Occasional
Paper Series

SMALL FARM CREDIT PROFITABILITY AND REPAYMENT PROJECT

Department of Economics
Colorado State University

ANALYSIS OF THREE METHODOLOGIES FOR COLLECTING DATA FROM SMALL FARMERS IN THE DOMINICAN REPUBLIC

by

John D. Longwell

Views expressed are those of the author and are not necessarily those of the supporting institutions.

January 1981

ABSTRACT

ANALYSIS OF THREE METHODOLOGIES FOR COLLECTING DATA
FROM SMALL FARMERS IN THE DOMINICAN REPUBLIC

Institutions working to improve the social and economic conditions in the rural sector of Third World countries frequently lack adequate empirical data upon which to base their policies and evaluate their programs. Without such data, these institutions are forced to develop policies based on value judgments that are often inaccurate or inappropriate. These value judgments can have negative effects on both the institution and the people that are served by the institution.

This paper presents an alternative model for collecting data from small farmers in the Third World. The model is based upon empirical data gathered from farmers, and it employs the process of inductive-deductive reasoning to arrive at policy decisions. The effects of the policies on farmers are verified through follow-up visits by the institution, and the overall effectiveness of the program is evaluated and made available for future program development and for use by other institutions.

The model was tested by comparing three methodologies for collecting production cost data from small farmers in the Cibao Valley of the Dominican Republic. The three methodologies were: (1) the estimation of production costs by an Agricultural Bank credit agent; (2) a purposive sample of five farmers chosen by the credit agent; and, (3) a random sample of 30 farmers. The purpose of testing these methodologies was to determine if credit agents can accurately estimate production

costs and also to determine the administrative costs to the Agricultural Bank of the Dominican Republic of employing random sampling over purposive sampling.

The results of the analysis of the three methodologies support the hypothesis that credit agents' estimations of production costs vary significantly from the production cost data provided by farmers based on their own farming operations. No significant biasing was caused by purposive rather than random sampling, and the administrative costs to the Agricultural Bank of employing one methodology over another were insignificant.

PREFACE

This report is one of a series emanating from the joint Oklahoma State University - Colorado State University cooperative agreements on Small Farmer Credit with the Agency for International Development. The overall objective of the project is to carry out small farm data collection analysis activities to improve credit use. The specific objectives of the cooperative effort between the two Universities and the agricultural development banks in Honduras and the Dominican Republic are to: (a) develop data collection and analysis approaches for use by credit institutions; (b) test these approaches in LDCs; and (c) disseminate the results.

The in-field part of the project began in Honduras with the Banco Nacional de Fomento, now the Banco Nacional de Desarrollo Agricola (Banadesa), on July 1, 1978, and in the Dominican Republic with the Banco Agricola on July 1, 1979. Dr. Loren Parks, faculty member in the Department of Agricultural Economics at Oklahoma State University (OSU) was the field staff professional in Honduras for two years. Dr. Tom Dickey, faculty member in the Department of Agricultural Economics at Colorado State University (CSU) is the field staff professional in the Dominican Republic.

The OSU part of this three year cooperative project was funded by AID under Cooperative Agreement AID/ta-CA-1, Basic Memorandum of Agreement No. AID/ta-BMA-2, and CSU operates under AID/ta-CA-3 and AID/ta-BMA-6. The Credit Project began in 1977. We express appreciation to Dr. William Merrill, former chief of the Economics and Sector Planning Division, Bureau of Development Support, AID, for his encouragement and leadership in implementing this project. Special thanks are due to Ms. Anne Grace Ferguson, Agricultural Economist in ESP/DSB/AID for developing the contractual agreements, and to Mr. Erhard Rupprecht and Ms. Karen Wiese, AID project managers on the project for their guidance and support during the past three years. We also express appreciation to the many in-country AID personnel who provided suggestions and support for the project.

We wish to give special recognition to Mr. Tomas Hernandez Aberto, President of the Agricultural Bank in the Dominican Republic, to Mr. Augusto Peña Castro, Head of Credit Operations, to Mr. Francisco Checo, Deputy, Credit Operations, and to Mr. Ramon Aquino, Head of Programming where the CSU portion of the project was located.

Recognition is expressed to all additional faculty involved in this cooperative agreement, including James Osborn, Odell Walker, Harry Mapp, Michael Hardin, and Joe Williams of the OSU faculty, and Kenneth Nobe of the CSU faculty. In addition, J. D. Longwell, CSU Graduate Research Assistant was stationed in the Dominican Republic, and Kurt Rockeman, OSU Research Associate, was stationed in Honduras.

Ronald Tinnermeier
CSU Project Coordinator, and
Overall Project Coordinator
Small Farmer Credit Project

Daniel D. Badger
OSU Project Coordinator
Small Farmer Credit Project

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES
(Continued)

LIST OF FIGURES

CHAPTER I

INTRODUCTION

The research undertaken for this study forms one part of the Small Farm Credit Profitability and Repayment Project. The goal of the Project is to "develop methodologies which credit institutions in the developing countries can use to carry out analyses to improve small farm credit policies, programs, and loan repayment" [27]. The primary activity in the development of these methodologies has been farm level data collection and analysis. Since the Project was implemented in Honduras in June of 1978 and the Dominican Republic in July of 1979, several data collection methodologies have been tested. These methodologies include a farm records program, estimations of production costs by credit agents, both single visit and multiple visit farmer surveys, client loan file analyses, and formal training programs in data collection techniques for credit agency personnel [13, 30, 31]. As these methodologies have been developed, an on-going effort has been made by the Project to incorporate them into the operations of the National Development Bank in Honduras (Banco Nacional de Fomento) and the Agricultural Bank of the Dominican Republic (Banco Agrícola de la República Dominicana) through reports, seminars, and training programs.

Background

The Agricultural Bank of the Dominican Republic[1] has the policy of financing a certain percentage of the production costs of its borrowers [4]. Presently, these costs are estimated by credit agents for each client in an investment plan. This plan is supposed to be prepared jointly by the client and the credit agent. In most cases, however, the agent prepares the plan based on his own experience and knowledge of the production costs for the crop in question. Prior to a crop cycle, many of the agents consult budgets that have been developed by other rural institutions and conduct informal surveys of input suppliers to determine current prices in their areas.

The investment plans, therefore, tend to be subjective estimations of production costs by the credit agents. These estimations are usually accepted, without modification, by the credit approval committee. The committee then uses the investment plan as the basis for deciding how much to loan for a particular farming operation.

In talking with credit agents and other Bank officials, the consensus among them was that, in most cases, the cost estimations in the investment plans do not accurately reflect the true production costs faced by the individual farmer. Several agents noted that because of the high ratio of clients to credit agents in the branch offices, the agent does not have time to estimate a separate investment plan for

[1]The Agricultural Bank of the Dominican Republic is an autonomous state-run institution with headquarters in Santo Domingo and branch offices in each province. The primary objectives of the Bank include: 1) providing credit facilities to stimulate the growth and diversification of agricultural production and to raise the living standards in the rural areas, 2) to provide credit for new agricultural enterprises established under the Agrarian Reform law, and 3) to help in the formation of agricultural cooperatives through supplying credit and technical assistance [1, 2, 3].

each farmer. Therefore, one or more "standard" plans are submitted for farmers displaying a wide range of characteristics. With this system of estimating investment plans, few if any of the farmers' goals and ideas are incorporated into the plan.[2] Several credit agents suggested that many farmers have little or no concept of planning and that they would therefore have difficulty understanding the concept of an investment plan.

In reviewing some of the budgets that the credit agents in the branch offices use as guidelines, it was discovered that several contained arithmetic errors. Also much of the price data, both in the guideline budgets and in the informal surveys conducted by credit agents, was outdated.

Purpose of the Study

After analyzing the methods currently employed by the Bank to collect production costs and other information, one of the goals that the Project developed became the design of a more objective system for collecting production cost data. Based on this goal, the present study sought to identify alternative methodologies for the collection of production cost data, and to evaluate these methodologies in terms of the benefits and the costs to the Bank and to farmer-borrowers.

---

[2]One agent indicated, however, that the amount of time spent with a farmer-borrower in developing an investment plan was a function of the amount of credit he was soliciting. In other words, the larger farmers soliciting greater amounts of credit were afforded more time with the credit agent than the smaller farmers seeking smaller loans.

Description of the Study Area

The most important agricultural region in the Dominican Republic is the Cibao Valley. This region has an average population concentration of over 330 persons per square kilometer and it contains some of the richest soils in the American tropics [39]. Because of the diversity of crops, farm sizes, and technology levels, it was determined that the Cibao Valley would be an appropriate study area. In addition, the Cibao Valley offered an adequate population size from which a large sample could be chosen, easy access by road, and an area where the Bank has extended a large number of loans for many years.

Figure 1 shows the five provinces in the Cibao Valley where the study was carried out. These provinces are characterized by a series of valleys surrounded by the two principal mountain ranges in the country. The most important crops grown in the mountains are coffee and cacao. The valleys are flat and conducive to irrigation. Some large cattle operations are evident in these valleys, but the most important agricultural product is rice.

Two major rivers, the Yaque del Norte and the Yuna, flow through the Cibao region. These two waterways, along with many smaller rivers and tributaries, contribute to the irrigation potential of the valleys. Nearly all of the rice in the area is irrigated with most farmers relying on a gravity flow system provided by a series of canals that have been constructed and are maintained by the Dominican Government.

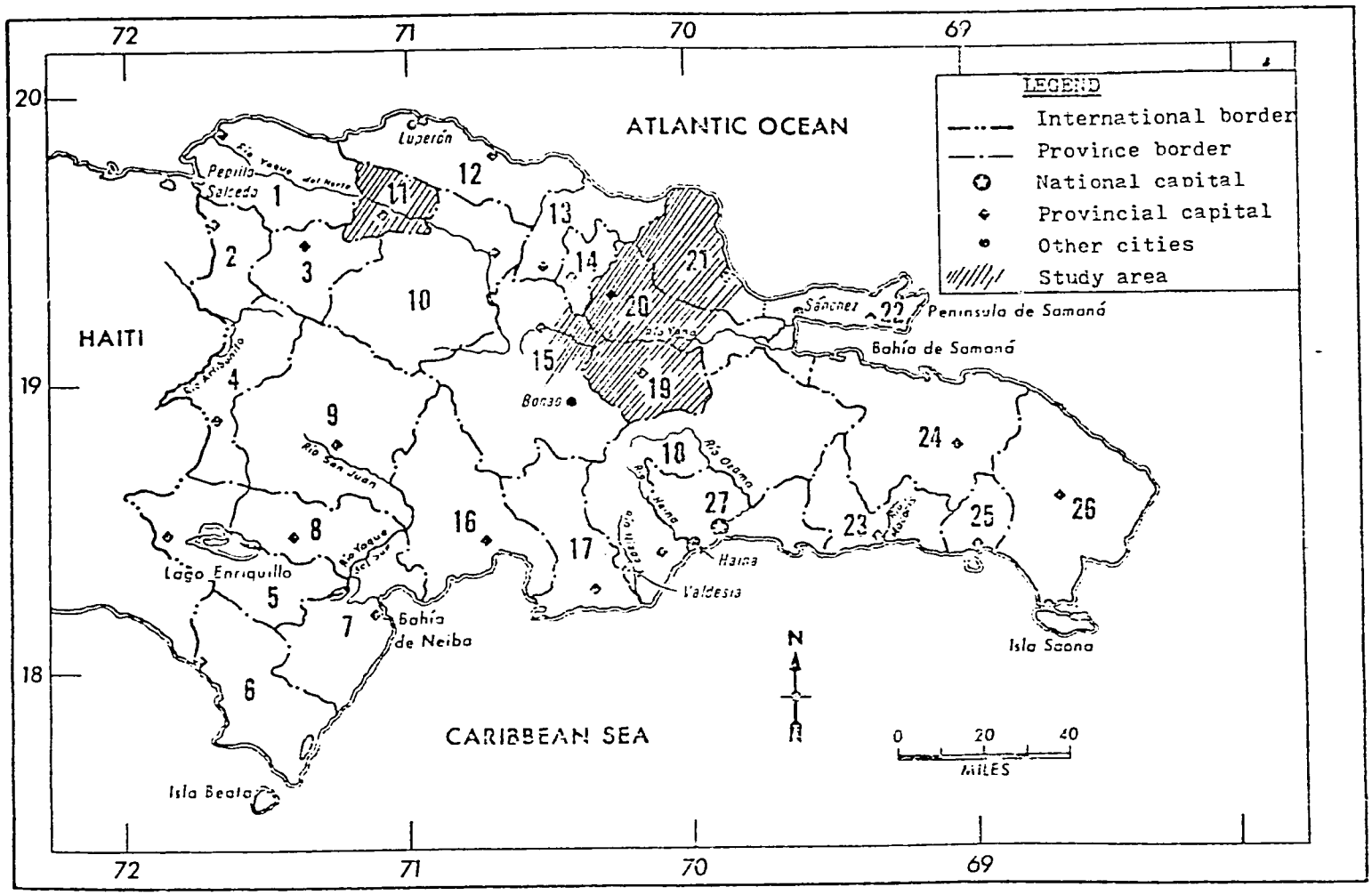

Figure 1. Map of the Dominican Republic showing Study Area.

