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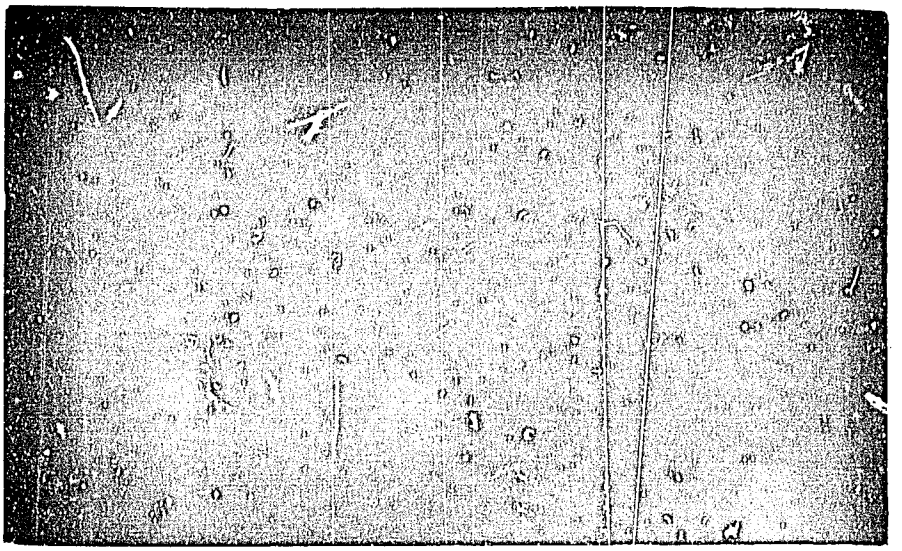

SMALL FARM CREDIT PROFITABILITY AND REPAYMENT PROJECT

Department of Economics
Colorado State University

COLLECTION OF FARM PRODUCTION DATA FOR CREDIT PROGRAMS IN DEVELOPING COUNTRIES

Occasional Paper No. 7

by

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PREFACE

This report is one of a series produced by the Small Farm Credit Profitability and Repayment Project, carried out jointly by Colorado State University and Oklahoma State University under cooperative agreements with the Agency for International Development. The objective of this project was to develop data collection methodologies that credit institutions in less developed countries could use in performing analyses that can lead to improved credit policies and programs and improved loan repayment. Implementation of the methodology, a necessary part of the design objective, involved the design of the organizational and administrative systems required for its use and training of the government employees in the use of the methodology and the operation of the system.

Each university performed the activities with an agricultural development bank in a less developed country. Oklahoma State assigned Dr. Loren Parks to the project with the Banco Nacional de Desarrollo Agricola (BANADESA) in Honduras, between July of 1978 and July of 1980. Mr. Kurt Rockeman also participated in the Honduras project as a research associate. Colorado State assigned Dr. Thomas M. Dickey to the project with the Banco Agricola de la Republica Dominicana (BAGRICOLA) in the Dominican Republic between July of 1979 and August of 1981. Mr. John Longwell also participated in the Dominican Republic project as a graduate research assistant (10 months).

The differences in conditions in each country required different approaches to the major task of designing methodologies for the preparation of enterprise budgets. In Honduras, none of the governmental entities has a continuing responsibility for the preparation of budgets. Thus, the project developed a methodology for use by the Bank (BANADESA), in accordance with its particular needs, capabilities and resources. In the Dominican Republic, a Division of the Secretariat of Agriculture, the Bank (BAGRICOLA) and, to a lesser extent, other assorted agencies had each been preparing budgets using different and non-rigorous methodologies. Thus, the project developed a methodology for a joint Agriculture - Bank budgets system.

By designing methodologies with varying degrees of complexity in different aspects, this joint project provides a variety of design characteristics that another country can combine and adapt in order to produce a system that conforms best to its particular set of conditions (purposes, personnel and resources).

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PART I

INTRODUCTION

A large number of agricultural credit institutions in low income countries (LICs) are faced with two serious problems when lending to small farmers: (1) annual rates of delinquency may approach 20 to 30 percent [4], and (2) high administrative costs often result from handling many small loans. Both of these problems greatly weaken the financial viability of lending institutions. For most such lending institutions, the sum of the administrative, delinquency and other costs usually exceeds revenues. If these institutions are to financially survive at all, they must either reduce these costs and delinquencies (and/or raise revenues) or continually depend on government or outside lending agencies for financial support, leaving them very vulnerable to outside influence. Since nearly all credit programs require some type of data from farmer-borrowers to serve as a basis for their reporting and decision making, it is important to understand what role (if any) data play in the solution of the previously mentioned delinquency and administrative cost problems and to identify the most cost-effective ways of collecting data when needed.

Generally, improved understanding of small farm systems can help reduce loan delinquency but it also may increase administrative costs. Thus, data collection must be consistent with data needs of the institution or program to justify such expenditures.

Data Needs

In the context of a credit program for small farmers, four levels of data uses can be identified. These levels are: (1) farmer, (2) credit agent, (3) program analysis and guidelines, and (4) overall evaluation. Each use level has special data needs.

The data needs of small farmers depend upon their level of managerial sophistication. As farmers receive training in the use of farm plans and analysis, their need for farm level and other data increases.

Some data collection techniques provide few or no data to the farmers themselves. Nevertheless, farmers are asked to respond to time consuming and sometimes difficult or even unanswerable questions which have no meaning and provide no benefits to them--the widely used general, one-visit farm survey has this characteristic. Other data collection methods, like case studies and farm record keeping systems (single visit or multiple visit), may or may not result in data useful for the participating farmer depending upon how such activities are organized. Certainly it is safe to say that past collection systems for farm data in most LICs generally have not been designed for the farmer but rather were designed to meet higher level needs. Where farmer behavioral changes in management and production practices are objectives of a program, the provision of reliable data to the farmer measuring the effects of recommended innovations might be a very effective way of speeding up the adoption of such innovations (assuming they are to his benefit, of course).

A second level of data need in a credit program is at the credit agents' level (the primary focus of this paper). Here the agent wishes to

gather appropriate data to assist him in evaluating the borrower. Traditionally this has meant gathering data on the farmers' assets and net worth, on income flows, and on available collateral. These are then used to evaluate the applicant in terms of credit risk. The actual amount loaned often is based on a "representative" enterprise budget for the activity to be financed. In most cases these budgets are hand prepared, represent a fairly large region, and assume rather high levels of technology and managerial capability. Past LIC credit studies lead to the conclusion that these data collection efforts provide little information on the role and profitability of credit use and even less on the factors affecting loan repayment.

Thus, data collection by the credit agent tends to become formalized, ending up with both the farmer and agent spending considerable time recording data of very questionable use in program guidance and in meeting program goals and objectives. Few credit agents have sufficient and reliable data to classify borrowers by need and potential so that different criteria can be used for loan evaluation, supervision, and collection. Given the credit agent's responsibilities for administration, loan evaluation and approval, loan and technical supervision, and loan collection among others, it is unlikely that he alone can do much to improve the collection and use of farm level data. He must essentially rely upon data supplied by the loan applicant which is often based on recall rather than a systematic collection system. In addition, when working with small farmers it is administratively very difficult to gather such data and put it to use for each individual loan (even if the farmer had excellent recall and honestly reported his situation). Thus, credit agents must depend upon a higher level or supportive unit (either

within or without the financial institution) to provide reliable data and guidelines for borrower selection, classification, credit terms and amounts, purposes, and for identifying crop and livestock enterprises which have the greatest potential for profitable credit use.

The third data need is for program analysis and guidance. Most LDC credit institutions include a planning office, economics department or some other such office which has the overall responsibility for recommending credit allocation among regions, types of farmers, and types of enterprises. These recommendations require farm level data and analysis if the objectives of efficient and productive credit use are to be reached. Data are needed on: (1) returns to investment at the farm level under varying assumptions, (2) repayment capacity of farmers by type and size of operation, (3) the inter-relationships among consumption, production, investment and savings decisions and how risk affects those decisions, (4) the demand for and use of informal credit which can complement or compete with formal credit, and (5) farmers attitudes toward formal and informal sources of credit. Using these data, guidelines on loan terms and purposes can be established for the local credit offices. They also will help in designing allocation criteria consistent with national development objectives or to measure trade-offs associated with alternative allocation policies. The office responsible for this program analysis and guidance needs direct and continual access to farm level data.

Unfortunately, data gathered in general surveys lack sufficient detail, reliability, and timeliness to carry out significant policy analysis and to develop program guidelines on credit allocation. At the same time questionable data for analytical purposes are gathered by the

local credit agents due to extreme time and resource constraints. Thus, it appears logical to design a systematic procedure for continual data collection which primarily serves the analytical needs of this higher administrative level but which also results in data and results useful for the local credit agent and the farmer as well. Certainly no one system alone will meet the data needs at all levels but since the greatest data need exists at the analytical level, a system organized on this basis will have considerable merit.

Credit program evaluation, the fourth use, builds on the data used for analysis but is broader in scope and, as a consequence, requires considerably more data. Operationally, this function may be carried out by the same organization unit which does the analytical and program guidance work. Program evaluation is concerned not only with the profitability and repayment of credit but with the overall impacts of the program and whether or not program goals are being reached. Thus, data on credit use and productivity at the farm level for analytical work would be of use but other data also might be needed: number of loans made and distribution by crop, type and size of farm, office and region; loans per agent and office; loan repayment by crop, farm, office and region; percentage of all farmers and small farmers reached; impact on income distribution; use of non-farm produced inputs; and percentage of output marketed, among others. Because of the special data needs for evaluation, it is unlikely data provided solely by credit agents or through the analytical office would be sufficient. Thus, special one-purpose but perhaps periodic surveys may be the most appropriate data collection system to provide the additional general data needed for evaluation.

Objectives of Paper

This paper focuses primarily on meeting selected data needs at the credit agent level. The objectives are to:

1. Identify alternative approaches to gathering farm level production data for use by credit agents in lending institutions;
2. Review experiences with these approaches in selected LICs, with specific reference to Honduras and the Dominican Republic; and
e. Provide recommendations concerning these data collection approaches for credit agents within lending institutions in LICs.

A credit agent typically (among other duties) must help decide who is to receive credit, for what purposes, how much to lend and when the disbursement and repayment should take place. Requiring these decisions of the credit agent assumes adequate knowledge about production needs and practices for potential and existing borrowers. Usually, the agents' knowledge is based largely on his field experience and observations and to a lesser extent on collected farm level data. At best, a country-wide crop or livestock enterprise budget with little detail in terms of level of technology and input use, timing of activities and costs may be used as a basis for such decisions. Nevertheless, these simple budgets serve as the primary mechanism for setting loan limits, developing investment plans, and establishing dates for disbursements. This paper reviews the experiences with producing more detailed and representative enterprise budgets and farm records within the operational constraints of lending institutions. The results presented are a synthesis of insights obtained from: a review of literature pertaining to the general subject; the experimentation in Honduras and the Dominican Republic; and personal observation and experiences of the authors.

The decision to focus on developing enterprise budgets and farm records for the LIC cooperating credit institutions were for two reasons. First, almost all LIC credit programs use some kind of cost of production or enterprise budget, however simple, crude or outdated, to estimate credit requirements (investment plans) and loan limits. If a more reliable and timely system for generating the budgets were introduced, adoption by the credit institutions might be more likely. The pilot farm record keeping activity was tested to determine if it was a cost-effective mehtod of generating data similar to that provided by the enterprise budgets. Second, the AID funding office indicated through various documents and discussions that these two approaches should be studied during the life of the project.

The paper is organized into four major parts. Part I includes a general discussion of data needs by lending institutions, objectives of the paper, and study limitations. Part II provides a summary of findings from the literature review. Part III analyzes the experiences with farm records and enterprise budgeting approaches in two selected LICs. Finally, Part IV summarizes the general results of the study and presents recommendations on these data collection and analysis approaches for lending instituions in LICs.

Limitations of the Study

The testing of a few approaches to farm level data collection in only two countries, both in Latin America, is not adequate evidence for making strong recommendations on the application of those approaches in other countries. Also, the limited time period for testing and the non-random selection of most of the farmer participants means the findings

and general conclusions should be used with care. The experience in these two countries may not be representative of what would be found if wider application across farmers and countries were attempted. Nevertheless, this experience, combined with that of others in different countries, provides some policy guidance if a country wishes to start or strengthen its data collection system related to lending institutions.

The effects of the data collection procedures on farmers and higher program levels will be indicated when feasible and appropriate. However, this study was not specifically designed to analyze data collection approaches which might serve levels other than the credit agent. Furthermore, the study was concerned with only a part, not all, of the data needs generally faced by credit agents.

PART II

A CONCEPTUAL FRAMEWORK[1/]

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 usually are considered neutral and the way in which they are collected is deemed unimportant in determining whether or not a loan is approved.

In many LIC lending institutions, the data set used by loan approval committees to determine eligibility is often a conceptualization based on the experience or intuition of credit agents. Normally, these 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. This includes cost of production data or enterprise budgets used for calculating investment plans. Therefore, real data do not play a dynamic role in operational procedures or credit policy formulation. 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. On the contrary, more data than are actually

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[1/] Material in this section is largely drawn from Longwell [25]. A literature review can be found in [45].

used in decision making often are solicited from borrowers.[2/] Such a perverse data collection system increases costs for both clients and the lending institution. 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 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 time (often one-half day or more) for the application procedure. Client 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 direct borrowing costs are higher.

For the lending institution, inefficiencies in the data collection and analysis system create high costs 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 forms. In addition, most of the data are forwarded by branch offices to central offices for filing or storage. It is commonly found that these data are not widely used by personnel in the central office.

[2/] Some of the data solicited from clients are required by outside organizations that provide financing for the lending institution. These organizations include the Central Banks, the United States Agency for International Development, the Inter-american Development Bank, World Bank, and others. However since periodic up-dating of the 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.

Given the above background, the role that data solicited from farmers play in credit operations and policy formulation is difficult to define. Data that may be irrelevant to the loan are solicited from borrowers while the key information for the investment plan (enterprise budgets) 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 lending institution itself is not in a position to take full advantage of the data it solicits from farmers. Given the way the data collection system is structured, policy decisions are not based on empirical evidence gathered from farmers. Instead, policies are formulated at administrative levels and the economic data of the clients are massaged to fit those policies. In summary, the current role of data collection in LIC lending institutions 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 actually collected.

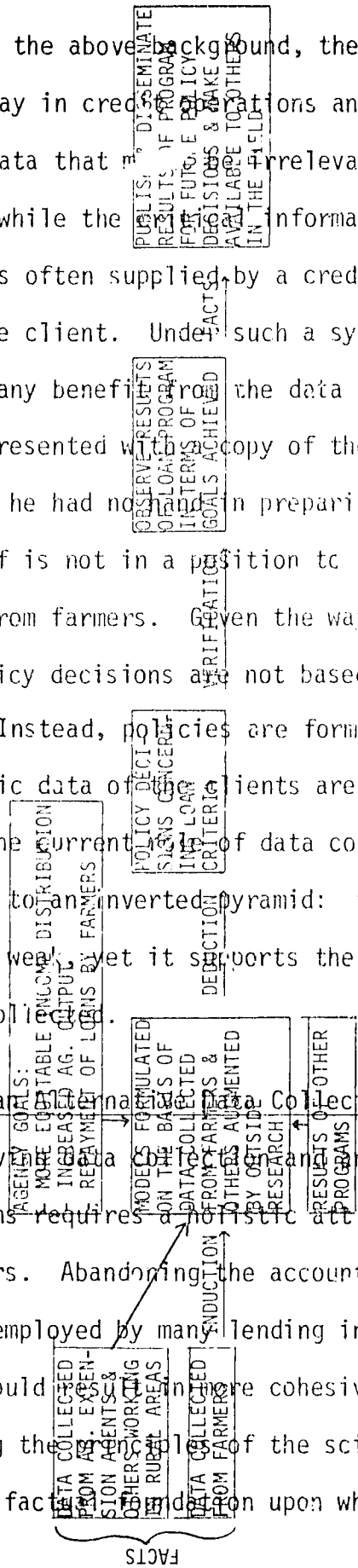

Figure 1. Inductive-Deductive Flow Diagram.

Model for an Alternative Data Collection Methodology

Improving data collection and analysis methodologies for credit institutions requires a holistic attitude on the part of administrators and planners. Abandoning the accounting theory of data collection currently employed by many lending institutions in favor of a scientific approach would result in more cohesive credit policies and operations. By applying the principles of the scientific method [23], 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 1.

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 incorporation of useful data into a credit project is for planners to adopt a discriminating attitude about the collection of data. For our purposes, a distinction must be made between data that provide decision-making criteria in determining investment plans 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 farmers 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

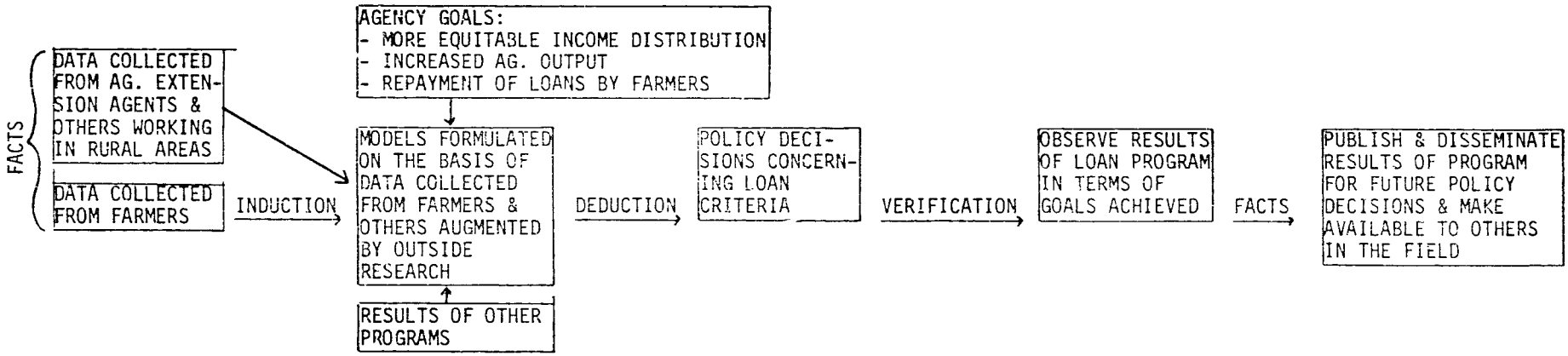

Figure 1. Inductive-Deductive Flow Diagram.

