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MEMORANDUM

TO : Mr. Emerson Melaven
AD/O

THRU : Mr. Curry Brookshier
AGR

FROM : Mr. Simon J. Weinger
OE

SUBJECT: North Carolina State Self-Evaluation

DATE: September 28, 1971

Curry Brookshier and I have reviewed the latest draft of the North Carolina State Self-Evaluation and we feel that as presently written it is an acceptable document.

The evaluation was made within the context of Esman's "Institution Building Framework" and thus comes to some different conclusions than would be expected from the approach taken by the Caton report. The self-evaluation has included some inputs from the "Caton approach", although minimally, in Chapter III.

Curry and I do not mean to infer that we agree with all of the conclusions drawn by North Carolina State, but we certainly feel that North Carolina State should be notified that this present draft is acceptable to us and that they may put it into final form.

F. I. D.
Reference Center
Room 1656 NS

North Carolina State University

Preliminary Report of the Self-Evaluation by the North
Carolina State University AID Mission to Peru

July 1971

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The evaluation, which is based on Esman's "Institution Building Framework," discussed the Universidad Nacional Agraria (UNA), the Direccion General de Investigaciones Agro-Pecuaras (DGPA), the Direccion General de Promocion Agropecuaria (DGPA), and projects related to the National Food Commodity Programs. Of the three institutions, UNA has advanced furthest toward the institutional goals it set for itself. This is because it is autonomous, its leaders and staff have had a clear idea of the development goals they wished to reach, and during the formative years they were able to assemble the resources to do the job. The DGIA is less advanced in institutional development than the UNA. The basic problem is that the DGIA has technical responsibility for a large decentralized national agricultural research program. The DGPA is the largest of the three institutions and has diverse responsibilities. Its institutional development has been somewhat less than in the DGIA and UNA. The evaluators made recommendations throughout the text including: (1) the present collaboration in National Food Commodity Programs of the Ministry of Agriculture as a medium for institutional development should be carried forward in a way that fully recognizes the stages of development of each project; and (2) linkages between regional institutions and the DGIA, DGPA and UNA should be fostered.

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July 1971

Preliminary Report of the Self-Evaluation by the
North Carolina State University AID Mission to Peru

The NCSU-AID Agricultural Mission to Peru has been carrying on a self evaluation which is designed to help it see the progress that has been made in the development of the institutions with which it has been working for the past seventeen years, and to see what remains to be done. The Evaluation Report, when complete, will consist of four chapters, as follows:

Chapter 1	Historical Review
Chapter 2	The Evaluation: Institutional and Linkage variables
Chapter 3	Evaluation of Present Project Components
Chapter 4	Future Program 1972-76

This preliminary report has been prepared in order to provide the Evaluation Team of USAID-PERU, which was making a study of the total AID Agricultural program in Peru, with information desired in its considerations. It deals only with the first three chapters mentioned above. Further work will be required to complete and perfect those chapters. The fourth chapter will be prepared after the AID Evaluation Team report has been considered by the Ministry of Agriculture and AID.

The work of the self evaluation has been undertaken by a group of five, including a member of the NCSU Mission, a member of the USAID-Peru staff and representatives of the three Peruvian institutions with which the NCSU has worked primarily. The group is as follows:

Dr. Damon Boynton, Evaluation and Planning Specialist, NCSU
Mr. Clifford Belcher, Program Officer, USAID-Peru
Dr. José Valle-Riestra, Director of Research, UNIA
Dr. Félix Quevedo, Subdirector of Agricultural Production, DGLA
Ing. Edgar Pye, Subdirector of Technical Assistance, DGPA

Mr. Belcher was unable to take part in a number of the sessions, and was represented in them either by Mr. John Fasullo or Mr. Simon Weinger. In the course of the evaluation all of the full-time NCSU Mission staff members and a considerable number of Peruvian counterpart staff were interviewed, many numbers of reports and documents were read, and a trip was made to the Regional Center of the Ministry of Agriculture in Lambayeque.

Dr. H. T. Scofield, UNA Academic Advisor prepared the Historical Review (Chapter 1), combining his personal knowledge and interviews with appropriate individuals with a review of the contracts and annual reports for the period.

CHAPTER I

Historical Review

A. 1954-56. The First Two Years of a Contract signed November 15, 1954 Between the Foreign Operations Administration of the United States Government and the North Carolina State College

After preliminary study of a proposal initiated by the U. S. Operations Mission in Peru that the N. C. State College provide technical backstopping for an agricultural development program in Peru, a contract was signed stipulating that N. C. State would "strengthen the agricultural research programs of Peru, working through the Programa Cooperativo de Experimentación Agropecuaria (PCEA), and under the general direction of the Servicio Cooperativo Interamericano de Producción de Alimentos (SCIPA)". The contractor agreed to "advise and aid in training of staff of PCEA in organization, administration and methods in the field of agriculture. This will include (1) surveys of research needs (2) improvement of research organization and administration (3) development of research projects in major fields (4) training of research workers and (5) preparation and dissemination of research results. The program will be centered initially in the Estación Experimental Agrícola de La Molina and in the Estación Experimental de Tingo María." Goal

To accomplish these objectives, N. C. State recruited and stationed in Peru a team of seven technicians. A Chief of Party and Advisor to the Director of PCEA in Lima, an advisor to the Director of the Experiment Station in Tingo María and a livestock specialist in Tingo María were on board early in 1955. Later in the year a soils specialist and a geneticist were stationed in La Molina and an agronomist and a physical plant specialist were added to the group at Tingo María. During the two-year period short-term consultants in pasture research, potato cultivation, experimental design and project development, entomology and plant breeding were brought to Peru to assist with specific programs. The principal research efforts were toward establishing a dairy herd improvement program and initiating a pasture improvement program for the selva.

During the two-year period the Mission Party Chief assumed the acting directorship of PCEA because efforts to obtain a Peruvian Director were unsuccessful. However, a survey and evaluation of research activities, personnel and facilities was achieved and a proposed organization of the agricultural research resources of Peru under PCEA was developed.

B. 1957-60. Development of a National Agricultural Program

In August 1957 a national agricultural research program to be administered by PCEA was approved and was funded by a sizeable grant from the Peruvian Congress.

The national program was organized along commodity lines and oriented principally to the basic food crops of Peru. National coordinators for programs in corn, small grains, rice, beans, potatoes, pastures and forages, and livestock were to be responsible for marshalling the existing facilities and personnel in a concentrated effort to solve basic problems of production. The principal stations at La Molina and Tingo María were not adequate to accommodate the diverse crop and livestock programs and therefore five additional locations under Ministry control were scheduled for improvement and reinforcement so as to serve as regional experiment stations.

The initiation of the national research program made a change in the N. C. Mission staffing pattern essential. The commodity programs could not be adequately serviced by Mission personnel stationed in Tingo María particularly when national coordinators were located in the Lima area. Thus by mid-1958 all N. C. technicians were located in Lima and deployed in such a way as to lend maximum assistance to the national commodity programs.

