectores, San José, Costa Rica. 89 pp.
- OPES (Oficina de Planificación de la Educación Superior). 1982. Costa Rica: Cifras relevantes de la educación superior 1980-81 (pamphlet). Consejo Nacional de Rectores, San José, Costa Rica.
- Presidential Mission on Agricultural Development in Central America and the Caribbean. 1980. Agricultural development and economic progress in the Caribbean Basin. Author, Tallahassee, Florida. 137 pp.
- Safford, Frank. 1976. The ideal of the practical: Colombia's struggle to form a technical elite. University of Texas Press, Austin, Texas. 373 pp.
- Waggoner, B., G. Waggoner, and G. B. Wolfe. 1964. Higher education in contemporary Central America. *Journal of Inter-American Studies* 6(4):445-462.
- Waggoner, George R. 1966. Problems in the professionalization of the university's teaching career in Central America. *Journal of Inter-American Studies* 13(2):193-212.

- Waggoner, George R. 1974. National planning, university autonomy, and the coordination of higher education: Latin American points of view. *Journal of Interamerican Studies and World Affairs* 16(3): 372-378.
- Whiteford, Michael B. 1983. Rural-urban differences in the nutritional status of Costa Rican children: A case study. Paper presented at the Annual Meeting of the Society for Applied Anthropology, March 17-19, 1983, San Diego, California.
- World Bank. 1981. World development report 1981. Oxford University Press, New York. 192 pp.
- Zschock, D. K., G. W. Schuyler, A. Fernandez, and W. R. Duncan. 1974. The education-work transition of Venezuelan university students. *Journal of Interamerican Studies and World Affairs* 16(1):96-118.

ARTICLE II. AGRICULTURE GRADUATES OF THE UNIVERISTY
OF COSTA RICA: WHAT FOLLOWS GRADUATION?

Introduction

In the past decade, a tremendous amount of research and information on education in Latin America has been carried out and reported. A major portion of this research has centered on universities, and has been primarily directed at either the role of universities as a force for change in developing societies or student politics and activism (Egginton, 1983). Egginton also indicates that less than one-fifth of reported information during the past twelve years deals with the Central America and Caribbean region. Concerning Costa Rican education in particular, very little research has been performed.

Reviews of pertinent literature and indexes also indicate that agricultural education has rarely been investigated, especially as it pertains to career programs in higher education which prepare professional agriculturalists. Chaparro (1959) and Naranjo (1966) made early contributions to this field of study, compiling specific information and data on several such programs in Latin America. They also report the results of studies performed in Brazil and Colombia during that same era. Contributions of this type, but of more recent vintage, have not been reported.

Certainly, agricultural career programs in higher education have grown in number. For example, Chaparro (1959) and Waggoner et al. (1964) report the existence of four Central American universities with agricultural faculties offering professional degrees, one (1) of which

was located in Costa Rica. Today, there are 12 universities in the region which offer agricultural training (CSUCA, 1981), of which four (4) are in Costa Rica (OPES, 1981). Furthermore, with the advent of the regional campus concept of the Universidad de Costa Rica (UCR), there are currently seven (7) distinct programs offering the licenciatura degree in agriculture in Costa Rica. Yet, astonishingly little is known of these programs or of the post graduation activities of program completers.

To counter the paucity of research among agricultural faculties and programs in higher education, this paper is directed at reporting a portion of the results of investigations performed among recent graduates of the Facultad de Agronomía (Agronomy Faculty or, merely, Faculty) of the University of Costa Rica. This paper shall focus primarily upon the activities and employment status of graduates since terminating their licenciatura degree programs at the Agronomy Faculty. The results of the study indicate information of direct interest to educational planners, policy-makers, and students of both agricultural and educational development. Knowledge of graduates' activities can arm these individuals with valuable information for program enhancement (Wentling, 1980).

Background

UCR, particularly the Agronomy Faculty operating at the main campus in San Jose, is clearly the leader in agricultural instruction in Costa Rica. Programs at the central campus site accounted for 43.6 percent of all agriculture students and 62 percent of all agriculture career

graduates in 1981. Even more indicative of its prominence, 83 percent of all graduates at the licenciatura level in 1981 were from the Agronomy Faculty (Decanos, 1982). Several factors which contribute to the prominence of the Agronomy Faculty are perhaps (1) it is the oldest of all programs of agriculture, (2) its career programs are more specific in discipline orientation, while at the same time, (3) offering students the highest academic degree available in agriculture, the licenciatura.

Three (3) major career area specialities are offered by the Agronomy Faculty, each under the direction of a Faculty escuela (school), analogous to a department in U.S. universities. These are Plant Science, Animal Science, and Agricultural Economics. Either the bachillerato (bachelor) or licenciatura (licenciate) degrees can be obtained from these escuelas. Graduates of these three programs, at the licenciatura level, were the focus of the research.

Methodology

The follow-up study of graduates was performed by the author in Costa Rica during the summer of 1982. Personal interviews were conducted in Spanish utilizing a prepared interview schedule. All responses were systematically recorded on the schedule by the researcher.

The interview schedule was developed based on a review of literature and refined with the able assistance of several Costa Rican graduate students at Iowa State University, all graduates of UCR Agronomy Faculty programs. The instrument was also reviewed by the Faculty's dean and school directors prior to data collection activities. Of the

71 interviews completed in the study, 58 were performed in person, and the remaining 13 by telephone. Statistical tests indicate no significant differences between the two interview procedures on selected variables (see Appendix Table C1).

The population consisted of graduates of the UCR Facultad de Agronomía: (1) who had been awarded the licenciatura degree; (2) who presented a thesis in 1979, 1980, or 1981; (3) who completed degree coursework requirements in 1976 or thereafter; and (4) who resided in Costa Rica during the data collection period. Figure 1 demonstrates the distribution of the population by school and by year of graduation.

A stratified random procedure was utilized for sample selection, the strata being the three schools. A proportional sample was drawn from each stratum based on its size in numbers of graduates for the period under investigation, with no stratum represented by fewer than 20 respondents. Table 1 indicates the total population size and number of survey respondents by school and by year. The data in Table 1 demonstrate that the respondent group represented 29.7 percent of all graduates for the period under study.

Table 1. Total population and sample size by school and by year of graduation

Year	Plant Science		Animal Science		Agricultural Economics		Total	
	N ^a	n ^a	N ^a	n ^a	N ^a	n ^a	N ^a	n ^a
1979	33	12	29	10	19	8	81	30
1980	37	13	26	5	18	7	81	25
1981	39	6	18	5	20	5	77	16
Total	109	31	73	20	57	20	239	71

^aN = population and n = sample.