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; (3) how accurate and realistic are the investment plans; and, (4) how he perceives his obligations to the credit program in terms of the agreement made with the lender.

At higher decision making levels, 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 [12].

Another means of understanding the above procedure is to contrast it with the way many lending institutions currently design their credit programs. These designs are based upon normative criteria whereby value judgments rather than empirical verifications form the basis of decision making [44]. In such a design, policy makers develop programs without first investigating an area or a group of farmers and assessing what the needs are. If an assessment were made, it 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 [12]. 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" [12]. 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 2.

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 the benefits which farmers are to 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.

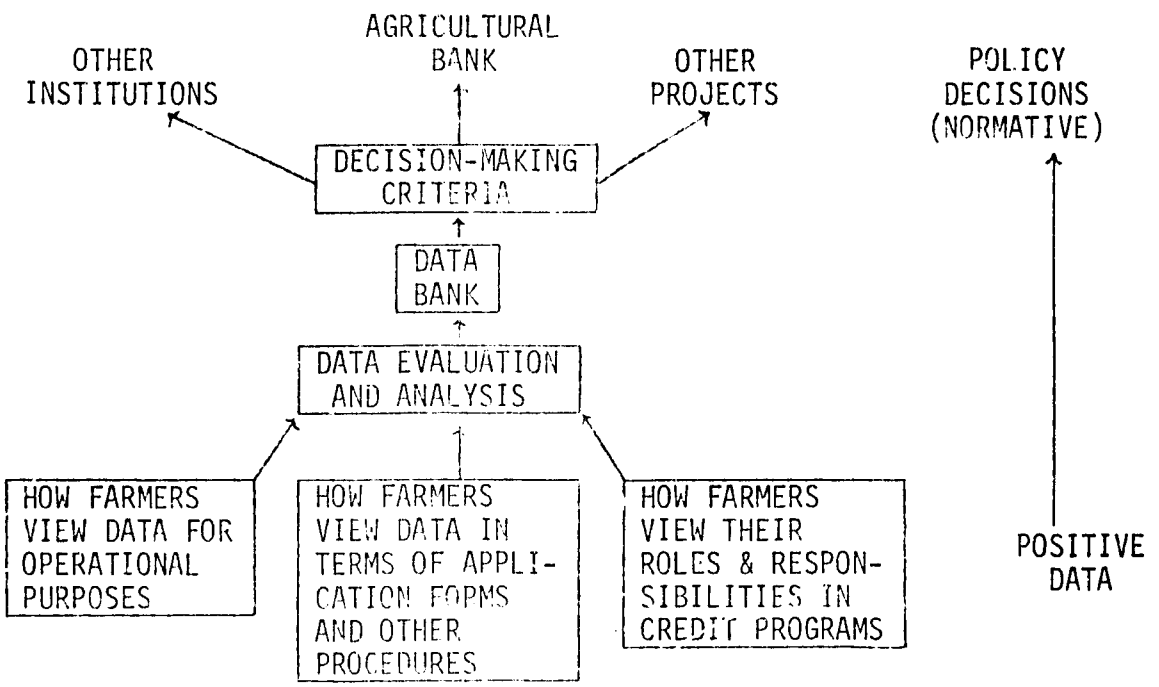

Figure 2. Relationship between Positive Data and Policy Decisions for an Agricultural Bank.

The model also has implications in terms of costs to both the lending institution 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 long questionnaires associated with the accounting approach lead to problems of maintaining the attention span of the farmer [42], which means that the accuracy of the data collected in the later stages of the interview is more questionable. 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 new data collection approaches.

Related Studies

Specific studies on data collection for credit programs are limited. Indeed, it has only been recently that the subject of small farm data collection for any type of development program has begun to attract attention [24, 28, 47]. Most of the literature on data collection

concentrates either on specific case studies or on the experience of field researchers over a number of years. Several 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 [19, 21, 27, 30, 31, 33]. It is interesting that most studies focusing upon farm level data collection have been conducted in Africa, Asia, 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 [24] 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, Ogunfowora, and Kabwegyere 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 [42, 43], Collinson [7], Hunt [20], and others [11, 15, 29, 32, 34] discuss farm management data collection and analysis. All 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 [13] and Yang [48] 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 collection 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 [22] 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 [23]. Uchendu [47] introduces many of the same types of questions that credit projects seek 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 [47]:

> 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...?

In summary, it is proposed that assuming a static role for data, as is common in LICs, does little to improve operational procedures, policy formulation, or development of realistic and usable loan investment plans. As specified by the dynamic model of data collection, data need to be continuously gathered to serve as a foundation upon which credit policies and decisions can be made. This model applies to all levels of decision making, whether at the agent level or at the highest levels of management. For the more limited objectives of producing enterprise budgets and the resulting loan investment plans, such data need to be obtained from the farmer-borrowers in such a way that they are able to perceive the value of the data being collected. Consequently, this involvement and understanding will improve the reliability and accuracy of the production data.

PART III

ENTERPRISE BUDGETS

An enterprise budget is a listing of the physical production inputs and costs associated with the production of a specified product. They also are sometimes referred to as unit budgets since they commonly represent a single unit of land, say a hectare, or a specific number of animals, say a cow-calf unit, for example. The simplest budgets present only variable costs of production while the more advanced budgets will include more detail on variable costs and also may include estimates of fixed costs, quantities produced, income, and the returns to land, capital, and management. An enterprise budget is simply a means of organizing and presenting information for use in one or more particular types of analysis. Thus, the decision of what items to include, and how to include them, will depend on the type of analysis to be performed with the information.

Enterprise budgets in one form or another are used by many LIC credit institutions. The most common use is for completing an "investment plan" for each loan. This investment plan is a simple form of an enterprise budget. It specifies the major activities to be financed by the loan and serves as the primary basis for setting loan limits and the timing of withdrawals.

A second current use for enterprise budgets is in the projection of annual credit flows for the institution. Total land area to be financed for each crop and activity is estimated based on past experience, and these estimates are then multiplied by the average cost of production indicated by the enterprise budgets prepared for each activity. The resulting total credit need may be adjusted downward if the institution's policy is to finance only a set percentage of total costs.

A third use for enterprise budgets prepared by credit institutions is to provide a basis for government price stabilization programs if that is a function of the institution. For example, until recently, the Agricultural Development Bank in Honduras was responsible for that country's price stabilization programs. As a consequence, production cost estimates (enterprise budgets) had implications for commodity prices established by the bank.

Various types of enterprise budgets are produced by groups other than lending institutions. Agricultural sector planning offices often produce enterprise budgets for the specific purpose of policy analysis. These budgets may be produced only for certain crops or activities of particular policy concern or they may be produced sporadically depending upon the needs of the analysis.

General sector or rural household surveys associated with broader research programs on rural and agricultural development also may publish forms of enterprise budgets [6, 41]. Background materials justifying specific agricultural loan programs for international donor agencies is another source of one-time budgets. An example of this would be the cost of production figures published as part of the AID agricultural sector survey of the Dominican Republic in 1976.

Sometimes enterprise budgets are prepared by programs for developing and testing new agricultural technology. Local, national or international research experiment stations are common sources for such data. Farming systems research would be another source. Crop budgets resulting from these sources, however, are characteristically partial budgets. That is, the budgets associated with new technology development tend to summarize the costs and returns related to the recommended change (increased

fertilization, new variety, etc.) rather than total costs and returns for the crop [18].

As can be seen, a number of sources may be producing farm enterprise budgets over time. Thus, it might be asked why additional work in this area is needed. Unfortunately, LIC lending institutions seldom if ever have access to or use these enterprise budgets prepared by other governmental agencies, international donors, or other groups. Typically, budgets used by lending institutions are produced internally. There are many reasons for this.

Problems with Existing Enterprise Budgets

A number of problems are related to the budgets presently available in many LICs, whether produced internally by lending institutions or available from external sources:

1. Budgets in any one country are not based on any uniform procedure or methodology. One budget may be the estimate of one agronomist, one may result from an ad-hoc survey and another may be a synthesis of many sources. Seldom are the methods of preparation described. Thus, a lending institution, as a potential user, has no basis for judging the accuracy or reliability of the data.

2. Typically, one budget may be prepared for the whole country which ignores differences in technology, soils and climate, yields, and costs among regions. Because of the averaging across many differences, the resulting budget may not represent any farmer in the country.

3. Budgets do not provide sufficient specification or detail to allow modifications for use by lending institutions. If a budget only includes costs for a few major categories, this precludes making simple adjustments to input quality and quantity and prices. Further, if there is no information on the timing of operations, the budget cannot be used to time loan disbursements.

4. Budgets may reflect recommended rather than actual farming practices followed by the borrowers. Thus, they cannot serve as a very accurate guide for lending to most farmers.

5. Budgets may be prepared for the best farmer or for the highest cost situation. This may establish the maximum lending limit but provides few data for preparing individual investment plans.

6. Release of budgets may be delayed because other activities of a project have higher priority. Further, published budgets often must be approved by higher authorities which can lead to large time delays. The result may be that the budgets are outdated by the time they are released.

7. Budgets may not include information on fixed costs and depreciation or on some variable costs such as equipment maintenance. Although just variable cost information may be adequate for the credit agent's work, total costs are needed for farm and program analysis.

8. Finally, other sources of enterprise budgets may not even wish to release their cost of production estimates for political or other reasons. If their figures differ from those officially recognized, this could lead to political difficulties. For example, producers could use such data to argue for higher farm prices. If one agency produces cost estimates that differ from another, this may raise criticisms about the competence of government or the agency producing the data.

Standardizing Budgeting Systems

It is a basic premise of the Credit Project that loan preparation and evaluation by lending institutions can be significantly improved and costs reduced if more detailed, accurate, and reliable enterprise budgets can be provided credit agents and other lending personnel.

The design and implementation of a system for the routine preparation of enterprise budgets using a standard methodology offers several advantages. First, the cost of collecting data on the economics of producing many different crops in different areas and using different technologies is generally too high for any one agency that has only a few particular uses for the data. The result, as could be observed in the Dominican Republic, is that each agency designs small surveys that can be carried out quickly with a minimum of expense, or it relies on estimates of

its field personnel rather than on farmer interviews. Although a methodology that will fulfill the needs of many different types of analyses will be more complex and detailed, the creation of a specialized enterprise budgets office can produce significant savings for the government. Secondly, the poor quality and availability of basic data limit the use of more advanced analytical tools and models. This, in turn, limits the development of the analytical capabilities of the employees of the agencies. The circle is complete when the analysts continue to use only the simplest analytical tools because they cannot obtain good data. This circle is difficult to break because, at the political decision level, the cost of a specialized budgets office seems high and the benefits seem indirect, uncertain and too far into the future. The demand for enterprise budgets, however, is evident from the multiple, but limited, attempts to prepare budgets.

Standardized, up-to-date budgets also can be used in place of individual, custom-made budgets in preparing investment plans for clients. Instead of preparing a separate plan for each borrower, as is now attempted in many countries, a standardized budget could be selected which most represented the region, crop, and level of technology for the farmer in question. If needed, minor adjustments could be made by the credit agent in consultation with the farmer. If implemented, this system could greatly reduce the amount of time the agent spends with each farmer in preparing an investment plan and would almost eliminate the need to use bank personnel to type the investment plan as part of the loan documentation.

Finally, standardizing the system and methods for producing enterprise budgets should increase the utilization of such budgets by

individuals and groups outside the lending institution. Clearly documented and understood procedures should help eliminate some of the problems associated with the very simple but inadequate budgets being prepared now as discussed in a previous section of this paper.

Alternative Country Approaches

The establishment of a system to produce enterprise budgets must fit the political and institutional environment of the country in question. This means no single approach will serve needs and conditions of all LICs.

Generally, from the perspective of a lending institution, three alternative approaches to enterprise budgeting are possible. First, the lending institution can depend entirely on data (budgets) produced by another entity (say a farm management division of a ministry of agriculture or of an agricultural university). Second, the lending institution can set up and operate its own system, independent of similar activities by other groups or agencies. Finally, a collaborative approach could be established where the lending institution would share responsibilities for enterprise budgeting with one or more other insitutions.

The first alternative has been tried unsuccessfully (from the point of view of credit institutions) in many LICs as explained previously. The remaining two approaches were implemented under the Credit Project. In Honduras, the enterprise budgets were developed completely within the Agricultural Development Bank. The Ministry of Natural Resources had the general responsibility of estimating costs of production for the country, but neither it nor any other governmental agency was continually preparing enterprise budgets. On the other hand, the Bank had an administrative procedure which required the loan officer to continually prepare an

estimate of production costs, enterprise by enterprise, for each loan applicant. After identifying and evaluating these existing efforts to prepare enterprise budgets both within and outside the Agricultural Development Bank, it was decided, through discussions with Bank personnel, that the budgeting system would be established entirely within the Bank. A bank-only system would avoid the problems that are inherent in interinstitutional coordination and would permit the design of a methodology that would meet the specific needs of the Bank.

A different situation was encountered in the Dominican Republic. There, the Farm Management Division of the Secretariat of Agriculture already had the official responsibility for preparing enterprise budgets and a staff of 35 university-trained agronomists (at least one in each of the 26 provinces) with some experience in budgeting. It was felt, a Bank-only system would create additional responsibility for the already over burdened credit agents and would require the establishment of a staff in the central office to organize and manage the system. This likely would contribute further to the duplication of resources for enterprise budgeting and to interinstitutional jealousies and lack of cooperation. Further, the Farm Management specialists lacked adequate transportation in the field while the credit agents were visiting farmers four or more days per week and were continually discussing production costs with farmers.

These considerations led to the decision to design a system that would be the responsibility of, and managed by, the Farm Management Division with the use of Bank credit agents for the farmer interviews for data collection. This system was designed to build on the existing

strengths in each agency. Of course, the interinstitutional coordination problems inherent in such a system also were recognized.

Data Sources

Two basic alternative sources of data exist for preparing enterprise budgets. First, budgets can be directly based on estimates of field technicians that have experience with the crop (probably the most common alternative used in LICs). Second, budgets can be prepared from data generated through farmer interviews.

Testing of these two alternatives was implemented as part of the Credit Project during 1979-80 in collaboration with the Agricultural Bank of the Dominican Republic in five different Bank agencies in the country.

The first alternative (estimates by field agents) and two versions of the second alternative (interviews with five farmers selected by the agent and interviews with a random sample of borrowers) were tested [25, 26].

The first alternative represents the way in which the Agricultural Bank presently establishes the amounts it will loan to its clients. The Bank has the policy of financing a certain percentage of the production costs of its borrowers. 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.

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.

For the first part of the study, a Bank credit agent from each of five branch offices was asked to estimate, on the basis of his experience and knowledge, the production costs of a hypothetical farmer in the geographic area where he worked. This estimation was to be for farmers who met certain characteristics. These were that the sample farmer (1) was an Agricultural Bank client during the period from August 1978 to July 1979, (2) grew rice as his principal crop, (3) cultivated ten acres or less of farm land, and (4) met his production costs on an individual or family basis and not communally.

The second part of the study required a sample of five "representative" farmers from each study area. The same credit agent who had estimated production costs in the first part was asked to select and interview five sample farmers in his area that he considered representative of the population. Those farmers selected had to meet the same four requirements mentioned above.

The third part of the study consisted of interviews with a sample of 30 farmers from each area selected at random from a geographically stratified population. Again, the same credit agents participated in the interviews and those selected had to meet the four requirements mentioned previously.

The preliminary evidence from this analysis 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.[3]

Finally, the credit agents' knowledge and experience may be based on outdated information, may be associated with the better farms of the region, or may reflect technical recommendations or expectations of the lending institution. Identifying the major reason(s) for differences in cost of production estimates will be impossible without considerably more farm level research. Nevertheless, when credit agents' estimates differ

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[3]It is possible that input price information gathered by credit agents 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.

from estimates based on farmer interviews, intuitively one would assume data from farmers themselves would more accurately reflect their actual situation.

The most important trend that emerged from the comparison of the three tested data collection methodologies supported the hypothesis that when critical farm level data such as production costs are merely estimated by credit institutions, then the actual on-farm conditions faced by clients might not be accurately represented. The consequences of under- or overestimating production costs can have profound effects on both the credit institution and the client. For example, if the institution overestimates production costs, 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, then the institution 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 affect the farmer's ability to repay his loan.