During this three-year period specific project outlines were developed in all of the commodity programs and substantial research was underway. A continuing problem since the very beginnings of the Mission program was a lack of sufficiently trained manpower in the agricultural sciences in Peru to carry on the research needed as well as an almost complete absence of capable people to fill leadership positions. A start was made during the period to provide training grants for technicians who were interested and capable of undertaking advanced study abroad.

The national potato program was coordinated by a well-trained Peruvian plant breeder and projects in breeding, soil fertility, pest control and management were initiated. Short-term consultants from the Mission assisted the program.

The small grains program derived much of its stimulus from a N. C. technician during this period and it was hoped that local leadership could be trained to take over the program. New lines of wheat from the Rockefeller Foundation programs in Mexico and Colombia were introduced and tested in the central sierra and an assay laboratory was set up at La Molina. A nursery for world collections of wheat and barleys was established

in a central sierran station. Some fertility work in the sierra as well as along the coast was initiated.

The major emphasis in the rice program along the northern coast was a breeding program to solve the severe lodging characteristics of the varieties in common use as well as to build in disease resistance. Some screening of the world rice collections for promising parent materials took place. A small start on fertility studies and weed control was also made.

The national corn program was located by PCEA at the Escuela Nacional de Agricultura (ENA) under a contractual arrangement and the breeding program at the La Molina Station was closed out. The program at ENA had received substantial support from the Rockefeller Foundation and a core of well-trained scientists had been assembled. The U. S. Mission provided only short-term consultant assistance to a program considered capable of maintaining its record of substantial research and development progress.

The national program in pastures and forages was developed in three parts in response to the distinct problems on the coast, in the sierra and in the selva. U. S. technicians provided backstopping and short-term consultants were brought in for special situations. Peruvian leadership, in this instance was outstanding and early successes were achieved with cultivated forages on the coast and improvement of existing grazing lands in the sierra. Progress was slow in the jungle and only work with evaluation of species and with management techniques was started.

A national program in beans was organized utilizing the personnel at the La Molina station formerly associated with the corn breeding program which was discontinued. A U. S. Mission technician provided technical assistance. The goal of the program was to increase the yields of these edible leguminous crops, high in vegetable protein, so that they would be available to the consumers at a lower cost. Screening of genetic materials from the Rockefeller Foundation programs in Mexico and Colombia provided the basis for a breeding program and efforts were initiated to develop a virus-free seed program.

Activity in the livestock areas was slow in developing due to lack of supporting funds, almost no leadership capacity among Ministry personnel and the existence of a stronger group located in the ENA which was determined to go its own way in terms of research and development. Two U. S. Mission technicians worked with cattle and hogs, and with poultry. The livestock problems of Peru were rated by the PCEA group as difficult and poorly understood, a situation which was to prevail for some years.

In an attempt to overcome the serious shortage of trained personnel to carry on the research programs of the country, PCEA decided to

train its own personnel. The ENA was, during this period, attempting to introduce some specialization in its curriculum as well as to develop post-graduate training and PCEA decided to take advantage of the situation. Nearly all of the commodity programs provided one or more graduate assistantships, the N. C. Mission supported several and a few were obtained from commercial sources. The recipients spent half-time studying at ENA and the other half-time working on research projects under the supervision of national coordinators or N. C. technicians. Some 17 assistantships were in force at the height of this activity during the three-year period and an excellent source of young technicians for the expanding programs was the result. In contrast, a much smaller number of established technicians in the programs had shown interest and language ability sufficient to be sent out for training in foreign countries. The two together, however, offered some hope for future improvement in the trained manpower situation.

During this three year period some significant changes were taking place in the Escuela Nacional de Agricultura which led to a request that the Mission provide some technical assistance in the areas of ~~aga-~~ ^{economic} ~~demographic~~ ^{demographic} affairs and business organization. The Contract between N. C. State and the ICA was amended to permit such assistance to be rendered during the last years of this period.

C. 1961-63, The Last Year of the Original Contract, the Disappearance of SCIPA, and the First Year and a Half of a New Contract

Amendment # 7 to the original contract between ICA and the N.C. State College provided for the operation of the Mission to the end of 1960. During the year, the U.S. Government terminated its participation in SCIPA and the Ministry of Agriculture in the government of Peru found it necessary to take over completely the agricultural research program formerly administered by PCEA. A new Servicio de Investigación y Promoción Agraria (SIPA) was organized to be responsible for research, extension, agricultural development (crops) and livestock development. These four divisions with their directors were coordinated by the overall Director of SIPA, formerly the Director of PCEA. Further, the country was divided into 12 agricultural zones, each with its Director who was to have control over the research, extension and development activities in his zone, presumably in cooperation with the central offices in Lima. A considerable period of confusion and adjustment prevailed as the new administrative system contended with its mixing up of people and changes in responsibility and authority.

1961 marked the beginning of activities by the Mission under a new contract, ICAc-1775, which was to extend through December 1963. Much

of the work was of a continuing nature but provision was made for greater assistance to the new Universidad Agraria, formerly EIA. During the year the Mission had a Chief-of-Party, livestock specialist, soils technician, pasture specialist, geneticist-plant breeder and an academic advisor to U/A on duty in Lima. The major link with SIPA was through the Director of the research division with additional linkages to extension and development branches. The concept of national commodity programs was still in effect but much of the organization and close personal involvement of technicians disappeared with PCEA and was weakened by the decentralized control. Too, Mission efforts to promote coordination of research, teaching and extension activities among the various institutions and divisions thereof ran into difficulties inherent in the legal separation of SIPA and the U/A as well as the vested interests within SIPA.

Even with the re-organization in the Ministry and problems related thereto, substantial work took place during the first year and a half of this contract period in those programs with which the Mission was involved. Progress continued in the cereals program toward development of well adapted lines of wheat, barley and rice. Soils research expanded materially and a beginning was made in the area of soils testing. The pasture and forage programs in the coast and sierra continued to attract favorable attention. Considerable success was experienced at U/A in its efforts to organize new university curricula and more efficient handling of student records and registration procedures. The Mission supplied two short-term consultants to survey the needs of U/A in terms of courses, physical facilities and staff for a predicted period of growth. This formed the basis for the MCSU campus planner to come to Peru for the purpose of drawing up a plan for a new university campus project to involve some joint facilities with SIPA. The idea gained approval of both institutions and the Campus Planner returned to Peru in June 1962 to start work on the project.

During the early part of 1962 substantial agreement was reached between AID, SIPA, U/A and the U. S. Mission that a much expanded technical assistance program in the areas of teaching, research and extension should take place. This culminated in an amendment in July, 1962 to contract ICAC-1776 which funded a much enlarged participation by the U. S. Mission for FY's 1963 and 1964.

D. 1963-65. The U. S. Contract Expands to Include the Development of Teaching, Research and Extension in Peruvian Agricultural Institutions ✓

The staffing pattern submitted under Contract Amendment ICAC-1776 (1) Peru called for Mission technicians in three general areas: the Universidad Agraria at La Molina, the Research Division of SIPA and

the Extension Division of SIPA. The latter was to include a fairly extensive thrust in southern Peru (Puno, Arequipa and Cuzco) where work was to be related to all phases of agricultural activity there.

