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INNOVATIVE SMALL FARMER CREDIT
IN NICARAGUA

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ABSTRACT

During the past few years INVIERNO, an autonomous Nicaraguan government institution devoted to rural development, has been providing agricultural credit and other comprehensive services to small farmers in an innovative way. This paper describes and evaluates the innovative approaches followed by INVIERNO to reduce administrative costs; to fit loan repayment to the capacity of farmers; and to simplify loan evaluation and lending procedures.

INNOVATIVE SMALL FARMER CREDIT IN NICARAGUA

INTRODUCTION

Credit has been a major component of agricultural and rural development programs in the Low Income Countries (LIC) during the past two decades. This has resulted from the major international lending agencies emphasizing credit in their loan and grant efforts and from LIC governments requiring that national financial institutions devote increasing shares of their portfolios to the rural sector. An increasingly larger share has been going to small farmers over time as the donors and LICs emphasize reaching the rural poor in their development programs.

The record and image of small farmer credit programs have not been very impressive in many respects. The majority of the small farmers have not benefited from this credit expansion even when programs are specifically oriented to that group; often, less than five or ten percent of the small farmers in any one country have access to such institutional credit. In many instances the role of credit is unclear and it has not been accompanied by productivity or income increases, largely due to unavailable or inappropriate technology or to greater risk to the farmer when recommendations are followed (Tinnermaier). Loan delinquency rates have been very high, often surpassing 40 or 50 percent, and, at the same time, administrative expenses have been exorbitantly high. Interest rates usually are subsidized, resulting in negative real rates of interest being charged farmers in many cases. These three factors commonly have produced credit institutions which are not financially viable. Further, loan application, evaluation, lending, and collection procedures have been inadequate in many countries. Finally, institutional and managerial problems have been listed

as common problems in many credit programs. These and other experiences with small farmer credit in LICs are summarized in a number of publications (AID; FAO; World Bank; Donald).

Attempts to overcome these commonly identified problems obviously vary among countries and programs. The purpose of this paper is to highlight and review the major innovations and approaches adopted by the Institute for Campesino Development (INVIERNO) in Nicaragua to overcome some of these problems. That program is examined in light of the important small farm credit issues mentioned in the recent literature (some of which were mentioned previously) or as a result of research reported on in other LICs. Tentatively, the paper investigates the possible applicability of the innovative concepts and procedures implemented by INVIERNO to similar programs in other LIC countries.

Background

Nicaragua is the largest of the Central American countries and lies between Honduras, on the north, and Costa Rica, on the south. It has a total population of about 2.2 million people. The average annual family income in the rural areas was US \$902 in 1973, but the average family income for those rural households falling in the lower 50 percentile bracket was only US \$236 (UNASEC).

INVIERNO is part of a recent major attempt by the Government of Nicaragua to restructure the public institutions and policies serving the agricultural sector. In early 1972 a National Agricultural Committee was established to define a new strategy for rural-agricultural development. This resulted in a plan or general policy strategy in 1975 which would "improve the standard of living of the rural population through greater

access to the flow of goods and services and increased participation of the individual in the decisions that affect his progress." The Ministry of Agriculture was to be relieved of direct operating functions and would become the leader and coordinator of the sector. The Ministry's operating functions, in turn, were to be distributed among various autonomous institutions. One of these was INVIERNO, whose sole responsibility and orientation would be to stimulate the development of the small farmer by making various required services more effective at the local level (Ministerio de Agricultura). INVIERNO became operational by the middle of 1975; field offices were officially opened in March 1976; and loan disbursements to small farmers began in April, 1976. During this same six month period, administrative manuals governing the organization and its procedures as well as manuals for the credit, input delivery and marketing programs were prepared; a major accomplishment for such a young institution.¹

INVIERNO Objectives

INVIERNO's primary objective "is to develop in the individual lower income rural farmer--the campesino--the capability and means which will enable him to have access, directly and jointly, or in coordination with other agencies, to the opportunities and services which he needs for his development with the purpose of promoting a sustained increase in his standard of living" (INVIERNO, Philosophy...). The institution deals with the non-farming but rural poor as well through development efforts of the

¹This paper is based on materials and experiences before the current political conflict erupted into civil violence. No doubt that violence has seriously disrupted the activities described herein.

newly formed community councils and through INVIERNO's small scale rural industry program.