Source: Weil et al., Area Handbook for the Dominican Republic, p. 10.

Overall farm size in the Cibao Valley is quite diverse ranging from two acres to several thousand acres. Many rice farms are between five and twelve acres. This size consistency is due largely to the Agrarian Reform Program begun in 1962. Under this program, many landless farm families were organized into groups and resettled on lands previously controlled by the Dominican Government. Within these groups, equal sized parcels were established for each family. Farmers not participating in the Agrarian Reform Program tend to either own their land outright or rent it. In recent years land "squatting" has become a problem due to inefficiencies of the Agrarian Reform Program and the growing population pressure in the Cibao region.

Outline of the Paper

Chapter II provides the conceptual framework upon which the study is based, along with a review of related studies. Chapter III describes the methodologies developed for the study and discusses the procedures and problems involved with the data collection. Chapter IV compares the results of field testing the three methodologies. Chapter V summarizes the study and discusses the implications and recommendations for future investigations and policy making.

CHAPTER II

CONCEPTUAL FRAMEWORK

Role of Data Collection

From an operational standpoint, the collection and analysis of data form a routine part of the loan approval process in any credit institution. Data are solicited from clients in a standard manner and are matched against a set of criteria established by the institution. If the data conform to these criteria, then the client is eligible for a loan. The data themselves are considered neutral and the way in which they are collected is unimportant in determining whether or not a loan is approved.

In the Agricultural Bank of the Dominican Republic, the data used by the loan approval committee to determine eligibility is often a conceptualization based on the experience or intuition of a credit agent. As was noted in Chapter I, credit agents do not have the time to solicit data from every client, nor do they necessarily believe that clients are capable of providing worthwhile data. Under the Bank's present system, therefore, real data do not play a dynamic role in operational procedures or credit policy formation. Instead, data collection is an accounting exercise whereby a standard set of responses are tabulated for review by credit analysts.

This static role of data does not mean that there is any lack of information generated by the Bank. On the contrary, more data than are actually used in decision-making are currently solicited from

borrowers.[1] Such a perverse data collection system increases costs for both clients and the Bank. The costs to the client are higher because of the increased transaction time necessary to complete the loan application procedure. When a farmer applies for a loan, he must have all the information for the application form at hand; if some of the information is lacking, he might be required to return to the Bank at a later date with the data. Even if the farmer has all of the necessary information at the time he is applying for a loan, he must set aside at least one-half day for the application procedure.[2] Borrower costs are also increased if data processing bottlenecks cause a loan to be too late for a crop cycle, or if the loan amount estimated in the investment plan falls significantly short of the amount needed to finance the operation. Either of these situations can force the farmer into the informal credit market where borrowing costs reach as high as 20 percent per month[3] (as opposed to the 0.75 to 0.917 percent range per month charged by the Bank).

[1]Some of the data solicited from clients are required by outside organizations that provide financing for the Agricultural Bank. These organizations include the Central Bank of the Dominican Republic (Banco Central de la República Dominicana), the United States Agency for International Development, the Inter-american Development Bank, and others. However since periodic up-dating of the Bank forms is infrequent, much of the information for these organizations continues to be solicited from clients long after a particular program or line of financing has terminated.

[2]The Bank has been trying to reduce the transaction costs of clients by installing a series of "satellite" offices where farmers can apply for loans and receive dispersements. These satellite offices are intended to reduce the travelling time of farmers applying for a loan. In addition, they serve a smaller clientele of farmers than the regional branch offices thus decreasing the time spent waiting for attention by a Bank official. The loan is still approved, however, through the regional branch office.

[3]The researcher learned about the informal borrowing cost through conversation with farmers, credit agents and other bank personnel, and store owners during the course of the study.

Inefficiencies in the data collection and analysis system create high costs for the Bank through added processing and employee costs. Duplication of data is common as is the previously mentioned problem of outdated information that continues to appear on Bank forms. In addition, most of the data are forwarded by the branch offices to the central office in Santo Domingo where they are either filed or stored in the Bank's computer. There is little evidence that any of these data are used by personnel in the central office.

Given the above background, the role that data solicited from farmers play in the Bank's operation and policy formulation is difficult to define. Data that might be irrelevant to the loan are solicited from borrowers while the critical information for the investment plan is often supplied by a credit agent without the direct participation of the client. Under such a system, the farmer-borrower derives little if any benefit from the data collection procedure. Although he might be presented with a copy of the investment plan, it will lack meaning for him if he had no hand in preparing it. Similarly, the Bank itself is not in a position to take full advantage of the data it solicits from farmers. The way the Bank's data collection system is structured, policy decisions are not based on empirical evidence gathered from farmers. Instead, policies are formulated at administrative levels in the Bank and the economic data of the clients are massaged to fit those policies. In summary, the current role of data collection in the Agricultural Bank is similar to an inverted pyramid: the basis for collecting the data is narrow and weak, yet it supports the large (and growing) amount of data that the Bank actually collects.

Model for an Alternative Data Collection Methodology

Improving data collection and analysis methodologies for the Agricultural Bank and other credit institutions requires a holistic attitude on the part of administrators and planners. Abandoning the accounting theory of data collection currently employed by the Bank in favor of a scientific approach would result in more cohesive credit policies and operations. By applying the principles of the scientific method [24], the data would act as the factual foundation upon which credit policies and decision models could be developed. Instead of trimming the data to fit the policies, the policies would be constructed on the basis of data collected in the field, data generated by other institutions in the country, and the institution's own goals for a credit program. In terms of the scientific method, this would constitute the inductive step of the model building process. Having based the model on the data, the next step would be to deduce policy decisions concerning loan criteria and borrower selection. The reliability of the model would be verified by observing the results of the loan program insofar as they met the established goals of the institution and the client. Regardless of whether or not the program was successful, the end results would be documented and made available for future policy decisions and as a reference for programs developed by other institutions within the country and/or similar institutions in other countries. This inductive-deductive process is summarized in the flow diagram in Figure 2.

An infinite number of facts exist in the field of observation and it is unrealistic to try to develop a credit decision model based on all the information available. Therefore, a primary objective for the

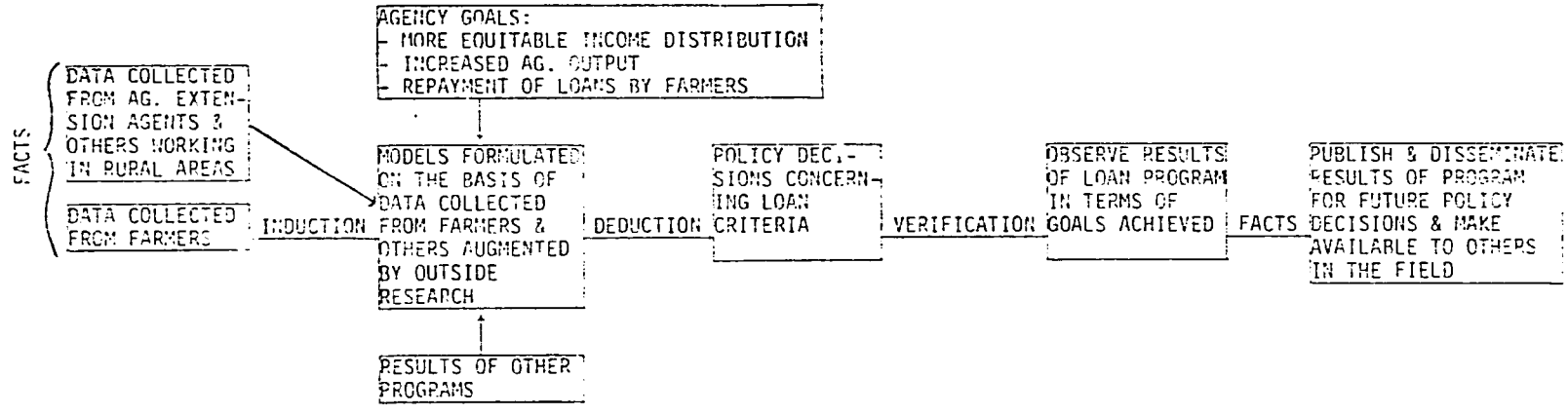

Figure 2. Inductive-Deductive Flow Diagram.

incorporation of useful data into a credit project is for planners to adopt a discriminating attitude about the collection of data. A distinction must be made between data that provide decision-making criteria in determining borrower selection for credit programs, and the data that are not applicable or important to such decisions.

Since the model is based upon information provided by farmer-borrowers, it is important that they be incorporated into the planning phases of the credit operations in their area and that they are able to perceive the value of the data that are collected from them. For example, it was mentioned in the previous section that farmer-borrowers have a limited input into the development of the investment plan and thus they derive little if any benefit from the plan. The alternative approach being suggested here is that it is necessary to understand certain attitudes of the farmer before a successful credit program can be designed. These attitudes include: 1) how the farmer views credit in terms of the benefits accruing to his operation and to the overall quality of his life; 2) how he views the procedures he must go through to receive a loan such as application forms, collateral, and record-keeping; and, 3) how he perceives his obligations to the credit program in terms of the agreement made with the lender.

Through this approach of involving farmers, certain generalizations can be made about a farming area. These generalizations can then be used to construct a model upon which policy decisions can be based. The model is essentially a prediction about how farmer and agency goals can be mutually achieved within the context of a credit program. These predictions are tested by the policies that the agency adopts and can

only be judged according to the accuracy, degree, and consistency by which they are successful in achieving the goals [15].

Another means of understanding the above procedure is to contrast it with the way the Agricultural Bank currently designs its credit programs. These designs are based upon normative criteria whereby value judgments rather than empirical verifications form the basis of decision-making [34]. In such a design, Bank policy makers in Santo Domingo develop programs without first investigating an area or a group of farmers and assessing what the needs are. Such an assessment would involve gathering information from a number of sources in the area, including farmers, credit agents, and other rural extensionists, and using that information as a resource for establishing credit policies for the program. When normative criteria are the basis for determining credit policy, the probability of failure is higher than if empirical evidence were collected and analyzed. Not only are many of the historical, political, agro-climatic, and other important factors not fully understood or considered, but neither are cultural and personal differences. Variations in the value of labor, different concepts of time, religious, and even superstitious considerations all combine to undermine the program.

Undoubtedly, any policy decision must contain some normative aspects. The point is, however, that the normative aspects cannot be independent of some positive foundation and still be effective [15]. In other words, any policy conclusion must rest upon some prediction about the effect of taking one course of action instead of another, "a prediction that must be based--implicitly or explicitly--on positive economics" [16]. In this context, positive economics refers to some

factual data that have been collected to aid in the development of a model and which are capable of yielding predictions about how that model will behave under changing circumstances. The accuracy of the data must be judged in terms of how they were collected and analyzed and from whom they were collected. If it is farmers who are to be the beneficiaries of a credit program, then it is the farmers who must provide the basic information required to make that program a success. This concept is shown diagrammatically in Figure 3.

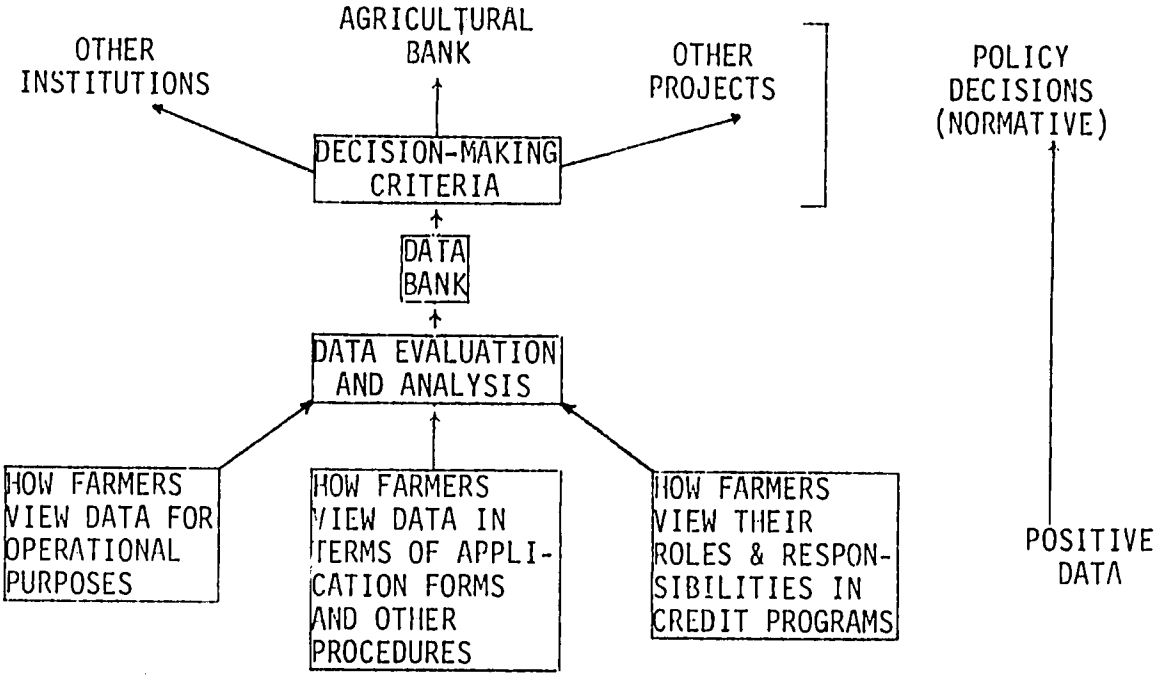

Figure 3. Relationship between Positive Data and Policy Decisions for an Agricultural Bank.