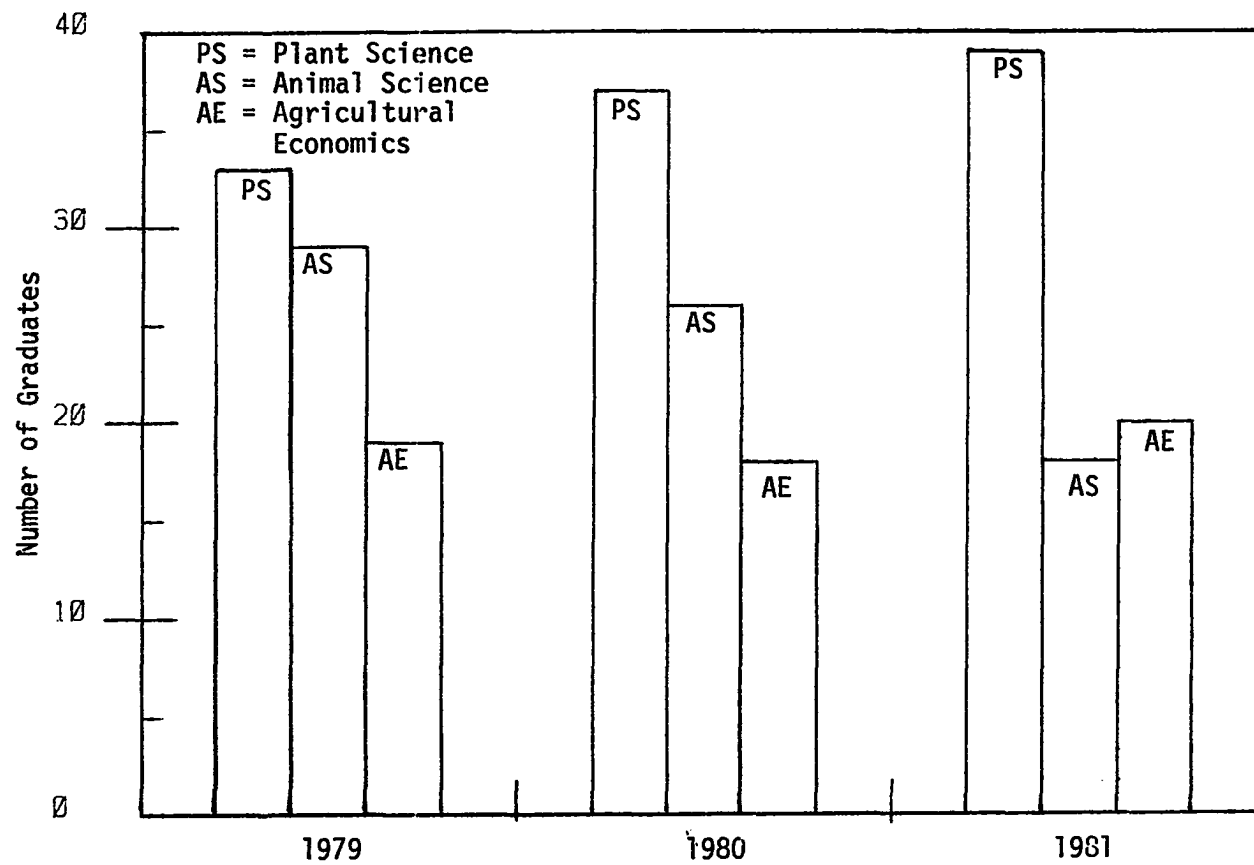


Figure 1. Population distribution by school and year of graduation

Characteristics of Graduates

Respondents varied in age from 25 to 40 years, with 28 being the average age. The most frequent age among respondents was 27 years. At the time of the survey, 31 respondents were married, 28 were single, and 1 was separated. Table 2 shows the distribution of interviewees by age, gender, and year of graduation.

Table 2. Age by year of graduation and sex of respondents (n=71)

Age	1979		1980		1981		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
25-27	8	1	13	4	8	3	29	8
28-30	13	1	5	1	5	0	23	2
31-33	5	0	1	1	0	0	6	1
36-40	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>
Total	28	2	19	6	13	3	60	11

Participants consisted of 60 (84.5%) males and 11 (15.5%) females. This distribution of respondents was consistent with the population, which was composed of 87.3 percent males (212 individuals) and 12.7 percent females (27 individuals). The proportion of females in the survey group was somewhat greater in Agricultural Economics (25.0%) than in Plant Science (9.7%) and Animal Science (15.0%). A series of t-tests was performed on selected variables and revealed no differences in the responses of males and females interviewed (see Appendix Table C2).

There were respondents from each of the nation's seven (7)

provinces, representing 41 different cantones (political subunits of a province). However, 47 percent resided in San Jose province, generally in the San Jose Metropolitan Area (Area Metropolitana de San José).¹

Employment Status

Survey results indicate that 85.9 percent of those interviewed were employed full-time. Two (2) respondents worked only part-time, and five (5) were unemployed at the time of the study. There were two (2) full-time students (attending CATIE), and one (1) self-declared housewife. Three (3) of the unemployed were 1981 graduates (one (1) each for 1979 and 1980), and 3 were from the Animal Science program. Though the numbers are identical, they do not represent the same individuals.

The single largest employer of graduates in the study was the Costa Rican government. Fully 85.7 percent (54) of those who were employed worked for some public entity. Private agribusinesses were employers of 5 (7.9%) graduates, and 3 (4.8%) worked for international organizations. One (1) respondent was self-employed. Figure 2 shows the comparative size of entities with which survey respondents were employed. A breakdown and summary of those employed by government agencies are found in Table 3.

In reviewing Table 3, it is interesting to note that institutions

¹For a definition and general demographic description of the San Jose Metropolitan Area, see Bermudez and Fernandez (1975).

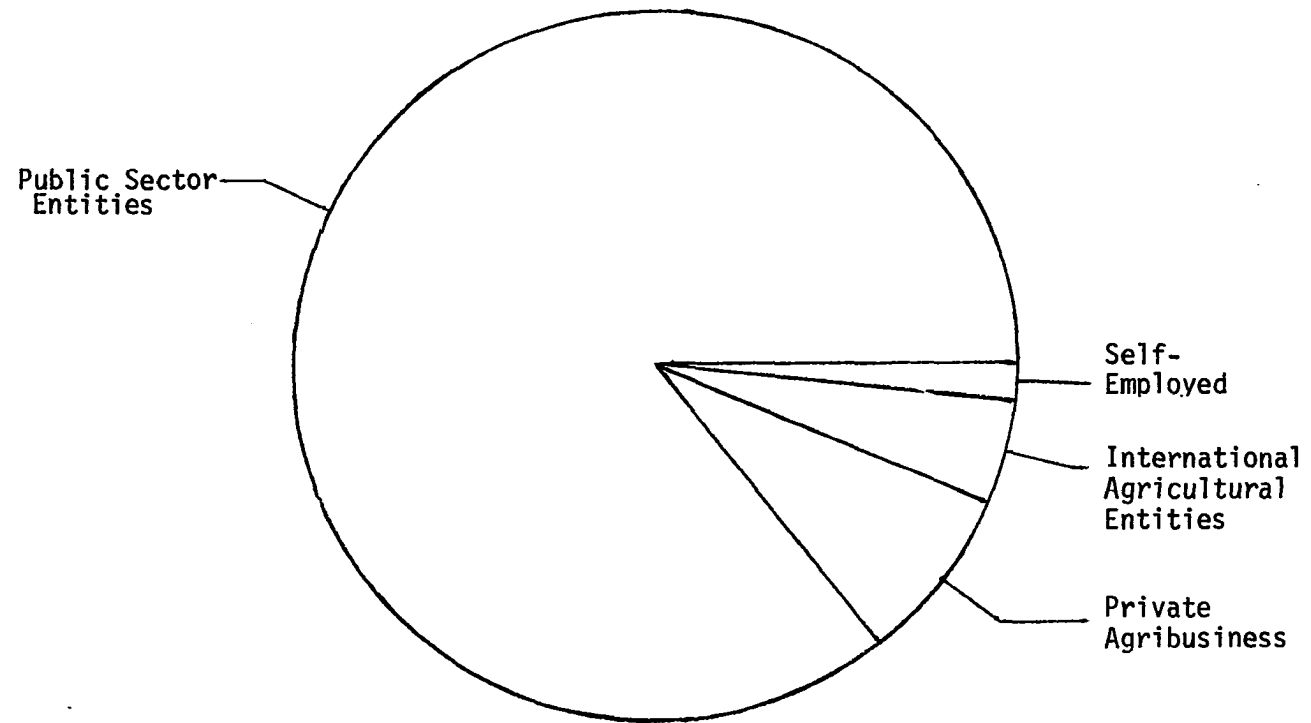


Figure 2. Employment groupings by type of entity

Table 3. Number of survey respondents employed by public sector agencies

Entity	Number	Percent- age
Higher Education		
University of Costa Rica	12	22.3
Technical Institute	3	5.6
Ministry of Agriculture		
Extension	7	13.0
Forestry	3	5.6
Production	3	5.6
Entomology	1	1.4
Bank System		
National Bank (BNCR)	5	9.3
Central Bank (BCCR)	2	3.7
Planning Agencies		
Agricultural (SEPSA)	4	7.4
Central (OFIPLAN)	3	5.6
All other (9 agencies)	<u>11</u>	<u>20.5</u>
	54	100.0

of higher education were the primary public employers of the graduates surveyed. The Ministry of Agriculture, however, was the largest single-entity employer. The national bank system of the country and two government planning offices (central planning and agricultural sector planning) each employed 13.0 percent of survey participants. All others are employed by a variety of individual public agencies. Naranjo (1966) also found a large percentage of the graduates he studied employed by different branches of national governments, including universities.

In comparing respondents by school, data analysis revealed that 100 percent of those from Animal Science who were employed worked in the public sector. Correspondingly, 84.2 percent of agricultural economists and 78.6 percent of plant scientists surveyed were employed by public institutions. Of the five (5) individuals engaged by private agribusiness operations, four (4) were Plant Science graduates and worked for Standard Fruit, United Fruit, a sugar plantation (La Emilia), and a produce cooperative (URCOOPAPA).