In summary, the study results suggest 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 a system for generating enterprise budgets should not use field technician estimates but rather should employ some other methodology or combination of methodologies. Representative sampling (agent chooses five farmers) and

random sampling were tested in the study and no significant differences in cost data were observed in four out of five agencies studied. No biasing with respect to the size of the farmers' rice parcels was evident when credit agents were allowed to select representative farms. Finally, there was no significant difference in the average cost per interview employing one methodology over another. Since total interviewing costs increased at least six fold for the random sample of 30 farmers compared with the representative sample of five farmers, and no significant differences were found for the results produced by the two methods, the small representative sampling method was selected for the enterprise budgeting system in the Dominican Republic. The research also verified the application of a similar farmer selection system which had been implemented in Honduras at an earlier date. In that country, three separate yield levels for each crop were identified and then five farmers were selected in each level for interview to gather cost and production data for that category.

Budget Specification

The extremes in the specification of enterprise budgets by technology, yield or area of applicability varies from: 1) a budget that is an average for all technologies and areas for that crop (one country-wide budget per crop), to 2) one for each individual producer of the crop which represents just the characteristics of his operation. The generality of the first extreme makes it virtually useless while the sheer volume of budgets and associated costs of the other extreme makes it infeasible. Some intermediate point must be selected in accordance with the availability of resources (both monetary and human), the expected needs of the potential

users of the budgets, and the variety of technologies and practices used in the country.

A second question relates to the number of different crop and livestock budgets which should be prepared. Should all crop and livestock activities financed by the credit institution be budgeted or should only the major ones be studied? Again, an intermediate point was reached in each country. As many different budgets were prepared as time and resources permitted.

Budget specification and approach differed in the two country programs. Still, there were many similarities. Each country was divided into regions according to ecological homogeneity and service areas of the bank branch offices. A total of 13 regions in Honduras and 8 regions in the Dominican Republic were used to categorize budgets. Even this level of disaggregation was inadequate to cover the diversity of microclimates and soils found in each country, but further partitioning would have greatly increased the number of budgets and costs.

Other similarities were found in the two country enterprise budgeting programs. The date of preparation was included in each budget so the user could make adjustments as they became outdated over time. The name of the person responsible for the final budget was also indicated. This was done for two reasons: 1) it gave recognition for the work done and, as a result, should have improved work quality, and 2) it allowed the user to contact the preparer in case there were questions about the specific items in the budget. All budgets carried standardized headings, codes, and formats, although the codes and procedures varied by country. Also, all budgets included physical detail (pounds and kind of fertilizer or insecticide used , type of cultural practice applied, etc.) as well as prices and

total cost for each item or activity. This allows later modification of the budgets as time and circumstances dictate. Finally, the timing of operations was specified in each budget prepared in both countries to help serve as a basis for loan disbursements.

There also were differences in budget specification in the two countries. Obviously, one budget per crop per region is inadequate because production techniques within a region may range from the most traditional agriculture to modern, mechanized agriculture. Establishing separate budgets by region partially accounts for such variation but further specification is needed if the budgets are to be of much use to credit agents. Two different approaches were followed to further define the resulting budgets.

In Honduras it was decided that crop budgets would be further classified within each region according to yield per unit of land. Yield categories of low, medium and high were subjectively determined for each crop in a meeting of bank loan officers (agronomists) from all the regions. The yield categories represented a compromise among the agronomists as to what comprised these three levels based on the previous three years experience. Yield categories established for selected crops is shown in Table 1.

A bank loan officer selected five farmers in his region who recently obtained similar yields within a yield category. Data on production practices and costs of services and materials were obtained from the interviews and the final budget was an arithmetic mean of the five interviews.

TABLE 1: YIELD CATEGORIES FOR SELECTED CROPS IN HONDURAS

(Quintals per manzana)[a/]

Crop	Low	Medium	High
Corn	<30	30-60	>60
Sorghum			
Native	<15	15-30	>30
Improved	<30	30-60	>60
Beans	<12	12-25	>25
Rice			
Irrigated	<50	50-80	>80
Dryland	<30	30-60	>60

[a/] One quintal equals 100 pounds and one manzana equals .69 hectares.

Source: [35]

A different approach was followed in the Dominican Republic. There, budgets were further specified in each region by using five technology and land quality categories. These were: 1) planting method (direct, transplanted, or ratoon), 2) source of water (dryland, swampy areas, pump irrigation, gravity irrigation, or sprinkler irrigation), 3) input (off-farm) use level (none, low, medium, or high relative to recommended levels), 4) land preparation system (none, manual, animal, semi-mechanized, or mechanized), and 5) land use capability class (I to IV). In each region the bank credit agents and the Secretariat farm management specialists indicated the most prevalent technology combinations in their area. At least five farmers were selected for interview which had grown the crop in the area with the specified technology. The resulting enterprise budget for the specified level of technology and land type was the arithmetic mean of data from the five or more farmer interviews.

If the interviewer found during an interview that the farmer did not represent the specified technology combination, then the interview was terminated or the results were used for another budget which it more closely represented.[10].

The Results

The first round of enterprise budget preparation in Honduras as part of the credit project produced 163 crop budgets. These budgets were officially approved by the Bank's Board of Directors and were published by the Bank in 1980 [36]. For details on methodology used one should refer to Parks, et al [35]. Most regions and major crops in the country were represented by the budgets as shown by the list in Appendix Table A. One of those budgets, dryland rice with medium yield for the Choluteca area (Region 11), is shown in Table 2. The total variable cash cost of 679.65 lempiras (1 U. S. $ = 2 Lempiras) per manzana are broken down into labor, materials, and other cash costs to provide more detail for preparing loan investment plans or for analysis. The estimated fixed costs for interest, depreciation and maintenance are added to variable costs resulting in a total production cost per manzana of L. 758.77. All of the other crop budgets were prepared and presented in a similar manner.

A few livestock budgets also were prepared for Honduras using the same basic organizational structure and methods used to prepare the crop budgets. Unlike crop budgets, livestock budgets were an entirely new concept for Bank employees. Because of this and the complexity of gathering livestock data, only a few budgets were prepared to test the approach and to train personnel. An example of a livestock budget prepared by the project is shown in Table 3.

Table 2: EXAMPLE OF A NEW ENTERPRISE BUDGET

BANCO NACIONAL DE DESARROLLO AGRICOLA
ENTERPRISE BUDGET NO. 11043

Enterprise: Rice, dryland, medium yield 50 qq/mz
Region: Choluteca
Prepared by: Clemente Meraz Cruz, 9/22/79

Labor	(man-days) a/	Total Units	L/ Unit	Costs Total
Jun	clear brush	11.6	3.00	34.80
Jul	seed/fertilizer	2.0	3.00	6.00
Aug	weed	11.6	3.00	34.80
Aug	apply fertilizer	1.4	1.40	1.96
Aug	apply fungicide and herbicide	2.2	2.20	4.84
Oct	protect crop from birds	1.0	1.00	1.00
Other contracted services				
Jun	plow (1 time)	c	30.00	30.00
Jun	disc (4 times)	c	12.00	48.00
Aug	apply herbicide	c	7.50	7.50
Aug	apply fungicide	c	7.50	7.50
Oct	combine harvester	b	3.75	187.50
Materials				
Jun	seed	2.0 qq	42.00	84.00
Jun	fertilizer (formula)	2.0 qq	23.50	47.00
Jun	urea	2.0 qq	23.50	47.00
Jun	herbicide Stam LV-10	1.5 qq	32.50	48.75
Jun	Dipterex	1.1 qq	30.00	33.00
Jun	Lannate	1.0 qq	30.00	30.00
Jun	Benlate	1.0 lb	26.00	26.00
Sub Total				L. 679.65
Other costs				
Interest on annual operating capital (12%)				23.35
Ownership costs:	Interest on investment (12%)			11.64
	Depreciation			38.07
	Maintenance			4.02
Total Production Cost/Manzana				758.77

TABLE 2 (continued)

Detailed ownership costs

Initial information

Equipment	No. Units	Initial Cost	Scrap Value	Useful Life	Manzanas/ Year
Backpack sprayer	1.0	225.0	15.00	2.0 years	120.0
Sacks (25)	1.0	60.0	0.00	2.0 years	1.0
Fence (4 manzanas)	1.0	480.0	48.00	15.0 years	4.0

Annualized costs

Equipment	Totals			Per Manzana		
	Inter	Deprec	Maint	Inter	Deprec	Maint
Backpack sprayer	14.40	105.00	3.00	0.12	0.87	0.02
Sacks (25)	3.60	3.00	0.00	3.60	30.00	0.00
Fence (4 manzanas)	31.68	28.80	16.00	7.92	7.20	4.00
Totals Per Manzana				11.64	38.07	4.02

Profitability Analysis

	Possible price per unit			Client's Income
	Low	Medium	High	
	17.00	20.00	22.00	
Gross revenue	850.00	[illegible].00	1100.00	
Net income[d/]	170.35	320.35	420.00	
Net income[e/]	91.27	241.27	341.27	
Price necessary to cover variable costs				13.59
Price necessary to cover total costs				15.17

a/ Man-day = six hours

b/ Fixed cost per quintal

c/ Fixed cost per manzana

d/ Gross revenue minus variable costs

e/ Gross revenue minus total cost

Source: [35]

TABLE 3: DUAL PURPOSE CATTLE BUDGET

BANCO NACIONAL DE DESARROLLO AGRICOLA
LIVESTOCK BUDGET NO. 05032

Enterprise: 100 Cow Dual Purpose
Region: Choluteca and Valley
Prepared by: Clemente Meraz Cruz

ANNUAL PRODUCTION

Product	Units Sold	Detail	Price Lps.	Total Income	Income per Cow
Milk	83,160	Bottle	.31	25,779.60	257.80
Bull calves	33	380 lbs	.53	6,646.20	66.46
Heifer calves	20	340 lbs	.53	3,604.00	36.04
Cull cows	11	900 lbs	.74	7,326.00	73.26
Herd bull	.6	1280 lbs	.74	568.32	5.68
Estimated Total Income				43,924.12	479.24

PRODUCTION COSTS

Labor (man months)	Total Units	L/ Unit	Total Cost	Cost per Cow
Milkers	36	135.00	4,860.00	48.60
Common labor	12	120.00	1,440.00	14.40
Manager	12	300.00	3,600.00	36.00
MATERIALS				
Salt and minerals	a/	4.50	450.00	4.50
Veterinary products and medicine	a/	6.70	670.00	6.70
Supplemental feed (sugar cane)	180 cwt.	1.20	216.00	2.16
Maintenance of equipment and improvements	-	-	1,747.00	17.47
OTHER COSTS				
Interest: 14% annual operating capital			778.89	7.79
14% livestock investment capital			11,396.00	113.96
14% investment in equipment and improvements			2,879.10	28.79
Depreciation: Equipment and improvements			1,836.00	18.36
TOTAL PRODUCTION COSTS			29,873.08	298.73
NET INCOME			14,051.04	140.51

TABLE 3: (continued)

LIVESTOCK INVESTMENT

Type of Animal	No. Units	Value/ Unit	Total Investment	Investment per Cow
Cows	100	700	70,000	700
Replacement heifers	13	300	3,900	39
Herd bulls	3	2,500	7,500	75
TOTAL LIVESTOCK INVESTMENT			L 81,400	L 814

EQUIPMENT AND IMPROVEMENTS FOR 100 COW UNIT

Detail	No. Units	Initial Cost	Salvage Value	Useful Life	Interest	Depre-ciation	Mainte-nance
Materials and tools b/	-	800		10 years	56.00	80	-
Backpack sprayer	1	210	20	5 years	16.00	38	5
Water tank	1	500	50	15 years	38.50	30	10
Horses	3	1,200	150	5 years	94.50	210	108
Improved pasture	-	20,000	5,000	20 years	1,750.00	750	1,000
Well	1	2,000	500	20 years	175.00	75	-
Milk house	1	1,200	240	20 6ears	100.80	48	24
Fences and corrals c/	-	8,260	1,000	12 years	648.20	605	600
TOTALS					2,879.10	1,836	1,747
÷ 100 = TOTAL/COW					28.79	18.36	17.47

Annual Rates

Weaning	66%	Mortality	2%
Replacement	13%	Bull/Cow	1/33

NOTES: Milk: 6 bottles/day for 210 days
Supplemental feed: 3 lbs/day/cow - 60 days

a/ Cost per cow

b/ Includes all small tools

c/ 70 hectares with 14 pastures

Source: [35]

In the Dominican Republic, a total of 101 crop enterprise budgets were prepared during the project period based on farmer interviews. A list of the crop budgets prepared in each of the eight regions is shown in Appendix Table B. Details on the procedures and methods used in producing these budgets can be found in Dickey, et al [9]. As for Honduras, the major crops financed in all of the regions are represented by the budgets. The exact technology/land class package reflected in each of the budgets was jointly determined by bank agents and SEA farm management specialists working in the region in question.

An example of one of the budgets produced in the Dominican Republic is shown in Table 4. For bell peppers in the North Region, the mean variable costs based on five farmer interviews was found to be $76.58. ($1 U.S. = $1 D.R.) per tarea. This represented a technological package of transplanting, pump irrigation, high input use, and mechanized soil preparation on either Class I or II land (Classification "A"). As can be noted, the budget first lists all input (material) costs and then the other activities are listed in chronological order during the production period.

As a first step, only variable costs were calculated for the crops and regions indicated. No attempt was made to calculate fixed costs nor to prepare more complicated budgets associated with multiple cropping or livestock. It was felt these budgets would have to be introduced after the system for preparing variable cost budgets had been established and made operational.

In comparison, the Dominican budget exercise resulted in more detail within each budget in terms of timing and nature of cultural practices

TABLE 4: ENTERPRISE BUDGET SYSTEM FOR DOMINICAN REPUBLIC

SEA/BAGRICOLA
Region: North
Source of Data: Interviews (5)

Budget No. 1-42-1334A
Date: Jan. 1981
Harvest: Apr/July 1980

Varieties	Yields	Unit Cost
"Cubanela"	1,407lbs	$0.054/lb

One Man-Day = 8 hours/DR$4.00

Crop : Bell Peppers
Areas : North Region
Planting Method : Transplanting
Source of Water : Pump Irrigation
Input Use Level : High
Soil Prep. System: Mechanized
Soil Classif. : A

VARIABLE PRODUCTION COSTS PER "TAREA" OF LAND (.629 ha.)

Activity, Service or Input	Month	Quantity	Unit	Unit Price	Cost
1. Inputs					
.1 Seed		.1772	lb	29.00	5.14
.2 Fertilizer (15-15-15)		.014	cwt.	12.50	0.18
.3 Fertilizer (16-20-0)		.394	"	10.50	4.14
.4 Fertilizer (Ammonium Sulphate)		.252	"	8.50	2.14
.5 Fertilizer (foliar)		.45	lb	1.00	0.45
.6 Insecticide (Furadan)		.37	"	0.65	0.24
.7 Insecticide (Nuvacron)		.2212	liter	8.50	1.88
.8 Fungicide (Dithane M-45)		.28	lb	1.50	0.42
.9 Fungicide (Kocide)		.6712	"	2.25	1.51
.10 Pump Costs					1.42
.11 Fuel (gas oil)		6.74	gallon	1.00	6.74
.12 Transport of Farm Inputs					0.09
.13 INDRHI Water User Charges (6 mnths)		1.00	"tarea"	0.07	0.07
2. Seedbed	I				
.1 Preparation of the Seedbed		.35	man/day	4.00	1.40
.2 Applic.Chem.Products (0.014 qq 15-15-15) (0.37 lbs Furadan)		.06	man/day	4 00	0.24
.3 Planting		.057	"	4.00	0.23
.4 Applic.Fungicide (0.28 lbs Dithane)		.06	"	4.00	0.24
.5 Irrigation		1.89	"	4.00	7.56
.6 Weedings		3x.083	"	4.00	1.00
3. Soil Preparation					
.1 Plowing (mechanized)		1.00	tarea	3.00	3.00
.2 1st disking (mechanized)		1.00	"	1.60	1.60
.3 2nd disking (mechanized)		1.00	"	1.25	1.25
.4 Furrowing (horse-drawn)		1.00	"	1.25	1.25
4. Transplanting	II	0.773	man/day	4.00	3.09
5. Applic. Fertilizer (0.394 qq 16-20-0)		0.335	"	4.00	1.34

I. Seedbed:	$ 10.67	14%	III. Labor:	$ 34.39	45%
II. Soil Prep.:	$ 7.10	9%	IV. Inputs:	$ 24.42	32%

The use of a brand name does not constitute a recommendation of the product. It simply reflects the information supplied by the interviewed farmers.

TABLE 4 (continued)

SEA/BAGRICOLA
Region:
Source of Data:

No. 1-42-1334A
Date: Jan. 1981

Crop : Bell Peppers
Areas : North Region

Varieties	Yields	Unit Cost

One Man-Day = ____hours/DR$___

Planting Method : Transplanting
Source of Water : Pump Irrigation
Input Use Level : High
Soil Prep. System: Mechanized
Soil Classif. : A

VARIABLE PRODUCTION COSTS PER "TAREA" OF LAND

Activity, Service or Input	Month	Quantity	Unit	Unit Price	Cost
6. Irrigation		2x.179	man/day	4.00	1.43
7. Applic.Chem.Products (0.0553 liters Nuvacron) (0.1678 lbs Kocide) (0.1125 lbs foliar)		0.1163	"	4.00	0.47
8. Weeding		0.952	"	4.00	3.81
9. Applic.Chem.Products (0.0553 liters Nuvacron) (0.1678 lbs Kocide) (0.1125 lbs foliar)		0.1163	"	4.00	0.47
10. Applic. Fertilizer (.242 qq Sulphate)		.23	"	4.00	0.92
11. Irrigation		2x.179	"	4.00	1.43
12. Use of Cultivator (horse-drawn)		1.00	tarea	1.20	1.20
13. Weeding		.952	man/day	4.00	3.81
14. Harvest		2.814	sack	1.00	2.81
15. Irrigation	IV	.179	man/day	4.00	0.72
16. Applic.Chem.Products (2x.0553 liters Nuvacron) (2x.1678 lbs Kocide) (2x.1125 lbs foliar)		2x.1163	"	4.00	0.92
17. Harvest		2.814	sack	1.00	2.81
18. Irrigation	V	.179	man/day	4.00	0.72
19. Harvest		2x2.814	sack	1.00	5.63
20. Harvest	VI	2.814	sack	1.00	2.81
					76.58

I. Seedbed: $ _____ ____ %
II. Soil Prep.: $ _____ ____ %
III. Labor: $ _____ ____ %
IV. Inputs: $ _____ ____ %

The use of a brand name does not constitute a recommendation of the product. It simply reflects the information supplied by the interviewed farmers.