What types of questions must be asked of farmer-borrowers in order to establish an empirical foundation upon which credit models can be developed? First, it is important to determine what value (if any) farmers derive from data collection for credit programs. This is most important with respect to how farmers view data collection for operational purposes. Is there a give and take of information between the

farmer and the data collector, or is there only a one-way flow from farmer to collector? Secondly, the farmer's view on the importance of data collection should be established so that the credit institution can develop a feeling as to what the loan criteria should be from the farmer's standpoint. Opinions on such controversial topics as loan collateral, interest rates, and repayment can be gathered and analyzed. It is also important to determine what benefits farmers derive from data collection for credit programs. In other words, if farmers are not presently benefiting from data collection, then some means must be found by which they can benefit.

The model also has implications in terms of costs to both the Bank and the client. The premise here is that costs can be trimmed and efficiency improved by eliminating unnecessary data from surveys and questionnaires, and by soliciting farmer cooperation and understanding in the collection of relevant data. The practice of employing the accounting theory as described previously results in a great deal of data being collected that are never actually used in decision-making. With respect to credit agents, this means that much of their time is spent filling out forms. From the farmers' standpoint, it means sacrificing more of their time for answering questions. In addition, the longer the questionnaires, the shorter is the attention span of the farmer [32], which means that the accuracy of the data collected is more questionable when the accounting theory is used. The costs of analyzing and storing the data also accumulate.

Trimming costs requires a careful analysis of the present data collection system. By merely incorporating a new methodology, there is no guarantee of improved cost efficiency. It is quite possible to carry deadweight along when changing from one approach to another. Once the inefficiencies from the old system have been identified, care must be taken not to include them (or other, new inefficiencies) in the data collection methodologies.

Related Studies

Specific studies on data collection for credit programs are limited. Indeed, it has only been recently that the subject of data collection for any type of development program has begun to attract attention [7, 23, 36]. Most of the literature on data collection concentrates either on specific case studies or on the experiences of field researchers over a number of years. Several more recent studies, however, have begun to examine the theoretical aspects of the subject and how data collection plays a critical role in every aspect of program development and implementation. It is interesting that most studies focusing upon data collection have been conducted in Africa and the Middle East; very little of this type of research has been undertaken in Latin America.

An important area of data collection that is especially critical in terms of the model-building process described in the previous section is the question of how farmers and other rural residents view surveys, enumerators, and the other aspects of information gathering. Barghouti [5] notes that since rural people often do not comprehend the research process and its implications to their situation, they tend to

view investigative activities undertaken in their communities as an invasion of privacy, or associate it with tax collection and police investigation. El Hadari [14], Ogunfowora [29], and Kabwegyere [22] stress the importance of involving rural people in the planning and implementation of data collection activities. Not only will worthwhile information be gathered in this manner, but good relations will also be cultivated between the parties involved. In addition, those who are collecting the data gain a better understanding of the people and environment with which they are working.

Spencer [32,33], Collinson [9] , Hunt [20], and Norman [28] discuss farm management data collection and analysis. All four of these researchers deal with problems of area stratification, sample size, development of appropriate survey instruments, and the establishment of good rapport with local leaders and those who are to participate in the study. Spencer describes the four methodologies for farm management and production economics research as being: 1) the model farm study, 2) farm account books, 3) farm business surveys, and 4) the cost route method. Each of these methods has limitations and therefore must be evaluated with respect to the specific study to be undertaken. Hunt provides data collection strategies for dealing with a variety of crop and management situations. He also provides guidelines for field organization, error control, staffing, operation and budgetary recording, and crop forecasting.

Friedrich [17] and Yang [41] deal with the organization of data collection, farm management data collection forms and formats, and various coding systems for all aspects of a farming enterprise. The handling and storage of data after they have been collected is stressed

along with the types of computer analyses that can be performed on coded data.

Studies on the theoretical aspects of data collection are limited. Jeffers [21] makes an important distinction between the accounting theory of data collection, which assumes that the subsequent use of data is independent of the methods by which they were collected, and the philosophy of science in which observable data play an important role in the inductive-deductive cycle of the scientific method [24]. Uchendu [36] introduces many of the same types of questions that the project in the Dominican Republic seeks to answer. Although not directed specifically at credit issues, these questions attempt to establish the roles played by the various actors in an agricultural setting. The questions include [37]:

> What are the technical possibilities for increasing farm productivity? What is the farmer's awareness of and response to agricultural advice offered to him, and how extensive have [sic] been the move away from the traditional pattern of farming? What has been the influence of government policy and action with respect to the allocation of funds to various aspects of development...[such as] provision of credit and subsidies...?

No significant contributions to the methodology of data collection were discovered which directly relate to agriculture or credit in the Dominican Republic.

CHAPTER III

DESIGN OF THE STUDY AND DATA COLLECTION

The conceptual framework presented in Chapter II provides the basis upon which the methodologies for the study were designed. Due to time and budget limitations, all aspects of the data collection process were not examined. Instead, three alternative data collection methodologies were tested within the context of the Bank's current operating procedures. No direct attempt was made to alter the Bank's methods for credit policy formation nor was a model such as the one discussed earlier (Figure 2) presented to the Bank for consideration.[1]

Because the investment plan plays a key role in determining borrower eligibility and the amount for which a loan is made, alternative methodologies for soliciting the information required for this plan were designed and tested.

Design of the Study

The investigation began by reviewing the current methodology used by the Bank to collect production cost information. This review consisted mainly of conversations with Bank personnel, both in the central office and the branch offices. Also, the circulars and memorandums sent out by the Credit Policy division of the Programming Department to the branch offices were located and evaluated to determine what

---

[1]With respect to the overall goals of the Project, however, the methodologies developed for the study did play an important role in proposals recommending significant changes in the Bank's operations [31, 12]. These changes center around how production cost information is collected and used.

information was currently being solicited, what types of questionnaire formats were used, and the general limitations of the methodology.

Methodologies. The three alternative methodologies tested in the study were as follows:

1. Estimations by a Bank credit agent of rice production costs. This methodology required a credit agent from each of the five branch offices in the study area to estimate production costs based on his own knowledge and experience. The parameters for this estimation were the population characteristics described in the next section. The purpose of testing this methodology was twofold. First, the methodology was intended to simulate the investment plan completed for each client by the credit agent. In this way, the reliability of the agent's estimations for the investment plan could be contrasted with the cost estimations obtained directly from farmers for the same crop. The other purpose behind testing this methodology was to provide credit agent training in the use of the survey instrument. The survey instrument filled out by the agent was the same one used for the farmer interviews. The researcher was present during this exercise to explain the purpose and design of the survey instrument, and to answer any questions the credit agent might have about the survey.
2. A sample of five "representative" farmers from each study area. The same credit agent who had estimated production costs in the first methodology was asked to choose five sample farmers in his area that he considered representative of the population. The interviews with these representative farmers were conducted with

the researcher present and were usually completed before the 30 farmers for the third methodology were interviewed. This methodology was designed for comparison with the third methodology to determine the degree of biasing caused by representative or purposive sampling.[2]

3. A sample of 30 farmers from each area selected at random. These sample farmers were chosen by the researcher from a geographically stratified population and each credit agent was provided with a list of selected farmers in his area. The same credit agents who participated in the testing of the other two methodologies conducted these interviews on their own, although at times the researcher might have been present during the interview.

Population. The population consisted of all farmers served by the branch offices of Mao, Nagua, San Francisco de Macorís, La Vega, and Cotuí who displayed the following characteristics:

1. were bank clients during the period from August 1978 to July 1979;
2. grew rice as their principal crop;
3. cultivated 65 tareas[3] or less of farm land; and,
4. met their production costs on an individual or family basis and not communally.

A listing of this stratified population was obtained from the Bank's Central Data Processing office.

---

[2]Purposive sampling is a method whereby sample units are selected according to how typical they are of a heterogeneous population according to the judgment of specialists in the subject matter. The composition of the resulting sample is therefore a personal judgment of those responsible for selection [8, 35].

[3]"Tarea" is the common land measurement in the Dominican Republic. There are approximately 6.46 tareas in one acre [2].

Sample selection. Sample farmers were selected randomly from the population list. Random sampling was employed to avoid introducing biases and to provide a probabilistic basis for the selection of a sample [18, 25]. Each farmer in the population was assigned a number and a Random Number Generator program was used to select the numbers. Thirty sample farmers were chosen from each of the five provinces in the study, with five additional farmers in each area selected as alternates.

In each province, the credit agent assigned to the study was asked to choose five representative farmers based on the characteristics of the population for the purposive part of the study.

The survey instrument. A copy of the survey instrument appears in Appendix 1. The survey instrument was designed as a Farm Business Survey. This title implies that farmers are visited only once during a crop cycle and therefore the principal source of data is the farmer's memory. Such a survey is far from ideal, but due to time and budget limitations, plus the large number of farmers to be surveyed, it was the only practical means of obtaining the data.

The survey is divided into five parts.[4] Part I solicits general information about the farmer and his farm operation. Part II consists of an open-ended format for recording variable production costs in rice. Similarly, Part III uses an open-ended format for recording fixed cost data. Part IV records information on other costs, land values, and rice output. Part V is reserved for information such as the

[4]A detailed description of each part of the survey appears in Appendix 1.

date of the interview, travelling times, distances travelled, and so forth.

Training. The five credit agents who participated in the study received minimal training in data collection techniques. At the initial meeting between the credit agent and the researcher, the study was briefly explained and an instruction set ("Instrucciones para los Cuestionarios Usados en la Investigación para la Recolección de Datos sobre Costos de Producción") was left with the agent to study prior to the next meeting in one or two weeks. The instruction set discussed each section of the interview in detail and provided examples of how the survey form should be filled out.

In the next meeting between the credit agent and the researcher, the instructions were reviewed section by section. The three alternative data collection methodologies were also outlined for the agent at this time. At the end of the meeting, the agent was given a survey form and was asked to provide his production cost estimations. All parts of the survey were completed using hypothetical data. This exercise provided the agent with the opportunity to go through the entire survey form in detail with the researcher present to clear up any of the agent's questions. At the end of the second meeting arrangements were made for the farmer interviews.

At the next meeting, the researcher would spend two or three days with the agent during which time about ten interviews would be completed. The first several interviews were conducted by the researcher with the credit agent observing. At the beginning of each interview, the purpose of the study was briefly explained to the sample farmer.

Each farmer was told that the interview would in no way affect the status of his loan or his relationship with the Bank. It was stressed that the information being gathered would remain confidential and would be used by the Bank to improve service to its clientele of farmers.

After each of these interviews, the researcher and the agent would review the completed form together and clear up any questions that the agent might have had about the interview. Once the credit agent appeared to have a clear grasp of the interview process, he would conduct the remainder of the interviews while the researcher observed. After each interview the researcher would discuss his observations with the credit agent and offer comments and suggestions for improvement.

When the ten interviews had been completed together, the researcher would return at least once every week and a half or two weeks to collect completed survey forms and monitor the progress of the agent. Any questions or problems that had arisen during the researcher's absence would be cleared up at this time. Each credit agent was advised that if he encountered problems before the researcher arrived in his area, he should either refer to the instruction set or contact the researcher through the central Bank office.

Data Collection

The farmer interviews began the first week of January 1980 and were completed by the first of April 1980. In all, some 185 farmers were interviewed of which the data from 157 were actually used in the analysis. The remainder of this section describes the pre-test of the survey instrument and the experiences of the credit agents in each study area.

Pre-test. The survey instrument was pre-tested in the La Vega province on 15 and 16 November 1979. With the help of a credit program supervisor from the branch office in La Vega, five farmers were chosen for the test. These farmers tended to have a larger land base than had been defined for the population; however farm size was not a critical factor in the pre-test since the objective was merely to observe the effectiveness of the open-ended questionnaire format, and to pinpoint specific problems in the interview process. Three of the interviews were conducted by the researcher and two by the credit supervisor from La Vega. The time required to complete an interview in this pre-test ranged from 30 to 45 minutes.