Originally, to determine an individual's eligibility for the program, an upper income limit was set at the average national per capita income of US \$590. This was converted into a farm size limit of 69 hectares. However, INVIERNO has been criticized for setting such a high limit since about 78 percent of the rural families own less than 3.5 hectares of land or no land at all. There is justified criticism that over time the benefits of the program will tend to accrue to those at the upper end of the scale if the maximum size is not lowered. So far this has not appeared to be a problem for INVIERNO since it has been serving farmers and landless laborers with sizes of farms and incomes well below these limits. One of the reasons for this has been the focusing of efforts on farm communities with no more than 300 families which usually are characterized by small farms.

The distribution of loans by size and region through September 1977 is shown in Table 1. More than 78 percent of the loans are for less than US \$429 for the two regions presently serviced by INVIERNO.² Very few loans are over \$2,100 and these must go through a special review process by a senior level credit committee. The number of relatively large loans declined significantly during the second year of operation. The average size of loan also has declined slightly over time.

²Work has begun in these two regions because of a high number of small and relatively poor farmers and communities in these areas. It is expected that INVIERNO will expand into the other regions of the country once resources and financing permit.

Table 1. Distribution of Loans By Size and Region Through September 1977

Loan Amount (US \$)	Region II		Region V		Total	
	Number	%	Number	%	Number	%
Less than 143	175	18.2	2,538	36.2	2,713	34.0
144 - 428	546	55.8	3,015	43.0	3,561	44.7
429 - 714	160	16.6	783	11.2	943	11.8
715 - 1000	48	5.0	286	4.1	334	4.2
1001 - 1428	20	2.0	182	2.6	202	2.6
1429 and over	<u>13</u>	<u>1.4</u>	<u>202</u>	<u>2.9</u>	<u>215</u>	<u>2.7</u>
TOTAL	962	100.0	7,006	100.0	7,968	100.0

Source: INVIERNO, ...Evaluacion.

The average size of the land area financed per loan by INVIERNO also has been very small, ranging from 1.9 to 3.3 hectares for each cropping season. As has been the case with respect to loan size, the average size of farm of the borrowers has been declining through time as reflected in Table 2.

Table 2. Percentages of Loans Authorized By Farm Size and Cropping Period

Farm Size in Hectares	1st Crop 1976	2nd Crop 1976	1st Crop 1977	2nd Crop 1977
Less than 3.5	45.0	49.0	83.2	81.1
3.5 - 6.9	22.0	22.0	10.3	11.4
7.0 - 13.9	15.0	14.0	4.8	5.4
14.0 or more	<u>18.0</u>	<u>15.0</u>	<u>1.7</u>	<u>2.1</u>
TOTAL	100.0	100.0	100.0	100.0

Source: INVIERNO: Informe...1975-1976, and Informe...1977.

While during 1976 almost one-half of all loans authorized were for farmers with less than 3.5 hectares of land, during 1977 this proportion increased

to over 81 percent. On the other hand, the proportion of loans authorized for farmers with more than 7 hectares declined from over 30 percent to just over 7 percent. This substantial reduction in farm size has been due in part to the institution's efforts to eliminate a few large borrowers as it gained confidence in its objectives and procedures. The incorporation of Region II during this period also added a substantial number of smaller farmers. Finally, drought problems in some areas resulted in farmers planting less, which reduced loan size and area financed per farmer.

Corn and beans are the major crops financed under the program but test plots are being established to allow the financing of other crops, especially vegetables, as technical recommendations are perfected. In addition, credit was made available to rural but non-farm residents in 1977 as part of INVIERNO's comprehensive approach to rural development. In that year a total of 292 loans for \$369,557, or an average of \$1,265 per loan, were made to small businesses, small scale industries, service firms, and artisan works. The major portion, about 70 percent of the total amount loaned, went to small businesses in the two regions serviced by INVIERNO (INVIERNO, Informe...1977).

The scarcity of human and financial resources limits the possibilities of reaching the entire rural population of the country on a massive scale through a program of integrated development. For this reason, INVIERNO has attempted a strategy of regional concentration, based on a regional development plan. Of the eight regions into which the country has been divided for agricultural development, INVIERNO has selected two and will be concentrating all of its efforts in these two regions during the first phase of its operation. Later, as the program is consolidated, costs reduced, and experience gained, INVIERNO expects to expand into other regions.