Source: [8]

and specificity of the technological package being applied. On the other hand, the Honduran system resulted in more completeness because fixed costs also were calculated for each enterprise. Generally speaking, variable cost budgets would be adequate for most uses at the credit agent level since investment plans for production loans usually are associated only with variable costs. If the budgets were to be used for analyzing credit and other policies or to analyze existing or proposed farm operations, then more complete budgets would be desirable.

Both budgeting systems also produced comparative data which show considerable variations in costs from one region to another in each country. A summary of Honduran corn production costs by region and yield category is shown in Appendix Table E. For the low yield category, total production cost per manzana ranged from a low of L. 159.72 in the Choluteca region to a high of L. 465.22 in the Santa Rosa de Copán region. Similar differences were found for the other two yield categories.

For corn in the Dominican Republic, the variable costs per tarea varied from a low of $5.80 in the East Region to a high of $28.64 in the Northeast Region (see Appendix Table D). This large difference is associated with different technological packages and their resulting yields (61.5 kg./tarea versus 117.3 kg./tarea). Even if regions with similar technological packages and/or average yields were selected for comparison, there would still be significant differences in costs. For both countries, these data demonstrate that one or a few enterprise budgets for the same crop for the whole country will not adequately represent the diversity in soils, climatic, and other conditions among regions and localities. If the budgets are to be of much use, they must

reflect as close as possible (given resource constraints) these differences--that is one of the major objectives of this project.

The Honduran team also calculated break-even prices for corn for the various regions and yield categories as shown in Appendix Table F. To cover total production costs, producers in the Santa Barbara region would need L. 7.43/qq. while those in Danli would need L. 9.05/qq. to break even (assuming high yields). In the Dominican Republic, cost per unit of output among regions is shown in Appendix Table D. These and other analyses are possible with both sets of country production cost data.

Utilization

As indicated previously, 163 grain budgets were prepared in Honduras in 1980 and 101 crop budgets were completed in the Dominican Republic in 1981. These enterprise budgets were eagerly received by Bank and government personnel as well as by other groups in both countries. A large number of copies of the budgets were published and distributed in each country. For example, in the Dominican Republic, 1000 copies were produced and distributed by the Secretariat of Agriculture in 1981.

Ultimately, it is expected that the loan evaluation process in each country will use one of these standard budgets directly and eliminate the custom-made (individual) budgets for each client. Although the enterprise budgeting system had not yet been integrated into the Banks' operations when the project ended, one would expect it to operate in the following manner.

The loan officer or credit agent would interview the prospective borrower and select a standard budget which most closely represented his situation. If his costs were determined to differ significantly from those

in the standard budget, then adjustments would be made, perhaps in a blank right-hand column on the budget available for that purpose. If the differences were small, then the credit agent would simply use the standard budget numbers to calculate expected farm credit needs and loan repayment capacity in accordance with Bank policy.

This approach was tested in one region in Honduras in early 1980. "Each potential client was interviewed in detail about his production costs as the Bank had always done. However, in the experiment the loan officer wrote the name of the client on a copy of the standard budget, indicated the total amount to be planted, and entered cost totals in the right-hand column of the client's estimated cost for a particular operation differing from the standard. Using this procedure, interview time was reduced approximately 75 percent, and office typing of each budget was eliminated. Standard budgets for the region proved to be very accurate, with cost differences rarely exceeding 5 percent of the standard budgets" [35]. However, to implement such a procedure in each country would require more time and effort to train bank personnel. Implementation was not included as one of the objectives for this two-year project.

By the end of the project, other uses of the budgets were apparent. Budgets were used repeatedly in training courses in both countries. Various individuals and groups requested budgets even before they were completed. International donors also were requesting budgets to use in their analysis of project and loan proposals. In Honduras, copies of standard budgets for the region were included in each credit agent's manual. This loose-leaf binder included the standard budgets as well as current input prices, and a table of historical monthly product prices.

In the Dominican Republic the budgets also were distributed to bank credit agents in each region as well as to the regional farm management technicians with the Secretariat of Agriculture. There was less opportunity to measure the extent of use of the budgets in the Dominican Republic since they were released a couple of months before the end of the project.

There is no doubt that there will be strong demand for the budgets from many places. The problem will be to maintain a system which keeps them accurate and current. The project tested and began the process. Further effort will be required to keep it going.

Evaluation and Recommendations

The development and implementation of the enterprise budgeting system in both Honduras and the Dominican Republic was greatly facilitated by the general approach of working directly with field level personnel in both designing and preparing the budgets. Even though a national level office had the final responsibility of budget preparation, field staff were heavily involved in the process in both countries.

This approach leads to several positive results: (1) field cooperation and support is more easily obtained since the system is not mandated from above, (2) budgets are designed by and for the field agents making the budgets more relevant for their use, (3) field support helps convince higher administration of the need for such work, (4) terms and units of measure are more precisley defined since they can vary widely from region to region, and (5) using field personnel greatly increases the number of enterprise budgets that can be prepared without mounting a large interview team in the national office.

However, utilizing field staff effectively, also implies considerable time and resources must be devoted to training field personnel in the preparation and utilization of enterprise budgets. The Credit Project found that most bank and ministry of agriculture field staff had satisfactory training in agronomy but often lacked or were weak in arithmetic and economic analytical skills. Thus, on-the-job and periodic formal training sessions must be an integral part of any enterprise budgeting system.

Budgets based on periodic farmer interviews is recommended where feasible. A minimum of five interviews is considered most practical and will be fairly representative of the farmers growing that crop. In some cases, budgets may have to be estimated by a knowledgeable field agent without farmer interviews, but this approach is not generally recommended. A cost-effective approach to preparing accurate and reliable budgets is to prepare an initial budget using data from interviews. Then, perhaps yearly, budgets can be updated by modifying the input and product prices to reflect current conditions. Return farmer interviews might be done every two or more years as technology and farming methods changed. Any time the physical coefficients of production are thought to be changing, then new budgets need to be prepared based on new farmer interview data.

The extent and method of setting budget specification (amount of detail in defining technology and farming practices used) is a major question in designing enterprise budgets. Two approaches were used in this project: budgets were based on yield categories (Honduras) or were specified on the basis of the technological package used (Dominican Republic). Both approaches resulted in quality and usable budgets. However, it was found that using

the yield approach can be a problem. Agricultural census and other data often are inadequate to establish useful yield categories and farmers often do not know or remember historical yields. Thus, we generally recommend that the technological package approach be used. With assistance of field staff, the most common technological packages or farming methods can be identified for a specific crop and then budgets prepared on that basis. How detailed the technological package should be will depend on the needs and capacity of the user.

Quality of enterprise budget data is another important concern. Quality will vary from author to author which again stresses the need for training. Identifying, by name, the person responsible for each farmer interview and the final enterprise budget, recognizes good and poor work and should improve quality over time. Good supervision and control of the interviewing and budget preparation phases is an obvious requirement. Verification or testing of prepared budgets also is necessary. Spot checks on farmer interviews and on calculations leading to final budgets helps find errors in data and procedures. Finally, complementing one-time farmer interview data with multi-visit or farm recordkeeping data discussed in the next section further serves as a check on the accuracy of the budget data.

The final test of an enterprise budgeting system is how well the budgets are being used. Although, the Credit Project was not funded long enough to measure utilization, a few recommendations can be made. Institutionalization of an enterprise budgets system cannot be done in a short time. This is because many potential users will not start utilizing the budgets until they are convinced the budgets are accurate, reliable, timely and will

continually be available in a usable farm. However, to establish a system which produces budgets with those characteristics requires financial, administrative, and political support. But this support may be related to evidence that the budgets are being used--an example of the common "vicious circle" dilemma. Thus, to make sure all of the pieces fit together, funding and support must be made available for a long enough period so that good budgets are prepared and so that potential users can have access to the budgets and begin using them with the expectation that they will continue to be available. This process likely will be speeded up if the unit which produces the budgets also has some responsibility for their utilization. Some general guidelines for implementing both enterprise budgets and farm recordkeeping in developing countries are presented in the last part of this report.

FARM RECORD KEEPING

Farm records are widely used in the developed countries as a source of data for farm and sector analysis and for evaluating loan applications of farmers. A complete farm record is a history of a farmer's operation which provides data on production costs and returns, input use, production output, changes inventories and resources, and levels of efficiency and on his financial position among other things. Income, net worth, and cash flow statements are commonly prepared from such records. Strong reasons for maintaining farm records in the developed countries are to provide data for preparing required income tax returns and to justify loan requests. Most lenders now require financial statements when evaluating loan applications. These incentives for record keeping do not exist in most developing countries, especially for small farmers. Thus, farm record keeping is not commonly found in developing countries.

Background

Farm record keeping has been experimented with in a few developing countries but it is not widespread [3, 16]. Hayami established a very intensive record keeping program for 12 villages for one year in the Philippines in 1975-76 [17]. This activity included a complete recording of the flow of all goods and services among various activities in the 12 households and in the village to help better understand the peasant economy in its entirety. The record books (many different accounts) were checked by a trained technician twice a week for the entire study period. An example of another intensive but one-time record keeping (multi-visit survey) activity can be found in Sierra Leone where 552 detailed household records were kept for a one-year

period (1974-75). Households were visited twice weekly by resident enumerators who used eight types of questionnaires to collect data [41]. Both of these multi-visit, very intensive record keeping activities were designed primarily for research objectives associated with study of alternative agricultural and rural development programs and policies. Enterprise budgets were produced by the studies but the record keeping was not specifically designed for that purpose. For example, 14 different crop enterprise budgets were developed as part of the Sierra Leone research effort [41]. However, these budgets do not have the specificity of those prepared in Honduras and the Dominican Republic under the Credit Project. Also, because these types of intensive record keeping activities require large financial support and well-trained people, they cannot normally be continued on a sustained basis for a very long period by any developing country entity. An apparent exception to this is the commitment to farm record keeping in Botswana. There, farm records have been maintained with selected farmers for the past 11 years (since 1970). The present system includes an "enumerator" in each of nine data collecting stations scattered around the country. Each enumerator works with about 12 sample farms with twice weekly visits to record data or to help the farmers fill out their own record books. A summary about these farmers and their practices is published periodically [14, 40].

Other, more limited, farm record keeping activities can be found in other countries. For example, the Bureau of Agricultural Economics of the Department of Agriculture in the Philippines has established a farm record keeping program using local high school students to help fill out the records at home [2]. Also, farm record activities often are established to help analyze the effects of specific technological packages. For example,

technical recommendations resulting from farm systems research may be tested on farms by having selected farmers keep records on just that aspect of their operations [18]. The CSU-led Egyptian Water Use and Management Project established farm records in three areas to measure the income and other effects of on-farm water management changes [1]. An example of a crop enterprise budget produced by that project is shown in Appendix Table C. As can be seen, those budgets reflect the concern about water use and timing by the project but do not indicate the timing of other production activities which would be of use to credit institutions for establishing loan disbursements.

In summary, most farm recordkeeping activities for small farmers in developing countries tend to be associated with specific research projects or activities. Seldom are they established on a continuous basis for the purpose of providing data for credit and policy analysis over longer periods of time.

Project Experience With Farm Records

The experimentation by the Credit Project with farm recordkeeping in Honduras and the Dominican Republic was for three main purposes: (1) to provide cost of production data to compare with enterprise budget data obtained from single-visit farmer interviews described in the previous section, (2) to provide other data (income, net worth, resource use, etc.) about small farm operations which could be used by credit institutions and (3) to gain additional insights on the problems associated with small farm recordkeeping as a source of data. For details on each country experiment please refer to the respective reports [39, 46].

In Honduras, farm records were initiated in three different areas during the two-year life of the project. The first area selected was Jutiapa in the Jamastran Valley (southeastern) because of its importance for corn and

bean production. It also was an area of relatively high bank loan delinquency. Ten farmers started the recordkeeping in September 1978 with the assistance of a teenage son of one of the farmers. This experiment had continual problems either because of suspicion or disinterest by the farmers or due to inadequacy of the local interviewer hired by the project to periodically visit the participating farmers. In November 1978 another set of records were established with seven farmers in Las Playitas in the Comayagua Valley (central). There, a very capable, educated young woman was employed to visit the farmers. However, the farmers were hard to find and didn't appear to be very interested so the experiment was dropped after two months. Finally, a very successful recordkeeping activity was established in January 1979 in Ajuterique (also in the center of the country), an area characterized by many small, irrigated farms. Nine complete records were obtained during 1979. Ajuterique was the most successful recordkeeping activity in Honduras because: records were associated with a loan so there was an incentive for farmers to keep good records; the woman who helped keep the records did an outstanding job; the participating farmers were generally more educated and economically better off compared with the other areas; and the farmers were more receptive to new ideas and were less suspicious of the motives for keeping records.

Due to pressures within and outside the Agricultural Bank, the Credit Project also established a set of records for a cooperative farm (El Matazano) of 17 members in the Jamastran Valley. This experiment also was very successful: It was known beforehand that the group was hardworking and receptive to assistance; the recordkeeper (a member of the group) was intelligent and concientious; records were needed to pay wages, track loan and other obligations, and distribute profits; and the members were interested in using crop summaries for future plans.

In the Dominican Republic, the recordkeeping activity built on the results of the Honduran experience. Farm records were established with 10 farmers in Nizao, a diversified horticultural area near the coast about 35 miles southwest of Santo Domingo. A local girl, a student of journalism at a university in Santo Domingo, was hired to visit each farmer at least once a week to record all their activities, incomes and expenses. These records were kept for over one complete crop cycle. The primary emphasis of this experiment was to produce enterprise records which could be compared with those based on farmer interviews described in an earlier section. No attempt was made to maintain complete farm records in the Dominican Republic since the Honduran experience suggested farmers and the bank were less interested in that type of information.

The Farm Record Books

The record book utilized in Honduras was a simplified version of the Looseleaf Enterprise Record Book used in Oklahoma. The new design eliminated all reference to income taxes or tax-motivated items such as depreciation schedules and was based on the assumption that a local paraprofessional would visit farmers on a regular basis to make record book entries. The Honduran book included six basic sections: (1) receipts, (2) farm and home expenses, (3) labor records, (4) crop and livestock production summaries, (5) inventory of crops, livestock, equipment, buildings and land, and (6) financial statements including net worth, cash flow, and profit and loss. A total of 16 different forms were used to record the above information. A copy of the record book can be found in the appendix of Parks, et al [39].

The record book used in the Dominican Republic departed from the Honduran design. That design had separate sections for income, expenses,

labor, etc., as described previously. Such a design permits a direct flow of information into the end-of-year profit and loss statements, balance sheets and cash flow statements. However, such a system also complicates the interview process since farmers are not accustomed to thinking in terms of income separate from expenses and separate from labor wage for a given crop.

The initial design of the Dominican record book included a section in which to record all of the movements or uses of inputs and products and a separate section in which to record all of the work activities, whether manual, animal traction or mechanized. Additional sections were included for non-farm income and expenses and the inventories (annual). This design was used between December of 1979 and June of 1980. However, the interview process was difficult because the interviewer was required to flip back and forth between the two main sections in order to record both the work and the materials used or the production and sales.

The second design simplified this process by providing a relatively open format for the recording of all of the work activities, purchases and uses of inputs, sales of products, etc., on a single page for each crop or enterprise. The format is similar to that of a cash record, in which the expenses are recorded in one column and the income is recorded in a separate column. This organization permitted the interviewer to obtain all of the information on an enterprise before proceeding to the next one. In addition, the interviewer could refresh the memory of the farmer by informing him of the items that were recorded in the previous interview. When the farmers indicated what work would be performed during the next week, she would make a note to herself to make sure that she asked about that work during the next interview. This design also included a perpetual inventory section

(for each input or product stored temporarily) with which the interviewer could check the source of the inputs used or the products sold. The inclusion of this section resulted from problems in balancing the purchases and uses of inputs.

The design of the farm record books in both countries was based on its potential use as a means of collecting information on small farmers' operations through an interviewer for use by the respective banks to compare with the enterprise budgets produced from farmer interviews and to understand the operations of their borrowers. The books were not designed for use by the farmers themselves or for their own analysis of their operations. Nevertheless, the resulting crop and farm summaries were presented to and discussed with the participating farmers as a means of educating them on the potential value of the records for their own future use. Few farmers are presently capable of using such data directly.

The Results

As explained previously, the farm records in each country were organized somewhat differently and, thus, provided somewhat different direct information. The Honduran record book was organized so that whole farm analysis could be implemented fairly directly from the records. On the other hand, the record data needed to be reorganized to produce enterprise data. In the Dominican Republic, the forms were organized for ease of data entry by the recordkeeper and to be used directly for producing enterprise budgets. Data for whole farm analysis were not generated by the records in that country.