The following observations were made on the basis of the pre-test:

1. Production cost information should be written down on a per tarea basis whenever possible. If this is not possible, then the information can be calculated by dividing the total input or labor cost by the total rice area.
2. All calculations do not need to be made during the interview. As long as the credit agent gets the essential information (such as quantities and the per unit prices), then the per tarea costs can be calculated back in the branch office.
3. Salvage value on fixed cost items is often difficult to determine because after a tool has expended its usefulness in rice production, it is still used around the home.
4. The farmer may not be able to make a realistic valuation of his land if he is participating in the Agrarian Reform

program.[5] In addition, some farmers might be reluctant to make such valuations if they are suspicious or uncertain of the interviewer's motives.

On the basis of these observations, plus comments and suggestions from Bank personnel, several changes were made in the survey instrument before the farmer interviews began.

Interview observations. It was explained in Chapter II that when new policies or programs are being developed by an institution like the Agricultural Bank, it is of critical importance that the responses and reactions of the affected farmers be observed and documented. In this way, the farmers' goals and ideas can be incorporated into the planning stages of policy making and program design. Because of the importance of farmers' responses and reactions in terms of the study's objectives, the remainder of this chapter deals with the interviews conducted in each study area.

Nagua. In this province the credit agent caught on to the interviewing process quickly. He took more time to conduct the interviews than did most of the other agents in the study, but he was meticulous and was able to get added details from farmers through his patience and persistence.

The rice crops of many farmers in this province were affected by Hurricane David, which struck the island on 31 August 1979, and Tropical Storm Fredrick which occurred less than one week after the

[5]Under this program, government-owned land is redistributed to groups of farmers. The farmers do not technically own the land nor do they pay rent or taxes on it. Since there is no active land market, these farmers find it difficult to establish realistic monetary values for their land.

Hurricane. Sample farmers who reported that they did not harvest because of these phenomena were dropped from the study and replaced with alternates. Replacing these sample farmers caused a problem in that the credit agent did not understand that he was to choose the new samples from the list of alternates. Instead, he merely selected farmers of his own choosing as replacements. When this error was discovered, the agent was advised to interview the remaining alternates from the population list. In addition, several new sample farmers had to be randomly selected from the population so as to bring the total number of random interviews up to the required 30.

Another problem noted by the credit agent after he had completed several interviews was that it is difficult to establish how much a farmer earned from his rice crop since many of the sample farmers in the study had overdue loans with the Bank and were understandably reluctant to reveal their true income from the crop to a Bank agent. Also, many farmers were unwilling to estimate their land values; most likely due to suspicion about the interviewer's motives in asking such a question. To overcome this problem, the question about land values was rephrased. Instead of asking: "if you were going to sell a tarea of your land, how much would you ask for it?", the question was changed to: "if you were going to buy a tarea of land that was exactly like yours, how much would you pay for it?" This change in approach proved effective in overcoming the farmers' hesitancy to reply.

Some problems were encountered with farmers remembering all the activities involved in irrigating their rice crop. These problems arose because the amount of time spent irrigating is highly variable between and within crop cycles. Factors such as the general physical

condition of the crop, the growth stage of the plants, climatic conditions and so forth all affect the irrigation schedule.

Deriving labor costs caused some problems for the agent in the beginning of the study. These problems occurred in situations such as the following: if a farmer had one laborer working for ten days and hired five more laborers for two days, then it is possible to erroneously record the activity as six men working twelve days instead of one man working ten days and six men working two days.

San Francisco de Macorís. Several problems were encountered with the interviewing credit agent in this province. First, it was difficult to keep him from prompting farmers during the interviews, especially since he had a good idea of costs and production activities for the area. Prompting proved to be one of the main problems in having a technical agent conduct interviews. Such people have a natural tendency to prompt because they often already know the answer to the question they are asking the farmer. To avoid this problem, a teacher or someone who is not a technical agent can be hired to conduct the interviews. The difficulty with employing these types of people, though, is that their ignorance of the subject matter might prevent them from detecting erroneous or misleading answers to survey questions.

The second problem with this agent was his lack of enthusiasm. After the researcher and the agent had completed their ten interviews together, the agent was asked to continue interviewing farmers on his own. After nearly a month, however, the agent had only completed one interview. Each time the researcher questioned him about his lack of progress, the agent had an excuse about why he was unable to complete

the interviews. The branch office manager was made aware of the problem, but took no action on it. The problem was finally resolved when the assistant head of the Credit Operations department in the central office intervened and an arrangement was made whereby the researcher would accompany the agent on the remaining 19 interviews. With this approach, the farmer interviews were completed in six days.

One interesting and effective technique the credit agent from San Francisco developed to help the farmer remember the month in which an activity occurred, was to relate the activity to a specific date or event with which the farmer was familiar. For example, the agent would ask the farmer whether a certain activity occurred before or after Hurricane David. If it occurred before the Hurricane, he would ask how many weeks before. He also used religious and other holidays in this way.

In some villages the credit agent used a "contact farmer" who would help him locate sample farmers and also advise sample farmers of the agent's arrival.

Several observations were made by the researcher during the interviews in which he was present. One observation was that when more than one family member is active in rice production and is present during the interview, disagreements can arise over the price paid for a particular input or service, the amount of an input that was used, when a particular event occurred, and so forth. These disagreements can add extra time to the interview as it often takes everyone a while to reach a consensus. Another observation was that it is difficult to get accurate information on how much it costs the farmer to travel to and from his rice parcel. For example, one farmer lived 35 kilometers from his

parcel. He said that sometimes he must pay for his passage while at other times he can secure free passage.

La Vega. The interviews in this province proceeded at a fairly even pace. The agent would usually have several forms completed each time the researcher arrived in his area. The quality of the interviews, however, deteriorated over time. On each successive interview form there was less and less information. The time required to complete an interview was often as short as 15 minutes.

As was the case in San Francisco de Macorís, there was often a problem with the agent suggesting probable answers if a farmer was slow in responding to a question. In addition, if the sample farmer was interviewed in the presence of other farmers, there sometimes was a problem with these other farmers prompting.

Cotuí. The branch Bank manager of this office was reluctant to assign the credit agent to the study for more than two days per week. As a result, progress on the interviews was slow, and often when the researcher arrived for a periodic visit there would be no completed interview forms, nor would the credit agent be available for consultation. As in the case of San Francisco de Macorís, the problem was resolved with the support of the Credit Operations office. After the intervention of the Credit Operations office, the remaining interviews were completed within two weeks.

Two interesting points were made by the credit agent from the Cotuí office. One was that farmers are unable to consider all of the hidden costs inherent in the production process such as buying rum for workers, furnishing them with meals, and providing them with other

amenities. The fungibility and substitution of credit funds [6, 10, 11, 38] was also noted by the agent. For example, when farmers receive production credit, they will often sell less rice than usual thus retaining more for home consumption. Also he noted that farmers will buy food and other goods with money loaned for rice production.

Mao. The data collected in this area provided a special case for the study. Out of the five offices in the study, Mao had the fewest problems during the two months of field work. The credit agent at this office had many years of experience and knew the province well. He caught on quickly to the interview process and seemed genuinely enthusiastic about the study. In the first several interviews some problems were encountered with missing information on the forms, but the agent re-interviewed the farmers with whom this was the case. He also got into the habit of reviewing the survey form immediately after an interview to check for missing information. This agent's completed interview forms were the most detailed of the study, yet he was the first agent to complete all 35 interviews.

It was not until after the interviews were completed and the variable costs for the sample farmers were being calculated in the central office, that problems began to appear. It was discovered that many forms contained the exact same activities all written down in the same order. Also, most of the parcel sizes were the same and so were the prices paid for inputs and services. The result was that there was very little difference in the total variable costs per tarea between sample farmers. On the basis of these results, it was determined that

the researcher should return to the study and re-visit several of the sample farms.

Four farmers were picked at random from the Mao sample list and were visited by the researcher unaccompanied by the credit agent. These farmers were asked several questions from the survey form and later their responses were compared with those that appeared on the completed survey form. The results of this comparison appear below:

	Information from the completed survey form	Information from the researcher's inquiry
Farmer #1		
Age:	43	52
Tareas of rice land:	50	40
Other crops:	20 tareas of plantain	none
Seedbed:	planted 3 tareas	purchased 3 tareas from another farmer
Yield:	351 kilograms per tarea	220.5 kilograms per tarea
Other:	The names of the family members on the completed survey form were not correct. The farmer indicated that he had no family members whose names or ages corresponded to those on the survey form.	
Farmer #2		
Age:	26	25
Seedbed:	planted 2 tareas	purchased 2 tareas from another farmer
Double Crop?	no	yes
Yield:	148.5 kilograms per tarea	315 kilograms per tarea

	Information from the completed survey form	Information from the researcher's inquiry
Farmer #3		
Age:	48	52
Family members involved in rice production:	0	1
Other crops:	40 tareas of plantain	70 tareas of plantain
Seedbed:	3.5 tareas	5 tareas
Yield:	315 kilograms per tarea	103.5 kilograms per tarea
Farmer #4		
Age:	49	60
Tareas of rice land:	50	30
Seedbed:	3 tareas	2 tareas
Seed rate:	9.1 kilograms per tarea	8.2 kilograms per tarea
Yield:	369 kilograms per tarea	270 kilograms per tarea

In each of the four cases, the identification number[6] of the farmer was checked against the identification number that corresponded to the farmer's name on the sample list. In each case the numbers corresponded. More importantly, each farmer stated that he had not been interviewed by a Bank credit agent about his production costs.

Later, the credit agent for the study was confronted with the discrepancies. He claimed that he had honestly completed every interview. He did add, however, that sometimes when he was unable to locate the

---

[6]Every Dominican citizen is required by law to have an identification card (cédula).

farmer whose name appeared on the sample list, he would interview a member of that farmer's family or even a hired laborer who worked for the farmer. He admitted that the data obtained from these secondary sources might be incorrect. Upon questioning about his interviewing techniques, he noted that if a farmer was unable to recall a piece of information, he would write down his own estimation based on his knowledge and experience as a credit agent. The agent readily agreed to conduct as many re-interviews as necessary to clear up the problem. The branch Bank manager was informed of the situation and agreed that some of the sample farmers should be re-visited to clear up any discrepancies in the data.

In the meeting between the credit agent and the researcher, a list was drawn up of the interviews that had been conducted with a non-family member. It was agreed that these interviews would be re-done with the direct participation of the farmer whose name appeared on the sample list. There was further discussion about the four farmers who had been re-visited by the researcher. In one case, it was discovered that there were two farmers with almost identical names in one village. One of these farmers was on the sample list and it was later deduced that the agent had interviewed the other farmer with the similar name.

A farmer was chosen from the sample list and was visited by the researcher and the credit agent. The completed survey form indicated that this farmer had been interviewed on 6 February 1980. The farmer confirmed that the agent had indeed interviewed him around that date, but when he was asked some of the questions from the interview, his responses were generally quite different from those that appeared on the survey form. The most significant differences were the following:

1. The farmer stated to the researcher that he had 60 tareas of rice instead of the 40 tareas that appeared on the form. He also stated that he had 30 tareas of plantain, but no other crops were listed on the completed form.
2. The survey form indicated that the farmer had planted two tareas of seedbed and had purchased a variety of agro-chemicals for it. The farmer explained to the researcher, however, that he had purchased a mature seedbed when he was ready to transplant instead of growing one himself. As a result, he had no seedbed preparation nor agro-chemical expenses.
3. The rice yield on the survey form was listed as 325 kilograms per tarea. The farmer informed the researcher that his output was only 111.5 kilograms per tarea.

Other differences were also found between the data on the survey form and information provided by the farmer during the visit by the researcher and the credit agent. One item that did seem to indicate that the interview on 6 February had taken place was an RD$400 per year rent expense that appeared on the survey form for some land that the farmer rented with a group of other farmers. This type of expense had not been encountered on the other forms, but it was confirmed by the farmer during this second interview as being an expense that he had incurred.

After the interview, the credit agent was confronted about the data discrepancies between the interview that had just been completed and the information on the survey form. His only response was that perhaps the farmer had not clearly understood that he was supposed to provide information on the last year's crop. During the interview with

the researcher and the agent, however, the farmer seemed very clear about which crop was being referred to.

The researcher and the credit agent next attempted to locate one of the four farmers the researcher had re-visited earlier. The farmer was not at home but his son was able to provide some information. He indicated that a man who worked for them had mentioned talking with a Bank agent several weeks earlier. After discussing some of the items on the completed survey form with the son, it was determined that most of the data that the worker had provided was incorrect.

At the end of the day, the credit agent commented that often farmers will give different responses depending on who is conducting the interview.

The next day another farmer was chosen from the sample list and re-interviewed. This was another case where the credit agent claimed to have interviewed a worker rather than the farmer himself. The differences between the two interviews appear below:

	Credit agent's interview with worker on 6 Feb.	Re-interview with farmer on 20 March
Age:	45	85
Family labor:	0	1
Tareas of rice land:	50	17
Double crop?	no	yes

The remainder of the interview was not completed due to the farmer's advanced age. He was unable to remember much about his previous rice crop and had difficulty understanding the questions being asked.