The two regions of operation were selected as a result of a critical analysis which considered the availability of physical resources and infrastructure in each region, their agricultural potential, their relative degrees of development, the concentration of small farmers and rural poor, and other social and economic factors, such as income and employment generation potential, population density, illiteracy rates, road network, and availability of warehousing.³

INNOVATIVE APPROACHES

Integrated Services

The primary objective of INVIERNO is to improve the level of living of the low-income rural resident. To achieve this objective INVIERNO is attempting to provide its beneficiaries with a set of integrated services. These activities include institution building, agricultural credit, technical assistance, marketing help, community action (called MOC--to motivate, organize, and capacitate), municipal development, small farm adaptive research, land sale guarantees, cooperative development, access road construction and improvement, small rural and artisan enterprises, and rural housing.

Rather than assume all of these activities directly and at once, INVIERNO has decided to handle certain services itself and to coordinate selected services with other institutions and agencies. At present, INVIERNO is providing agricultural credit, technical assistance, marketing assistance, and community action to its beneficiaries. Through support services provided by other public agencies, INVIERNO has promoted access road construction,

³INVIERNO has been criticized that political not economic reasons dictated this selection. For further details see (Washington Office on Latin America, no date and INVIERNO, Reply...).

infrastructure and municipal development, and research oriented to the development of technology appropriate for small farmers. Also, education, health services, and electrical power are provided under the Institute's coordination.

This strategy of integrating services is consistent with an observation resulting from the U.S. Agency for International Development (AID) review of its credit programs that "credit institutions working within an integrated program have a better overall success" (Rice). However, at the same time, this strategy increases the demands on the institution's financial, administrative, and managerial resources and capabilities and may, in turn, reduce the number of clientele that can be reached in a given period of time.

In practice, the extent to which the various services have been provided by INVIERNO has not been the same, thus endangering the integrated approach endorsed at the conceptual level (INVIERNO, "...Evaluacion,"). As in many other countries, credit has been given first priority, while most of the other services have been organized around and for the sake of the credit operations. This has not happened by planning or conceptual design. Rather, it reflects INVIERNO's attempts to get things moving, given the institutional constraints and political circumstances which it faced. Not only was the credit a particularly difficult component, but it was the activity which most significantly influenced the institution's image with the Government and with the public. However, there is danger that only borrowers and not other non-borrower rural residents will benefit from the program. INVIERNO is aware of this danger and is attempting to correct it by focusing on community action and by incorporating the communities into the formulation of its operating plans (INVIERNO, "Sistema...1977).

Some other problems in integrating services at the local level have been due to the difficulty of coordinating operations with other public agencies. As an example, this has been particularly true with respect to marketing. Initially, INVIERNO signed a contract with another government agency for the marketing of basic grains produced by the small farmers. The farmers, however, chose not to market through the public agency (or had no choice), dealing instead with private intermediaries. As a result, INVIERNO was forced to look for other ways to assist the marketing of small farmer crops. It is now limiting its marketing aid to the dissemination of information about crop prices, hiring trucks for transport, and establishing contacts between buyers and sellers. In the future INVIERNO expects to promote on-farm storage to allow farmers to sell their crops at a time when prices are more favorable.

INVIERNO's general philosophy is to deal with the total needs of the rural resident at his doorstep or at least in his own immediate area. Its intent is to assure that the services which may be necessary for an improvement in the level of living of the rural population may arrive at a time, and in a form, quantity and place, which will facilitate the rural residents' own self-help efforts. All of this is accomplished through multi-disciplinary mobile teams at the local Development Center (CEDE), usually located in market towns. This team normally is composed of an agricultural technician-extension agent (AGROMOC), an input and marketing specialist (CREDOMERC), and a community specialist.

INVIERNO's strategy has been to saturate the geographic area to be served by a CEDE in order to minimize operating costs. For this reason, emphasis was placed on the selection of new localities to be served. An eligible locality must be situated within a 25 kilometer radius from a CEDE

or SUB-CEDE (branch office), must have an all-weather access road (if not, this will have high priority in INVIERNO's planning), must have agricultural potential, and must include at least 20 houses within a 5 kilometer radius. These criteria were selected so they could provide services at the lowest operational cost possible.