By the latter half of 1953 the team had been recruited and located in Peru. There were eight N.C./AID contract technicians at U/A plus two more funded by a contract signed with the Ford and Rockefeller Foundations to assist development in the social sciences. The SIPA research team included six Mission technicians and one direct hire AID plant pathologist. Mission personnel assigned to the SIPA extension group included four in Lima, two in Cuzco, one in Arequipa and four in Puno. Except for minor changes due to terminations of contract and additions, the Mission team remained at this number until mid-1965.

1. The Program at Universidad Agraria

The period from 1952 through 1965 represented a "grand period of growth and development" at U/A. Inspired and led by an outstanding Rector, the university embarked on programs of improvement in all phases of its operation. The professional qualifications of its staff members were increased significantly by a policy of granting study leaves with pay to all who were able to qualify for advanced study in foreign universities. Support was provided by granting agencies both domestic and foreign. The N. C. Mission/AID alone provided training grants to about 40 people from U/A to undertake advanced degree programs abroad during this period. Short-term training grants were also awarded to attain specific objectives. The goal of forming an integrated university of Faculties with a common central administration was achieved, the only one of its type in Peru. Business procedures and organization were streamlined so as to promote greater efficiency and better service. Strong curricula were developed in all of the Faculties and courses of study were reviewed and modified to improve the offerings available in the academic departments. New Faculties of Forestry and Fisheries were formed to meet pressing needs for some specialization in these areas. Several discipline areas made outstanding progress during this period, animal nutrition, economics, agricultural engineering and plant breeding being noteworthy. With all of these advances, one or more N.C. technicians were involved. These included an academic affairs advisor, a specialist in business administration, a poultry specialist, a geneticist-plant breeder, a soil-plant-animal nutritionist and a team of agricultural economists. These were the years also when a team of N.C. architects finished the designing of a complex of new buildings for U/A, prepared the specifications and the bid documents, and supervised the beginnings of the construction process. They were assisted by two Peruvian architects and a group of engineers and draftsmen. An office of Architects and Engineers was organized under the administration of the Mission chief architect and this office was later to be supported by

loan funds assigned to a special contract between NCSU and U/A by USAID. This project was ultimately to result in four new office buildings, two laboratory complexes, a Library, a Union Building and a maintenance building, the majority of which were inaugurated in appropriate exercises on July 20, 1968.

During this period of growth and development, the student body increased from around 325 in 1962 to just over 1400 in 1965. The number of full-time staff members rose to over two hundred, more than a two-fold increase and the percentage of full-time staff went to better than seventy percent from something less than fifty in earlier years. This, too, was an unusual situation in Peru where a majority of the university professors work on a part-time basis. In addition to undergraduate curricula in seven Faculties, a graduate school offered the Magister Scientiae degree in several fields of specialization. The Universidad Agraria achieved a top rating among Peruvian universities during these years and had attracted favorable attention throughout Latin America.

2. Research and Extension Programs in SIPA

A number of unfavorable factors influencing research in SIPA developed during these years. The loss of all of the experimental stations outside of Lima to provincial universities cut down the land available for field research and this was only partially compensated for by rental of alternative sites. Also, after the initial staffing by the U. C. Mission of its southern Peru effort, SIPA was unable to follow through with expanded financing and considerable loss of interest in local Zones took place. Fairly frequent changes in top level spots in the Ministry also kept policy matters fluctuating with resulting loss of stability. Nevertheless, considerable progress was made through individual and group efforts and Mission technicians played important roles.

Substantial advances were made by the Soils group in SIPA at the La Molina Station. Fertility work was intensified, soils testing intensified, fertilizer recommendations for several crop plants were formulated and the new Soils Laboratory building was completed and equipped. Peruvian technicians were trained through study grants in the USA and a capable staff was developed. The U. C. Mission had a soils specialist working with the group during the entire period.

The plant pathology section was active during this period and both long and short term technicians from the Mission assisted with the development of research programs. New diseases in food crops were observed and the pathogens were identified. Breeding programs for disease resistance were initiated and intense studies of pathogen life histories as a basis for disease control programs were made. Some

effective cooperation between SIPA and U/A pathologists was developed, thus preventing duplicative work and greater productivity occurred. Participant training grants were made to increase the professional competence of several staff members.

The forage and pasture program had made significant progress over several previous years and continued to do so during this period. The N. C. Mission forage specialist position was discontinued at the end of 1964 because of the progress on the coast and in the sierra but it was evident that future work in the selva might well deserve Mission assistance.

The Southern Peru development program to which the Mission devoted a team of seven technicians in 1963 was not supported by an expanded GOP commitment as had been specified in the project agreement. The only region in which substantial inputs took place was in Arequipa where innovations in dairy cattle management practices attracted considerable attention and were supported by an expanded SIPA program. The all-practice programs in Puno and Cuzco had to depend largely on Mission technician activity and limited Mission financial support to keep going.

Some interesting and successful community development work was accomplished in the Cuzco area emphasizing self-help activity and cooperative efforts. The Arequipa program was continued with Mission support for some years to come.

With most of the southern Peru effort closed out in 1965, the Mission activities in 1966 were confined to a continuing and extensive program at U/A and some work with SIPA offices in line of a research and extension nature.

E. 1967-71. The Commodity In-Depth Projects

A new North Carolina State University contract was written in 1967 (Contract AM/1a 510), in order to provide better opportunity for NCSU to collaborate with the Ministry of Agriculture and the National Agrarian University in several of the high priority national integrated projects for the increased production of agricultural foods. This modification did not change the primary commitment for continuing technical assistance to strengthen and accelerate the institutional development of the National Agrarian University and the Ministry's Servicio de Investigación y Promoción Agraria. It simply created an expanded program with new focuses of activity having emphasis on certain agricultural commodities. This contract has remained in effect since 1967, with annual amendments, which mainly recognize changes in budget and personnel.

The 1967 contract provided for the development of five Commodity In-Depth projects (Potatoes, Rice, Beans, Fruit and Forages and Livestock) which corresponded to National integrated programs of the Peruvian Ministry of Agriculture. Within these National Programs, the NCSU Mission technical assistance personnel were given joint responsibility for program planning and implementation. The programs were designed to coordinate production and marketing components through integrated research, extension and fomento activities.

In addition to the grant funding by way of the contract, a complementary loan program was to provide funds for necessary physical facilities for the National Experiment Station and for the National Agrarian University at La Molina, and for selected regional research centers and provincial universities for extension training programs and essential equipment for foundation seed production, storage and processing for a National Animal Pathology Center and animal research facilities elsewhere and for production and marketing credit. Unfortunately the loan program was never implemented, so that the Commodity In-Depth projects could only be partly set in motion.