It did appear as though the agent interviewed someone about the rice crop because the farmer remembered one of his workers mentioning it.

After the interview, the credit agent was again confronted with the differences in the data. He finally admitted that, in most cases, the variable cost estimations were his rather than the sample farmers'. He said that instead of asking the farmer what product he used, how much of the product he used, and how much he paid for it, he would put the question to him in the following way:

"Did you use Azodrin?"

"...and you used about 1/2 liter, right?"

He said that sometimes he did not even bother to ask the farmers about prices paid for inputs and services since he had a good idea of these prices himself.

The agent was further questioned about other discrepancies. It was noted that some farmers who had been re-visited by the researcher indicated that they had purchased a seedbed from another farmer instead of planting one themselves. The agent explained this discrepancy by pointing out that the Bank does not loan money for the purchase of a seedbed. Therefore a farmer might tell a credit agent that he intends to plant a seedbed even though in reality he might purchase one. He can then buy the seed in accordance with his agreement with the Bank and later sell it. He then uses the money from the seed sale to buy a seedbed at a later date. It could be that since the farmer deals directly with the Bank in Mao, he might be reluctant to admit to a credit agent from that branch that he had purchased rather than planted a seedbed. If the agent was indeed suggesting probable answers to the

interview questions, then the farmer might very well have found it easier to go along with what he was saying rather than having to admit that he had done something of which the Bank might not approve. Discrepancies in land size between the original interview and the re-interview were attributed by the agent to the tendency of farmers to borrow money for more land than they actually intend to plant.

The researcher and the agent together sorted out the interview forms that contained erroneous or misleading information. It was also agreed that the agent would conduct five more interviews so that some analyses could be performed on the data from Mao.

After the investigation into the problems in Mao, it was concluded that the credit agent did not intentionally forge the data for the interviews. Instead, he was more concerned with producing data that he believed would please the researcher and be broadly representative of farmers such as those in the sample.

The interviewing experiences in all five study areas, and especially in the province of Valverde-Mao, clearly illustrate the difficulties of implementing survey research and the extreme importance of training and supervising the interviewers.

CHAPTER IV

RESULTS

Interviews with Credit Agents

The previous chapter explained that prior to the commencement of farmer interviews, several meetings were held with each credit agent assigned to the study. At some point during these meetings, the agents were asked the following four questions:

1. In general, where do credit agents get the information they use to complete the investment plan?
2. Do the credit agents use published budgets[1] for estimating production costs?
3. Do the agents use standard production systems when they determine the composition of the investment plan, or do they try to incorporate the goals and ideas of the individual farmer?
4. How much importance is placed on the investment plan by the credit agent and by the farmer?

With regards to the first question, two of the five agents identified three sources of information. In order of importance these sources were: (1) farmers, (2) the agent's own estimations based on his knowledge and experience, and (3) informal surveys of retail outlets and farm machinery operators. Two other agents were less specific

[1] Budgets are published by various agencies in the Dominican Republic such as the Dominican Agrarian Institute (Instituto Agrario Dominicano), the Secretariat of Agriculture (Secretaría de Estado de Agricultura), and the Center for Agricultural Development (Centro de Desarrollo Agropecuario).

about where they obtain their information while the fifth agent claimed to use published budgets when completing an investment plan.

Four of the five credit agents stated that they use published budgets only as general guidelines in the preparation of investment plans and that they rely more on their own experience and information provided to them by farmers in determining production costs. Only the one agent mentioned above actively uses budgets in his preparation of investment plans. This agent was of the opinion that the budgets accurately reflect price and quantity variables in his area.

All five of the credit agents indicated that they try to incorporate the goals and ideas of farmer-borrowers into the formulation of the investment plan as much as possible. Several agents pointed out, however, that they are limited in this endeavor by the high proportion of clients per agent in most of the Bank branch offices. One agent noted that the time spent on the formulation of an investment plan is a function of the amount of funds the farmer intends to borrow; in other words, the larger the loan, the more time that is likely to be spent by the credit agent and the farmer in developing the investment plan.

The five credit agents agreed that the investment plan (or something like it) is necessary if the Bank is to have a basis for its financial planning. One agent suggested that the investment plan should be reorganized to reflect differences in costs, soil types, technology levels, and so forth. The value of the investment plan for the client was questionable. One agent noted that the plan might be beneficial to the farmer in that it provides him with some idea of how much of his production costs he must obtain from sources other than the Bank. Another credit agent, however, observed that the small Dominican

farmer is too disorganized and ignorant to derive any benefit whatsoever from the investment plan.

Organization of the Data

After all of the farmer interviews were completed, both the variable costs and fixed costs were calculated on the individual interview forms. Next, all of the cost and other information from the interview forms were transferred onto two tables for each branch office. One table contained the production cost data for each sample farmer in a particular branch office tabulated according to technology. Originally, six different technologies were identified for rice production. These technologies were classifed as follows:

A - Irrigated rice planted directly

B - Irrigated rice transplanted from a seedbed cultivated by the sample farmer

C - Irrigated rice transplanted from a purchased seedbed

D - Dryland rice planted directly

E - Dryland rice transplanted from a seedbed cultivated by the sample farmer

F - Dryland rice transplanted from a purchased seedbed

Later analysis showed that the only significant difference in technology was between irrigated and dryland rice.

The other table incorporated the total production cost figure from the first table plus the additional data obtained in the interviews such as the age of the farmer, his average rice yields, the amount of time required to complete the interview, and so forth. This

information was tabulated according to the methodology used for the interview as follows:

G - Production cost estimation made by the credit agent in the Bank branch office

H - Representative farmers chosen by the credit agent

I - Sample farmers chosen at random from the population list

The following analyses were made using the information contained in the two tables.

Comparison of Technologies

The purpose of comparing and combining the various production technologies originally identified in the study was to establish relatively homogeneous sample sets that could be applied to the analysis of the three alternative data collection methodologies. The first statistical test related the average per tarea production costs in each of the study areas for irrigated rice planted directly and irrigated rice transplanted from a seedbed.[2] This comparison appears in Table 1.

In this test the hypothesis was that a difference exists at the 5 percent level of significance[3] between the two technologies. The rejection region for a statistical test at this level is 2.776. The t-statistic obtained was -1.54 resulting in the rejection of the

[2]The purchase of a seedbed versus a seedbed that had been cultivated by the sample farmer himself was rejected as a distinct technology. Only seven cases (4.09 percent of the total interviews) were encountered in which a farmer had purchased a seedbed; six in Mao and one in San Francisco de Macorís.

[3]The 5 percent and 1 percent significance levels are standard yet arbitrary critical levels. Since the cost of a Type I statistical error was low in this study, the 5 percent level was used. If the Agricultural Bank was prepared to make policy changes based on the results of the study, then the 1 percent significance level might be more appropriate.

TABLE 1

AVERAGE TOTAL PRODUCTION COST PER TAREA FOR IRRIGATED RICE PLANTED DIRECTLY AND IRRIGATED RICE TRANSPLANTED FROM A SEEDBED

	Irrigated Direct Plant	Irrigated Transplant
Mao	RD$51.46[a]	RD$53.32
Nagua	39.04[b]	52.10
San Francisco de Macorís	46.97	52.20
La Vega	49.39	50.42
Cotuí	58.21	56.57

[a]Officially, one Dominican Peso (RD$ 1) is equal to one U.S. Dollar.

[b]The low cost for irrigated rice planted directly for this province is probably not representative. Only two sample farmers were encountered who employed this technology.

hypothesis that there is a significant difference between irrigated rice planted directly and irrigated rice transplanted from a seedbed. This result allowed for the two tested technologies to be combined into one technology for irrigated rice.

In a further effort to reduce the number of technologies, the next statistical test compared the difference between irrigated rice and dryland rice. The results from this test appear in Table 2.

Again the hypothesis was that there is a cost difference at the 5 percent level of significance between irrigated and dryland rice. The resulting t-statistic was 5.89 which is significant at the test level. However, out of a total sample of 171 farmers, only 19 (or 11 percent) planted their rice under dryland conditions. Due to this small representation in the sample, it was concluded that the dryland rice

TABLE 2

AVERAGE TOTAL PRODUCTION COST PER TAREA FOR IRRIGATED AND DRYLAND RICE IN EACH STUDY AREA[a]

	Irrigated	Dryland
Nagua	RD$50.91	RD$34.57
San Francisco de Macorís	48.44	31.49
Cotuí	56.78	29.94

[a]In the study areas of Mao and La Vega no cases of dryland rice farming were encountered in either the randomly selected sample of farmers or in the representative farmers chosen by the credit agent.

technology is not representative of the majority of rice producers in the five study areas. Therefore, only the sample farmers who employed the general technology of irrigation will be included in the following analyses.

Comparison of Methodologies

The most important analyses with respect to the objective of the study were those that compared the results from testing the three alternative data collection methodologies described in Chapter III. Several analyses were performed using a completely randomized one-way analysis of variance.[4] The first and most important analysis compared the total production cost data obtained from testing each methodology. In addition, the interviews in which the researcher accompanied the credit agent were contrasted with the interviews conducted by the agent himself. Table 3 shows the F-ratios that were obtained when the total

[4]Since the sample size for each methodology tested was different, a completely randomized experimental design was applied to the analysis, rather than a randomized block design or a Latin square design.

per tarea production costs for the data collection methodologies were compared in a one-way analysis of variance.

TABLE 3

ONE-WAY ANALYSIS OF VARIANCE: TOTAL PER TAREA PRODUCTION COST DATA OBTAINED FROM TESTING THREE ALTERNATIVE DATA COLLECTION METHODOLOGIES

	Critical F Value (α=0.05)[a]	Observed F Value[b]
Mao	2.95	0.40
Nagua	3.13	4.03
San Francisco de Macorís	2.92	0.16
La Vega	2.90	2.42
Cotuí	2.95	3.25
All Offices	2.67	3.99

[a]The 5 percent significance level is a standard, arbitrary test level for F-tests.

[b]Observed values are rounded to two decimal places.

The data obtained from the branch offices of Mao, San Francisco de Macorís, and La Vega show no significant differences with respect to the three alternative data collection methodologies. The data from Nagua and Cotuí, on the other hand, do indicate a significant difference between the tested methodologies. Also, when the data from all five offices are combined according to methodology, a significant difference between the methodologies is apparent.

These results do not provide conclusive evidence, but they do indicate important differences between the methodologies used to

collect production cost data from farmers. What is more, even where the overall F-test is significant, it provides no information about the differences between specific methodologies. For this reason, a series of nine a priori contrasts between mean total per tarea costs obtained from testing each individual methodology, plus several combinations of methodologies, were tested.[5] The significant contrasts appear in Table 4.

Three important trends are evident in the contrast analysis. Each of these trends involve the credit agent's estimation of total production costs and at least one other alternative data collection methodology. In Contrast 1, the credit agent's estimation is compared with the total cost data obtained from the representative sample farmers chosen by the agent. In three of the five offices (60 percent) there is a significant difference between the two methodologies. Contrast 2 compares the credit agent's estimation with the randomly selected sample of farmers. In this contrast, four out of five offices (80 percent) reveal a significant difference in production costs obtained from testing the two methodologies. Finally, when the agent estimation is compared with both the representative and random sample of farmers, three out of five offices (60 percent) showed a significant difference. All other comparisons were either insignificant at the 95 percent test level or were only significant in one out of five offices (20 percent).

It is interesting to note that credit agents are matched with farmer-borrowers in their areas through the arbitrary process of loan applications; a process that is similar to drawing a random sample of

[5]Included within these nine contrasts are the random interviews at which the researcher was present and the interviews that the agent conducted alone.

TABLE 4

A PRIORI CONTRASTS[a] OF TOTAL COSTS WITH SIGNIFICANT DIFFERENCES BETWEEN METHODOLOGIES AND GROUPS OF METHODOLOGIES SHOWN FOR EACH OFFICE

Contrasts	Mao		Nagua		SFM		LV		Cotuf	
	cv[b]	ov[b]	cv	ov	cv	ov	cv	ov	cv	ov
1. Agent Estimation contrasted with Representative Sample			2.26	4.90	2.60	3.88			2.78	5.49
2. Agent Estimation contrasted with Random Sample	2.16	2.53			2.06	2.96	2.23	2.49	2.57	3.21
3. Representative Sample contrasted with Random Sample, Researcher present										
4. Representative Sample contrasted with Random Sample, Agent alone									2.37	3.34
5. Representative Sample contrasted with Random Sample (Researcher present + Agent alone)									2.37	2.76
6. Agent Estimation contrasted with Representative and Random Samples combined			3.02[c]	3.09	2.08	4.68			2.31	5.85
7. Representative Sample contrasted with Agent Estimation and Random Samples combined									2.45	3.65
8. Random Sample contrasted with Agent Estimation and Representative Samples combined					2.26	2.55				
9. Random Sample, Researcher present contrasted with Random Sample, Agent alone										

[a]The Statistical Package for the Social Sciences (SPSS) computer program provides both a "pooled" and a "separate" variance estimate for the Student-t statistic. The separate variance estimate is used when there is reason to believe that the homogeneity of variances assumption has been violated [26]. A test for homogeneity of variances can be made with Cochran's C statistic, where $C = \frac{s^2 \text{ largest}}{\Sigma s^2}$ with parameters k and n-1 [40]. The SPSS ONEWAY sub-program prints out the C statistic. In each of the analyses, the observed value of C exceeded the critical value at $\alpha = 0.05$ resulting in the rejection of the hypothesis that variances in mean per tarea total costs are homogeneous. Therefore, the separate variance estimates were used in the contrast analyses.