Program Management

A consensus has been emerging to the effect that management is a critical factor in the success of any agricultural credit or integrated rural development program, especially in the delivery of services to the poor (Government Affairs Institute; Hunder; Lele; Mann and Miracle; and Mosher). This management goes well beyond any narrow definition of administrative services. It is not "a thing apart" but becomes closely intertwined with technical activities. Such management includes the implementation of a system for planning, methods of supervision, use of a systems' approach in judging the resources required for service to the rural poor, the elaboration of operations manuals in order to introduce discipline into the various practices, and training and assistance in realistic methods for organizing the poor. All this has been particularly important in the case of INVIERNC, a fairly large and complex program for the delivery of an integrated package of services to small farmers. Achievement of the institution's goals has placed very heavy demands for an efficient management system and the quality of this system has been a key element in the relative success of the institution.

The main factor for this managerial success has been the competence of INVIERNO's staff. Although pleased with the results of their efforts and with the appreciation by various observers, INVIERNO's managers and

professionals have continued with their practices of rigorous internal evaluations, their search for better approaches and methods and their desire to anticipate potential problems due to the expansion of their operations.

One of INVIERNO's salient features has been the desire that its personnel be of the highest quality, both in education and competence. To assure this quality INVIERNO has implemented a highly professional personnel system which combines a competitive salary scale, a liberal fringe benefit package and an effective system for the selection and promotion of the personnel from within which includes six-month individual employee performance evaluations. All INVIERNO positions are described with their responsibilities and authorities as well as the minimum qualifications required of the incumbent. This attractive pay and classification system has helped bring persons to INVIERNO with substantial academic training and prior work experience, in many cases exceeding by much the minimum requirements. In turn, these high quality people have tended to stay at INVIERNO in view of the professional stimulation provided by the institution--which no observer can escape--as well as its dynamism and innovative approaches. A high degree of professionalism is particularly evident throughout the institution. This is particularly significant given the continual problem for LIC public institutions of keeping good people.

Planning has been given high priority throughout the institution and a great deal of effort has been devoted towards achieving a clear definition of INVIERNO's philosophy, objectives and approaches. This planning function takes place at all levels of INVIERNO, primarily through planning meetings and planning records as well as through a once a year overall planning exercise with community participation.

Department and Division heads keep track of project objectives and individual program objectives through the use of individual standardized planning sheets. Each department sends in a narrative description each month to the Department of Programming and Control. There has been an increasing use of PERT charting. Similar individualized planning records are maintained at the Regional Office and CEDE levels.

Along with the planning and progress records, the key to planning has rested on a series of closely synchronized meetings at the Central Office, Regional Office and CEDE levels. Every other Monday the Central Executive Committee meets in Managua, both as a decision making group and a planning body where short and long term strategies are discussed and agreed upon. This committee consists of INVIERNO's General Manager, two Vice-managers, Department and Program Directors, and Regional and CEDE Managers. In turn, the regional staff meets with the Regional Manager to learn about results of the Managua meeting and to provide the information resulting from the periodic meetings at each local CEDE. These synchronized meetings have been good devices both for management and for a flow of information for planning and operations from the top down and the bottom up.

INVIERNO is also critically aware of the importance of evaluation. Therefore, several elements have been introduced that will permit internal and external evaluations. In the institution's overall plan certain quantifiable goals have been established which have become benchmarks against which actual results can be measured. This has been accomplished in the most recent internal evaluation, the depth and quality of which is a reflection of the importance accorded to these activities and of the competence of INVIERNO's personnel (INVIERNO, "...Evaluacion"). At the personal initiative

of INVIERNO's General Manager, a team of five high officials was organized in August, 1977, on a full-time basis (i.e., leaving their regular positions), in order to evaluate the progress made in the different programs and to identify problems which could limit future expansion. This evaluation has led to a number of procedural and organizational changes.⁴

Loan Procedures

INVIERNO's agricultural credit component has been designed to address the problem of making credit available in small amounts, to a fairly large number of small farmers at reasonable costs, and adjusted to meet their needs. In this connection, INVIERNO has adopted several innovative concepts and procedures which, if successfully implemented, would be particularly relevant for other small farmer credit programs in LICs.

The identification of potential beneficiaries is achieved through a "census" performed by the AGROMOCs in each one of the localities served. In effect, each locality is canvassed completely to explain the credit program and to ascertain the needs and desires of the residents for credit. This first step is a reflection of INVIERNO's philosophy of bringing the public sector services to the locality of every potential beneficiary.