An example of information produced by the farmer records in Honduras is shown in Table 5 and 6. The first table includes a summary of the incomes received by the nine farmers keeping records in the Ajuterique area. The

mean net farm income for 1979 was $433, but ranged from a low of $159 (L. 38.78) to a high of $938 (L. 1877.95) per year.

In Table 6 the returns to capital, operator's labor and management by crop are shown for seven of the farmers who produced tomatoes, onions, cucumbers and corn. Again, one can observe wide variability in the returns among as well as within crops. When a value for family labor was assumed, only one of five farmers producing tomatoes ended up with positive returns to capital and management. Similar results were associated with onions and cucumbers. The only crop of the four which consistently showed positive returns in the Ajuterique area in 1979 was corn.

These two tables represent only part of the analysis of farm record data carried out in Honduras. But they do illustrate how farm record data can be useful in analyzing the financial situation of small farmers and the relative profitability of selected crops. Where an analytical capability exists in an agricultural bank, such data are very useful for credit policy analysis. Other summaries produced in Honduras which also would be of use to such work included: net worth statements, cash flow statements, labor sources and use, family consumption and household expenses, and selected crop enterprise budgets. Similar summaries also were made for records maintained with one agricultural cooperative. These additional summaries can be found in the report on farm recordkeeping for Honduras [39].

The farm record books in the Dominican Republic were maintained primarily as a complementary source of data for preparing crop enterprise budgets. A total of 48 enterprise budgets were produced from the records of ten farmers in the Nizao area (for detail see [46]).

TABLE 5: INCOME STATEMENTS FOR RECORD BOOK PARTICIPANTS IN AJUTERIQUE - 1979

	PARTICIPANTS									
	1	2	3	4	5	6	7	8	9	Mean
Total Cash Farm Income	7,596.50	3,823.00	2,480.00	5,031.00	1,294.50	4,080.00	2,144.50	2,906.00	500.00	3,317.78
Total Cash Farm Expenses	4,009.55	1,904.70	2,559.50	1,444.50	2,616.64	1,900.95	2,349.70	3,063.85	1,801.20	2,294.51
Net Cash Income from Farming	3,586.95	1,918.30	(79.50)	3,586.50	(1,322.14)	2,179.05	(205.20)	(157.85)	(301.20)	1,022.77
CHANGES IN INVENTORY										
Crops and Market Livestock	(2,023.25)	(82.02)	126.15	(2,936.00)	1,729.64	(1,915.77)	226.50	1,179.63	206.97	(387.57)
Breeding Livestock and Draft Animals		250.00					140.00	(925.00)		(59.44)
Equipment and Machinery	(74.50)	(48.50)	(38.50)	(56.00)	341.10	(43.00)	(116.50)	(34.00)	41.50)	(12.38)
Land and Improvements				500.00						55.56
TOTAL CHANGE IN INVENTORY	(2,097.75)	119.48	87.65	(2,492.00)	2,070.74	(1,958.77)	250.00	220.63	165.47	(403.84)
Value of Home Consumption of Crops Produced	388.75	13.02	361.95	26.20	55.20	418.05	511.00	256.00	195.58	247.30
NET FARM INCOME	1,877.95	2,050.80	370.10	1,120.70	803.80	638.33	555.80	318.78	59.85	866.23

Source: [39]

TABLE 6: RETURNS TO CAPITAL, FAMILY LABOR AND MANAGEMENT, AND RETURNS TO CAPITAL AND MANAGEMENT PER MANZANA FOR 4 SELECTED CROPS IN AJUTERIQUE - 1979

	Observation							Mean	Range	
	1	2	3	4	5	6	7		High	Low
				(LEMPIRAS)						
TOMATOES										
Return to Capital, Family Labor and Management/MZ	314.65	-19.00	141.60	-84.32	-206.40			29.30	314.65	-206.40
Return to Capital and Management/MZ	256.15	-271.00	-36.70	-291.52	-271.73			-122.96	256.15	-291.52
ONIONS										
Return to Capital, Family Labor and Management/MZ	399.80	55.50	61.63	155.53	253.00	96.98	1746.00	395.49	1746.00	55.50
Return to Capital and Management/MZ	252.80	-67.00	-11.91	-52.13	183.00	45.88	1641.00	284.52	1641.00	-67.00
CUCUMBERS										
Return to Capital, Family Labor and Management/MZ	-58.00	95.50	-25.40	-227.00	225.90	18.10		4.85	225.90	-222.00
Return to Capital and Management/MZ	-89.50	57.00	-67.40	-297.00	218.90	-35.80		-35.63	218.90	-297.00
CORN										
Return to Capital, Family Labor and Management/MZ	227.60	55.68	166.88	305.26	61.66	204.72	10.56	147.48	305.26	10.56
Return to Capital and Management/MZ	260.10	5.86	124.25	165.26	21.28	171.47	-2.67	106.50	260.10	-2.67

One of the budgets for rice based on farm records is shown in Table 7. Variable production costs per tarea for Farmer A were $42.20 in 1980. This falls within the range of per tarea costs for rice estimated from farmer interviews shown in Appendix Table D. The range of costs across technologies was from $14.74 50 $61.40 per tarea. However, the direct seeding budget (similar to that of the record keeper) based on five farmer interviews shows an average per tarea cost of $25.55, considerably lower than that experienced by Farmer A. On the other hand, Farmer A obtained a much higher yield compared with the average obtained by the five farmers interviewed for the direct seeding method. Additional comparisons can be made for eggplant, chili, salad tomato, and onions since cost data for these crops also were obtained from farmer interviews (Appendix Table D).

This comparison shows that even when considerable specification is made when preparing "model" enterprise budgets, what takes place on a certain farmer's field may still be different. Thus, credit institutions must have sufficient flexibility in their lending procedures to allow for these differences.

The ranges for variable costs and returns above those costs for selected crops, based on farm records in Nizao, are shown in Tables 8 and 9. One crop, salad (fresh) tomatoes, had per tarea costs of $30.30 for Farmer G but $271.10 for Farmer B. As one might expect, Farmer B lost money to the tune of $25.93 per tarea (Table 9). The only crop that consistently showed positive returns over variable costs in the farm records during 1980 was onions.

Although whole farm records were not kept in the Dominican case (inventory records, fixed costs and depreciation records were not maintained),

Table 7. Costs and returns for rice production from farm records--
40 tareas in Nizao, R.D., Farmer A

This crop developed without disease or plague problems. The applied herbicide was very effective and, thus, there were few weeding expenses. The farmer did not record irrigation labor expenses due to calculation difficulty.

The sales were made to a local processor in sacks of about 81 kilograms each. Harvest and sale took place in October 1980.

A. Production and sales	Cycle: April-October 1980			
1. Sales	15,726 kg			
2. Income	$4,403.28			
3. Average price/Kg.	$ 0.28			
4. Seed stored	415 kg			
5. Value produced	$4,519.48			
6. Total production	16,141 kg			
7. Production per tarea	403.525 kg			
B. Expenses				
1. Materials				
.1 Seed	6	qq	22.00	132.00
.2 Fertilizer	7.5	qq	13.73	103.00
.3 12-24-12 fertilizer	20	qq	12.10	242.00
.4 Stam herbicide	5	.gal.	14.50	72.50
			Sub-Total....	$ 549.50
2. Labor				
.1 Seedbed				
.1 Plowing	1	Ta	5.00	5.00
.2 Land prep. and planting	9 2/3	Man-days	3.00	29.00
.3 Urea application	1/6	Man-days	3.00	0.50
.2 Chapeo	2	Man-days	3.00	6.00
.3 Plowing	40	Ta	3.50	140.00
.4 Reconstruction of bunds	6	Man-days	3.00	18.00
.5 Leveling and transplanting	40	Ta	14.00	560.00
.6 Herbicide application	6	Man-days	3.00	18.00
.7 Fertilizer application	3 2/3	Man-days	3.00	11.00
.8 Weeding	16	Man-days	3.00	48.00
.9 Harvest	190	Saco	1.50	285.00
.10 Transport	6	Man-days	3.00	18.00
			Sub-Total....	1,138.50
			Total Expenses	1,688.00

Summary

Value of production	$4,519.48
Total expenses	1,688.00
Net returns	2,831.48
Production costs per tarea	$ 42.20

Source: [46]

Table 8. Per tarea costs of production from farm records by crop and farmer, R. D.

Crop	Farmer									
	A	B	C	D	E	F	G	H	J	Mean
	(in dollars)									
Rice	42.20									42.20
Eggplant	30.03 43.81			75.84 45.24					70.15	53.01
Tomato	88.84	40.28					71.03	47.91		56.30
Chili	41.38	94.97	46.03 65.06							61.86
Onion		56.70	105.62 135.73				27.29			81.33
Corn			8.81							8.81
Okra										
Salad tomato	99.62	271.10	101.08		33.43	64.77	30.30	34.74	88.78	54.65

Source: [46]

Table 9. Returns above variable costs from farm records by crop and farmer, R.D.

Crop	Farmer								
	A	B	C	D	E	F	G	H	J
	(in dollars)								
Rice	70.78								
Eggplant	12.72 14.06			54.83 (26.46)					(37.03)
Tomato	6.43	(17.62)					101.04	(28.53)	
Chili	(18.71)[a]	143.56	(12.08) 159.30						
Onion		156.86	683.31 57.87				45.13		
Corn			24.73						
Salad tomato	38.38	(25.93)	126.67		16.24				
Okra						49.90	(22.98)	(23.98)	(.62)

[a] Denotes a loss

Source: [46]

additional analyses are possible using the available data. For example, risk analysis would be possible where a number of records are available for the same crop and/or where records are kept on the same crop over time. The average (mean) returns above variable costs can be misleading since there can be considerable variability around the mean. An enterprise producing a positive average return among farmers, but with one-half of the producers losing money, is more risky than one with the same or a lower average return but where all make some profit. As reflected in Table 9, eggplant appears less risky compared with okra. Calculation of standard deviations and coefficients of variation would be useful statistical tests of risk as more data are generated. Returns per unit of labor used and per dollar invested would be useful methods of comparison, among others.

Evaluation and Recommendations

Farm record keeping is certainly an expensive way of gathering data for use by credit and other institutions. For small, often illiterate, farmers a system of record keeping can only function if there is an outsider to help with organizing and recording the data through weekly visits. This outside interviewer or record keeper may well cost $200-$400 per month on a part-time basis and can handle 10-15 farm records. The interviewer is probably the key factor in operating a successful farm records program. Because of this, the interviewer should be selected before the farmers.

The competence and training of the interviewer are the most important factors affecting the accuracy of the records. General knowledge of agriculture and of area farmers is a definite asset. In Honduras the

most successful interviewer was a school teacher. In the Dominican Republic, a daughter of one of the farmers who was beginning university studies, worked well. In another test, a farmer with only primary education worked well. Thus, competence and general knowledge of agriculture is more important than having a lot of formal education.

The individual cooperating farmer also is important for obtaining accurate and reliable data. If the farmer or a son or daughter can record some of the data themselves this greatly reduces the load of the outside interviewer. Furthermore, the participating farmer must be sufficiently interested in helping record the weekly information or the results will be unsatisfactory. Motivating the farmer to continue his participation is a challenge since records are not needed for tax or other purposes as in the developed countries. Tying farm record keeping with provision of credit is probably one of the strongest participation motivators available in developing countries.

Record book data must be judged on their accuracy relative to other sources or methods. Usually, the more detail required, the more accurate are farm records compared with other data collection means, especially one-visit surveys. This is because farmers cannot remember such detail over time.

Farm record keeping activities (when adequately organized and managed) have a number of possible advantages over single-visit surveys [5]. Accurate data on labor and water use and the timing of such use, for example, are almost impossible to obtain through using one-visit questionnaires. Special or new crops or livestock activities can be studied by using records whereas they may be missed by surveys. Also,

farm record data can be used to check the results of data obtained through other means.

The study of farmer decision making and of the production-consumption-investment interrelationships within the farm family can be more clearly traced and understood with detailed records.

Data on rural consumption and savings patterns also can be obtained through detailed and complete farm family records. Obviously, this type of record keeping is more complex and does require more training and supervision. Nonetheless, if one expects to more clearly understand small farmers' perceptions of credit and borrowing then these other questions are important. Farm records could be a valuable source of information but this phase must come after simpler records have been established successfully.

Finally, farm records and the participating farmers can serve as a valuable educational tool. Bank administrators and technicians in both countries were invited to visit the participating farmers with a project professional. This served as an effective means of educating those Bank personnel on the costs and returns and on problems faced by small farmers. The records provide a point of reference for the visit and the ensuing discussion. Also, the farm record data can be used as material for training seminars and workshops. Finally, the records can serve as a focal point for farmer education. The reasons for profits and losses can be studied with the farmer from the records. Data from actual farm cases will be more readily received by other farmers in farm management training sessions.

PART V

GUIDELINES FOR IMPLEMENTATION IN OTHER COUNTRIES

Earlier sections of this report included information on the criteria used for designing the enterprise budget and farm record keeping systems and a detailed description of the methodologies used for the respective systems. A summary and evaluation of each system can be found at the end of the respective sections. This final section provides some generalizations on what one should consider in designing these systems for another developing country.

In the design of enterprise budgets and farm record keeping systems, the demand for increasing degrees of sophistication must be matched with the ability and expense of producing the budgets and records. The final design often will be more sophisticated than the level required by many of the users, but lower than the level required by the most exacting user. Further, the demand for budget and record data will also be shifting--as most users begin using the initial data, they will learn the meaning of the types of information that were included for the more exacting users. The ability of an institution to supply data with a higher degree of sophistication can be provided in the short run through an increase in the training provided to the staff (at a cost). The design of a system that matches this demand and supply must be done with a series of judgments about the needs and abilities of many individuals and groups. For an outside professional, fluency in the language of the country, experience in

dealing with the governmental officials and an appreciation for the culture are essential to making correct judgments about these people.

In the process of assessing the needs and abilities of the various individuals, it is important to distinguish between the political officials and the technical staff of the various units and institutions. A greater weight should be placed on the needs of the political officials since they are the ones that must provide the resources required for the operation of the system. The influence that the technical staff has with the political officials will, nevertheless, be reflected in the political officials' opinions of their needs.

This chapter suggests particular points to be considered in arriving at these judgments. Some of them are direct reflections of the authors' experiences in Honduras and the Dominican Republic, and others are based more generally on situations or conditions that could have hindered their efforts. These guidelines are divided into three sections: 1) the selection of the institution and the unit or office that will be producing the budgets and records, 2) assessment of the demand for such data, and 3) assessment of the capabilities of the responsible office.

Institutional Arrangements

It is extremely important that a single unit of an institution be solely responsible for the performance of the budgets and records system. If the other institutions in a joint or cooperative system do not fulfill their promises of support, the responsible unit must be able to produce some minimum number of budgets or records in order to assure itself of continuing support and resources.

In selecting the unit and institution to be responsible for the system, preference should be given to a unit that already has responsibility for providing economic information to the general public. This will probably be a unit of the Ministry of Agriculture. The creation of a special unit within such a department or division is an alternative, but this would require a stronger commitment from the political officials. A less risky alternative may be to begin with an existing unit and to spin the results off into a new unit once they have proven themselves to be useful and deserving of the undivided attention of a specialized, professional staff.

If no institution provides economic information to the general public, then the alternative will be to design a system for the specific needs of the institution that would be the principal user of the information. This will probably include the Agricultural Bank (or equivalent financial institution). In this case, the system could be operated either by a Planning Office or a unit of the Operations Department. The choice will probably depend on the quality of the staff of the field agents (of the Operations Department). One cannot overemphasize the need in this case to design the budgets and records for this particular user rather than try to meet the needs of many different institutions. If these resulting data achieve acceptance by the other institutions, the system could be enlarged and taken over by the Ministry of Agriculture.

Under either of these alternative arrangements, it will be important to decentralize (to the field level staff) virtually all of the decisions as to which particular budgets should be prepared and the

extent to which farm records should be established. This decentralization is needed because no central office staff can be expected to remain knowledgeable about the current agricultural and technological practices of the farmers, unless they spend all their time (and a lot of money) in the field. The central staff should be trainers and supervisors of the field staff and should provide the clerical systems for printing and distributing the final budgets, farm summaries, and other data.

Assessment of the Demand for Data

The logical first step in assessing the demand for data from enterprise budgets and farm records, and the appropriate degree of sophistication, is to determine the current uses and availability of such data. The following list of general types of information and coverage of activities may be used as a guide in this determination.

I. Types of Information
   A. Variable costs
      1. Total only
      2. By line item (degree of completeness?)
   B. Fixed costs
      1. Total only
      2. Schedule of capital asset requirements, cost and depreciation, etc.
   C. Production and Disposition
      1. Yield
      2. Sales
      3. Home or farm consumption
   D. Value of production
   E. Computation of returns (profit)
      Are costs attributed to land, owner labor and capital with resulting residual returns estimated?
   F. Degree of specification of enterprise (technology, land area of applicability and time period)
   G. Farm and household decision making
      1. Consumption and savings--cash flows
      2. Production and investment
      3. Farm and household interrelationships
   H. Off-farm employment and sources of income
   I. Amount and nature of risk and uncertainty faced by the farm family

II. Types of Activities
   A. Annual (or single-harvest) crops
   B. Perennial crops (How is timing of income and expenses considered?)
   C. Intercropping enterprises
      1. Annuals only
      2. Annuals intercropped with perennials
      3. Perennials only
   D. Livestock enterprises
   E. Household income-producing activities

Although most of these types of information are provided only through a formal data collection system, many of them can be provided (with greater or lesser degrees of reliability) through other systems or studies. For example, most Ministries of Agriculture will have an estimate of total variable costs for a crop--obtained through formal surveys of farmers, extension agents and bank field agents and/or through informal discussions with farmers during normal travels. Nevertheless, these data often are inaccurate or outdated. Data on labor use, household decision making, and risk are not usually available.