At first glance, the fact that more than 85 percent of employed respondents worked for the government may seem extraordinarily high. However, two observations put this percentage in perspective. First, respondents worked for a wide array of areas within the public sector--from higher education to ministries to banks. Costa Rica, being small both in geographic area and population, has a highly centralized government structure, one which assumes responsibility for satisfying many societal needs, including agriculture.

The second point is related to the first. It is this. The Costa Rican central government is the primary "agribusiness" in the country; that is, it is heavily in the business of promoting and conducting agricultural research and development. Thus, government agencies which interface with agriculture, of which there are many, need employees with professional credentials in agricultural disciplines.

Employment Positions and Functions

Respondents who were employed held a variety of positions and titles. These have been grouped into five (5) general classifications,

as found in Table 4. Such a listing provides some indication of job characteristics and functions. Briefly, slightly over one-half of survey participants were either Ingeniero Agrónomos (professional agriculturalists) I, II, or III, or occupied a commensurate position in the government's civil service system. Another 22.0 percent were in a professor/instructor role in higher education. Together, these areas accounted for almost all public employees. Individuals in positions with titles such as manager, administrator, superintendent, or director were much fewer in number.

Table 4. Position or title groupings of employed graduates

Position/Title Group	Number	Percent
<u>Ingeniero Agrónomo</u> I, II, III or commensurate position	35	54.7
Professor or Instructor (all ranks)--higher education	14	21.9
Plant administrator, Manager, Chief or commensurate position	5	7.8
Superintendent, Coordinator or similar position	6	9.4
Executive Director, Director, Assistant Director or similar position	<u>4</u>	<u>6.2</u>
Total	64	100.0

Position names or titles may be misleading and are insufficient to assess work-related duties and responsibilities. Consequently, survey graduates were, in multiple response fashion, requested to indicate their primary job-related functions. Their responses have been

arranged by school and are found in Table 5.

Table 5. Employment duties and functions by school

Functions	Plant Science (n=28)	Animal Science (n=16)	Agricultural Economics (n=19)	Total (n=63)
Project/Program Planning	4 (14.3%)	3 (18.7%)	9 (47.4%)	16 (25.4%)
Personnel Supervision	8 (28.6%)	4 (25.0%)	6 (31.6%)	18 (28.6%)
Project/Program Direction	2 (7.1%)	0 (0.0%)	4 (21.1%)	6 (9.5%)
Project/Program Execution	6 (21.4%)	9 (56.2%)	6 (31.6%)	21 (33.3%)
Extension/Techni- cal Assistance	9 (32.1%)	6 (37.5%)	0 (0.0%)	15 (23.8%)
Research	16 (57.1%)	2 (12.5%)	4 (21.1%)	22 (34.9%)
Instruction	8 (28.6%)	4 (25.0%)	1 (5.3%)	13 (20.6%)
Other	7 (25.0%)	2 (12.5%)	7 (36.8%)	16 (25.4%)

The data provide a clear indication of the general employment preparation needs of licenciatura graduates as a composite group and by area of specialization. For example, the duties of Agricultural Economics graduates surveyed primarily entailed program planning, project execution, and personnel management. On the other hand, their colleagues from Plant Science were heavily involved in research,

extension, and formal instruction, as well as personnel management functions. Program execution and extension activities were most common among Animal Science graduates, although several are in supervisory or instructional roles, as well.

Research and program/project execution (or implementation), as noted in Table 5, are clearly the most common roles carried out by interviewees. In general, preparation in these areas appears to have been satisfactory, from the graduate's point of view.

One observes that personnel supervision ranks as the third most frequently mentioned task, and no lower than third in each school group, making it the item most consistently mentioned by all respondents. Yet, this subject area receives minimal emphasis in the curriculum offerings of the Faculty. Other interview items demonstrate that graduates did, indeed, perceive a need for more preparation in personnel and supervisory matters once they were in the world of work. For one, when asked to offer suggestions for additional courses in the curriculum, participants most often recommended courses in administration and management. Still another survey item requested that respondents indicate areas, from their perspective as program completers, in which their professional training may have been deficient. Again, one of the most frequently mentioned fields of inadequate professional preparation was administration/management. In summary, all of these responses demonstrate a consistently high level of concern for better preparation in the techniques and science of personnel and other administration processes.

The fifth and sixth most common functions of those surveyed both deal with education, one in a formal setting, and one an informal or extension setting. In both cases, these roles are almost exclusively carried out by Plant Science and Animal Science graduates. The Faculty, through the school of Agricultural Economics, does offer one course in extension, basically covering its role and general purpose. This course is mandatory for students of all three schools.

No courses or formal training in instructional methods or other pedagogical skills are either offered by the Faculty or are required in student programs of study. In view of the numerous employment assignments which place graduates in teaching related situations, either formal or informal, perhaps consideration ought to be given to increased levels of appropriate and adequate preparation in educational philosophy, processes, and techniques, and in specific extension methods and procedures. Extremely consistent with the above indications, Naranjo (1966) also found that research, instruction, program administration, and extension were the primary activities of CATIE graduates. He further recommended alterations in course offerings to prepare graduates with the skills and abilities these activities demand.

Employment Patterns

Insufficient data were collected to form complete employment profiles or histories. However, survey responses furnished sufficient information to report that nearly eight (8) in every ten (10) respondents were employed in a professional capacity related to their career prior to the completion of the licenciatura degree. The remainder

either began at (or near) degree completion (11.6%) or at some later point in time (10.1%). Most, then, were already professionally employed during at least some portion of their career education, and the pattern applied equally to graduates of all three schools. As discussed in Waggoner et al. (1964), this tendency has often been observed among university students in Latin America. Though some graduates surveyed began their professional employment prior to 1978, over 70 percent began during the period 1978-1980.

In their study of Venezuelan university students, Zschock et al. (1974) also found that over 70 percent of the respondent group had professional work experience in their fields of study at some point prior to program termination.

Until recently, when the bachillerato degree program was initiated, it was customary practice for an individual who had completed required coursework to request and receive from the Faculty a carta de egresado (letter of certification of coursework completion). With this, the person could occupy professional posts. This practice has also been observed in other studies (Hunter and Ternent, 1960).

Of graduates responding, 62.0 percent had been continuously employed by the same entity with which they commenced employment, though often having occupied different positions. Those having worked for more than one employer (32.8% of respondents) most frequently indicated two (2), but in some instances, three (3) entities.

Length of time in current employment position was recorded in months. Data analysis indicates that 77.8 percent of employed

respondents had occupied their current posts from between 1 and 36 months, the largest percentage (30.2%) being 12 months or less. On the other extreme, five (5) individuals (8.0%) had more than 52 months' longevity. The mean time in current position was exactly 24 months.

Perceptions of Professional Preparation

Graduates were asked to rate, on a scale of 1 to 5, the benefit of their career studies to current employment. The mean rating was 4.17. Analysis of variance, as found in Table 6, shows a difference in

Table 6. Analysis of variance of benefit of career preparation to employment by school

School	No.	Mean	S.D.	F-value	F-prob.
Plant Science	28	4.429	0.836		
Animal Science	17	3.706	1.160	3.570*	0.034
Agricultural Economics	19	4.211	0.631	(2<1)	

*Significant at the .05 level.

the ratings by school in that graduates of Animal Science classified the benefit of their career preparation to current employment significantly lower than Plant Science graduates. Analysis of variance by year of graduation indicated no differences between groups, and is found in Table 7.

Both Tables 6 and 7 indicate that the graduates surveyed basically perceive their professional studies as beneficial to their current employment. The grand mean for the comparison among schools was 4.11,

Table 7. Analysis of variance of benefit of career preparation to current employment by year of graduation

Year	No.	Mean	S.D.	F value	F prob.
1979	29	4.069	1.033	0.326	0.723
1980	23	4.261	0.864		
1981	12	4.250	0.754		

and for year of graduation it was 4.19, both of which are above average composite ratings.

Respondents were asked to identify those aspects of their career education in which they felt adequately trained, and those in which the Faculty could have prepared them better. The most common aspects defined by survey participants have been compiled and ranked in Tables 8 and 9. Many responses were reiterative in that they were directed at specific courses mentioned at an earlier point in the interview.¹ These are shown in one composite group. Of other indications, respondents perceived they had received an adequate "general education" at the Faculty, and were well-founded in the theoretical aspects of their career areas. Correlatively, Table 9 details that nearly one-half of those responding expressed concern for too few practical oriented experiences, making it the most frequently noted program deficiency. This strongly reinforces respondent attitudes expressed in other survey questions. For example, they placed great importance

¹The results of coursework evaluation can be found in the preceding article.