The commodity In-Depth projects were designed to integrate institutional programs, making use of human and physical resources of the Ministry, National Agrarian University and other public and private institutions. The 1967 contract provided for 29 full-time NCSU staff members, 19 campus cooperators and 2 man years for short-term consultants. The concept of campus cooperator was new - an NCSU Faculty member who devotes approximately one quarter of his work time on the campus and on assignments in Peru to an In-Depth program, serving throughout the year as a consultant to Peruvian counterparts. The number of full time NCSU Mission personnel to be assigned to each In-Depth project was as follows: Potatoes 4; Rice 2; Beans 3; Forage and Livestock 11; Fruit 2. Seven NCSU Mission staff members were assigned to other responsibilities. In order to provide for the total NCSU program the 1967 budget was \$938,000. This was to increase to \$1,750,000.00 in 1968.

Recruiting for the In-Depth projects began in 1966 and continued until October 1968. At this time the Potato project was completely staffed and good progress had been made with the other programs. The fruit program was discontinued in 1968 due to loss of priority status. Unfortunately a financial crisis of the Peruvian government was followed by a political upheaval in October, and differences between the new Military government and the United States government unfortunately brought the recruitment to a halt. This resulted in steady loss of NCSU personnel in the latter part of 1968 and 1969, as two-year contracts were not renewed and the full-time staff number decreased from 22 to 8. The In-Depth programs were affected differently. Full-time personnel in the Forages and Livestock project were reduced from 8 to 1; in the Bean project both of the team members were discontinued; in the Rice project the Co-leader remained but there was a delay

in the appointment of the Rice Breeder; in the Potato Program there was no loss of full time personnel. In late 1969, the NCSU Mission was again allowed to staff its program but on a more limited basis. As a result, the full-time program staff increased in size to 12 during 1970. It is anticipated that the full-time staff will be 11 during 1971, despite a 15 percent reduction of budget. During 1970 the number of campus cooperators was 8 and it will rise to 10 in 1971.

NCSU Mission collaboration with UJA continued during this period both within Contract AD-12 510 and complementary to it. During part or all of the time there was a contract Academic Advisor, and a contract Agricultural Economist. In addition there were two Agricultural Economists and a Rural sociologist on Ford-Rockefeller Grant appointment until 1969 and an architect with staff to supervise the construction and equipment of the buildings for the new campus, under direct contract with UJA. Among the short-term consultants engaged to serve the UJA program were a Library consultant and a classroom consultant.

During the period 1967-71, several events took place in the Ministry of Agriculture and the National Agrarian University that temporarily affected their operational efficiency. SIPA was discontinued as a semi-autonomous agency in a reorganization of the Ministry and its functions were assumed by the Dirección General de Investigación and the Dirección General de Promoción Agropecuaria. Coordination between these two Direcciones Generales and between them and the five others of the Ministry was placed in the hands of a new Director Superior, directly under the Minister of Agriculture. Beginning 1967 in the Ministry and 1966 in the University, salary levels were frozen. As a result of this, the financial problems of the professional staff have become cumulatively more difficult, and there has been a loss of key personnel with advanced training. In the National Agrarian University, new laws have reduced its innovative capabilities to some extent. The regulation of salaries at reduced levels, the creation of a requirement for a 10 hour weekly teaching load for each faculty member, and the low budgetary level in the face of rising student numbers have created difficulties. One of the most alarming results has been a loss of more than sixty full-time faculty members. Partly in consequence of these events and partly because of reduced budget for contract 510, the number of Ministry and University staff members studying in the United States for advanced degrees has been reduced sharply for 1971. In spite of the problems enumerated above, however, the new policies of the military government, which emphasize economic and social planning and which focus on both agrarian reform and agricultural production have provided the basis for constructive thinking and action in the Ministry and the University. There is also room for encouragement as a result of increased budget for the two Direcciones Generales of the Ministry of Agriculture in the 1971-72 biennium.

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General Observations

This brief survey shows the origins of the present commitments of the N. C. Mission to provide technical assistance for the development of the national research and extension agencies of the Ministry of Agriculture, and for the development of the National Agrarian University. For the first six years (1954-60) the technical assistance efforts concentrated on the development of the national agricultural research agency (PCEA), under the general direction of the existing national agricultural extension agency (SCIPA). But during this period, warm relations developed with the National Agricultural School (UNA), and some research activities carried on there were fostered by the Mission. When UNA was preparing to become the National Agrarian University it turned to N.C. State for guidance, and as a result the responsibilities of the Mission were enlarged to include technical assistance to UNA. At this same time, in 1960, SCIPA and PCEA went out of existence and the Ministry of Agriculture formed the Servicio de Investigación y Promoción Agraria (SIPA). SIPA had four technical Divisions: Experimentación Agropecuaria, Extensión Agropecuaria, Fomento Agrícola and Fomento Ganadero, coordinated by a Technical Director. The involvement of the N. C. Mission with Extensión and Fomento as well as Experimentación was a natural evolutionary step within this organizational setting. Thus, by early 1960, the N. C. Mission was working with SIPA principally in the Research and Extension Divisions but also in some aspects of Fomento Agrario, and Fomento Ganadero, as well as with UNA. When SIPA was discontinued in 1968, its four Divisions were placed in two Direcciones Generales of the newly reorganized Ministry: the Dirección General de Investigaciones Agropecuarias and the Dirección General de Promoción Agropecuaria. The N. C. Mission continued its technical assistance under this new structure.

The evolution of the Commodity In-Depth Projects may be seen in this survey. In 1957, on the basis of plans proposed by the N. C. Mission Director, a national agricultural research program to be administered by PCEA was approved and funded. This was organized along commodity lines and oriented to the principal food crops and animal products of Peru. When SIPA was formed in 1960, the national commodity programs were set up so as to coordinate appropriate commodity activities not only in the Research Division, but also in the Extension and Fomento Divisions. With the exception of the national Corn Program, whose administration was largely delegated to UNA, and the National Storage Program the Commodity Programs were weak, due principally to insufficient trained personnel, inadequate funding and imperfect communication, but the system was established. The NCSU-AID Mission Commodity In-Depth Projects implemented 4 of these Programs, and in the original concept were to enlarge upon them by bringing into the system of services loan-funded implementation of credit, marketing and material input needs of the projects. Unfortunately, the AID loan was not obtained, the technical assistance program of the NCSU-AID Mission was reduced, and SIPA was divided into two Direcciones Generales. Nevertheless, the Peruvian trained staff, the physical resources and the coordina-

CHAPTER II

The Evaluation: Institutional and Linkage Variables

The preceding chapter provides a brief chronological resume of the North Carolina State University AID Mission, placed in the setting of the institutional development which its program is designed to strengthen and accelerate. This chapter will deal with the evaluation of the Mission's program in terms of the present status of institutional development of the three institutions which have received major technical assistance. The status of institutional development of each institution will be considered under six headings according to the Esman Institution Building model: 1) Doctrine; (2) Leadership; (3) Programs; (4) Resources; (5) Internal Structure; and (6) Linkages.

UNIVERSIDAD NACIONAL AGRARIA

Doctrine

Roles. The principal role of UNA is in higher education in the biological, physical and social science fields and technologies concerned with agriculture, food technology, forestry and fisheries. Associated with this role are increasing commitments to research and to social projection (publication, technical assistance and intensive training programs) related to production and economic development in these fields, and to the welfare of the rural population.