[b]cv = critical value; ov = observed value.

[c]Interpolated t-value.

farmers and assigning them to a credit agent. The third alternative data collection methodology, in which farmers were selected at random, was designed to correspond to such a process. The fact that four out of five offices revealed a significant difference in cost between the credit agent's estimation and the information obtained from the farmers selected at random, indicates that agents might be better at estimating the production costs of farmers with whom they are familiar, rather than farmers who have been chosen at random. A possible explanation for this trend is that agents are familiar with the past and present farming operations of the representative farmers and therefore have a better idea of their current costs. When farmers are selected at random, on the other hand, the farming operations might be totally unfamiliar to the interviewing credit agent.

Table 5 shows the actual and percentage differences between the per tarea total production costs estimated by the credit agent for each branch office, and the corresponding cost data obtained from the representative and random samples of farmers. Although the data provided by all three methodologies differ widely (from less than a 1 percent difference up to a 40 percent difference), there is not a strong pattern evident that would indicate credit agents tend to consistently over estimate or under estimate production costs. It is interesting to note that, with the exception of the branch office in Mao, the agents' cost estimations are closer to the average costs obtained through random sampling than through representative sampling. This difference is probably due to the wider variation in costs associated with the larger sample size in the third methodology.

TABLE 5

PER TAREA PRODUCTION COST DIFFERENCES BETWEEN THE CREDIT AGENT'S ESTIMATION AND THE AVERAGE COST DATA OBTAINED THROUGH REPRESENTATIVE AND RANDOM SAMPLING

	Agent Estimation	Representative Sample		Random Sample	
		RD$	Δ%	RD$	Δ%
Mao	RD$56.16	RD$55.63	-0.94	RD$52.87	-5.86
Nagua	39.45	47.91	21.44	43.25	9.63
San Francisco de Macorís	50.69	46.80	-7.67	47.59	-6.12
La Vega	52.05	57.97	11.37	48.44	-6.94
Cotuí	48.45	67.97	40.29	51.51	6.32

The evidence from this first analysis of methodologies supports the hypothesis that credit agents' estimations of production costs generally do not coincide with the production cost data supplied by farmers. The reason for these discrepancies might be attributed to several factors. One factor is that a farm business survey, in which farmers are interviewed only once about a crop that they may have harvested anywhere from one month to nine months previously, cannot furnish precise production cost data. Since few farmers keep written records or save their receipts from input purchases, most farmers are forced to rely only on their memories for price and quantity information.

Another reason for the discrepancies between credit agents' estimations of production costs and the production cost information provided by farmers, is that credit agents have access to price information that might not be available to farmers. Such information

would include official price lists published by the Dominican government and information obtained through the credit agents' informal surveys of retail outlets.[6]

Finally, the degree of variability attributable to the differences in sample sizes between the agent's production cost estimation for each branch office (n=1) and the cost information provided by the farmers who are served by that office (n=35) must be considered when the two sets of data are compared. All of these factors make it difficult to conclude that any one methodology is "better" than another methodology for obtaining reliable cost of production information.

Several additional F-tests and contrast analyses were performed using rice yields per tarea, tareas of rice land,[7] and total interview time[8] as the dependent variables.[9] The purpose of these analyses was to determine if the three dependent variables displayed the same trends as the total cost variables.

With respect to rice yields, there was no significant difference in the F-ratios between methodologies for any of the offices individually, nor for all offices combined, at the 95 percent test level. The

---

[6]It is possible that input price information gathered by credit agents through surveying retail stores might not be representative of the actual prices charged to farmers for those inputs. This is especially true of inputs for which the government has established a price ceiling.

[7]Tareas of rice land refers to the share of total farm land devoted to rice production for each sample farmer.

[8]Total interview time included traveling time, time spent waiting or looking for the sample farmer, and the time required for the interview itself.

[9]Since these variables are not as important to the analysis as total production cost, their corresponding F-tables and contrasts appear in Appendix 2.

yield contrasts were similar to the total cost contrasts. Three out of five (60 percent) of the contrasts were significant when the agent's estimation was compared with the yield data from the representative samples, when the agent's estimation was compared with the data obtained from the randomly selected farmers, and when the agent's estimation was compared with the data from the representative and randomly selected farmers combined. All other contrasts were either insignificant at the 95 percent test level or were only significant in one out of five offices (20 percent).

Although the above results tend to support the hypothesis that credit agents' estimations of yields differ from the farmers' estimations, one important fact that must be considered is that there is no standard weight measurement for rice in the Cibao Valley. Farmers generally quote yields on a per sack basis. The volume and weight of a sack of rice can vary up to 100 percent between provinces. Weight can also vary between and within farms depending on the moisture content of the rice when it is harvested. Because of these significant measurement discrepancies, farmers had to be asked what they thought an average sack of rice from their crop weighed in kilograms. Such estimations were difficult for many farmers, and they often had to ask the interviewing agent what the average weight of a sack might be. Therefore, it is difficult to conclude that the contrasts for rice yields provide reliable information about the differences between the data collection methodologies.

The F-ratios for total rice land were insignificant within all five offices, but were significant when the data from all offices were combined. The significant contrasts that appeared in at least two out

of the five offices were the following: (a) the credit agent's estimation compared with the representative sample (four out of five offices); (b) the agent's estimation compared with the random sample (two out of five offices); (c) the representative sample compared with the random sample when the researcher was present (two out of five offices); (d) the agent's estimation compared with the representative sample and random sample combined (all five offices); and (e) the random sample compared with the agent's estimation and the representative sample combined (three out of five offices).

Again, these results add support to the hypothesis that the information estimated by the credit agent in the investment plan is not representative of farmers in the area; this support is especially strong when the agent's estimation is compared against the combined representative and random samples. The data do not, however, indicate a bias towards either the larger rice operations or smaller operations within the size limitations defined for the population. Table 6 shows the actual and percentage differences in rice land between the agent's estimation and the other two methodologies for each office and all offices combined. No distinct patterns are apparent in the table which would indicate that credit agents tend to be biased towards a specific size category of rice farm in their estimations. In two offices, the average amount of rice land for the representative and random samples was lower than the amount estimated by the agent. The other three offices consisted of somewhat larger rice operations than those estimated by the credit agent. Table 7, on the other hand, does reveal the tendency of credit agents to select somewhat larger farmers when they are allowed to choose a representative sample; when the agents are

restricted to selecting farmers randomly, the size of the rice operations are apt to be smaller.

TABLE 6

ACTUAL AND PERCENTAGE DIFFERENCES BETWEEN RICE LAND: CREDIT AGENT'S ESTIMATION VERSUS THE REPRESENTATIVE AND RANDOM SAMPLES

	Agent Estimation	Representative Sample		Random Sample	
		Tareas	Δ%	Tareas	Δ%
Mao	50	47	-6.00	43	-14.00
Nagua	40	47	17.50	48	20.00
San Francisco de Macorís	40	56	40.00	44	10.00
La Vega	60	40	-33.33	33	-45.00
Cotuí	30	45	50.00	36	20.00
All Offices	44	47	6.82	40	-9.09

TABLE 7

ACTUAL AND PERCENTAGE DIFFERENCES BETWEEN RICE LAND: REPRESENTATIVE SAMPLES VERSUS RANDOM SAMPLES

	Representative Sample	Random Sample	
	Tareas	Tareas	Δ%
Mao	47	43	-8.51
Nagua	47	48	2.13
San Francisco de Macorís	56	44	-21.43
La Vega	40	33	-17.50
Cotuí	45	36	-20.00
All Offices	47	40	-14.89

The final dependent variable tested was the total time required for each interview. The F-test revealed a significant difference between methodologies for the office of Cotuí; F-tests for the other offices and the five offices combined were insignificant at the 95 percent test level. In the total time analysis, the agent's estimation has no meaning for at least two reasons. First, time variables are not currently estimated by credit agents and therefore they lack any background upon which to base such estimates. Secondly, the purpose of testing time variables was to estimate the actual cost to the Bank of employing one methodology instead of another. Since the credit agents' estimations did not involve any actual cost, there was no need to include them in the analyses. The reason for conducting any contrasts at all with total time variables was to determine if there were significant cost differences to the Bank between allowing the agent to select representative farmers and requiring him to interview only randomly selected farmers.[10]

The only contrast that contained more than one significant case (and did not involve the agent's own time estimate) was the contrast in which the total times required for the representative samples were compared with the total times required for the random samples conducted by the credit agent on his own. Only two out of the five offices (40 percent) displayed a significant difference; and among those offices, part of the difference could be attributed to the presence of the researcher

[10]The cost to the Bank of employing either representative or random sampling was arrived at by establishing how much it would cost the Bank to hire someone with training and salary levels comparable to a credit agent and also by estimating per interview vehicle costs based on the Bank's records of gas, oil, and maintenance expenses. These figures were summed and then multiplied by the actual total times to arrive at an RD$ cost for all interviews.

during the interviews with representative sample farmers, and the researcher's absence during the random interviews.

The results of the contrast analysis for total interview time indicate that it is no more expensive for the Bank to employ a random sampling methodology than a methodology whereby the credit agents are allowed to select representative samples. The results also imply that credit agents do not necessarily select representative farmers who live near the Bank branch office. Table 8 summarizes the average per interview cost to the Bank of both the representative and random sampling methodologies, along with the percentage differences between the methodologies.

TABLE 8

AVERAGE PER INTERVIEW TOTAL COST[a] TO THE BANK: REPRESENTATIVE VERSUS RANDOM SAMPLES

	Representative Sample	Random Sample	
	RD$	RD$	Δ%
Mao	RD$2.38	RD$3.40	42.86
Nagua	2.48	2.94	18.55
San Francisco de Macorís	2.05	2.37	15.61
La Vega	1.69	1.54	-8.88
Cotuí	2.28	2.47	8.33

[a]Total cost included the cost of the agent's time and the operational costs of the Bank vehicle.

Several summary observations can be made about the results of this part of the study. First, and most importantly, the results support

the hypothesis that cost estimations by credit agents do not accurately reflect the actual costs faced by farmer-borrowers. If this conclusion is accepted, then the case can be made that the Bank should employ some other methodology or combination of methodologies for estimating production costs. Representative sampling and random sampling were two other methodologies that were tested in the study. In only one office was there a significant difference in the cost data obtained by employing one of these methodologies over the other. No biasing with respect to the size of farmers' rice parcels was evident when credit agents were allowed to select representative farmers. Finally, there was no significant difference in the cost to the Bank of employing one methodology over another.

As is the case with most survey data, other factors not accounted for in the analyses may have affected the results. These factors include the data collection problems described in the previous chapter, the fact that the researcher conducted the first three or four interviews in each of the five areas, and the possibility that the quality of the interviews conducted by the credit agents deteriorated over the course of the study.

CHAPTER V

CONCLUSION

The data collection methodologies tested in this study were limited to farm business surveys, involving random and purposive sampling, and credit agent estimations. The object of these methodologies was the measurement of production costs faced by a population of farmers in one geographical region of the Dominican Republic. The purpose of testing these methodologies was to compare the Agricultural Bank's current method of estimating production costs, as represented by the investment plan, with an alternative methodology whereby farmers were interviewed directly about their production costs.

The limitations of both the investment plan and farm business surveys were discussed in several parts of the paper. Despite these limitations, however, several significant trends emerged from the comparisons of methodologies; the most important was that by estimating production costs in the investment plan, the Bank might not be accurately representing the actual production costs faced by its farmer-clients. The consequences of under- or over-estimating production costs in the investment plan can have profound effects on both the Bank and the client. For example, if the Bank overestimates production costs in the investment plan, then too much money might be loaned for certain activities or inputs which can result in some degree of negative marginal productivity. On the other hand, if costs are underestimated in the investment plan, then the bank might not be loaning enough for certain

activities which could force the borrower into the informal credit market if he wants to maintain efficient production levels. Either of these situations can adversely effect the farmer's ability to repay his loan.

The interviews that were carried out in conjunction with the farm business surveys also provided useful insights into the process of interviewing small farmers. Most farmers experienced little difficulty with the open-ended questionnaire format or with the chronological listing of activities. Certain questions and concepts, however, proved difficult for the farmers. As was noted earlier, many farmers were unable to place a market value on their land. Farmers also encountered difficulty in recalling the details of their last rice crops such as the labor coefficients (i.e., the number of days worked on a specific activity, the number of people employed in the activity, and so forth), input prices, whether family or hired labor participated in certain activities, and the total amount of time spent irrigating the crop. Most importantly, though, the farmer interviews demonstrated the importance of adequate training and supervision of the data collectors.