Table 8. Adequacies in career education ranked (n=66)

Items mentioned	Frequency	Percent
References to various courses	33	50.0
Basic/General education	11	16.7
Theory	8	12.1
Problem Solving	5	7.6

Table 9. Deficiencies in career education ranked (n=62)

Items mentioned	Frequency	Percent
Insufficient practical experience	30	48.4
References to various courses	18	29.0
Administration/Management	10	16.1
Extension methods	4	6.5

on the need for practical experiences (a mean rating of 4.8 on a scale of 1 to 5), yet, rated the adequacy of such experiences during their student years as 3.2 (average), with 3.0 having been the most frequent indication. When describing why they placed a high value on practical experiences, one of the following three basic concepts was reiterated repeatedly: (1) to complement and balance the theoretical nature of classroom instruction; (2) to learn "how" to do things through hands-on experience; and (3) to identify with the realities of rural areas--of the campo.

Chaparro (1959) noted discrepancies in faculty member attitudes toward the value of theoretical versus practical training in the agriculture faculties he studied. He also determined and reported that students clearly supported the practical and wished there were more of it. Waggoner reported the results of a survey conducted among ranking representatives of three (3) Latin American groups concerning a variety of key policies in higher education. Of interest here is that the groups agreed that, "... in general, university programs are excessively theoretical and do not give students the practical experience they need" (1974, p. 374). Safford (1976) and Zschock et al. (1974) have also addressed student and societal attitudes in other Latin American countries which agree with these assessments.

The Faculty is currently working on the expansion and enhancement of its experiment station sites. It may do well to consider the utilization of other avenues to assist future graduates in acquiring increased practical, real-life experiences. For example, perhaps the

little-used practicum option may provide more meaningful experience for many students than the traditional thesis route. As indicated by the graduates interviewed, only some 10 percent elected the practicum option. The Faculty may also be able to capitalize on UCR's required community service program as a means for exposing students to rural life and giving them useful practical training. If properly organized and supervised, this program may help the Faculty answer student demands for field experience and should be explored.

Returning to Table 9, one should also note that inadequate preparation in administrative and management matters was also of major concern to graduates. This subject was discussed in an earlier section of this paper.

Survey participants were asked to indicate what field of study they would choose if they were beginning their university training again. Nearly 6 in every 10 responded they would make no change in their career choice. These individuals expressed general satisfaction with their chosen field of study, several indicating that it offered a variety of employment opportunities and was one which could be of benefit to Costa Rican society. Naranjo (1966) also posed this hypothetical question to participants in his study, and encountered a similar percentage of favorable responses.

Nevertheless, 40 percent (29 respondents) of those surveyed indicated they would select a different career, of which nine (9) said they would pick one related to agriculture. Of these, the plant science discipline was most often mentioned. Thirteen (13) different fields,

including business administration (5), computer science (2), medicine (2), and law (2) were identified as the career choice of close to 30 percent (20 individuals) responding to the survey.

These percentages are perhaps more a reflection of the present difficult employment situation in Costa Rica than an indication of dissatisfaction with agronomy, or with education in the Agronomy Faculty or school of study. Indeed, follow-up inquiries as to why career changes would be made tended to identify either increased employment opportunities or better remuneration as key factors. However, several respondents did indicate a change in personal preference at present, and only four (4) individuals identified that better professional preparation was a key factor in their desire to alter careers.

The survey data indicate that a smaller percentage of Plant Science graduates (29%) demonstrated a desire to change careers than either Agricultural Economics (45%) or Animal Science (55%) graduates. Comparisons also show that 62.5 percent of the 1980 graduates were willing to alter careers, while their counterparts from 1979 and 1981 indicated 26.7 percent and 37.5 percent, respectively.

Somewhat related to the preceding, 22.5 percent of the survey participants had enrolled in university level courses since completing their licenciatura degree. Of these 16 individuals, five (5) were working toward a master's degree, and five (5) took these courses for personal enjoyment. Only three (3) indicated they were specifically seeking an additional new carrera (career).

Summary and Implications

This article has focused on the employment patterns and other post-graduation activities of recent graduates of the Agronomy Faculty of the University of Costa Rica. The feedback they so freely offered also provides valuable data on their perceptions and attitudes toward their professional preparation at the Faculty, information which has never been compiled and presented, heretofore.

The baseline data herein presented draw attention to several items which have direct and significant implications on future professional preparation at the Agronomy Faculty. First, the vast majority of graduates surveyed worked for public agencies. Secondly, the job-related responsibilities most common among graduates varied somewhat by area of specialization (or school), and certain patterns can be identified for each.

Across all three specialization areas, recent graduates are heavily involved in three basic functions. These are research, formal or informal education, and the execution of their agency's programs, including interacting with and supervising fellow workers. These results suggest that, in addition to the purely "scientific" aspects of their respective disciplines, graduates may well benefit from adequate amounts of preparation in such things as interpersonal skills, applied principles of administration and management, and extension and/or teaching methods and techniques in their preparation for the world of work.

Survey respondents identified the lack of sufficient practical experiences as the major deficiency in their professional career

preparation. This implies that measures should be taken to correct this negative impression so evident among those surveyed. Future graduates, as they experience the education-work transition, could benefit from an increased infusion of field/practical experiences as an integral part of the educational process.

Generally speaking, however, graduates expressed favorable impressions of their preparation in agriculture. Their frank and open criticisms or suggestions for improvements were constructive and seldom derogatory in nature. Most were anxious for the opportunity to provide feedback in hopes that it would aid the Faculty or their escuela.

Albornoz (1977) expresses concern that traditional student curricula fail to reflect the needs of a developing state. The information reported in this paper provides valuable data which can be useful in assessing the employment needs of agriculture graduates and structuring programs to adequately meet those needs for Costa Rica.

Literature Cited

- Albornoz, Orlando. 1977. Higher education and the politics of development in Venezuela. *Journal of Interamerican Studies and World Affairs* 19(3):291-314.
- Bermudez, V. and M. Fernandez. 1975. Informe de la encuesta de inmigración en la ciudad de San José, 1972. Ciudad Universitaria Rodrigo Facio: Centro de Estudios Sociales y a Población-CESPO, Universidad de Costa Rica, San José, Costa Rica.
- Chaparro, Alvaro. 1959. Un estudio de la educación agrícola universitaria en América Latina. Food and Agriculture Organization of the United Nations, Rome. 208 pp.
- CSUCA (Confederación Universitaria Controamericana). 1981. II Reunión de facultades de ciencias y tecnologías agropecuarias. Instituto Interamericano de Cooperación para la Agricultura (IICA), San José, Costa Rica. 55 pp.

- Decanos de Facultades de Ciencia y Tecnología Agropecuaria de Costa Rica. 1982. La educación agrícola en Costa Rica. (mimeo). Author. División de Carreras Agrícolas, Instituto Tecnológico de Costa Rica, Cartago, Costa Rica. 9 pp.
- Egginton, Everett. 1983. Educational research in Latin America: A twelve-year perspective. *Comparative Education Review* 27(1):119-127.
- Hunter, John M. and James Anthony Short Terner. 1960. Teaching of economics in Colombia. *Journal of Inter-American Studies* 2(2):189-196.
- Naranjo, Gerardo B. 1966. The graduate program of the Inter-American Institute of Agricultural Sciences: An evaluation of certain aspects through a follow-up of graduates. Ph.D. Thesis. Michigan State University. 204 pp.
- OPES (Oficina de Planificación de la Educación Superior). 1981. Posibilidades de estudio en la educación superior universitaria estatal de Costa Rica. Consejo Nacional de Rectores, San José, Costa Rica. 40 pp.
- Safford, Frank. 1976. The ideal of the practical: Colombia's struggle to form a technical elite. University of Texas Press, Austin, Texas. 373 pp.
- Waggoner, B., G. Waggoner, and G. B. Wolfe. 1964. Higher education in contemporary Central America. *Journal of Inter-American Studies* 6(4):445-462.
- Waggoner, George R. 1974. National planning, university autonomy, and the coordination of higher education: Latin American points of view. *Journal of Interamerican Studies and World Affairs* 16(3): 372-378.
- Wentling, Tim L. 1980. Evaluating occupational education and training programs. 2nd ed. Allyn and Bacon, Inc., Boston, Massachusetts. 410 pp.
- Zschock, D. K., G. W. Schuyler, A. Fernandez, and W. R. Duncan. 1974. The education-work transition of Venezuelan university students. *Journal of Interamerican Studies and World Affairs* 16(1):96-118.