If, during the census, a resident wishes to get a loan from INVIERNO, a two-page census form and a loan application appropriate for electronic processing is filled out reflecting the interaction between the farmer and the AGROMOC. All of this basic information is later used in the computerized

⁴A number of independent, external evaluations have been carried out in recent years (Gonzalez-Vega and Tinnermeier; Brown, et al.; Development Associates; and Heard, et al.).

evaluation of the loan application where weights are accorded different borrower characteristics found by INVIERNO (or estimated) to be important. If the loan is approved, the amount of the loan is calculated and a loan contract, notification letter and enterprise budget are printed--all electronically--showing the dates of anticipated withdrawals of funds and the amounts to be financed by input.

This procedure has significantly reduced INVIERNO's administrative costs per loan. It also has released CEDE level personnel for activities other than loan processing and it has eliminated many of the errors resulting from hand processing. Moreover, since all loan applications arrive at about the same time at the beginning of the planting season, INVIERNO would require a large number of trained staff to adequately process the applications within a reasonable period of time. Nevertheless, borrowers still complain about the excessive delays in loan approval and fund disbursement even with computer use. A trend towards group lending is evident as a means of further reducing costs and delays.

Presently, approximately two weeks after the loan forms have been sent to Managua, each CEDE receives computer lists of approved borrowers with loan and input amounts. Summary lists of credit and input needs by CEDE and region are easily prepared to assist in coordinating input purchases and delivery logistics since INVIERNO delivers the cash to the farmer in each locality and at the same time it provides inputs which the farmers can buy if they so desire.

Initially, INVIERNO had little idea about what factors and weights were most appropriate for borrower selection. During the first planting season a set of fairly restrictive criteria for acceptance were programmed. These

criteria are being modified as more lending experience is gained and as results from regression and simulation analysis of borrower data are forthcoming.

A second innovation in small farm lending for INVIERNO was the introduction of a line of credit. The plan was to establish a five-year line of credit, the amount depending upon the acreage controlled by the farmer and his needs. Fund disbursement would be made in subsequent planting seasons. This line of credit contributes to a reduction of a farmer's uncertainty about the performance characteristics of the credit program, a point emphasized during the AID Spring Review (Donald, p. 48). It also helps to reduce administrative and other transaction costs, both for the borrower and INVIERNO, since the legal and other expenses associated with yearly applications and loan contracts are avoided. Further, the institution can maintain a single account for each borrower rather than keeping one account for each loan operation into which the borrower enters, as is usually done in many credit institutions. INVIERNO has had some legal and other problems in implementing lines of credit so this technique is not yet widely used.

When INVIERNO provides all of its services locally, this certainly increases the institution's costs; but it does not necessarily increase the social costs associated with the provision of these services. It has been found that the costs for small farmers of obtaining credit from public agencies are usually very high.⁵ The summation of all of these individual and interest costs of borrowing is very likely to be greater than INVIERNO's costs of reaching them, given the economies of scale and other size and administrative efficiencies achieved by the institution. Therefore, from

⁵Non-interest costs can represent as much as 12 to 74 percent of the amount of the loan according to studies in Bangladesh and Brazil (Nehman and Adams).

a social point of view INVIERNO's strategy may be justified. In addition, if they can achieve a significant reduction in administrative costs through massive lending, then the strategy may become justified from a "private" point of view for INVIERNO as well. This is evident in that the institution has been attempting to be self-sufficient in connection with its banking program and eventually expects to cover most of these costs with loan interest charges.

In summary, INVIERNO has established a loan application and credit-input delivery system designed to provide timely credit with associated off-farm inputs as cheaply as possible. Even so, problems have been encountered in making sure the inputs are available when the mobile team visits the locality to deliver the credit. Multiple repeat visits to accomplish what could be done in one visit greatly increases delivery costs. For this reason INVIERNO is looking at ways of either improving the present system or finding alternative ways of delivering the credit and inputs.

Repayment By Ability

Theoretically, most credit specialists recognize the need to adjust loan repayment according to the repayment capacity of the farmer. However, in practice this is not easy to put into operation.

INVIERNO has been experimenting with mechanisms which recognize the variability of agriculture, and thus, the small farmer's ability to repay a loan. Initially, INVIERNO estimated the farmer's repayment ability using a concept of income availability. An estimate of income available was based on estimated average yields and prices received in each area for the loan period in question, less an estimated amount for family maintenance. If availability were less than the estimated loan repayment obligation, the

actual payment required would have been the same as that available. That is, the borrower would pay all he could afford at that moment and the balance due would be automatically carried forward. On the other hand, if income availability had been greater than the estimated loan repayment obligation, the borrower would have had to pay the full estimated loan obligation plus 30 percent of the difference between what was available and what was due. This over-payment would have been placed in an interest-bearing savings account in the client's name, to be withdrawn as he wishes.