Implications for the Small Farm Credit Profitability and Repayment Project

It was indicated in Chapter I that the research undertaken for this study is just one aspect of the Small Farm Credit Profitability and Repayment Project. It is important, therefore, to discuss the results of the present study in terms of the overall goals of the Project.

It has been proposed by the Project that the Agricultural Bank, in conjunction with the Secretariat of Agriculture (SEA), develop a systematic procedure for collecting production cost data for all major crops in the Dominican Republic. These data would be collected and organized jointly by the two institutions, and would be published as budgets for use by SEA extensionists and Bank credit agents. These budgets would be sub-divided into the regions in which the crops are produced and also according to technology levels.[1] All costs would be calculated on a per tarea basis, and the data in the budgets would be updated at least once a year.

The proposal for replacing the investment plan with a series of enterprise budgets stems from the observed cost inefficiencies involved in developing a plan for each loan, no matter how many Bank loans the farmer might have had previously. Credit agents have indicated that it can take anywhere from one half hour up to several hours to complete an

---

[1]Technology levels refer to the use of purchased inputs (high, medium, and low levels) and the types of land preparation (manual, animal, semi-mechanized, and mechanized).

investment plan. It is easy to understand how an agent could quickly develop a backlog of investment plans, especially considering the high ratio of clients to agents in most offices.[2] Such a backlog could create significant bottlenecks during periods when many farmers are applying for loans. The result could be increased transaction costs for farmers and, possibly, failure by the Bank to deliver credit when it is needed. The results from the present study indicate that not only is the investment plan inefficient, but it may be significantly inaccurate in reflecting production costs.[3]

The methodologies that have been developed to collect the data for the enterprise budgets would involve both farmer interviews and estimations by Bank credit agents. Farmer interviews would be used to establish the basic cost structure for each crop in a region. If a technology change or a change in crop variety implied one or two changes from the basic budget that had been developed for that crop and region, then the credit agent would estimate the quantity and cost variables for those changes. If more than two changes were involved

---

[2]Alternatively, the agent could simply create one investment plan for all farmers regardless of the differences that might exist between farming operations.

[3]One possibility that has not been explored in this paper but might warrant future consideration is that the investment plan is used by the Bank to ration credit. In other words, the amounts loaned for various production activities might be dictated by the Bank's shortage of loanable funds rather than by empirical evidence on production costs. If such rationing is indeed an "unwritten" Bank policy, then this could account for some of the discrepancies between the credit agent's estimations of production costs and the data obtained from sample farmers in the survey. Of course there is no guarantee that production cost budgets would not also be used as a rationing device since it is unlikely that the Bank would loan money for the full cost of each activity in the budget.

from the original budget, then a new budget (or budgets) based on additional farmer interviews would be developed.

For the interviews, credit agents would be allowed to select a representative sample of farmers whose production systems displayed the desired characteristics in terms of crops and technologies. The results for the present study indicated that selecting a purposive sample rather than a strictly random sample should not seriously effect the data. An open-ended format, like the one developed for this study would be used in the questionnaire, and the sample farmers would be asked to describe their production activities in chronological order.

Perhaps the most significant contribution that the present study has made to the proposed new budget system, is to stress the importance of adequate training and supervision of the data collectors. A series of training seminars were conducted from May through August of 1980 in each of the agricultural zones of the Dominican Republic in order to instruct credit agents in data collection techniques and provide them with the opportunity to interview several farmers under the supervision of Project personnel. Much of the training materials that were developed for these seminars were based on the experiences of testing the three alternative data collection methodologies in the Cibao Valley several months before.

Broader Implications of the Study

This paper has isolated and examined one small aspect of the large and complex problem of increasing the productivity of small farmers in the Dominican Republic. Many would argue that data collection

plays no role at all in bettering the lot of the small farmer or improving the operations of a credit institution. It is true that, for the farmer, improvements in data collection methodologies cannot contribute directly to the resolution of the pressing problems of low productivity levels, inappropriate or unprofitable technologies, inaccessibility to formal credit, discriminatory interest rates, or general poverty. And likewise for the credit institution, improved data collection methodologies can offer no panacea for the problems of delinquency, liquidity, and inflexible credit policies.

Indirectly, however, the way in which data are collected and how those data are used can have profound effects on the problems mentioned above. In Chapter II it was suggested that Bank administrators and planners adopt a holistic attitude towards data collection whereby policy formation is based on information provided by farmer-borrowers. A system of follow-up interviews would keep the Bank up to date on how effective those policies are once they are enacted. This type of system provides an almost constant line of communication between farmers and the institution; it also provides a means of evaluating whether or not the policies of the institution are meeting the goals of the farmers. It is these policies, then, that furnish the means by which problems, like those listed above, can be resolved. When data ceases to be an effective transmittal mechanism (for what ever reasons) and the communication line breaks down, then policies begin to become fragmented and farmers find that their goals and aspirations are ignored.

Obviously, the type of system described above is applicable to any institution working in the area of small farm development specifically and rural development in general. And it is only when all of these

institutions adopt the same attitude towards data collection that real changes will begin to occur in the rural sector.

REFERENCES

1] Banco Agrícola de la República Dominicana.
Ley de Fomento Agrícola.
No. 6186 de fecha 12 de febrero de 1963. G. O. No. 8740 (bis).
Santo Domingo, January 1975.

2] Banco Agrícola de la República Dominicana.
Proyecto de crédito agropecuario: solicitude presentada al Banco Interamericano de Desarrollo (BID).
Santo Domingo, July 1979.

3] Banco Agrícola de la República Dominicana, Departamento de Programación.
Proyecto de crédito agropecuario a ser presentado al Banco Interamericano de Desarrollo (BID).
Santo Domingo, April 1976.

4] Banco Agrícola de la República Dominicana, Departamento de Programación, Sección de Política Crediticia.
Programa de Préstamos 1980.
Santo Domingo, December 1979.

5] Shawki M. Barghouti.
Some cultural constraints in collecting socio-economic information from rural communities.
The Arid Lands Agricultural Development Program, the Ford Foundation, Beirut.
Also see Kearl [23], page 57.

6] Kwadowo Boakye-Dankwa.
A review of the farm loan repayment problem in low income countries.
Economics and Sociology Occasional Paper No. 582, Agricultural Finance Center, Department of Agricultural Economics and Rural Sociology, the Ohio State University. February 1979.

7] Peter M. Cavas.
Development of statistical surveys in Pakistan.
U.S. Department of Commerce, Bureau of the Census, International Statistical Programs Office. June 1965.

8] William G. Cochran.
Sampling Techniques.
John Wiley and Sons, third edition 1977.

9] M. P. Collinson.
Farm Management in Peasant Agriculture: A Handbook for Rural Development Planning in Africa.
Praeger Publishers, 1972.

10] Cristina C. David and Richard L. Meyer.
Measuring the farm level impact of agricultural loans in low income countries: a review article.
Economics and Sociology Occasional Paper No. 602, Agricultural Finance Program, Department of Agricultural Economics and Rural Sociology, the Ohio State University. June 1979.
Paper presented at Workshop on Rural Financial Markets and Institutions, Wye College, Wye, England. 12-14 June 1979.

11] B. M. Desai.
Delivery of credit to rural poor.
Paper presented at Round Table on Adaptation of Administration to Rural Development: Decentralized Management and People's Participation in Poverty-focused Programs, New Delhi. 16-18 August 1978.

12] Thomas M. Dickey.
Monthly report number 11 for the Small Farm Credit Profitability and Repayment Project.
Department of Economics, Colorado State University, Fort Collins, Colorado, 80523. June 1980.

13] Thomas M. Dickey, Manuel Ant. Vásquez C., and Vitalino Peña Nova.
La historia de un cliente "A-1": un estudio de caso sobre las políticas y procedimientos del Banco Agrícola.
Proyecto de Estudios Sobre Crédito Agrícola, Banco Agrícola de la República Dominicana [1980].

14] A. M. El Hadari.
Association with village leaders promotes confidence.
In Kearl [23], pages 53-54.

15] Milton Friedman.
Essays in Positive Economics.
University of Chicago Press, 1953.

[16] Page 5.

17] K. H. Friedrich.
Farm management data collection and analysis system.
Food and Agriculture Organization of the United Nations, 1977.

18] Omer Gucelioglu.
Statistical data collection in rural areas in Turkey.
Paper presented at ADC Conference on Field Data Collection in the Social Sciences: Experiences in Africa and the Middle East, Beirut. December 1974.

19] Raymond F. Hopkins and Robert C. Mitchell.
The validity of survey research in Africa: some propositions.
African Studies Review XVIII(3): 567-575, December 1974.

20] K. E. Hunt.
Agricultural Statistics for Developing Countries.
Oxford University Press, 1969.

21] J. N. R. Jeffers.
Constraints and limitations of data sources for systems models.
In G. E. Dalton, editor, Study of Agricultural Systems, pages 175-186. Applied Science Publishers, London, 1975.

22] T. B. Kabwegyere.
The survey method, participant observations and some East African experiences.
Seminar/Workshop on Field Collection of Socio-economic Data in Developing Countries, Beirut. 8-13 December 1974.
Also see Kearl [23], page 168.

23] Bryant Kearl, editor.
Field Data Collection in the Social Sciences: Experiences in Africa and the Middle East.
Agriculture Development Council, New York, 1976.

24] John G. Kemmeny.
A Philosopher Looks at Science.
D. Van Nostrand, New York, 1959.

25] William Mendenhall.
Introduction to Probability and Statistics.
Duxbury Press, North Scltuate, Massachusetts, fourth edition 1974.

26] Norman H. Nie et al.
Statistical Package for the Social Sciences.
McGraw-Hill Book Company, second edition 1975.

Kenneth C. Nobe and Ronald L. Tinnermeier.
Annual administrative report no. 1 for the Small Farm Credit Profitability and Repayment Project: September 26, 1977-September 30, 1978.
Department of Economics, Colorado State University, Fort Collins, Colorado, 80523. October 1978.

[27] Page 1.

28] D. W. Norman.
Methodology and problems of farm management investigations: experiences from Northern Nigeria.
African Rural Employment Paper No. 8, African Rural Employment Research Network, Department of Agricultural Economics, Michigan State University. April 1973.

29] O. Ogunfowora.
Some sources of reluctance to cooperate.
In Kearl [23], page 167.

30] Oklahoma State University.
Annual review: Small Farmer Credit Project in Honduras.
October 1, 1978-September 30, 1979.
Report presented Sunday, 29 July 1979. Washington State University, Pullman, Washington.

31] Secretaría de Estado de Agricultura, Subsecretaría Técnica de Planificación Sectorial Agropecuaria, Departamento de Economía Agropecuaria, División de Administración Rural.
Metodología de costos de producción 1980.
Prepared with the assistance of the Small Farm Credit Profitability and Repayment Project of the Agricultural Bank of the Dominican Republic.

32] Dunstan S. C. Spencer.
Collecting primary socio-economic data in Africa: some experiences from Sierra Leone.
Unpublished paper, December 1974.

33] Dunstan S. C. Spencer.
Micro-level farm management and production economics research among traditional African farmers: lessons from Sierra Leone.
Rural Employment Paper No. 3, African Rural Employment study, Department of Agricultural Economics, Michigan State University. September 1972.

34] Milton H. Spencer.
Contemporary Economics.
Worth Publishers, second edition 1974.

35] P. V. Sukhatme and B. V. Sukhatme.
Sampling Theory of Surveys with Applications.
Iowa State University Press, second revised edition 1970.

36] Victor C. Uchendu.
Rapid survey techniques for interdisciplinary research.
Paper presented for presentation at the Seminar on Problems of Field Data Collection in Rural Areas of Africa and the Middle East, Beirut. 8-14 December 1974.

[37] Page 2.

38] J. D. Von Pischke and Dale W. Adams.
Fungibility and the design and evaluation of agricultural credit projects.
Paper presented at the Second International Conference on Rural Finance Research Issues, Calgary, Alberta. 29 August-1 September 1979.

39] Thomas E. Weil et al.
Area Handbook for the Dominican Republic.
Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Second edition 1973.
Compiled by the U.S. Department of Defense.

40] B. J. Winer.
Statistical Principles in Experimental Design.
McGraw-Hill Book Company, 1962.

41] W. Y. Yang.
Methods of farm management investigations for improving farm productivity.
FAO Agricultural Development Paper No. 80, Food and Agricultural Organization of the United Nations. Rome, 1965.

APPENDIX 1

SURVEY FORM

código:_____ Empieza_____
Termina_____

PARTE I

INFORMACION SOBRE EL AGRICULTOR Y SU OPERACION DE LA FINCA

1. Nombre del Agricultor:_____ Edad_____
2. Dirección:_____
_____
3. ¿Cuántos años de educación tiene el Agricultor?_____
4. Nombres y edades de los familiares que trabajan en la producción de arroz:

Nombre	Edad
_____	____
_____	____
_____	____
_____	____
_____	____
_____	____
_____	____
_____	____

5. ¿Cuántas tareas de arroz tiene el Agricultor? ____tas.
¿Cuántas tareas de otros cultivos (incluyendo el pasto) tiene el Agricultor?