The second step in assessing demand is to determine how these types of information are to be used. Of greatest importance is the use of this information in the institution that is to be responsible for the collection system, since continued support will require a perception of usefulness for the institution. The use of data in other organizations will be important to the extent that the responsible institution places importance on providing such information to other organizations.

If the political officials do not now use much budget or farm records information (of any type), it may be a reflection of their lack of understanding about the meaning and usefulness (for them) of the data. If this is the case, do not attempt to create a sophisticated system. Few political officials will provide strong support for a system that produces

information they cannot understand. In making this assessment, do not ask: "Do you use farm level data?" The question should be "What data do you need, and for which decisions?"

Another possibility is that the political officials understand, and perceive a need for, farm level data, but do not now have adequate data made available to them. This case will allow the design of a more sophisticated system.

If a staff of trained economic analysts exists in the institution, a greater degree of sophistication may be useful. In this case, however, an assessment is needed of the degree of influence that the technical staff exerts on the political officials and the degree of support that they enjoy. In any case, there may be a strong temptation to design an overly sophisticated data collection system that may later receive an insufficient supply of resources with which to comply with the methodology.

The implementation of a budgets and farm records system (or any other information providing system) should progress slowly from the initial methodology to higher degrees of sophistication. The political users of the information will learn more analytical tools (and therefore require more information) most efficiently when the sophistication of the information provided only slightly exceeds their ability to use it. If the information provided is at or below their understanding, the system will be unable to induce an improvement in their abilities in economic analysis. If the system provides an excessive (in their opinion) amount of information, then they will not be as willing to support the expense of the system.

The assessment of the demand for different degrees of sophistication in a data collection system is a very difficult task. After the initial

conversations with the political officials, the local technical staff should participate in the design of the system and the methodology. This participation will permit an assessment of their technical abilities and their interest in, or enthusiasm for, the development of the system. If no significant contributions are forthcoming, the design should be simplified. It will make little difference if the lack of contributions is due to lesser abilities or lack of interest--in either case, the outside professional will have to do all of the work.

Assessment of the Data Collection Capability

The assessment of the technical and institutional abilities for the operation of a data collection system is just as important as the assessment of the demand for using the data. Once again, the assessment must consider alternative degrees of sophistication since intensive training can significantly alter the technical abilities of the data collection office's staff. This assessment can be divided into two categories: 1) technical/professional abilities of the staff, and 2) institutional/bureaucratic efficiencies of the unit and the larger institution.

The technical and professional abilities of the staff refer quite simply to their mastery of the subject matters. In this case, the subject matters include knowledge about agronomy and animal husbandry; familiarity with agricultural input and product markets and their operation; and basic farm management concepts and tools, including classification of costs, budgets and other financial statements, and the time value of money (multi-period analysis). Extreme importance must be given to the staff's mastery of basic arithmetic and algebraic skills and their discipline in performing and checking their mathematical operations

and in transferring data from interview forms to tabulation forms to final budget forms, or in checking farm records and transferring such data to summaries. If the staff is deficient in any of these areas, either the methodology should be designed at a lower degree of sophistication or a series of training sessions must be devoted to raising the level of their abilities.

Institutional efficiency is difficult to assess in the short time that will be available for the design stage of a project to develop a farm level data collection system. A number of characteristics can be mentioned, but they are very interdependent. A deficiency in one area is likely to be an indication of deficiencies in the others.

An initial characteristic is concerned with the relative importance of the unit itself and of the units directly above it in the chain of command and the degree of logistical and financial support it receives. The assessment of this characteristic may be approached by investigating the priorities placed on the activities of each unit at the same level and at successively higher levels. This may include the following questions:

1) Which activities are most discussed by the superiors?
2) Which units have the more dynamic staff or fewer politically appointed staff?
3) Which units are able to borrow vehicles and staff from other units?
4) Which units can establish their own funds in order to avoid the paperwork of the standard disbursement bureaucracy?
5) Which units can obtain special supplemental budgets or receive larger proportions of their 'approved' budgets?

Of critical importance is the relative priority of the budgets and farm

records within the unit responsible for the work, if the unit has more than one activity.

A second characteristic is concerned with the quality of leadership and the motivation of the staff. The assessment of this characteristic can be approached by observing meetings of the unit. Of particular interest will be:

1) the respect shown by the subordinates (note that informality is not a sufficient condition for disrespect), and
2) the excuses used for inability to fulfill responsibilities.

A third characteristic is concerned with the use of the unit's staff for irregular assignments. The data collection unit itself may have a greater importance than its regularly assigned responsibilities. In the Dominican Republic, the budget unit's staff had a high proportion of university-trained agronomists, with the result that they were commonly required to dedicate large amounts of their time to special (normally "emergency") studies.

A fourth characteristic is concerned with confusing or contradictory line authority in the organizational structure. Field staffs of ministries of agriculture generally are divided into regions. Each staff member is responsible to the Regional Director for 'administrative' purposes and to the appropriate central office unit for 'technical' direction. The field staff, however, knows very well that the Regional Director can fire them. The result is a constant use of staff for special assignments that interfere with the fulfillment of the responsibilities assigned to them from the central office. A dependence on

inter-unit "coordination," as specified in the unit's work plans and stated objectives may also be a cause of institutional inefficiency.

In summary, the design of a data collection system in isolation is a relatively simple task. The challenge is to design a system that is both consistent with the needs of the users at that point in time but sufficiently adjustable to change over time as needs increase, and is consistent with institutional capabilities in producing those data. Training to improve user capabilities as well as to improve the quality and relevance of the data will be important in any case.

APPENDIX

Appendix Table A. List of Grain Crop Budgets in Honduras

June 30, 1980

Region	Crop	Yield Level	Budget Number
San Pedro Sula-Yojoa	corn	low	01011
" "	"	med	01012
" "	"	high	01013
" "	beans	low	01021
" "	"	med	01022
" "	rice	med	01042
" "	"	high	01043
San Pedro Sula-Macuelizo	corn	med	01012
" "	"	high	01013
" "	beans	med	01022
San Pedro Sula-Choloma	corn	med	01012
" "	corn	high	01013
" "	rice	high	01043
San Pedro Sula-Quimistan	corn	low	01011
Puerto Cortes	corn	low	01011
" "	corn	med	01012
" "	corn	high	01013
" "	beans	med	01022
" "	rice	low	01041
" "	rice	med	01042
" "	rice	high	01043
El Progreso	corn	low	01011
" "	corn	med	01012
" "	corn	high	01013
" "	rice	low	01041
" "	rice	med	01042
La Ceiba	corn	low	02011
" "	corn	med	02012
" "	corn	high	02013
" "	beans	med	02022
" "	rice	med	02042
" "	rice	high	02043
Tela	corn	low	02011
"	corn	med	02012
"	beans	low	02021
"	beans	med	02022
"	rice	med	02042
"	rice	high	02043
Olanchito	corn	low	03011
"	corn	med	03012
"	beans	med	03022
"	rice	low	03041
"	rice	med	03042

Region	Crop	Yield Level	Budget Number
Tocoa	corn	low	04011
"	corn	med	04012
"	corn	high	04013
"	beans	low	04021
"	rice	low	04041
Comayagua-Villa San Antonio-Lejamani	corn	med	06011
"	corn	med	06012
"	corn	high	06013
"	beans	low	06021
"	beans	med	06022
"	beans	high	06023
"	sorghum	low	06031
"	sorghum-improved	med	06032
"	sorghum-improved	high	06033
"	rice	low	06041
"	rice	med	06042
"	rice	high	06043
Comayagua-Ajuterique-Cane-LaPaz	corn	med	06012
"	corn	high	06013
"	beans	med	06022
"	beans	high	06023
"	rice	low	06041
"	rice	med	06042
"	rice	high	06043
Comayagua-Siguatepeque-Meambar-Jesus de Otoro	corn	low	06011
"	corn	med	06012
"	beans	low	06021
"	beans	med	06022
"	rice	low	06041
"	rice	med	06042
Comayagua-San Jeronimo-Esquias-Minas de Oro	corn	low	06011
"	corn	med	06012
"	beans	low	06021
"	beans	med	06022
"	rice	low	06041
"	rice	med	06042
Comayagua-La Libertad Ojo de Agua	corn	low	06011
" "	beans	med	06022
	rice	low	06041
Tegucigalpa	corn	low	07011
"	corn	med	07012
"	corn	high	07013
"	beans	low	07021
"	beans	med	07022
"	beans	high	07023
"	sorghum-unimproved	med	07032
"	rice-dryland	med	07042
Danli-El Pariso	corn-hillside	low	08011
" "	corn-plains	low	08011
" "	corn	med	08012
" "	corn-herbicide	high	08013

Region	Crop	Yield Level	Budget Number
Danli-El Pariso	corn-no herbicide	high	08013
" "	beans-first season	low	08021
" "	beans-second season	low	08021
" "	beans/corn mixed	low	08021
" "	beans	med	08022
" "	rice	high	08043
Juticalpa-Catacamas	corn	low	09011
" "	corn	med	09012
" "	corn-bullocks owned	med	09012
" "	corn	high	09013
" "	beans	low	09021
" "	beans	med	09022
" "	beans-bullock owned	med	09022
" "	sorghum	high	09033
" "	sorghum-tractor owned	high	09033
" "	rice	med	09042
Santa Rosa de Copan	corn-early	low	10011
" "	corn	med	10012
" "	corn	high	10013
" "	corn/beans mixed, hillside	N.A.	10081
" "	corn/beans mixed, plains	N.A.	10081
" "	corn/sorghum mixed, hillside		10090
" "	corn/sorghum mixed, plains		10090
" "	beans	low	10021
" "	beans	med	10022
" "	rice	low	10041
" "	rice	med	10042
" "	rice	high	10043
Ocotepeque	corn	low	10011
"	corn	med	10012
"	beans	low	10021
"	beans	med	10022
"	rice	low	10041
"	rice	med	10042
"	rice	high	10043
Gracias-Lempira	corn-first season	low	10011
" "	corn-second season	low	10011
Lempira-La Virtud	corn/sorghum mixed	N.A.	10090
Lempira-Mapulaca	corn/sorghum mixed	N.A.	10090
Lempira-Erandique	corn/sorghum mixed	N.A.	10090
Lempira-Candelaria	corn/sorghum mixed	N.A.	10090
Lempira-La Campa	corn/sorghum mixed	N.A.	10090
Lempira-Virginia	corn/sorghum mixed	N.A.	10090
Lempira-Mapulaca	corn/sorghum mixed	N.A.	10090
Gracias-Lempira	beans-first season	low	10021
" "	beans-second season	low	10021
" "	beans-first season	med	10022
" "	beans-second season	med	10022

Region	Crop	Yield Level	Budget Number
Gracias-Lempira	rice	low	10041
Choluteca-Nacaome	corn	low	11011
" "	corn	med	11012
" "	sorghum-unimproved	low	11031
" "	sorghum-unimproved	high	11032
" "	sorghum-improved	high	11033
" "	rice-dryland	med	11043
" "	rice-irrigated	high	11044
" "	sesame-November plant	N.A.	11062
" "	sesame-August plant	N.A.	11063
Santa Barbara	corn	low	12011
" "	corn	low	12011
" "	corn-30 qq/mz	med	12012
" "	corn-45 qq/mz	med	12012
" "	corn	high	12013
" "	beans-first season	med	12022
" "	beans-second season	med	12022
" "	rice	med	12042
Yoro	corn	low	13011
"	corn	med	13012
"	corn	high	13013
"	beans	low	13021
"	beans	med	13022

Appendix Table B. Enterprise Budgets Prepared by Region,

Dominican Republic 1980-81

I. NORTH REGION

1-10-1234A*	Tall rice
1-10-1234A*	Tall rice, mechanical harvesting
1-10-2220A*	Swamp rice
1-11-0014A	Corn
1-20-0024A	Red beans
1-21-0024A	Black beans
1-31-0002A*	Sweet cassava
1-31-0024A*	Sweet cassava
1-32-0001B	Yautia
1-36-0002B	Sweet potato
1-36-0024A	Sweet potato
1-42-1334A	Chili
1-63-0034A*	Pineapple, double row
1-63-0034A*	Pineapple
1-70-1014A*	Tobacco
1-70-1022A*	Tobacco, criole
1-70-1024A*	Tobacco, criole

II. NORTHEAST REGION

2-10-0233A*	Short rice
2-10-11104*	Swamp rice
2-10-2210A*	Tall rice
2-11-0002A	Corn
2-11-0014A	Corn
2-20-0012A	Red beans
2-20-0014A	Red beans
2-32-0000B	Yautia
2-33-0000B	Yams
2-36-0012A	Sweet potato
2-36-0014A	Sweet potato

III. NORTHWEST REGION

3-10-1224A*	Tall rice, air spraying
3-10-1234A*	Tall rice
3-10-2220A*	Tall rice, regrowth
3-10-2230A*	Tall rice, regrowth
3-11-0004A	Corn
3-20-0000B	Red beans
3-20-0014A	Red beans
3-20-0224A	Red beans
3-20-0224A*	Red beans, animal planting
3-25-0022B	Peanut

3-25-0024A*	Peanut, animal planting
3-31-0002B*	Sweet cassava
3-31-0004A*	Sweet cassava
3-42-1334A	Chili
3-46-1333A	Onion

IV. CENTRAL REGION

4-10-1233A*	Tall rice
4-20-0012B	Red beans
4-24-0002B	Guandul
4-25-0014A	Peanut
4-30-0032B	Potato
4-32-0000B	Yautia
4-35-0002B	Ginger
4-44-0014A	Auyama
4-45-1234A	Eggplant
4-46-0233A	Onion
4-46-1233A	Onion
4-50-0234A	Cucumber
4-51-0001B	Lettuce
4-52-1022B	Cabbage
4-53-0002B	Carrots

V. SOUTHWEST REGION

5-20-0002B	Red beans
5-20-0012B*	Red beans, animal planting
5-20-0213A*	Red beans, animal planting
5-21-0014A*	Red beans, animal planting
5-21-0214A*	Red beans, animal planting
5-24-0000B	Guandul

VI. SOUTH REGION

6-10-0213A*	Tall rice
6-10-1223A*	Tall rice
6-11-0213A	Corn
6-12-0024A*	Sorghum, mechanical harvest
6-31-0203A*	Sweet cassava
6-36-0213A*	Sweet potato
6-40-1234A*	Salad tomato

VII. EAST REGION

7-10-01104*	Swamp rice
7-10-1323A*	Short rice
7-11-0013B*	Corn, animal planting
7-11-0014B*	Corn, animal planting
7-20-0011B	Red beans
7-20-0014B	Red beans
7-20-0014B*	Red beans, animal planting

7-20-0023B*	Red beans, animal planting
7-21-0011B	Black beans
7-21-0014B*	Black beans, animal planting
7-21-0023B*	Black beans, animal planting
7-25-0013B*	Peanut, animal planting
7-25-0014B	Peanut
7-28-0023B*	Cowpea, animal planting
7-30-0333B	Potato
7-31-0000B*	Sweet cassava
7-31-0014B*	Sweet cassava
7-32-0000B	Yautia
7-33-0000B	Yam
7-42-1333B	Chili
7-46-1334B	Onion

VIII. NORTH CENTRAL REGION

8-10-1233A*	Tall rice, mechanical harvest
8-11-0002A	Corn
8-11-0004A	Corn
8-11-0014A	Corn
8-20-0002A	Red beans
8-31-0012A*	Sweet cassava
8-36-0002A	Sweet potato
8-48-1234A*	Lettuce
8-52-1234A*	Cabbage

Appendix Table C.

CROP ENTERPRISE COST STUDY *

WHEAT AT ABU-RAIA AERA (1)

Prepared by: 4STUDENTS&FAROUK ABDELAL — EGYPT WATER USE & MANAGEMENT PROJECT
Identifier Code: Tp-1,Trk-1,f-7
Date Prepared: AUGUST 20, 1979

Item	Unit	Number of Units	Price or Value per unit L.E.	Total income or Costs L.E.
Income				
Wheat grains	Ardab	8.0	8.000	64.00
Wheat straw	Camel load	6.0	6.000	36.00
Total Income				100.00
Variable Costs				
Org. Fert. transportation	Donkey load	150.0	0.050	7.50
Labor to spread org. fert.	Man hour	6.0	0.200	1.20
Plowing	Tractor hour	2.0	1.250	2.50
Land smoothing	Tractor hour	1.0	1.250	1.25
Seeds	kaila	6.0	1.000	6.00
Labor to spread seeds	Man hour	3.0	0.200	0.60
Weeding	Boy hour	12.0	0.100	1.20
CHEMICAL FERTILIZER		0.0	0.000	0.00
Ammonium nitrate (31.5-0-0)	Kg.	150.0	0.050	7.50
Labor to spread chem.fert.	Man hour	4.0	0.200	0.80
IRRIGATION (2)		0.0	0.000	0.00
Sakia rent	Sakia hour	15.0	0.080	1.20
Cow or Buffle rent	C.or B. hour	15.0	0.300	4.50
Girl or Boy to observe sakia	B.or G. hour	15.0	0.100	1.50
Labor to spread water	Man hour	15.0	0.200	3.00
HARVESTING		0.0	0.000	0.00
Labor for harvesting	Man hour	36.0	0.200	7.20
Thrashing	Machine hour	6.0	1.150	6.90
Winnowing	Machine hour	3.0	1.150	3.45
TRANSPORTATION		0.0	0.000	0.00
Labor for loading	Man hour	3.0	0.200	0.60
Transport grains by camel	Camel load	3.0	1.000	3.00
Total Variable Costs				59.90
Return Above Variable Costs				40.10
Fixed Costs				
Land rent	Month	6.0	5.000	30.00
Management charge	Month	6.0	1.000	6.00
Total Fixed Costs				36.00
Grand Total Costs				95.90
Return Above All Costs				4.10

FOOTNOTES:

* This study for an area of one feddan.
(1) These data was collected from 4 study cases at ABU-RAIA site by IBRAHIM ELSHENNAWY, MOHAMED ELGAZZAR, ABDELHALIM ELSHERBINY and MOHAMED SALAMA Students from FACULTY OF AGRICULTURE AT KAFR ELSHEIKH-ECONOMICS DEPARTMENT
(2) Wheat needs about 5 irrigations , 1F. needs about 1600 cu. meters .