Goals and Objectives. The main goals and objectives of UNA are to provide and to help to coordinate on a national basis the higher education required to form strong and effective technical leadership in agriculture and the other fields of its concern, and to contribute by research to increased production and productivity in these fields. A dominant overriding goal is the improvement of the standard of living and social justice for the rural population.

Innovations desired. The principal innovational commitment of the UNA is the creation of an integrated University in which the central administration coordinates the work of the academic departments and educational and

research programs which are carried on mainly by full-time faculty members. This is in contrast to the highly decentralized traditional Latin American University in which the Faculties are essentially separate entities with uncoordinated programs of education conducted by part-time faculty. Both this structural innovation and the doctrine of the UNA are patterned after the North American Land Grant University to a considerable extent.

Complementarities with other agricultural institutions.

Complementarity between UNA programs and budgets and those of other Universities is accomplished through the Consejo Nacional de la Universidad Peruana (CONUP). Since UNA is the largest and strongest of the agricultural Universities, and its graduates constitute the main group of Ingenieros Agronomos of Peru, it has a national influence, whereas most of the others have regional or provincial influence in the network of agricultural Universities of the country.

Complementarity between UNA and the Ministries of Agriculture and of Fisheries in the areas of higher education and special training result from the fact that UNA provides a large part of the training personnel and retraining services needed by the Ministries. In the areas of research and technical assistance involvement of UNA personnel and facilities in the programs of the Ministries is accomplished by contracts and informal arrangements.

In the early years of its development, when UNA was developing doctrine to encompass its enlarged responsibility, there was a tendency for UNA to compete with the Research and Extension Divisions of SIIPA in those activities rather than to complement it in those roles. This tendency has decreased as UNA has matured, and with the present Ministry of Agriculture's DGIA and DGPA there is a rather good complementarity.

Leadership

Strength, Depth and Quality

In the UNA the strength, depth and quality of leadership have been, during the past ten years, and continue to be, very impressive. This results from the democratic nature of the University organization which provides a training ground for those with leadership qualities, as well as from the policy of the University to encourage advanced training of its professional staff. Of the total professional staff of about 350 more than 100 hold the degree of MS and more than 25 have or are studying for the degree of PhD. Most of the key officers hold advanced degrees.

Thus, despite losses of professional staff leaders to other institutions and to private business, the University has been able to replace them with other qualified leaders.

Influence on the "Power Structure"

During the period prior to October 1968, the UIA had very strong influence in the "Power Structure" of the government as well as in the private sector. With the formation of the Revolutionary Government, and the decline of power of "the landed oligarchy" this influence decreased. At present, UIA has a strong leadership role in the Consejo Nacional de la Universidad Peruana which has responsibility for coordination of budgets and policies of the National Universities and also exerts direct influence through the participation of its graduates and its professional staff in key administrative or advisory positions in the Ministries of Agriculture, Education and Fisheries, and other national institutions, as well as in public and private business concerns related to agriculture. In common with the other National Universities, the UIA at present suffers the effects of a lowering of the priority status for higher education which existed under the previous government.

Stability of Leadership

The stability of leadership in the positions of top responsibility has been good. In the lower ranks, more changes of leadership are to be expected, and this has been accentuated somewhat since 1968, when a ceiling was placed on salary levels and starting salaries for lower academic ranks were decreased.

Success in Motivation and Dedication of Staff to New Goals

A new University Law has created basic changes in University organization and procedures, and more changes are to be expected from the prospective Educational Reform Law; the UIA staff must adapt to these changes. Thus far, the UIA has been successful in carrying the loyalty and dedication of the professional staff to the new situation. There is also a positive attitude of this staff toward the new emphasis on social justice and human development proscribed by the Revolutionary Government.

Success in Collaboration with other Public and Private Institutions

The UIA collaborates with the other agricultural universities through its program of technical assistance. There are close relationships

with the University of San Marcos Academic Program of Veterinary Medicine; with the DGLA, in addition to formal collaboration based on contracts, a great deal of informal collaboration in research activities take place. The proximity of the National Experiment Station of La Molina to UNA makes it possible for each institution to contribute to the program of the other. Thus, increasingly, research for Ingeniero and graduate theses is done at the Experiment Station, and staff members of the Experiment Station assume part time teaching responsibilities in UNA. Staff members of UNA also collaborate not only in the work of DGLA but also of DGPA, OSPA and other Direcciones Generales of the Ministry of Agriculture, including those of Aguas and Riego and Reforma Agraria y Asentamiento Rural.

Programs

The UNA educational programs are highly developed in nine areas (Agronomy, Agricultural Engineering, Animal Science, Social Sciences, Science, Forestry, Fisheries, General Studies, Food Industries). The requirements of the University and those of the individual programs are integrated. A program of Graduate Studies leading to the degree of Magister Scientiae is also offered in the fields of Plant Breeding, Plant Pathology, Entomology, Animal Nutrition, Animal Production, Crop Production, Communications, Agricultural Engineering and Economics.

For the development and central administration of research, there is a Director of Research who has an advisory council representing the different program-oriented centers of investigation. In 1970 there were some 430 research projects. Certain research programs are well-developed: for example, the Corn Program and the Meats Program. Others are in a state of rapid evolution: for example, the Socio-Economic Research Center. In many departments a lack of support in the regular budgets has inhibited development of effective research programs as yet. In general, staff training and competence for research exceeds the financial support available.

Relevance of Programs to the needs of the Country

The basic educational programs of UNA are relevant to the state of economic, social and technological development of Peru. A recent review of these programs has been made in order to assure this. In addition, much of its research, and the activities of its office of Social Projection in communications, technical assistance and intensive training provide direct contributions of UNA to the development needs of the country.

Acceptance and Understanding of the Programs by Professional Staff

In the UIA the professional staff is involved in the development of its programs as a result of the organizational and committee activities in which each member takes part. As a result, the new doctrine and procedures set up in conformity with the new University law have been accepted and understood, even though debate continues as to the wisdom of some of the requirements.

Coincidence of the New Programs with Doctrine

The new programs of education, research and social projection of UIA coincide satisfactorily with the doctrine of the institution. This results from the fact that the doctrine has been sensitive to social justice, human development and improvement of the lot of the campesino which are newly emphasized by the Revolutionary Government.

Quality and Quantity of Results of the Programs

The UIA has been able to provide an expanding student body with high quality educational programs at the undergraduate and graduate levels. Its major research programs are of high quality also, but due to limited resources are limited in number and do not represent its full potentialities. The programs of Social Projection represent a new dimension which has yet to develop fully, but there is much promise in this aspect of the University's work.

Resources

Budget

For the biennium 1971-72 the UIA will have a budget of \$360,633,900, or approximately \$180,000,000 per year. This amounts to 4.2 million dollars per year and is about the same as the budget for 1970. Most of it comes from the Ministry of Education. Careful husbandry will be needed in order to provide adequately for the programs now underway.