This original concept of variable repayment would have been one of INVIERNO's most interesting innovations because it helps protect both the farmer and INVIERNO against the risks and uncertainty inherent in agriculture. That is, the use of the line of credit to carry the borrower during bad years is supposed to be offset by accelerated repayment during the good years. In every case, repayment would have been a function of proceeds from the loan activity.

Unfortunately, this concept turned out to be too ambitious and complicated for INVIERNO to handle in its formative years. Therefore, the system was never implemented. In its place, a "minimum payment" due under normal conditions of production is calculated for each borrower and reported every three months. The borrower is expected to pay this amount within six months of the report; if not, he is considered to be under willful delinquency. However, if the borrowers have suffered considerable losses due to causes outside their control, the "minimum payment" is adjusted accordingly and the loan is restructured. The adjustment is automatic if an entire area is affected or piecemeal on an individual basis for isolated problems. Presently, there is no operational mechanism for inducing a more rapid repayment during good years as previously conceptualized.

It is too early to evaluate the final efficacy of the present loan collection methods, but the danger persists that the delicate concept of variable repayment, although highly desirable, may be misunderstood by field personnel and farmers alike, or not be correctly implemented, leading the institution into financial difficulties over time. In fact, at the end of October, 1977, over 29 percent of the borrowers were late in their payments which represented about 15 percent of the total amount outstanding (INVIERNO, "Situacion..."). This illustrates the importance of analyzing the causes for delinquency if a variable loan payment system is to survive where the credit component is expected to be self-supporting. It is hoped that using "community boards" to help select borrowers and to assist in loan repayment will improve this record. INVIERNO also is considering rewarding a community with a donation for a visible community project when it achieves a certain repayment standard.

Integrated Technical Package

As already stated, the unavailability of profitable investment opportunities for small farmers has been one of the most serious problems facing the majority of agricultural credit programs in LICs. Even when profitable investments have been available, the additional risk associated with the adoption of such technologies often has been more than the small farmer is willing to accept. Such deficiencies can soon result in major difficulties for a credit program as reflected in high delinquency levels, considerable restructuring of loans and the exclusion of a major portion of the target group from receiving additional credit over time.

Although INVIERNO is a multifaceted program with several objectives, it has placed considerable emphasis on raising small farmer incomes through

the adoption of new technology and it has experimented with a number of ways of reaching these objectives. However, the key person for developing and introducing new technology has been the AGROMOC, the primary and continuing link with the farmer (INVIERNO, Projecto...; and "Manual...").

The technical recommendations of the AGROMOC are based on three data sources:

- (i) experimental work previously carried out by the Ministry of Agriculture and now by the Nicaraguan Institute of Agricultural Technology (INTA),
- (ii) results obtained from field test plots run by the AGROMOCs and from the demonstration-training plots operated by selected farmers, and
- (iii) the experiences of the farmers themselves at their own plots.

The technical knowledge resulting from these three sources guides the AGROMOC's recommendations to the farmers. The AGROMOC uses the test and demonstration plots in his technical assistance activities by directly involving some of the farmers in operating the plots, through periodic field days to demonstrate methods and results, and through individual contacts and group meetings to discuss new agricultural innovations, recommendations and experiences. To date, the voluntary collaborators, chosen among members of a locality with leadership potential when INVIERNO starts operation there, appeared to have been used primarily as messengers to alert the community to meetings, field days, etc. These voluntary collaborating farmers, however, could also be trained to serve as an element in extending technical knowledge and assistance to neighboring farmers, a considerably less costly delivery

mechanism if initiated and made successful. A study of data from AGROMOC daily time-use reports showed that up to 56 percent of their time on extension activities has been associated with individual farm visits (INVIERNO, Plan...). It also indicated that this has resulted in high administrative costs as well as a reduction in the number of farmers being reached, both of which are in direct conflict with program goals. As a consequence, INVIERNO is attempting to revert back to working with groups to correct this bias.