GENERAL SUMMARY

Research Purpose and Implications

Universities can be and are a vibrant force for development in Latin America (Waggoner, 1974). Albornoz (1977) suggests that to reach full potential for development, traditional university curricula must be examined and realigned to meet the needs of a changing society. In the spirit of these expressions, the essence of this dissertation has been to focus attention on higher education programs in Costa Rica which prepare individuals for professional careers in agriculture.

Costa Rica is an agrarian society, highly dependent on agriculture to sustain its economy and its working populace. The production of export crops has traditionally been, and continues to be, a major revenue generating activity. However, there is urgent need for increased production of food and fiber for domestic marketing and consumption. This implies that there must be a continuing supply of well-trained agriculturalists to assume key roles with the agricultural sector of the country.

Throughout Latin America, although much has been said and written of the significance and impact of agriculture in the development of the region, the educational programs and processes which train and prepare professional agriculturalists have received an extremely low level of attention from development specialists and scholars. Yet, these programs are a crucial element, or should be, to progress in agriculture.

In answer to the paucity of current information about agricultural education in Latin America, the stated purpose of this doctoral research

dissertation was two-fold. First, to explore and acquire information about programs in the higher education system of Costa Rica which prepare professional agriculturalists. This would lead to a basic comprehension of agricultural higher education in the country.

The second major purpose was an outgrowth of the first. It was to perform an in-depth investigation of the three basic agricultural career programs of the Agronomy Faculty of the University of Costa Rica using the follow-up study technique. To accomplish this second purpose, four (4) objectives were defined, as follows:

- (1) determine and compare graduates' perceptions and attitudes toward overall instruction received at the university;
- (2) assess graduates' perceptions of the adequateness of education in their professional discipline;
- (3) assess (and evaluate) graduates' perceptions of building facilities, tools, equipment and other facilities utilized by the Agronomy Faculty; and
- (4) determine the occupational status of graduates.

The contents of the preceding three sections of this dissertation are, in purposeful fashion, directed at fulfilling the foregoing primary purposes and objectives. To recount briefly, the first of these sections consists of a comprehensive presentation of the current professional career programs in agriculture operating in the Costa Rican system of higher education. The properties and characteristics of each are discussed. This overview was prepared from materials and personal interviews acquired during the in-country research period, and is

designed to satisfy the first stated research purpose.

Following this section are two sections prepared in journal article fashion. These articles present and discuss the data secured from recent graduates of the Agronomy Faculty of the University of Costa Rica. Together, these articles address the issues raised by the objectives identified for the follow-up study of graduates.

The graduates who participated in the study were a representative sample of all licenciatura level graduates from the three (3) escuelas (schools or departments) of the Agronomy Faculty for the years 1979, 1980, and 1981. Stringent sampling, instrumentation, and data gathering methods and techniques were meticulously employed to ensure the credibility and validity of the research findings. A previous section of this dissertation details these methods and procedures since they may be of use in future studies under similar circumstances.

The follow-up study results provide a baseline of factual data and information on Agronomy Faculty programs from the vantage point of program completers who now find themselves in situations where their professional education must be applied beyond the classroom. As such, their opinions and perceptions can greatly contribute to an analysis of program strengths, weaknesses, and appropriateness to the needs of graduates as they exercise their professions. Such appraisal, as postulated by Albornoz (1977), is necessary if curricula are to meet student and societal demands. Though each of the two articles interpret, discuss, and comment upon the survey findings, those most closely associated with current programs--the Dean, school directors, and faculty

members of the Agronomy Faculty--will undoubtedly draw from them many conclusions of their own.

Recommendations for Further Research

Research among programs of agriculture at the higher education level in Latin America has been greatly neglected. Little scholarly information has been accumulated or presented, especially during the past decade or more.

The study for this dissertation is merely the first of multiple research possibilities in this area of interest. The following are indications of research topics which could significantly contribute to the body of knowledge on professional career agricultural programs in Costa Rica and other countries of Latin America.

- (1) Further studies at the University of Costa Rica that would complement this dissertation's research:
 - (a) Studies of the attitudes, perceptions, and post-graduation activities of bachillerato level graduates of the Agronomy Faculty;
 - (b) Follow-up research among nonprogram completers to ascertain their attitudes and opinions;
 - (c) In-depth profiles and research of each school in the Agronomy Faculty, to assess the peculiarities of their curricula and students;
 - (d) Investigations into the composition, preparation, and professional and instructional characteristics and capabilities of faculty members; and

- (e) Comparative investigations of the programs offered by the three (3) regional centers in the University of Costa Rica operation.
- (2) Basic investigative efforts, patterned after those enumerated above, of the agricultural education programs offered by the other three institutions of higher education in Costa Rica. This could well include inter-institutional comparative studies and analyses.
- (3) Most other Central American nations have only one university or institution at the higher education level which prepares professional agriculturalists. Studies on the order of this study or others of those listed above for Costa Rica ought to be performed throughout the region. Such effort, if properly conducted, could significantly augment the sparse data available on agricultural programs in the hemisphere. The Confederación Universitaria Centroamericana (Association of Central American Universities) could possibly be used as a springboard for promoting such research.
- (4) Research among all of the above referenced program areas would be greatly facilitated and enhanced by the compilation and maintenance of factual data by each individual "faculty" or other unit. Consistent, accurate record keeping, though not in itself a research effort, is closely associated with the ability to conduct research and accurately describe programs. Therefore, it is also recommended.

- (5) Research, including case studies, into the quality of educational programs in agriculture would make important contributions. This research ought to include studies on the quality, methods, and effectiveness of instruction, as well as the appropriateness of curriculum offerings.

This listing is by no means inclusive. However, it does suggest work which could contribute to a more thorough understanding of educational programs in agriculture. Education in agriculture is essential to Costa Rica and other agrarian societies. It is certainly not a superfluous activity. Rather, the proper preparation of professional agriculturalists is crucial to the development of these nations.

GENERAL BIBLIOGRAPHY

- Albornoz, Orlando. 1977. Higher education and the politics of development in Venezuela. *Journal of Interamerican Studies and World Affairs* 19(3):291-314.
- Anderson, D. Craig. 1977. Irrigation institutions and water users in Ecuador. Utah State University, Logan, Utah. 149 pp.
- Ardila, J., E. Trigo and M. Pineiro. 1982. Human resources in agricultural research: Three cases in Latin America. *Agricultural Administration* 10(3):213-234.
- Atcon, Rudolph P. 1966. The Latin American university. Editorial A B C, Bogota, Colombia. 160 pp.
- Barlett, Peggy F. 1982. Agricultural choice and change: Decision making in a Costa Rican community. Rutgers University Press, New Brunswick, New Jersey. 196 pp.
- Biesanz, Richard, Karen Zubris Biesanz and Mavis Hiltunen Biesanz. 1982. The Costa Ricans. Prentice-Hall, Inc., Englewood Cliffs, New Jersey. 246 pp.
- Borg, Walter R. 1981. Applying educational research: A practical guide for teachers. Longman Inc., New York. 327 pp.
- Carvajal, Manuel J., David T. Geithman, and Patrick R. Armstrong. 1977. Pobreza en Costa Rica. La Academia de Centro América, San José, Costa Rica. 330 pp.
- Chaparro, Alvaro. 1959. Un estudio de la educación agrícola universitaria en América Latina. Food and Agriculture Organization of the United Nations, Rome. 208 pp.
- Cochrane, Willard W. 1969. The world food problem: A guardedly optimistic view. Thomas Y. Crowell Company, Inc., New York, N.Y. 331 pp.
- Costa Rica. 1949. Constitución política de la República de Costa Rica. Asamblea Legislativa, San José, Costa Rica.
- Costa Rica. 1966. Censo de Población 1963. Dirección General de Estadística y Censos, San José, Costa Rica. 321 pp.
- Costa Rica. 1975. Censo de Población 1973. Dirección General de Estadística y Censos, San José, Costa Rica. 631 pp.