	LABOR DISTRIBUTION			WATER DISTRIBUTION, CU METERS			
	Man Hours	Woman Hours	Boy/Girl Hours	First Irrig.	Second Irrig.	Third Irrig.	Fourth Irrig.
October	0	0	0	0	0	0	0
November	12	0	3	180	0	0	0
December	5	0	3	400	0	0	0
January	0	0	12	0	0	0	0
February	7	0	3	345	0	0	0
March	3	0	3	348	0	0	0
April	5	0	3	327	0	0	0
May	3	0	0	0	0	0	0
June	39	0	0	0	0	0	0
July	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0
Total	67	0	27	Total Water Applied=		1600 cu meters	

FOOTNOTES:

Water requirements based on our project research stations' data .
- Working day = 6 hours .

Appendix Table D. Yield and Production Costs by Tarea, Crop and Region, Dominican Republic 1980-81

Crop	Region[a/]	Harvest Rate	Cost of Production Mean	Cost of Production Min.	Cost of Production Max.	Plot Size in Tarea Mean	Plot Size in Tarea Min.	Plot Size in Tarea Max.	Yield Per Tarea	Cost Per Unit Produced
Tall rice	South	6-11/80	$ 25.55	$ 14.74	$ 44.81	25.6	14	60	103.7 kg.	$0.246 /kg.
"	South	10-12/80	47.67	33.05	61.40	35.8	18	60	142 kg.	0.336 /kg.
"	North	8/80	54.03	42.73	73.32	63.8	25	185	262.1 kg.	0.206 /kg.
"	Monte Cristi (P)	10/80	74.08	70.79	78.36	36.4	30	42	248.9 kg.	0.298 /kg.
Fumagacion Aerea	Valverde (P)	7-9/80	55.37	49.00	60.89	67.6	30	108	319.1 kg.	0.174 /kg.
Tall rice, regrowth	Northeast	10-12/80	16.89	12.91	19.57	46.0	40	50	177 kg.	0.095 /kg.
"	North	10/80	32.06	19.29	41.85	27.2	15	50	211 kg.	0.152 /kg.
"	Monte Cristi (P)	11-12/80	18.11	15.93	21.21	164.0	15	250	162.5 kg.	0.112 /kg.
"	Valverde (P)	11/80	24.67	20.14	26.98	34.0	10	40	242.3 kg.	0.102 /kg.
Swamp rice	East	1-2/80	29.92	23.44	35.[illegible]	32.6	20	50	244 kg.	0.123 /kg.
"	Northeast	1/81	33.55	32.13	36.4[illegible]	41.4	35	50	112.6 kg.	0.298 /kg.
Short rice	Northeast	6-9/80	48.93	40.71	54.00	106.7	45	187	227.7 kg.	0.215 /kg.
"	Central	6-8/80	58.30	44.34	68.97	20.3	8	60	375 kg.	0.156 /kg.
Short rice, Mecan:cal harv.	Northcentral	11-12/80	58.74	53.05	63.57	156.0	50	270	309.4 kg.	0.190 /kg.
"	East	7-8/80	45.98	38.79	49.55	46.5	29	60	190.9 kg.	0.241 /kg.
Corn	Northeast	5-8/80	12.91	7.35	20.62	26.7	10	45	127.2 kg.	0.102 /kg.
"	Northcentral	7-12/80	12.98		22.15	27.2	5	70	N.A.	N.A.
"	Northwest	8/80	12.33	11.38	13.40	48.4	20	100	94.2 kg.	0.131 /kg.
"	Northcentral	7-11/80	11.12	6.44	20.63	19.1	4.5	30	136.8 kg.	0.081 /kg.
"	East	7-9/80	7.70	5.80	11.39	57.6	35	100	61.5 kg.	0.125 /kg.
"	North	4-7/80	11.95	6.77	17.53	50.7	20	100	183.3 kg.	0.065 /kg.
"	Northeast	8/80	15.15	8.47	28.64	22.8	10	35	117.3 kg.	0.129 /kg.
"	Northcentral	7-8/80	12.69	9.58	15.35	42.2	8	100	154.5 kg.	0.082 /kg.
"	South	5-10/80	16.95	14.18	19.87	11.6	5	20	92.5 kg.	0.183 /kg.
Sorghum	South	12/79	11.37	5.83	14.98	166.8	78	390	4.64 QQ.	2.45 /QQ
Red beans	Dajabón y Stgo. Rodriquez (P)	6-8/80	14.75	12.86	17.18	21.3	12	50	71.5 lb.	0.206 /lb.
Red beans	Northwest	9-12/80	13.80	11.06	17.18	33.0	15	40	0.218 QQ	63.30 /QQ
"	Northcentral	2-3/80	18.31	11.34	30.55	28.8	20	45	N.A.	N.A.
"	East (except S. Rafael del Yuma)	3-4/80	21.17	20.43	22.18	9.6	5	14	105.6 lb.	0.201 /lb.
"	Northeast	2-3/80	20.27	17.08	24.02	23.4	7	50	128.7 lb.	0.158 /lb.
"	Central	11/80	18.88	15.02	23.14	16.4	8	36	90.2 lb.	0.209 /lb.
"	Northeast	2-3/80	23.44	16.55	25.47	14.2	4	20	85.5 lb.	0.274 /lb.
"	Dajabón (P)	2/80	19.91	19.12	21.23	18.6	10	40	99.0 lb.	0.201 /lb.
"	El Seybo (P)	1/80	16.17	15.74	16.83	23.4	10	47	67.5 lb.	0.239 /lb.
"	North	1-3/80	21.71	19.37	24.51	44.6	18	80	143.0 lb.	0.152 /lb.

a/ Provinces are indicated by (P).

Crop	Region	Harvest Rate	Cost of Production Mean	Min.	Max.	Plot Size in Tarea Mean	Min.	Max.	Yield Per Tarea	Cost Per Unit Produced
Red beans	Monte Cristi (P)	11/79-1/80	$ 32.12	$ 27.66	$ 34.97	20.4	12	36	158.3 lb.	$0.191 /lb.
Red beans with animal	Southwest	9-12/80	16.61	15.33	19.38	28.0	15	40	N.A.	N.A.
"	East (except S. Rafael del Yuma	1-4/80	19.43	17.42	22.77	34.6	25	50	126.8 lb.	0.153 /lb.
"	S. Rafael del Yuma	1-2/80	15.59	13.87	17.76	30.0	20	40	107.8 lb.	0.145 /lb.
"	Southwest	12/80	21.27	18.50	25.25	61.0	25	110	N.A.	N.A.
"	Northwest	1/80	29.93	24.36	32.87	28.6	14	40	197.8 lb.	0.151 /lb.
Black beans	East (except S. Rafael del Yuma	4-6/80	18.31	16.24	20.61	10.6	3	25	85 lb.	0.215 /lb.
Black beans	North	7-8/80	21.64	17.07	28.10	19.8	7	45	N.A.	N.A.
Black beans with animal	Southwest	12/80	20.92	16.86	25.98	31.0	15	50	N.A.	N.A.
"	East (except S. Rafael del Yuma	1-3/80	12.34	10.35	14.40	68.0	40	110	84.3 lb.	0.146 /lb.
"	S. Rafael del Yuma	1-2/80	13.88	12.52	14.97	49.0	10	80	127.6 lb.	0.109 /lb.
"	Southwest	9-12/80	22.51	20.04	25.19	30.2	20	40	N.A.	N.A.
Guandul	Southwest	1-2/80	10.68	9.61	12.48	48.0	30	60	1.005 QQ	10.63 QQ
"	Central	12/79-2/80	11.92	8.39	14.08	30.2	10	54	N.A.	N.A.
Peanuts	Central	7-11/80	15.16	12.45	19.61	14.8	8	26	41.3 kg.	0.368 /kg.
"	East	6/80	12.60	11.53	13.16	15.0	1	28	31.0 kg.	0.407 /kg.
"	Dajabón y Stgo. Rodriguez(P)	6-7/80	20.53	17.57	23.80	21.4	10	35	45.6 kg.	0.414 /kg.
Peanuts with animal	Dajabón y Stgo. Rodriguez	6-7/80	20.12	18.35	22.00	23.2	12	60	73 kg.	0.276 /kg.
Peanuts with animal and	East	6-7/80	16.92	14.59	18.51	46.4	25	96	52 kg.	0.325 /kg.
Cowpea with animal	S. Rafael del Yuma	5-6/80	10.45	8.21	12.47	32.6	8	80	85 lb.	0.123 /lb.
Potato	Central	9-11/80	109.93	95.11	120.84	11.0	6	15	771 kg.	0.143 /kg.
"	East	2-3/80	106.82	93.81	131.72	15.0	5	24	835 kg.	0.128 /kg.
Sweet cassava	East	9/79-4/80	22.33	14.40	31.73	30.4	12	50	840 lb.	0.027 /lb.
"	North	9-11/80	16.36	11.33	18.75	11.4	6	15	526 lb.	0.031 /lb.
"	Dajabón y Stgo. Rodgriguez(P)	8-11/80	20.37	18.00	26.85	16.0	10	20	779.3 lb.	0.026 /lb.
"	Northcentral	8/80	26.58	24.00	30.45	8.8	3	15	800 lb.	0.033 /lb.
"	East	12/79-4/80	20.17	9.75	29.00	39.0	15	70	940 lb.	0.022 /lb.
"	North	6-9/80	22.16	17.66	22.47	27.2	10	60	861 lb.	0.026 /lb.
"	South	9-12/80	27.87	16.67	50.00	12.6	4	24	6/87 QQ	4.06 /QQ
Bitter cassava	Dajabón y Stgo. Rodriguez(P)	8-10/80	19.53	15.94	22.40	26.0	10	50	963.4 lb.	0.020 /lb.

Crop	Region	Harvest Rate	Cost of Production Mean	Min.	Max.	Plot Size in Tarea Mean	Min.	Max.	Yield Per Tarea	Cost Per Unit Produced
Yautia	Northwest	2-6/80	$38.21	$29.50	$49.44	16.2	5	30	743.4 lb.	$0.051 /lb.
"	Central	1-3/80	24.81	19.46	31.29	46.2	12	80	628 lb.	0.038 /lb.
"	East	10-11/80	39.37	30.67	46.52	28.0	20	35	867 lb.	0.045 /lb.
"	North	4-5/80	28.71	24.05	37.60	25.0	20	30	563 lb.	0.051 /lb.
Yam	Northeast	1-3/80	26.98	18.95	32.67	30.8	4	100	437.7 lb.	0.062 /lb.
"	East	1-4/80	42.08	38.01	49.91	35.8	6	60	946 lb.	0.045 /lb.
Ginger	Central	3/80	69.26	42.70	98.32	14.0	10	15	660.7 kg.	0.105 /kg.
Sweet potato	North	6-9/80	22.94	12.50	47.08	19.1	10	36	430 lb.	0.053 /lb.
"	Northcentral	6/80	23.12	11.34	30.55	28.8	20	45	1566.6 lb.	0.015 /lb.
"	Northeast	7-8/80	20.69	12.70	27.91	20.8	7	35	545 lb.	0.038 /lb.
"	Northeast	4-5/80	19.19	14.60	23.77	22.4	9	45	205 lb.	0.094 /lb.
"	North	4-5/80	21.21	14.90	26.79	61.8	15	100	756 lb.	0.028 /lb.
"	South	7-11/80	34.04	22.21	63.83	27.0	10	55	741.4 lb.	0.046 /lb.
Salad tomato	South	7-9/80	119.49	78.90	163.72	15.0	14	17	2947 lb.	0.040 /lb.
Chili	East	7-8/80	67.65	59.01	74.95	8.8	6	10	N.A.	N.A.
"	North	4-7/80	76.58	64.52	103.80	9.2	7	14	1407 lb.	0.054 /lb.
"	Valverde (P)	7-8/80	72.28	58.41	82.09	14.4	10	20	1634.7 lb.	0.044 /lb.
Auyama	Central	1-6/80	17.42	13.51	22.83	30.6	18	50	1383 lb.	0.013 /lb.
Eggplant	Central	9-10/80	58.86	41.06	77.66	19.0	10	50	N.A.	N.A.
Onion	Central	4-6/80	89.95	73.10	107.66	13.5	6	25	1378 lb.	0.065 /lb.
"	Central	5-8/80	120.03	99.93	143.49	11.4	4	22	14.2 QQ	8.45 /QQ
"	Valverde (P)	1-3/80	93.97	82.16	114.56	28.0	10	50	876.3 lb.	0.107 /lb.
"	East	1-2/80	73.24	65.46	80.35	14.4	3	50	457.5 lb.	0.160 /lb.
Lettuce	Valle de Constanza	11-12/80	50.40	44.57	59.63	3.0	1	7	2592 lb.	0.019 /lb.
Cucumber	Central	11-12/80	71.80	44.04	120.19	5.6	1	12	N.A.	N.A.
Beets	Central	12/80	20.55	9.65	28.60	20.0	10	30	91.3 kg.	0.225 /kg.
Cabbage	Central	7/80-1/81	45.08	19.67	66.42	12.8	4	25	.644 thous.	70.00 /Mil.
"	Valle de Constanza	12/80-1/81	63.02	57.78	66.81	6.2	3	15	2.43 thous.	25.93 /Mil.
Carrots	Central	8-12/80	21.92	16.06	31.18	36.0	10	60	325 lb.	0.067 /lb.
Pineapple, double	North	11-12/80	244.18	197.83	288.64	60.4	12	100	1494 pina y 3712 hijue.	.163/pina + 2,485 hijue.
"	North	6-7/80	164.42	143.50	185.27	27.2	4	80	1145 pina y 3166 hijue.	.144/pina + 2.765 hijue.
Tobacco, criole	North	1-3/80	66.26	35.43	101.37	26.7	6	70	126 sartas	0.526/sarta
"	North	2-6/80	60.80	38.66	89.61	26.2	10	46	119.3 sar.	0.510/sarta
Tobacco. leaf	North	2-6/80	69.66	39.79	118.86	34.5	10	55	132.7 sar.	0.525/sarta

Appendix Table E. Summary of Corn Production Costs by Region and Yield Category--Honduras

Lempiras/Manzana

	Región	Low Yield		Medium Yield		High Yield	
		Variable Cost	Total Cost	Variable Cost	Total Cost	Variable Cost	Total Cost
1.	San Pedro Sula	231.30	314.07	368.00	438.92	373.00	446.29
	Puerto Cortés	231.20	285.62	317.00	368.25	429.00	485.64
	El Progreso	224.60	281.14	470.10	566.23	452.36	547.38
2.	La Ceiba	207.48	264.24	372.00	441.61	590.00	677.65
	Tela	186.00	236.93	421.00	521.94	N.A.	
3.	Olanchito	246.00	316.45	341.60	415.87	N.A.	
4.	Tocoa	220.00	297.96	261.00	341.81	377.50	470.41
5.	Marcala y Camasca	N.A.					
6.	Comayagua y Minas de Oro	223.75	299.54	417.25	484.06	576.50	666.19
7.	Tegucigalpa	193.65	246.72	325.00	412.67	387.80	473.77
8.	Danlí y El Paraíso	210.08	249.35	383.80	436.65	492.35	553.13
9.	Juticalpa y Catacamas	273.92	338.29	293.40	382.02	403.20	489.90
10.	Sta.R. de Copán	257.00	355.05	365.50	477.19	461.00	583.65
	Ocotepeque	370.60	465.22	384.30	485.47	N.A.	
11.	Choluteca y Valle	121.30	159.72	269.03	319.97	N.A.	
12.	Sta. Bárbara y San Luis	270.00	316.04	258.00	306.74	396.00	445.75
13.	Yoro	263.15	357.14	388.20	494.85	569.00	704.15

Appendix Table F. Break-Even Prices for Corn Production--Honduras

Lps./qq

	Región	Low Yield Excluding O/costs[a]	Low Yield Including O/costs	Medium Yield Excluding O/costs	Medium Yield Including O/costs	High Yield Excluding O/costs	High Yield Including O/costs
1.	San Pedro Sula	9.64	13.09	8.43	10.58	6.30	7.52
	Puerto Cortés	7.71	9.52	7.04	8.18	7.15	8.09
	El Progreso	9.35	11.71	9.40	11.32	5.65	6.84
2.	La Ceiba	8.38	10.27	8.42	9.81	7.38	8.47
	Tela	9.80	11.85	8.42	10.44	N.A.	
3.	Olanchito	8.20	10.54	5.63	6.93	N.A.	
4.	Tocoa	7.33	9.93	6.53	8.55	6.29	7.84
5.	Marcala y Camasca	N.A.					
6.	Comayagua y Minas de Oro	8.95	11.98	8.35	9.68	7.21	8.12
7.	Tegucigalpa	10.75	13.70	7.38	9.37	6.46	7.90
8.	Danlí y El Paraíso	9.13	10.84	8.53	9.71	8.04	9.05
9.	Juticalpa y Catacamas	9.44	11.66	6.52	8.48	6.72	8.16
10.	Sta.R.Copán	12.85	17.75	10.44	13.63	7.68	9.72
	Ocotepeque	16.11	20.23	9.37	11.84	N.A.	
11.	Choluteca y y Valle	6.06	7.98	8.15	9.69	N.A.	
12.	Sta. Bárbara y San Luis	11.25	13.17	5.73	6.82	6.60	7.43
13.	Yoro	8.77	11.90	9.71	12.37	6.62	8.19

[a] O/costs refers to the "other costs" section of the enterprise budget.