In 1977 there were two technological packages for farmers producing small grains. Package "A" was for the farmer with little or no prior experience in the use of credit for purchasing modern inputs. In this case the credit can be used to purchase improved seed, for family maintenance, land rental, and to buy oxen. Major emphasis is placed on improved seed and weeding, water retention practices, and greater plant density. Package "B" is for the more experienced farmer where credit may be used for the items cited as well as to finance hired labor, fertilizer, insecticides and other off-farm inputs. Soil samples are taken to guide fertilizer recommendations.

Typical crop budgets for these two alternatives for each of the major crops are prepared by the computer in the Central Office using the three previously mentioned sources of data. The limited number of technological packages is an obvious weakness in the program given the significant differences usually found among zones and farmers. Furthermore, the centralized system seems to have the disadvantage of building rigidity into the selection of the packages. At the same time, however, it greatly frees the AGROMOC and other field staff from the time consuming tasks of filling out crop budgets by hand as is done in most other small farm credit programs. Moreover, this rigidity has been observed in most hand and locally operated

systems where, due to time and other constraints, a "typical" crop or farm budget ends up being used as the basis for most loans.

The computerized system has two potential advantages: (1) Theoretically a much wider range of technological packages could be made available to the AGROMOC and farmer; and (2) if data on actual loan withdrawals by item are fed back into the system, it would be possible to modify the budgets so that they could be very close to what the farmers actually do. In addition, once reliable census or sample data on farm yields are obtained, an analysis of yield and net income by technological package used would provide valuable insights as to the most appropriate technologies to recommend for raising small farmer incomes.

INVIERNO contemplates developing other packages of inputs and farm management practices which will be an improvement over those practices presently used. This includes looking for ways to utilize the farm family's labor and other resources more effectively to raise income levels. Some delay was experienced in initiating research directly applicable to INVIERNO beneficiaries (contracted with another government agency). This has not yet significantly harmed the program, but unless usable research results are forthcoming soon, this could be one of the weakest links in the integrated program approach. It is possible it could already be showing up in the form of loan delinquency discussed earlier. The institution is just beginning to evaluate the impact of its programs at the farm level. Farm record keeping case studies are being carried out in the two regions. In addition, periodic sample surveys and other data collection techniques are being utilized to complement the case studies. Soon, considerable information should be available on levels of technology adoption, changing cropping

patterns, attitudes, and income levels, as well as other economic and social data.

Computerization

INVIERNO has made an intensive use of electronic data processing for its operations and management. In addition to using the computer to handle traditional administrative activities, such as cash flow analysis, payroll and budgets, INVIERNO also is attempting some highly innovative work in applying computer technology to programmatic areas (a few examples were briefly mentioned in earlier sections of the paper).

Among the uses of the computer as a management tool are INVIERNO's traditional and more innovative accounting records. The separation of banking and non-banking costs, for example, is an outstanding example of an effort to clearly define and measure the costs of the various programs implemented by the institution. Another use of the computer has been made in the area of recording the use of time by field workers. By categorizing the time each outreach worker spends, INVIERNO has been able to evaluate the working patterns and efficiency of its field personnel (INVIERNO, "Comentarios..."). Another source of important information which the computer handles cheaply has been the computerized analysis of the results of demonstration and test plots.

In general, the magnitude and complexity of the programs implemented by INVIERNO have required operating on a massive scale, with the purpose of reaching the greatest number of families in the least time and at the lowest cost possible. This has implied that efficient systems had to be designed to guarantee top-level performance of the operating activities of the institution with regards to the quality, timeliness and opportunity of

the services provided. This has been particularly true in the case of agricultural credit. The program was designed to reach the rural population on a broad scale, in the simplest way possible, guaranteeing timely delivery of loans and of the inputs needed by and at the doorstep of many small farmers. Besides, it has been necessary to reduce to a minimum the costs involved in delivering these services to a scattered population which operates on the basis of very small loans.

INVIERNO's most important and innovative use of the computer, therefore, has been its ability to process a large number of individual small loans at a relatively reduced cost. The AID Spring Review recognized that one of the most important factors which has militated against extending credit to small farmers in most LICs have been the high costs involved in processing the loan applications. With the use of the computer INVIERNO is attempting to make this loan processing cost-effective. At the same time it hopes to produce timely decisions with respect to loan authorizations--a computerized decision making model enables the institution to handle and make judgment about a large volume of small loans in a short period of time. In addition, INVIERNO acquires an effective control over the transactions involved, guaranteeing the quality of the services offered to the beneficiaries and the financial viability of the institution. Finally, the nature of INVIERNO's operations make indispensable a continuous follow-up, evaluation and reprogramming, with the aim of making adjustments on the basis of field experience. The computer significantly facilitates all these procedures.