Professional Staff

At the beginning of 1970 the professional staff was approximately 350 of whom about 250 were full-time members. More than 100 of these

held the degree of M. S. and more than 25 held, or were working on, the degree of PhD. In the course of the year some 60 full-time staff members either resigned or became part-time members, as a result of the low salary ceilings that have been imposed by law on the University.

Programs for Staff Improvement

During the period from 1962 to 1971, the NCSU Mission (AID) provided 87 long-term and 39 short-term training grants to UNA staff members recommended by their fellowship committee. The long-term grants in almost all cases were for M. S. or PhD study in the United States. In addition, fellowships for foreign study were made available by the Ford and Rockefeller Foundations, the Organization of American States, the United Nations Special Fund as well as a number of foreign governments. UNA has the policy of paying the salaries of staff members while they are on fellowships for staff improvement.

Physical Resources, Library and Publications

The Physical resources of the University are now adequate to provide for its present programs and a student body of 2500 to 3000. The first stage of its building program has provided four office and two laboratory buildings, a library, a student union, and a maintenance and operations building. Although classroom space is short, provision has been made for new classrooms in several of the office buildings and the student union, and renovation of classrooms on the old campus has been undertaken. At present the farm is adequate to satisfy the needs for teaching and research.

A new library building to house the National Agricultural Library as part of the new University City provides ample space for books, cataloging and other services, and reading rooms. A text book rental service has been developed to provide for some of the basic courses. At present the library book collection is small (about 40,000 volumes) and the budget for acquisitions of books and technical journals is not adequate.

The UNA publishes a journal of research, Anales Cientificos, and a number of information bulletins concerned with agricultural subjects.

Internal Structure

The organizational structure of the UNA was changed in 1969 as a result of a new University Law. Its previous academic organization, as

Faculties with a Central Administration, was modified to eliminate the Faculties, create Academic Programs of Instruction, and to make the subject matter departments directly responsible to the Administration.

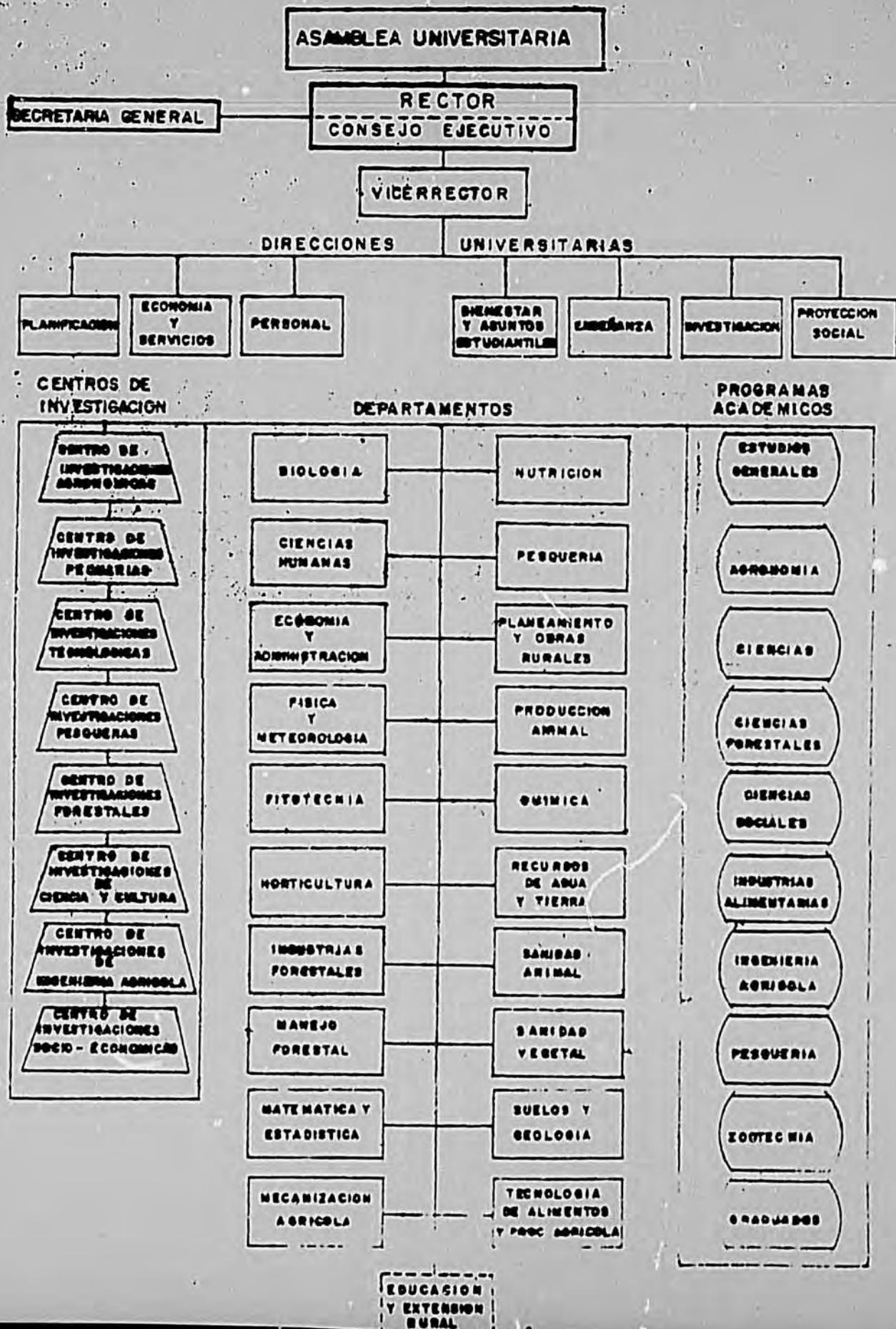
As Fig. 1 shows, the UIA now has a central administration composed of seven Direcciones. Under this administration are 20 subject matter Departments which correspond to 10 Academic Programs and 8 Research Centers. This organization, during the short period of its existence, appears viable, and there was not at UIA the trauma that occurred in traditional Peruvian Universities as a result of the new University Law. This is because UIA already had a relatively strong central administration which coordinated the academic programs of the Faculties.

The isolation of the management of the Academic Program from that of the departments, both of which previously belonged to a Faculty, may not be necessary in order to strengthen the authority of the central administration, and there may be a joining of the two responsibilities at the Faculty level again in the forth-coming Educational Reform Law. This will probably be wise. Another matter which is more the result of tradition than of organization is the high degree of democratic control of decision making, through the many committees and councils that have vested authority. Since this type of organization is characteristic of Universities it should continue. But it is possible to increase the efficiency of a committee — structured organization by limited delegation of decision-making powers to the chairmen of the committees.