Cultivos	
a. _____	____tas.
b. _____	____
c. _____	____
d. _____	____
e. _____	____
TOTAL	____tas.

6. Tipo de siembra: Directo___ Transplante___
7. ¿Cuántas siembras de arroz realiza por año?_____

GUIA DE CODIGOS

Columna: COD.

INSUMOS

IA - Insumo provisto por el Agricultor

IC - Insumo comprado en una cooperativa o asociación

ID - Insumo comprado en una tienda o almacén del Gobierno Dominicano (ej., SEA Centro de Venta de Materiales Agropecuarios, Departamento de Semillas, etc.)

IP - Insumo comprado en una tienda o almacén privada

MANO DE OBRA

MA - Mano de obra aportada por el Agricultor

MF - Mano de obra aportada por familiares del Agricultor (no pagada)

MP - Mano de obra aportada por familiares del Agricultor (pagada)

MO - Mano de obra

SERVICIOS AGRARIOS

SA - Avión

SB - Bomba asperjadora de mochila

SM - Motobomba de mochila

SC - Cosechadora

S2 - Tractor de 2 ruedas

S4 - Tractor de 4 ruedas

TRANSPORTE

TC - Caballo

TM - Camión

TA - Camioneta

TG - Guagua

Columna: MES

1 - Enero

2 - Febrero

3 - Marzo

4 - Abril

5 - Mayo

6 - Junio

7 - Julio

8 - Agosto

9 - Septiembre

10 - Octubre

11 - Noviembre

12 - Diciembre

Columna: UNIDAD

D - Día

G - Galón

H - Hora

K - Kilograma

L - Litro

LB - Libra

Q - Quintal

SC - Saco

T - Tarea

PARTE II

COSTOS VARIABLES DE LA PRODUCCION DE ARROZ						
DESCRIPCION DE LA ACTIVIDAD	COD	MES	CANT-DAD	UNI-DAD	PRECIO/UNIDAD	VALOR EN RD$

PARTE II

COSTOS VARIABLES DE LA PRODUCCION DE ARROZ						
DESCRIPCION DE LA ACTIVIDAD	COD	MES	CANT-DAD	UNI-DAD	PRECIO/ UNIDAD	VALOR EN RD$

PARTE III

COSTOS FIJOS MAQUINAS Y HERRAMIENTAS USADAS EN LA PRODUCCION DE ARROZ				
DESCRIPCION DE LA MAQUINA O LA HERRAMIENTA	VIDA UTIL PROMEDIA (EN AÑOS)	VALOR ORIGINAL	VALOR DE SALVA-MENTO	CULTIVOS EN CUALES SE USA

PARTE IV

OTRA INFORMACION SOBRE LA FINCA

1. Rentas o impuestos pagados por año por el terreno usado en la producción de arroz. (Si el agricultor paga rentas o impuestos por todo el terreno de la finca, poner la cantidad total pagada por año):

Descripción	Cantidad
_____	RD$ _____
_____	_____
_____	_____
_____	_____

2. Estimación del Agricultor del valor mercado (por tarea) de su terreno usado en la producción de arroz. (Si el agricultor arrienda el terreno, poner la cantidad pagada por año): RD$_____

3. Estimación del Agricultor sobre el rendimiento promedio de arroz (por tarea),

   en un año normal: _____ sacos

   en un año bueno: _____ sacos

   en un año malo: _____ sacos

4. Precio corriente pagado por saco de arroz: RD$_____

PARTE V

INFORMACION SOBRE LA ENTREVISTA

1. Fecha de la entrevista: _____

2. Tiempo para llegar a la casa de este Agricultor (o de la sucursal o del sitio de la entrevista anterior): _____ min.

   Tiempo gastado esperando o buscando el Agricultor: _____ min.

   Tiempo de la entrevista (de Parte I): _____ min.

   TIEMPO TOTAL _____ min.

3. Distancia aproximada de la sucursal o del sitio de la entrevista anterior a la casa de este Agricultor: _____ km.

4. Tipo de vehículo usado (ej., motocicleta, Safari, Jeep, camioneta, etc.) _____

DESCRIPTION OF SURVEY FORM

Part I of the survey form begins by soliciting information about the farmer such as his name, his age, and his address. The farmer's educational experience is also recorded since at least two researchers have noted that education has a biasing effect on responses [19]. It was originally hoped that more information on the value and general make-up of family labor could be acquired, but such information proved difficult to obtain in a one-visit survey; information on the amount of land devoted to rice and other crops was more easily acquired. Rice in the Dominican Republic is either broadcast directly upon the field or transplanted from a seedbed approximately six weeks after germination. A question appears regarding which of these two methods is used by the farmer. It is also common to double crop rice and therefore a question appears regarding whether or not the farmer plants one or two crops per year.

Part II has a corresponding code guide (Guía de Códigos) on its opposite page. These codes correspond to the column "COD" in Part II and refer to the sources of inputs, labor, agricultural services, and transportation used by farmers. For example, if a farmer planted his own seed from a previous crop, the input code would be "IA." If, on the other hand, he purchased his seed from a commercial dealer, the input code would be "IP." The remainder of Part I follows an open-ended format. This open-ended format was used in the survey principally because the Bank's investment plan follows such a format, but also becuase of the lack of time to derive adequate closed-ended questions.

The first column in Part II refers to a particular production activity. The interviews were structured chronologically around the actual crop schedule so that the first activity would generally be some type of land preparation and the last activity would be the rice harvest. The purpose of the "COD" column has already been explained. "MES" refers to the month in which an activity occurred. This denotation was important for determining the interest charge on capital. "CANTIDAD" corresponds to the amount of product, service, or labor used per tarea. "UNIDAD" refers to unit measurements such as liters, kilograms, tareas, and so forth. "PRECIO/UNIDAD" is the price per unit of input and "VALOR EN RD$" is simply the quantity multiplied by the unit price. All final values are recorded on a per tarea basis.

Part III employs an open-ended format to deal with fixed costs. The first column refers to the description of the machine or tool in question. "VIDA UTIL PROMEDIA (EN AÑOS)" refers to the farmer's estimate of how long a particular machine or tool will last under average conditions. "VALOR ORIGINAL" is the original value of the item and "VALOR DE SALVAMENTO" is the salvage value. "CULTIVOS EN CUALES SE USA" refers to other crops in which the machine or tool is used.

In Part IV information about other costs such as rent and taxes is solicited as are estimations by the farmer of his land value and rice yields in good, bad, and normal years. A question concerning the current market price of rice also appears in this section.

Part V contains the information that was used to calculate the costs of each interview for the Bank. This information includes the time it took the credit agent to arrive at the farmer's residence, either from the Bank office or from the previous interview, the time

spent waiting or looking for the farmer if he was not at home when the credit agent arrived, and the total time of the interview itself. In addition, the approximate distance in kilometers, either from the Bank office or the site of the previous interview is estimated. The type of vehicle (Jeep, motorcycle, and so forth) used by the credit agent for the interviews is also noted.

The survey instrument was designed as a Farm Business Survey. This title implies that farmers are visited only once during a cropping season. Such a survey is less expensive but less accurate than a multiple visit or cost-route type of survey.

APPENDIX 2

F-TESTS AND CONTRASTS FOR RICE YIELDS PER TAREA, TOTAL RICE LAND, AND TOTAL INTERVIEW TIME

TABLE 9

ONE-WAY ANALYSIS OF VARIANCE: PER TAREA RICE YIELDS[a] OBTAINED FROM TESTING THREE ALTERNATIVE DATA COLLECTION METHODOLOGIES

	Critical F Value (α=0.05)	Observed F Value
Mao	2.95	1.00
Nagua	3.13	0.98
San Francisco de Macorís	2.92	0.51
La Vega	2.90	1.09
Cotuí	2.95	0.62
All Offices	2.67	2.36

[a]Rice yields are in kilograms per tarea.

TABLE 10

A PRIORI CONTRASTS OF PER TAREA RICE YIELDS WITH SIGNIFICANT DIFFERENCES BETWEEN METHODOLOGIES AND GROUPS OF METHODOLOGIES SHOWN FOR EACH OFFICE

Contrasts	Mao		Nagua		SFM		LV		Cotuí	
	cv	ov	cv	ov	cv	ov	cv	ov	cv	ov
1. Agent Estimation contrasted with Representative Sample			2.26	4.45					2.78	3.23
2. Agent Estimation contrasted with Random Sample	2.18	5.43	3.18	3.88	2.06	2.69				
3. Representative Sample contrasted with Random Sample, Researcher present										
4. Representative Sample contrasted with Random Sample, Agent alone										
5. Representative Sample contrasted with Random Sample (Researcher present + Agent alone)							2.31	2.39		
6. Agent Estimation contrasted with Representative and Random Samples combined	2.31	4.41	2.78	5.29					2.45	2.67
7. Representative Sample contrasted with Agent Estimation and Random Samples combined										
8. Random Sample contrasted with Agent Estimation and Representative Samples combined							2.12	2.13		
9. Random Sample, Researcher present contrasted with Random Sample, Agent alone					2.06	4.42				

TABLE 11

ONE-WAY ANALYSIS OF VARIANCE: TOTAL RICE LAND[a] OBTAINED FROM TESTING THREE ALTERNATIVE DATA COLLECTION METHODOLOGIES

	Critical F Value (α=0.05)	Observed F Value
Mao	2.95	0.40
Nagua	3.13	0.33
San Francisco de Macorís	2.92	1.07
La Vega	2.90	2.895
Cotuí	2.95	1.00
All Offices	2.67	4.30

[a]Total rice land refers to the share of total farm land devoted to rice production.

TABLE 12

A PRIORI CONTRASTS OF TOTAL RICE LAND WITH SIGNIFICANT DIFFERENCES BETWEEN METHODOLOGIES AND GROUPS OF METHODOLOGIES SHOWN FOR EACH OFFICE

Contrasts	Mao		Nagua		SFM		LV		Cotuí	
	cv	ov	cv	ov	cv	ov	cv	ov	cv	ov
1. Agent Estimation contrasted with Representative Sample			2.62	2.40	2.78	5.71	2.78	5.66		
2. Agent Estimation contrasted with Random Sample	2.20	2.80	2.62	5.77			2.23	7.52		
3. Representative Sample contrasted with Random Sample, Researcher present					2.12	3.01				
4. Representative Sample contrasted with Random Sample, Agent alone					2.78	5.71	2.23	2.23		
5. Representative Sample contrasted with Random Sample (Researcher present + Agent alone)					2.36	4.46				
6. Agent Estimation contrasted with Representative and Random Samples combined	2.13	2.94	2.10	5.71	2.12	4.73	2.15	9.30	2.37	3.13
7. Representative Sample contrasted with Agent Estimation and Random Samples combined					2.57	4.97				
8. Random Sample contrasted with Agent Estimation and Representative Samples combined			2.10	2.23	2.12	3.01	2.15	3.92		
9. Random Sample, Researcher present contrasted with Random Sample, Agent alone										

TABLE 13

ONE-WAY ANALYSIS OF VARIANCE: TOTAL INTERVIEW TIME[a] OBTAINED FROM TESTING THREE ALTERNATIVE DATA COLLECTION METHODOLOGIES

	Critical F Value (α=0.05)	Observed F Value
Mao	2.95	1.59
Nagua	3.13	2.36
San Francisco de Macorís	2.92	0.12
La Vega	2.90	0.35
Cotuí	2.95	3.63
All Offices	2.67	0.43

[a]Total interview time included traveling time, time spent waiting or looking for the sample farmer, and the time required for the interview itself.

TABLE 14

A PRIORI CONTRASTS OF TOTAL INTERVIEW TIME WITH SIGNIFICANT DIFFERENCES BETWEEN METHODOLOGIES AND GROUPS OF METHODOLOGIES SHOWN FOR EACH OFFICE

Contrasts	Mao		Nagua		SFM		LV		Cotuí	
	cv	ov	cv	ov	cv	ov	cv	ov	cv	ov
1. Agent Estimation contrasted with Representative Sample			2.26	7.35						
2. Agent Estimation contrasted with Random Sample					2.06	2.33	2.24[a]	2.24		
3. Representative Sample contrasted with Random Sample, Researcher present										
4. Representative Sample contrasted with Random Sample, Agent alone	2.26	2.52							2.45	2.85
5. Representative Sample contrasted with Random Sample (Researcher present + Agent alone)										
6. Agent Estimation contrasted with Representative and Random Samples combined			3.18	4.76			2.18	2.79		
7. Representative Sample contrasted with Agent Estimation and Random Samples combined										
8. Random Sample contrasted with Agent Estimation and Representative Samples combined										
9. Random Sample, Researcher present contrasted with Random Sample, Agent alone										

[a] Interpolated t-value.