The use of the computer, however, may not be free of dangers and other disadvantages. One of INVIERNO's most important management challenges,

therefore, is to increase the effectiveness of the computer's use and to minimize its potential drawbacks as well as to complement it with other mechanisms in order to add flexibility to the system.

One important area of potential problems is the coordination of the data processing activities at the Central Office with the needs and requirements of the AGRMOCs and other field staff. Three possible kinds of problems may arise in this connection:

- (i) delays,
- (ii) insufficient understanding of the computerized procedures or of the resulting outputs, and
- (iii) outputs in a form not readily usable by the field staff in their daily activities.

The computer could become an important bottleneck during certain peak periods, particularly just before loan disbursement. As reported, there have been important delays in the notification of the loan authorizations and in the disbursement of the loans. These delays, however, have been due more to problems of data collection in the field and to problems of coordination of the field activities than with the centralized computerized operations.

In the second place, although the computer greatly reduces the administrative burden at the local offices, thus liberating resources for other more important field activities, it also increases the problems of communication both between the field staff and the Central Office and particularly between INVIERNO's personnel and the beneficiaries.

At a different level there is also the danger that the computer may be viewed as a problem solver and that the institution may develop too much

of a dependency on the system rather than on agile problem solving. The computer and related systems cannot solve new and unpredicted problems. However, once the institution's management reacts to a new problem, it can process the information required for its solution with the use of the computer and it can undertake simulation and sensitivity analyses of alternative solutions in order to help choose the best one.

A final limitation for adopting computerization in other LICs relates to data transmittal and processing problems. Nicaragua is a relatively small country and road, telephone, and radio communication among the CEDEs and the Central Office is good. Other countries may (some did) encounter overwhelming problems in transferring data for processing from field offices to the central office and back again within a reasonable period of time and with minimal error. Thus, care should be taken in recommending this particular innovation to programs in other settings.

CONCLUDING REMARKS

There can be no doubt that INVIERNO is an extremely innovative effort to solve the problems of the Nicaraguan small farmer and that it has made extraordinary progress in outreach during its first few years of experience. This institution has adopted many concepts and procedures of the kind recommended in the literature and even beyond.

Its main strength has been the quality of its management system and the competence of its professional staff. One is favorably impressed not only by the novel concepts introduced and by the sophistication of the procedures employed but particularly by the rigorous internal evaluation efforts, the continuous search for better approaches and methods, and the ingenuity and energy with which new problems are solved.

Integrated services are either provided directly by INVIERNO or in coordination with another government agency. If such joint effort brings poor results then other alternatives are searched out. A multi-disciplinary team at the local level attempts to assure that such services actually do arrive and in the form which is of benefit to the local residents.

Agricultural credit is the "leading edge" for INVIERNO's efforts, perhaps at some cost to reaching other non-borrowing rural residents. Nevertheless, a number of innovative approaches to small farmer credit either have been implemented or are in the design stage. Credit application, evaluation, and control procedures have been simplified and processed using a modern computer. This releases field staff for other purposes. Lines of credit are planned and a scheme of variable repayment is being implemented to adjust for the income producing variability of agriculture.

Technical packages are being developed with farmer participation to help identify profitable investment opportunities which can be financed by the program. Small-scale businesses and local firms also are being reached through the credit and technical assistance efforts.

Finally, extensive use of high speed data processing is evident in all aspects of INVIERNO's operation. A centralized computer is used for the traditional accounting, payroll, and budgeting activities as well as for more innovative applications in the management and programmatic areas. The latter includes separation of banking from non-banking costs, the handling of a large number of individual small loans from the time of loan application to disbursement, the analysis of personnel work loads and use of time, and the processing of crop experimental and demonstration data and farm record keeping data.

This is but a sample of some of the innovative approaches being suggested or used by INVIERNO. Time will be the only relevant test of the validity of these approaches since it is still too early to measure the success or failure of INVIERNO's innovative concepts and procedures, especially in light of the recent civil turmoil. Therefore, this study has attempted to evaluate these concepts and procedures in the light of theoretical considerations and of experience with similar programs elsewhere; it has attempted to identify the strengths and weaknesses in the design and operation of the institution; and it has suggested how these positive and negative features may affect the successful future development of the program as well as provide insights for other LIC credit and rural development programs.

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