- Curle, Adam. 1970. Educational strategy for developing societies: A study of educational and social factors in relation to economic growth. 2nd ed. Tavistock Publications Limited, London. 180 pp.
- Decanos de Facultades de Ciencia y Tecnología Agropecuaria de Costa Rica. 1982. La educación agrícola en Costa Rica. (mimeo). Author. División de Carreras Agrícolas, Instituto Tecnológico de Costa Rica, Cartago, Costa Rica. 9 pp.
- Denton, Carlos F. 1979. Población y cambio en el sector agrícola: Caso Bataan. Informe No. 20. Instituto de Estudios Sociales en Población, Heredia, Costa Rica. 69 pp.
- Denton, William T. 1973. Program evaluation in vocational and technical education. Information Series No. 98. Center for Vocational and Technical Education, The Ohio State University, Columbus, Ohio. 17 pp.
- Edwards, Harold T. 1967. Power structure and its communication behavior in San Jose, Costa Rica. Journal of Inter-American Studies 9(2): 236-247.
- Edwards, William M. and D. Craig Anderson. 1983. Agricultural production and infrastructure in the Rio Frio Development Region of Costa Rica. International Studies in Economics Monograph No. 17, Department of Economics, Iowa State University, Ames, Iowa.
- Egginton, Everett. 1983. Educational research in Latin America: A twelve-year perspective. Comparative Education Review 27(1):119-127.
- Facultad de Agronomía. 1982. Reseña de la Facultad de Agronomía de la Universidad de Costa Rica (mimeo). Author, San José, Costa Rica. 4 pp.
- Feder, Ernest. 1971. The rape of the peasantry: Latin America's land-holding system. Doubleday & Company, Inc., Garden City, New York. 304 pp.
- Furtado, Celso. 1970. Obstacles to development in Latin America. Doubleday & Company, Inc., Garden City, New York. 204 pp.
- Goldrich, Daniel. 1966. Sons of the establishment: Elite youth in Panama and Costa Rica. Rand McNally and Company, Chicago. 139 pp.
- Gongora, Mario. 1979. Origin and philosophy of the Spanish American University. Pages 17-64 in J. Maier and R. W. Weatherhead, eds. The Latin American university. University of New Mexico Press, Albuquerque.

- Hull, C. Halair and Norman H. Nie, eds. 1979. SPSS Update. McGraw-Hill Book Company, New York. 238 pp.
- Hunter, John M. and James Anthony Short Ternent. 1960. Teaching of economics in Colombia. *Journal of Inter-American Studies* 2(2):189-196.
- IMF (International Monetary Fund). 1982. Government finance statistics yearbook. International Monetary Fund, Washington, D.C.
- Iowa State University. 1981. The graduate college thesis manual. Author, Ames, Iowa. 37 pp.
- ITCR (Instituto Tecnológico de Costa Rica). 1981. *Gazeta del Tecnológico*, Número 14. Author, Cartago, Costa Rica. 9 pp.
- Lanning, John Tate. 1940. Academic culture in the Spanish colonies. Oxford University Press, New York. 149 pp.
- Lipset, Seymour Martin. 1967. Values, education, and entrepreneurship. Pages 3-60 in S. M. Lipset and A. Solari eds. *Elites in Latin America*. Oxford University Press, New York.
- Maier, Joseph and Richard W. Weatherhead eds. 1979. The Latin American university. University of New Mexico Press, Albuquerque, New Mexico. 237 pp.
- Malassis, Louis. 1975. Agriculture and the development process: Tentative guidelines for teaching. The UNESCO Press, Paris. 284 pp.
- Monge Alfaro, Carlos. 1979. La educación. Pages 193-249 in Chester Zelaya, ed. *Costa Rica contemporánea*. Vol. 2. Editorial Costa Rica, San Jose, Costa Rica.
- Murphy, Jerome T. 1980. Getting the facts: A fieldwork guide for evaluators and policy analysts. Goodyear Publishing Company, Inc., Santa Monica, California. 215 pp.
- Naranjo, Gerardo B. 1966. The graduate program of the Inter-American Institute of Agricultural Sciences: An evaluation of certain aspects through a follow-up of graduates. Ph.D. Thesis. Michigan State University. 204 pp.
- Nett, Emily M. 1971. The functional elites of Quito. *Journal of Interamerican Studies and World Affairs* 13(1):112-120.
- Nie, N. H., C. H. Hull, J. G. Jenkins, K. Steinbrenner, and D. H. Bent. 1975. Statistical package for the social sciences. 2nd ed. McGraw-Hill Book Company, New York. 675 pp.

- Ochoa, M. L. 1981. Some basic issues on implementing a distance education system, in M. W. Neil ed. Education of adults at a distance: A report of the open university's tenth anniversary international conference. Kogan Page Ltd., London.
- OPES (Oficina de Planificación de la Educación Superior). 1979a. El sistema de educación superior en Costa Rica: Características, problemas y algunas sugerencias para su mejoramiento. Consejo Nacional de Rectores, San José, Costa Rica. 41 pp.
- OPES (Oficina de Planificación de la Educación Superior). 1979b. Las instituciones de educación superior públicas en Costa Rica. Consejo Nacional de Rectores, San José, Costa Rica. 89 pp.
- OPES (Oficina de Planificación de la Educación Superior). 1979c. La evolución del país y la educación postsecundaria. Consejo Nacional de Rectores, San José, Costa Rica. 44 pp.
- OPES (Oficina de Planificación de la Educación Superior). 1980. Leyes, decretos y convenios de la educación superior pública en Costa Rica. Consejo Nacional de Rectores, San José, Costa Rica. 74 pp.
- OPES (Oficina de Planificación de la Educación Superior). 1981. Posibilidades de estudio en la educación superior universitaria estatal de Costa Rica. Consejo Nacional de Rectores, San José, Costa Rica. 40 pp.
- OPES (Oficina de Planificación de la Educación Superior). 1982. Costa Rica: Cifras revelantes de la educación superior 1980-81. (pamphlet). Consejo Nacional de Rectores, San José, Costa Rica.
- PLN (Partido Liberación Nacional). 1981. Volvamos a la tierra; Programa de gobierno 1982-1986. Editorial Artes Gráficas, San José, Costa Rica. 137 pp.
- Presidential Mission on Agricultural Development in Central America and the Caribbean. 1980. Agricultural development and economic progress in the Caribbean Basin. Author, Tallahassee, Florida. 137 pp.
- Safford, Frank. 1976. The ideal of the practical: Colombia's struggle to form a technical elite. University of Texas Press, Austin, Texas. 373 pp.
- Salazar, José Miguel. 1982. Política agraria. Pages 211-232 in Chester Zelaya, ed. Costa Rica contemporánea. 2nd ed. Vol. 1. Editorial Costa Rica, San José, Costa Rica.
- Seligson, M. A. 1977. Agrarian policies in dependent societies: Costa Rica. Journal of Interamerican Studies and World Affairs 19(2):201-232.

- Seligson, Mitchell A. 1980. Peasants of Costa Rica and the development of Agrarian Capitalism. The University of Wisconsin Press, Madison, Wisconsin. 220 pp.
- Seligson, Mitchell A. 1982. Agrarian reform in Costa Rica: The impact of the title security program. *Inter-American Economic Affairs* 35(4):31-56.
- SEPSA (Secretaría Ejecutiva de Planificación Sectorial Agropecuaria y de Recursos Naturales Renovables). 1982. Información básica del sector agropecuario de Costa Rica. 2nd ed. Ministerio de Agricultura y Ganadería, Guadalupe, Costa Rica. 155 pp.
- UCR (Universidad de Costa Rica). 1981. Universidad de Costa Rica (pamphlet). Oficina de Divulgación de la Universidad de Costa Rica, San José, Costa Rica. 39 pp.
- Universidad Nacional. 1978. Reformas al plan de estudios. Facultad de Ciencias de la Tierra y el Mar, Escuela de Ciencias Agrarias, Heredia, Costa Rica. 31 pp.
- Universidad Nacional. 1981. Reglamento para trabajos finales de graduación. Facultad de Ciencias de la Tierra y el Mar, Escuela de Ciencias Agrarias, Heredia, Costa Rica. 16 pp.
- Van Dalen, Deobold B. 1979. Understanding educational research: An introduction. 4th ed. McGraw-Hill Book Company, New York. 547 pp.
- Waggoner, B., G. Waggoner, and G. B. Wolfe. 1964. Higher education in contemporary Central America. *Journal of Inter-American Studies* 6(4):445-462.
- Waggoner, George R. 1966. Problems in the professionalization of the university teaching career in Central America. *Journal of Inter-American Studies* 13(2):193-212.
- Waggoner, George R. 1974. National planning, university autonomy, and the coordination of higher education: Latin American points of view. *Journal of Interamerican Studies and World Affairs* 16(3):372-378.
- Wentling, Tim L. 1980. Evaluating occupational education and training programs. 2nd ed. Allyn and Bacon, Inc., Boston, Massachusetts. 410 pp.