Linkages

As has been indicated in the section on Leadership, prior to the present Military Government UIA had very strong enabling linkages to the political Power Structure. At present, UIA, which receives its basic budget from the Ministry of Education, has administrative (enabling) linkage to it through the Consejo Nacional de la Universidad Peruana (CONUP) which coordinates the budgets and programs of the National Universities. Since the UIA belongs to the group of the three most prestigious Universities of the country there are many other enabling and functional linkages to the government, formal and informal. For example, it is linked with the DGLA and DGRA in many activities of the Ministry of Agriculture. It is linked with OSFA and other governmental agencies concerned with planning and economics through the new Instituto de Investigacion Socio-Economico. It has given leave of absence to a key staff member for service as chairman of the new Consejo Nacional de Investigacion. Its educational and research programs place it in close functional linkage with the Instituto del Mar, the DG de Forestales, Caza y Tierras and the DG de Aguas e Irrigacion. It is linked functionally with the DG de Reforma Agraria y Asentamiento Rural and

Fig. 1
**ORGANIZACION ACADÉMICA Y ADMINISTRATIVA
 DE LA UNIVERSIDAD NACIONAL AGRARIA
 "LA MOLINA"**



CENICIRA, through field research and in-service training.

Because of its pre-eminence in higher agricultural education, UIA has very strong functional linkages in the private sector. Its ties with associations of agriculturists of the country, with insecticide, fungicide and fertilizer manufacturers, and with processors of food and fiber crops are of long-standing. New functional linkages with cooperatives and groups of small farmers are also being made.

The functional linkages of UIA with other Agricultural Universities and programs in Peru are also strong. To the extent of its ability UIA provides technical assistance to these institutions in the development and execution of their teaching and research programs.

UIA has excellent enabling linkages with international and foreign technical assistance agencies and foundations. The Ford and Rockefeller Foundations, the United Nations, the Organization of American States all provide support to the programs of UIA, as do USAID (mainly through the NCSU and ISU Missions) and other bilateral technical assistance programs.

The functional linkage between UIA and the DGIA is an essential one to both institutions, since the DGIA is a very important research and training resource for the University, and the UIA is the primary resource of trained personnel and specialized research facilities for the DGIA. Although this has improved in recent years, particularly at the working level, further strengthening of ties will benefit both institutions.

THE DIRECCION GENERAL DE INVESTIGACIONES AGRO-PECUARIAS

Doctrine

Role

The principal role of the DGIÁ is in agricultural research applied to the problems of production and development. It is implicit in this role that the research is directed primarily toward the welfare of the medium and small farmer in the context of the agrarian reform movement of Peru.

Goals and Objectives

The principal goals and objectives of the DGIÁ are to provide and coordinate on a national basis new knowledge and information and plant and animal resources which will lead to improvement in quantity, quality and efficiency of agricultural production in accordance with the planned development of agriculture in the country. In the context of the goals of the Revolutionary government, the improvement of rural employment and income are important objectives of this research.

Innovations Desired

The innovation desired is the conduct of applied agricultural research in a national network which includes a national administrative and experimental center at La Molina, and regional centers and research units in the 12 Agrarian Zones. Although the organizational structure of the DGIÁ is "horizontal" much of the research work is carried on in "vertically" structured National Commodity Programs.

Complementarities with Other Agricultural Institutions

The activities of the DGIÁ complement those of the DGPA and the other five Direcciones Generales of the Ministry of Agriculture satisfactorily. The Oficina de Planificación Agraria (OSP_A) of the Ministry of Agriculture determines the plans and priorities for the Direcciones Generales, and the Director Superior coordinates the activities.

Complementarily between the DGIA, UNA and the other Agricultural Universities in the conduct of research is accomplished by contracts and informal arrangements. Some duplication of effort has occurred. In the early years of the UGA there was a strong tendency for it to complete with, rather than complement, SIPA in research activities.

Leadership

Strength, Depth and Quality

The Dirección General de Investigaciones Agropecuarias has improved considerably in the strength, depth and quality of leadership during the past few years. This results, to a large extent, from the program of professional training that has gone on for the past ten years, in cooperation with AID, the Rockefeller Foundation and other organizations. At present 7 members of the staff have the degree of PhD and 3 are studying toward it; 23 staff members have the degree of MS and 7 are studying toward it. This is out of a group of 171 technical personnel of whom 136 are Ingenieros Agronomos. Six of the key administrative posts are held by people with advanced degrees.

Influence in the "Power Structure"

The influence of the DGIA and its predecessor organizations in the "Power Structure", has not been great in the past. It has improved recently, probably as a result of the publicity surrounding the "Green Revolution". The creation of the Consejo Nacional de Investigación has made a new avenue of approach by the DGIA to the level of the Cabinet. There is now, also, liaison between the DGIA and the National Planning Institute, through the Ministry of Agriculture's Oficina Sectorial de Planificación Agraria (OSPA).

Stability of Leadership

Stability of leadership in the DGIA appears to have been achieved recently after a period in which changes of organizational structure and responses to changes in the social and economic commitments of the Military Government resulted in replacement of administrators.

Success in Motivation and Dedication of Staff to New Goals

The new goals of the government, particularly its great emphasis on agrarian reform, have required changes in the organization, projects, and procedures of the Ministry of Agriculture. These changes have not affected the DGLA deeply, and there has been no difficulty in carrying the loyalty and dedication of the professional staff to the changed situation.

Unfortunately, since 1966, motivation has been affected adversely by the inability of the government to provide an adequate salary structure for the professional and subprofessional employees of the DGLA.

Success in Collaboration with Other Public and Private Institutions

One of the indications of strong leadership in an institution is the ability to arrange for effective collaboration with other institutions. In recent years, the DGLA has strengthened its collaborative role. For example, it has delegated by contract the major responsibility for the National Corn Program to the UNA, is collaborating with the veterinary Program of the University of San Marcos (IVITA) in forage and livestock activities in the sierra and selva, is collaborating with the Universidad Pedro Ruiz Gallo on rice research and with the Technical University of the Altiplano in range management work, and has recently undertaken collaborative research with several Centrales de Cooperativas created by Reforma Agraria. It is also strengthening its ties with the DGPA in the creation of a corps of extension specialists.

Programs

Degree of Development of Programs

In the DGLA, the research programs have been planned in detail at the National and Agrarian Zone levels. In recent years an annual complete listing of Projects and Subprojects has been published. The list is the subject of an annual meeting at which the National leaders of projects conference with the Agrarian Zone Supervisors, and agree on the research work to be conducted during the following year if adequate staff and budget are provided. Thus in 1970-71, 1660 subprojects in 15 commodity project areas were listed. Of these, 1199 were to be conducted in the Zones and 461 at the National Experiment Station at La Molina. Not all of these can be carried out, however, and the ultimate choices will depend on: (1) the total budget and staff, and national priorities within it; (2) the Agrarian Zone budgets and the priorities within them.

Certain programs, such as those of the Dirección de Investigación Pecuaria and of the Departments of Seed Technology and of Experimental Statistics are inadequately developed.

Relevance of Programs to the Needs of the Country

The DGLA programs are responsive to the government's concern for increased production of food crops and animal products presently imported, and for basic food crops whose prices are regulated. For example, more than 1400 of the 1660 research subprojects planned for 1970 were concerned with the seven priority commodities in the above two groupings.