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   This brief article contrasts the one-visit and multiple-visit techniques. The author has found that the one-visit technique is adequate for records of acreage, family size, etc. and of yields if done directly after harvest. If different crops are harvested at different times, it may be necessary to make several visits to coincide with the harvest of each.

   The weekly visit method is probably necessary if accurate labor records and certain other classes of data are required.

   Author also stresses the need for full-time recorders and the need for adequate supervision and checking.

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This is a technical manual designed to be used with keypunch and computer. Discussion includes farm management data collection and analysis and the various statistics which are involved, farm management selective analysis, farm management statistics and function analysis, and farm programming.

In each section examples are given on how data should be transposed onto keypunch cards.

In the appendices, organization of farm management data collection is dealt with more thoroughly. Here the author looks at sources of data, the preparation for data collection, the interviewer and supervision. An example of data collection and analysis is given in Appendix 2.

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This study attempted to document the complex of economic activities in rural households in the Philippines in terms of a set of accounts in a double-entry system, that summarizes the flows of goods and services. The data on which this study was based were generated from the integrated household record-keeping project conducted in a rice village in the Philippines. Supplementary data to complete the system of accounts, such as inventory changes, were collected from the assets surveys conducted both at the beginning and at the end of the record-keeping period.

The record-keeping procedures were carried out through the use of a book that contained: (a) labor sheets and (b) transaction sheets. The labor sheets were designed to record all labor uses, including those of family, hired and exchange workers, in terms of hours worked.

Only conventional income-generating works were recorded. The transaction sheets were designed to record all transactions in cash and kind, including exchange and grant. Home consumption of agricultural products and their uses for seeds and feeds were also recorded on the transaction sheets.

The accounting system designed to summarize the records on the economic activities of the village households consists of six accounts: (1) current agricultural production account, (2) current non-agricultural production account, (3) income-expenditure account, (4) fixed capital production account, (5) saving-investment account, and (6) outside-of-household account. Considering the critical importance of rice in the Philippine economy, the current agricultural production account was divided into: (IR) rice production account and (IN) non-rice agricultural production account.

The major problem in accounting economic activities in the village households is how to impute the value of goods and services that do not go through market transactions -- especially important were rice and family labor.

18. Hildebrand, P. E., "The ICTA Farm Record Project with Small Farmers--Four Years of Experience," Guatemala City: Instituto de Ciencia y Technologia Agricolas, 1979. (mimeographed)

19. Hopkins, Raymond F., and Robert C. Mitchell, "The Validity of Survey Research in Africa: Some Propositions," African Studies Review, XVII (3): 567-575, December 1974.

This brief article advances sixteen propositions which the authors feel are relevant to current survey research in Africa. Five of these propositions are concerned with survey design, four with survey execution and six with survey evaluation.

The authors seem to take an optimistic viewpoint on current survey research methods in Africa. They include in their recommendations for improvement the need for an African Survey Research newsletter. This could be important in linking the various disciplines involved in different facets of survey research together. Although interesting and enlightening, some of the propositions seem to have little to do with survey methods per se but rather apply to social research in general.

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

This book is presented as a work manual for data collectors in LDCs. Author presents chapters on data required, applications of sampling to agriculture in developing countries, staff and field organization, errors and error control, crop forecasting, statistics for a variety of crops and livestock, price and market statistics and others.

Of particular interest is a chapter of Farm Operation and Budgetary Recording. Here he looks at the frames involved, the general scope of such an undertaking, the approach to recording and farmer contact, staffing, recording techniques and problems.

The book covers a broad area of data collection. Much of it is concerned with field and yield measurements. The chapter noted above does lay a foundation for the relationship between resource inputs and product outputs. In order to quantify this relationship, some type of farm record keeping, either by the farmer himself or through frequent contact with enumerators, is essential.

21. Hursh-Cesar, Gerald and Prodipto Roy, Third World Surveys: Survey Research in Developing Nations, MacMillan Company of India, Ltd., New Delhi, 1976.

This comprehensive book draws upon the experience of a number of people working in survey research. Its principal aim is to focus upon overcoming the cultural biases inherent in survey research. Themes explored in the book include: 1) the need for using complementary research methods; 2) the need for adequate pre-testing; 3) significance of human errors (particularly those of the interviewer); 4) the need to study non-random sources and types of biases; and 5) improving ability of other researchers to replicate the study and of practitioners to know the socio-economic feasibility of implementing results.

Each chapter looks at a different aspect of survey research such as the survey setting, types of field experiments, problems in sampling and interviewing, etc.

This is probably one of the most thorough publications on the subject of surveying farmers in developing nations which is currently available.

22. Jeffers, J. N. R., "Constraints and Limitations of Data Sources for Systems Models," in G. E. Dalton, ed., Study of Agricultural Systems, Applied Science Publishers, London, 1975, pp. 175-186.

23. Kemmeny, John G., A Philosopher Looks at Science, DiVan Nostrand, New York, 1959.

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

The material presented in this publication comes from an ADC seminar which was held in Beirut, Lebanon in 1974. Many of the participants in this seminar present papers which have previously been reviewed (see: Spencer, Norman, Husain, Gucelioglu and Collinson).

In the beginning of the book there is an excellent list of the people involved in the seminar complete with the title of their contribution, a brief description of their research and their address.

Methodological considerations make up most of the book with research approaches, sampling, local support and cooperation, recruitment and qualifications of interviewers/enumerators, interviewing techniques and problems, pre-coding, coding and preliminary steps in analysis making up the bulk of the material.

25. Longwell, John D., "Analysis of Three Methodologies for Collecting Data from Small Farmers in the Dominican Republic," Occasional Paper Series on Credit No. 4, Department of Economics, Colorado State University, Fort Collins, Colorado, January 1981.

26. Longwell, J. D., "Investigaciones sobre la Recoleccion de Datos de Costos de Produccion en La Republica Dominicana," Occasional Paper Series on Credit No. 2, Department of Economics, Colorado State University, Fort Collins and Banco Agricola, Santo Domingo, Junio 1980.

27. Lynch, Frank, "Field Data Collection in Developing Countries: Experiences in Asia," ADC Seminar Report No. 10, June 1976.

This report is based on a seminar and workshop held in Singapore from October 28 to November 2, 1974. The participants in the seminar divided into five discussion groups, each of which presented a report. These groups were:

Group One: Research design and organization, problem definition and conceptualization;
Group Two: Sampling, unit of study, and unit of analysis;
Group Three: Choice and development of data collection procedure/instrument;
Group Four: Field Management; Recruitment, training, and supervision of investigators: logistics; and
Group Five: Intensive studies of the rural community.

Some of the more important points that came out of the reports were (1) survey research should attempt to integrate both theoretically and practically, from design to implementation, the different disciplinary skills which are necessary for any project; (2) inter-disciplinary integration; (3) random and stratified sampling; (4) topic population versus respondent population; (5) detailed structured questionnaires; (6) pre-testing; and (7) secondary data and retrospective information.

An appendix gives a list of participants, their addresses and the papers that they presented.

28. MacArthur, J. D., "The Economic Study of African Small Farms: Some Kenya Experiences," Journal of Agricultural Economics XIX(2): 193-205, May 1968.

This article is basically a history of enumeration techniques used in Kenya from 1961-1966. Many of the points are similar to those discussed in other materials on data gathering techniques in Africa, however, the author does not stress the educational level of the enumerators as do many of the other publications.

Whole farm studies using the multiple visit method have generally proven most successful in Kenyan farm surveys. This type of survey yielded satisfactory information on patterns of farming, production methods, major sources of revenue and profit, their relation to inputs and the levels of performances achieved by the farmers. Short-comings of this system were also discussed. Author relates how system was amended to adjust for enumerator problems, etc.

29. Newman, M; Ouedraogo, I.; and Norman, D. W., "Farm Level Studies in The Semi-Arid Tropics of West Africa," Hyderabod, India: ICRISAT, 1980.

30. Norman, D. W., "Farming Systems Research to Improve the Livelihood of Small Farmers," The American Journal of Agricultural Economics 60(5): 813-818, December 1978.

Four stages of thinking have evolved in the last two or three decades concerning third world development. Successively, these are: "(a) believing the extractive philosophy of colonial times; (b) knowing what was best for the LDCs, resulting in transfer of technology from the high income countries; (c) developing technology within the LDCs, using as building blocks elements that had made technological change successful in the high income countries; and, recently, (d) supplementing this 'top-down' approach, but not replacing it, by a 'bottom-up' approach."

It is this last stage which is of importance in the article and which the author identifies as the "farming systems approach." Such a system is perceived as being "the result of a complex interaction among a number of interdependent components. To achieve it, an individual farmer allocates certain quantities and qualities of the four factors of production--land, labor, capital, and management--to which he has access, to three processes--crop, livestock, and off-farm enterprises--in a manner which, within the knowledge he possesses, will maximize the attainment of the goal(s) he is striving for."

Technological and human elements are both important in determining what types of farm systems will develop. In terms of the human element, both exogenous factors such as community structures, norms, and beliefs, and endogenous factors will influence what a farmer is willing or able to do.

Under the farming system the role of the farmer is maximized and the research process is recognized as being dynamic and iterative, with backward linkages between farmer and research worker, instead of the forward linkages found in the "top-down" approach.

Examples of how the farming system might and has worked are provided in cases from Turkey, Nigeria, and Guatemala. Problems associated with the approach are also presented.

31. Norman, David W., "Inter-disciplinary Research on Rural Development; the Experience of the Rural Economy Research Unit in Northern Nigeria," Overseas Liaison Committee, American Council on Education, OLC Paper No. 6, April 1974.

This paper begins by noting the move away from a multi-disciplinary approach to rural development (in which researchers from more than one discipline who work together on a project do not necessarily communicate with one another) to that involving an increased emphasis on an inter-disciplinary approach (where there is greater integration of disciplines through joint projects).

The objective of the paper is (a) to describe the evolution of the inter-disciplinary research program of the Rural Economy Research Unit (RERU) of Ahmadu Bello University in the northern part of Nigeria; (b) to examine some of the problems of farmers in the northern states of Nigeria, which have become apparent through the research work undertaken by RERU; and (c) to discuss in the light of (b) the types of programs that could result in improving agricultural incomes under the present administrative and financial constraints in the area.

The author provides background on the Institute of Agricultural Research and RERU and also describes how specific research is undertaken at RERU. An overview is provided of RERU's major findings concerning the problems faced by farmers in the northern states of Nigeria. These include (1) low investment in traditional agriculture; (2) land and labor allocation; (3) seasonal labor constraints; (4) low incomes and risk aversion; and (5) implications of the four previous problems.

Strategies to improve agricultural incomes are also presented. These include (1) reallocation of resources presently committed to production; (2) the utilization of more inputs under indigenous technological conditions; (3) adjustment of prices; and (4) adoption of improved technology.

The paper concluded with a discussion of the measures employed to increase the rate of adoption of improved technology. An excellent bibliography is also presented.

32. Norman, D. W., "Methodology and Problems of Farm Management Investigations: Experiences from Northern Nigeria," African Rural Employment Paper No. 8, Department of Agricultural Economics, Michigan State University, April 1973.

33. O'Barr, William M., "Survey Research in Africa: An Anthropologist's View," <u>African Studies Review</u> XVII (3): 577-584, December 1974.

This author's point of view, although related more to anthropology than economics, is useful in that it provides insights into some of the ethnologically important variables involved in data collection. Well worth reading for a slightly different perspective on the subject.

34. Pakistan Ministry of Agriculture and Works, <u>Farm Management Survey Report on Mymensingh Project</u>, F. M. XXI: 56, Islamabad: Farm Management Section Food and Agriculture Division, January 1970.

A study based on 54 farmer surveys conducted during 1962-1965 in Tarakanda Union Council of Mymensingh district of East Pakistan. Monthly data on capital assets, liabilities, farm inputs and outputs, etc., were collected during the period. Data were classified by tenure type and farm size. Selected efficiency measures such as cost of production, income, returns to capital and labor were studied. Appears to be a well-handled study.

35. Parks, Loren L., et al., "Enterprise Budgets: A Multiple Use Data Base for Agricultural Banks in Developing Countries," International Development Series No. 80-1, Oklahoma State University, Stillwater, August, 1980.

36. Parks, Loren L., et al., "Enterprise Budgets for Grains in Honduras: 1980," International Development Series No. 80-6, Oklahoma State University, Stillwater, August 1980.

37. Parks, Loren and Mapp, Harry, "Managing Small Farmer Credit Programs: A Case Study in Honduras," International Development Series No. 80-4, Oklahoma State University, Stillwater, August 1980.

38. Parks, Loren L. and Tinnermeier, Ronald, "Production Loans to Groups of Farms: Experiments in Honduras," International Development Series No. 80-5, Oklahoma State University, Stillwater, August 1980.

39. Parks, Loren L., et al., "Records for Small Farms in Honduras: A Development and Critique," International Development Series No. 80-3, Department of Agricultural Economics, Oklahoma State University, Stillwater, August 1980.

40. Purcell, R.A. and Webster, J. P. G., "A Summary of Farm Management Survey Results 1970-76," Division of Planning and Statistics, Ministry of Agriculture, Botswana, October 1977.

41. Spencer, Dunston, et al., "Annual Costs, Returns and Seasonal Labor Requirements for Selected Farm and Non-farm Enterprises in Rural Sierra Leone," Working Paper No. 27, African Rural Economy Program, Department of Agricultural Economics, Michigan State University, May 1979.

42. Spencer, Dunstan S. C., "Collecting Primary Socio-Economic Data in Africa--Some Experiences form Sierra Leone," Beirut, December 1974.

Review of marketing system for staple crops and economics of rice production in Sierra Leone. Author discusses data collection techniques used and, where applicable, how these could be improved.

Stratified sampling techniques were used in both studies and the details were discussed. Single visit technique was found not to be adequate for flow-type information unless the system being worked with is very simple. List of factors were presented justifying the use of multiple visit (or cost-route) technique. Short, detailed structured questionnaires were used in conjunction with this technique. Use of enumerators and supervisors was discussed stressing training and rapport between enumerators and informants.

Paper presented a good, general review of two specific projects, but there were not specifics concerning data collection in a credit project.

43. Spencer, Dunstan S. D., "Micro-level Farm Management and Production Economics Research Among Traditional African Farmers: Lessons from Sierra Leone," Agricultural Economics African Rural Employment, Paper No. 3, Michigan State University, September 1972.

Four methods of farm mangement and production economics research are discussed. The most important include farm account books, farm business surveys and the cost-route method.

Further discussion of farmer sample selection in Sierra Leone rice study is included along with enumerator conduct and preparation (see: Spencer, "Collecting Primary Socio-Economic Data. . .").

Measuring of labor inputs, land inputs and estimating output are some of the more important topics dealt with in this paper. Also some general principles of field work such as farmer cooperation, enumerators and collecting "sensitive" information are discussed. This last point is especially important when dealing with questions involving credit and indebtedness and the author lays out some broad guidelines of how to handle such data.

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

45. Tinnermeier, Ronald and Longwell, J. D., "An Annotated Bibliography on Small Farm Data Collection and Analysis Methodologies," Occasional Paper Series on Credit No. 1, Department of Economics, Colorado

46. Tinnermeier, R. L., and Dickey, Thomas, "An Experiment with Farm Record-keeping in the Dominican Republic," Occasional Paper Series on Credit No. 8, Department of Economics, Colorado State University, November 1981.

47. Uchendu, Victor C., "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, Lebanon, December 8-14, 1974.

This paper concerns a project conducted by two economists, an anthropologist and an agronomist between 1966 and 1968, which covered seven district-level case studies in six countries. In these studies they were concerned primarily with technological adaptation of various types of farmers.

The data collection and record-keeping techniques which they employed were unique in that the interviews were conducted by the team members rather than enumerators. Also, the investigation was conducted in areas with some knowledge base which could be drawn upon to supplement data obtained in the field.

48. Yang, W. Y., "Methods of Farm Management Investigations for Improving Farm Productivity," FAO Agricultural Paper No. 80, Rome, 1965.

This pamphlet discusses the uses of survey methods in relation to farm management problems. The topics dealt with include: selection of areas where the survey will be conducted, the choice of the time period, problems of sampling, the designing, pretesting, and duplication of survey forms, selection and training of enumerators, interviewing the farmers and the source and accuracy of data from a farm management survey. A sample of a survey schedule form is presented on pp. 21-31.

This publication also contains useful information on: farm bookkeeping and financial accounting, farm business analyses, cost and enterprise studies, and farm planning and budgeting.