- Whiteford, Michael B. 1978. An introduction to the anthropological field school in Costa Rica. Pages 1-23 in M. B. Whiteford ed. *Through the eyes of others: Student ethnography in Costa Rica. Papers in Anthropology No. 2.* Department of Sociology and Anthropology, Iowa State University, Ames, Iowa.
- Whiteford, Michael. 1980. Doing it: Urban research in Popayan, Colombia. Pages 348-357 in G. Gmelch and W. P. Zenner eds. *Urban life: Readings in urban anthropology.* St. Martin's Press, New York.
- Whiteford, Michael B. 1982. The interface of cultural factors with nutritional well-being: The case of Moroceli, Honduras. *Medical Anthropology* 6(4):221-230.
- Whiteford, Michael B. 1983. Rural-urban differences in the nutritional status of Costa Rican children: A case study. Paper presented at the Annual Meeting of the Society for Applied Anthropology, March 17-19, 1983, San Diego, California.
- World Bank. 1978. *World development report 1978.* Author, Washington D.C. 120 pp.
- World Bank. 1981. *World development report 1981.* Oxford University Press, New York. 192 pp.
- Zschock, D. K., G. W. Schuyler, A. Fernandez, and W. R. Duncan. 1974. The education-work transition of Venezuelan university students. *Journal of Interamerican Studies and World Affairs* 16(1):96-118.

ACKNOWLEDGMENTS

I am deeply indebted to so many individuals who constructively contributed to this dissertation that I feel overwhelmed. Nevertheless, I am obligated to express my gratitude, concerned only that I may fail to adequately recognize their assistance in my behalf.

Foremost, I express appreciation to my wife, Bonnie, and children Anita, Larry, and Brenda, whose love, patience, and support never failed. To them, I dedicate this dissertation.

Special thanks are extended to my committee members: Dr. Harold R. Crawford, who served as major professor, and who shares a vision of agricultural needs in developing societies; Dr. David L. Williams, who is ever willing to share of his time and counsel; Dr. Michael B. Whiteford, latinamericanist and compadre, whose interest, time, and advice have been highly valued; Dr. Anton J. Netusil, for his incisive and helpful suggestions; Dr. Thomas A. Hoerner, who has always been supportive of my efforts; and Dr. J. T. Scott, who arranged the financial support for the research in Costa Rica.

Special gratitude is also owed to Dr. W. Wade Miller, who unselfishly aided me along the way, especially in the design of the research. In this same category, many thanks are extended to Dr. and Mrs. Tomás Mulleady for their friendship during lonely nights in San Jose.

The research for this dissertation could not have been possible without the full cooperation of the Facultad de Agronomía of the University of Costa Rica. Special recognition is due: Dr. Luís Carlos González, Dean of the Faculty; the escuela directors; and the many

faculty and staff members who assisted me during my stay in Costa Rica. Warm thanks is extended to Ing. Roberto González, my counterpart and friend.

Several fellow ISU graduate students from Costa Rica assisted in the preparation of the research instrument, for which I am grateful. To Julio Cháves, José Molina, and Cristóbal Montoya I simply say, "gracias, mis estimados amigos."

APPENDIX A: ESTUDIO DE SEGUIMIENTO FORMULARIO PARA ENTREVISTA

Provincia, cantón, ciudad y barrio donde reside actualmente.

¿De cuál provincia y cantón procede?

¿Cuál es la ocupación de su padre? (Qué tipo de agricultor, comerciante, etc.?)

¿Cuál es su estado civil?

Sexo

Años cumplidos

¿En cuál escuela completó usted la licenciatura?

Educación Superior:

**En que año comenzó sus estudios universitarios?

**En que año egresó?

**En que año presentó la tesis o práctica?

¿Cursó todos sus estudios de licenciatura en la UCR?

Si es "no", explique

¿Ha llevado algún curso universitario después de su graduación?

**Si es "sí", especifique:

**¿Cuál es la finalidad del curso(s) tomado(s)?

¿Ha asistido a algún curso corto o seminario desde su graduación?

¿Cuál fue el factor decisivo para que estudiara en la UCR?

Utilizando esta escala ¿como describiría su educación general a nivel universitario durante su época de estudiante?

Ahora, hablando de sus estudios en la escuela de (escuela) y empleando la misma escala ¿como calificaría la educación recibida?

Utilizando esta escala ¿como calificaría usted los estudios prácticos (o la parte práctica) fuera de la clase durante su época de estudios en la escuela de (escuela)?

A su modo de pensar y utilizando la siguiente escala ¿cómo clasifica usted las experiencias educacionales de naturaleza práctica en la educación a nivel universitario?

****¿Por qué?**

¿Realizó usted tesis o práctica?

Utilizando esta escala, mientras realizaba la (tesis o práctica) ¿cuál es su opinión sobre la ayuda que recibió de su director de (tesis o práctica)?

¿Como podría su profesor director de (tesis o práctica) haberle ayudado en una mejor forma?

¿El hecho de realizar una (tesis o práctica) le ayudó a usted a adquirir habilidades las cuales usted ahora utiliza en su empleo?

¿En que rango las utiliza? Empleando el rango anotado en esta tarjeta.

En referencia a la (tesis o práctica), refiriéndola a esta escala, en su opinión ¿cuán importante es ésta?

****Si es menos de "5", a su criterio ¿como podría mejorarse o fortalecerse?**

¿Realizó usted trabajo comunal?

****Si es "sí", ¿cuál es su opinión de este programa?**

****¿Por qué?**

¿Podría usted indicarme los cursos que estima le han sido más beneficiosos en su educación en (carrera) así como los de menor importancia?

¿Cuáles cursos o temas cree usted que deberían ser incluidos en el currículum? ¿Tal vez mejorar?

Suponiendo que tuviera que comenzar sus estudios universitarios de nuevo ¿cuál carrera escogería?

****¿Porqué cambiaría (o no cambiaría)?**

Voy a nombrar tres categorías generales de facilidades utilizadas por la Facultad de Agronomía. Utilizando la escala en esta tarjeta ¿cómo calificaría estas facilidades?

a. Edificios y aulas:

b. Equipos, herramientas, etc. (buses, palas, computadoras) para uso del estudiante.

c. Laboratorios, invernaderos, estaciones experimentales, etc.

¿Cuáles de las anteriores facilidades, u otras que podría nombrar, opina usted que deberían mejorarse?

Si algunas se indicaron, específicamente ¿cuáles mejoras sugeriría usted?

Actualmente está empleado....

¿En cuál entidad trabaja usted actualmente?

Brevemente, describa su puesto actual:

*Título o nombramiento

*Deberes principales

¿Por cuánto tiempo ha ocupado esa posición?

¿Cuándo comenzó el trabajo profesional relacionado a la carrera de (carrera).

En que año fué?

¿Ha trabajado con la misma entidad o patrono desde que obtuvo la licenciatura?

**Si es "sí", ¿cuántos puestos diferentes ha ocupado?

**Si es "no", ¿con cuántas entidades diferentes ha trabajado?

¿A qué grado o nivel se relaciona su educación en (carrera) con su empleo y puesto actual?

Con base en esta escala ¿cuán beneficiosa ha sido la educación (carrera) en su empleo actual?

Por medio de sus experiencias en el campo profesional ¿ha podido usted identificar algunas deficiencias en las cuales facultad le debfo haber preparado mejor?

**Si es "sí", ¿cuáles son éstas?

Por otro lado, ¿cuáles son las habilidades (o algunos aspectos) en que usted fue capacitado a un nivel adecuado?

APPENDIX B: A SUMMARY OF THE LAWS AND OFFICIAL AGREEMENTS
REGARDING HIGHER EDUCATION IN COSTA RICA¹

Coordinating Organisms

Pact for Coordination of Higher Education in Costa Rica (signed by rectors of UCR, UNA, and ITCR), establishing the National Council of Rectors and the Office of Higher Education Planning.

Agreement to add the State University at a Distance (UNED) to the Pact for Coordination of Higher Education in Costa Rica (signed by all four rectors).

Decree No. 4437-E (1974), creating a Liaison Executive Commission composed of representatives from Higher Education and from the central government.

Executive Decree No. 11644-E (1980) expanding the membership of the Liaison Commission.

Law No. 6162 (1977) granting full legal status (personerfa jurídica) to the National Council of Rectors.

Fiscal Laws Impacting Higher Education

Law No. 5909 (1976), Tax Reform Law of 1976.

Executive Decree No. 6725-H (1977), regulations for implementation of Article 7 of Tax Reform Law of 1976.

Law No. 6153 (1977), taxes on property transfers.

Law No. 6450 (1980), fiscal law reforms.

¹OPES (1980), compiled by author.

Inter-Institutional Agreements/Pacts

In 1976, a pact among rectors of the UCR, UNA, and ITCR creating a unified definition of the academic "credit" in higher education.

In 1977, a pact among rectors of the UCR, UNA, and ITCR to create a unified nomenclature for degrees and titles awarded in higher education.

In 1979, an agreement signed by the rectors of the four institutions of higher education, that each institution will not recognize (and accept) titles awarded in foreign nations for programs it does not offer but which are offered by another of the institutions party to the agreement.

APPENDIX C: RESULTS OF VARIOUS STATISTICAL COMPARISONS
FROM GRADUATE FOLLOW-UP SURVEY

Table C1. Comparison of interview procedure by selected items

Survey item	Per- sonal (n) Mean S.D.	Tele- phone (n) Mean S.D.	T value	T prob.
Quality of education--UCR	(58) 4.017 0.577	(13) 3.923 0.494	0.54	0.588
Quality of education--Ag Faculty	(58) 3.966 0.620	(13) 4.000 0.577	-0.18	0.855
Practical portion of education	(58) 3.207 0.642	(13) 3.077 0.760	0.64	0.526
Importance of practical education in career	(58) 4.828 0.381	(13) 4.692 0.630	0.74	0.469
Assistance from major professor	(57) 4.018 1.026	(13) 4.385 0.506	-1.88	0.068
Use of qualities gained from thesis/practicum	(45) 3.489 1.199	(11) 3.000 0.894	1.27	0.211
Importance of thesis/practicum	(58) 4.328 0.846	(13) 3.846 1.281	1.29	0.217
Building and classroom adequacy	(58) 3.810 0.661	(13) 3.538 0.660	1.34	0.184
Equipment, tools, etc. adequacy	(58) 3.069 0.722	(13) 3.000 0.816	0.30	0.762
Labs, greenhouses, exp. stations adequacy	(57) 3.333 0.764	(12) 3.250 0.866	0.34	0.738
Benefit of career to employment	(53) 4.151 0.969	(11) 4.273 0.647	-0.40	0.692

Table C2. Comparison of sex by selected items

Survey item	Male	Female	T value	T prob.
	(n) Mean S.D.	(n) Mean S.D.		
Quality of education--UCR	(60) 3.983 0.567	(11) 4.091 0.539	-0.58	0.562
Quality of education--Ag Faculty	(60) 3.950 0.649	(11) 4.091 0.302	-1.14	0.263
Practical portion of education	(60) 3.183 0.676	(11) 3.182 0.603	0.01	0.994
Importance of practical education in career	(60) 4.767 0.465	(11) 5.000 0.000	-1.66	0.102
Assistance from major professor	(59) 4.068 0.980	(11) 4.182 0.874	-0.36	0.720
Use of qualities gained from thesis/practicum	(46) 3.565 1.068	(10) 2.600 1.265	2.51	0.015
Importance of thesis/practicum	(60) 4.267 0.918	(11) 4.091 1.136	0.56	0.576
Building and classroom adequacy	(60) 3.733 0.686	(11) 3.909 0.539	-0.80	0.424
Equipment, tools, etc. adequacy	(60) 3.033 0.762	(11) 3.182 0.809	-0.61	0.542
Labs, greenhouses, experiment stations adequacy	(58) 3.259 0.762	(11) 3.636 0.809	-1.49	0.140
Benefit of career to employment	(54) 4.222 0.861	(10) 3.900 1.197	1.02	0.312

Table C3. Comparison of program type by selected items

Survey item	Thesis (n) Mean S.D.	Prac- ticum (n) Mean S.D.	T value	T prob.
Quality of education--UCR	(64) 4.000 0.591	(7) 4.000 0.000	0.0	1.000
Quality of education--Ag Faculty	(64) 4.016 0.604	(7) 3.571 0.535	1.86	0.066
Practical portion of education	(64) 3.219 0.629	(7) 2.857 0.900	1.38	0.171
Importance of practical education in career	(64) 4.812 0.432	(7) 4.714 0.488	0.56	0.574
Assistance from major professor	(63) 4.127 0.907	(7) 3.714 1.380	1.08	0.283
Use of qualities gained from thesis/practicum	(52) 3.365 1.155	(4) 3.750 1.258	-0.64	0.526
Importance of thesis/practicum	(64) 4.219 0.934	(7) 4.429 1.134	-0.55	0.582
Building and classroom adequacy	(64) 3.719 0.654	(7) 4.143 0.690	-1.62	0.110
Equipment, tools, etc. adequacy	(64) 3.094 0.750	(7) 2.714 0.488	1.30	0.197
Labs, greenhouses, experiment stations adequacy	(62) 3.339 0.767	(7) 3.143 0.900	0.63	0.531
Benefit of career to employment	(57) 4.246 0.912	(7) 3.571 0.787	1.87	0.066

Table C4. Analysis of variance of selected items by year of graduation

Survey item	1979	1980	1981	F value	F prob.
	(n) Mean S.D.	(n) Mean S.D.	(n) Mean S.D.		
Quality of education from UCR	(30) 4.067 0.640	(25) 3.960 0.455	(16) 3.938 0.574	0.368	0.693
Quality of education from Agronomy Faculty	(30) 3.967 0.615	(25) 3.960 0.676	(16) 4.000 0.516	0.022	0.978
Practical portion of education	(30) 3.233 0.728	(25) 3.080 0.493	(16) 3.250 0.775	0.465	0.630
Importance of practical education in career	(30) 4.733 0.521	(25) 4.840 0.374	(16) 4.875 0.342	0.688	0.506
Assistance from major professor	(29) 4.172 0.889	(25) 3.920 1.038	(16) 4.188 0.981	0.574	0.566
Use of qualities gained in thesis/practicum	(26) 3.423 1.065	(18) 3.389 1.243	(12) 3.333 1.303	0.024	0.976
Importance of thesis or practicum	(30) 4.200 1.031	(25) 4.320 0.852	(16) 4.188 0.981	0.137	0.872

Table C5. Analysis of variance of facilities by school

Facility groupings	Plant Science	Animal Science	Agri- cultural Eco- nomics	F Value	F Prob.
	(n) Mean S.D.	(n) Mean S.D.	(n) Mean S.D.		
Buildings and classrooms	(31) 3.645 0.709	(20) 3.800 0.696	(20) 3.900 0.553	0.941	0.395
Equipment, tools, etc. for student use	(31) 3.258 0.729	(20) 2.950 0.759	(20) 2.850 0.671	2.244	0.114
Labs, greenhouses, experiment stations	(31) 3.323 0.702	(20) 2.950 0.826	(18) 3.722 0.670	5.277** (3>2)	0.008

**Significant at the .01 level.

Table C6. Analysis of variance of facilities by year of graduation

Facility groupings	1979	1980	1981	F value	F Prob.
	(n) Mean S.D.	(n) Mean S.D.	(n) Mean S.D.		
Buildings and classrooms	(30) 3.867 0.507	(25) 3.880 0.726	(16) 3.375 0.719	3.751* (1,2>3)	0.029
Equipment, tools, etc. for student use	(25) 3.033 0.718	(25) 3.120 0.781	(16) 3.000 0.730	0.152	0.859
Labs, greenhouses, experiment stations	(29) 3.276 0.797	(25) 3.400 0.764	(15) 3.267 0.799	0.210	0.811

*Significant at the .05 level.

APPENDIX D: SCALES USED IN INTERVIEW SCHEDULE

	1	2	3	4	5
Scale 1	Muy Mala	Mala	Regular	Buena	Muy Buena
Scale 2	Sin Importancia	Poca Importancia	Regular Importancia	Importante	Muy Importante
Scale 3	Nunca	Pocas Veces	Algunas Veces	Muchas Veces	Siempre
Scale 4	Muy Inadecuados	Inadecuados	Regulares	Adecuados	Muy Adecuados
Scale 5	Ningun Beneficio	Poco Beneficio	Mas o Menos	Beneficiosa	Muy Beneficiosa