Acceptance and Understanding of the Programs by Professional Staff

The professional personnel of the DGLA generally accept and understand the research programs for which they are responsible. There are several means of maintaining group identity and enthusiasm. One of these is to bring the Supervisors of Research to La Molina twice a year for conferences on research planning. Another is to have annual report and planning meetings for the technical people concerned with individual commodity programs.

Coincidence of the New Programs with Doctrine

Under the Revolutionary Government, a new element, social justice and human development, has been emphasized in Doctrine. New goals for improved income distribution in the rural sector, and improved rural employment are not incompatible with the established ones for greater productivity and improved food supply, but they need to be taken into account in the DGLA programs. Thus the research functions of DGLA can adjust program details to the new Agrarian Reform principles.

Quality and Quantity of Results of the New Programs

There are research projects of high quality with important results in many of the programs. There has been a tendency in the DGLA to undertake more research work than could be supported effectively by the available funds and personnel. This has resulted in some uncompleted or poorly conducted work. In addition, the inadequacy of the total budget has meant that some essential aspects of research have been omitted or superficially treated.

Resources

Budget

In the biennium 1971-72, the DGIA will receive 4 percent of the total budget of the Ministry of Agriculture, or S/ 152,379,000 in each of two years (approximately 3.5 million dollars). Sixty-three percent of this is allocated to the Agrarian Zones. The 1971 budget is twice that of 1969 and 50 percent higher than that for 1970.

The increase in budget for the biennium appears to reflect an increasing awareness of the key role the DGIA plays in agricultural development. The projections in the "Plan Agropecuario a Mediano Plazo, 1971-75" should give the Ministry the basis for planning future increases appropriate to the level of activity needed.

Professional Staff

The professional staff of the DGIA in 1970-71 included 90 full-time technicians in the 12 Agrarian Zones plus a group of 60 at the National Experiment Station at La Molina. The five Regional Centers, located in the Agrarian Zones and counted as Zone personnel, included 15 professionals at Lambayeque, 15 at Tarapoto, 11 at Huancayo, 8 at Cuzco and 6 at Arequipa. The numbers of specialists in other zones ranged from 3 to 9 per zone.

Programs for Staff Improvement

During the period from 1962 to 1971 the ICSU Mission (AID) provided 37 long term and 95 short term training grants to Ministry of Agriculture professional employees. Most of these were awarded to DGLA technicians and administrators. In addition, the Rockefeller Foundation, the OAS and the Atomic Energy Commission provided several long term and short term fellowships for DGLA staff. The policy of the Ministry has been to allow a limited number of staff members to take leaves of absence with pay for training experiences abroad. The number in the DGLA allowed to leave for advanced degree study has not been large and recently there has been a discontinuance of the privilege. Short term study permits have been more plentiful.

Physical Resources, Library and Publications

In the past few years, the DGIA has improved its physical resources by construction of buildings at La Molina and Tarapoto. Construction has begun at Lambayeque and new buildings are planned for Huancayo and Cuzco. Land acquisitions have been made at Lambayeque, Huancayo, Cuzco and Arequipa. Plans are afoot for land acquisitions for the National Experiment Station of La Molina in an adjacent irrigated valley as well as other acquisitions which will provide experimental and seed production fields in various of the other Agrarian Zones. In general, purchase of laboratory and field equipment for these new buildings, laboratories and farms has lagged, and technical and operational personnel have not been added in sufficient numbers to satisfy the expanded needs, due to shortage of financial support.

The library of the DGIA has a collection of about 80,000 items. It is maintained separately from the National Agricultural Library in the University. There is no adequate financing for the acquisition of books and periodicals. At present some support is being provided the National Agricultural Library by the DGIA for personnel and it is possible that the two libraries will combine forces.

The DGIA has initiated a technical journal for publication of the research results of its staff. It also has increased the publication of technical bulletins and information materials on food crops and commodities. Substantial help has been provided for the latter type of publication by the NCSU Mission (AID).

Internal Structure

The organizational structure of the DGIA is shown in figure 2. There are two technical Direcciones: one for crop research (Investigaciones Agrícolas) and the other for animal research (Investigaciones Pecuarias). Except for the pasture and forage work and some work with Guinea Pigs and Swine the Dirección de Investigaciones Pecuarias depends on the DGPA, the Veterinary Program of the University of San Marcos, and UNA to conduct its animal research. The Dirección de Investigaciones Agrícolas is developed as indicate on the organization chart with about forty percent of the staff at La Molina.

The DGIA operates within the structure of the Ministry of Agriculture, as one of seven Direcciones Generales concerned with executive programs. All are under the Director Superior with common services provided by the Dirección General de Administración. Each of the 12 Agrarian

MINISTERIO DE AGRICULTURA
DIRECCION GENERAL DE INVESTIGACIONES AGROPECUARIAS

ORGANISMOS
E INSTITUCIONES CIENTIFICAS
NACIONALES E INTERNACIONALES

MISION DE LA UNIVERSIDAD
DE CAROLINA DEL NORTE

DIRECCION GENERAL
DE INVESTIGACIONES
AGROPECUARIAS

BIBLIOTECA AGRIC. NACIONAL

OFICINA DE PROGRAMACION

OFICINA DE SUPERVISION

OFICINA DE BIOMETRIA
Y ARCHIVO CIENTIFICO

OFICINA DE INTERCAMBIO CIENTIFICO

OFICINA DE ADMINISTRACION

DEPARTAMENTO
CONTABILIDAD

DEPARTAMENTO
ADMINISTRATIVO

DEPARTAMENTO
SERVICIOS

DIRECCION
DE INVESTIGACIONES
AGRICOLAS

DIRECCION
DE INVESTIGACIONES
PECUARIAS

SUB-DIRECCION

SUB-DIRECCION

DIVISION
DE MEJORAMIENTO DE CULT.

DIVISION
DE ABRONOMIA Y SUELOS

DIVISION
DE SANIDAD VEGETAL

DIVISION
DE MEJORAMIENTO Y
MANEJO ANIMAL

DIVISION
DE ALIMENTACION ANIMAL

DIVISION
DE SANIDAD ANIMAL

DEPARTAMENTO DE
FRUTOS Y OTROS TUBEROS
-CULOS Y RAICES-

DEPARTAMENTO DE
CEREALES

DEPARTAMENTO DE
HENERAS

DEPARTAMENTO DE
FRUTICULTURA Y
HORTICULTURA

DEPARTAMENTO
ALGODONERO

DEPARTAMENTO DE
OLEAGINOSAS

DEPARTAMENTO
CARA DE AZUCAR

DEPARTAMENTO DE
TECNICAS DE
SEMILLAS Y
ANILAS

DEPARTAMENTO DE
SUELOS Y SUELOS

DEPARTAMENTO DE
FERTILIZANTES Y
AGUAS

DEPARTAMENTO DE
INGENIERIA
AGRICOLA

DEPARTAMENTO DE
ENTOMOLOGIA

DEPARTAMENTO DE
FITOPATOLOGIA

DEPARTAMENTO DE
NEMATOLOGIA

DEPARTAMENTO DE
CONTROL DE
SALUD

DEPARTAMENTO DE
ANIMALES DE
GRANJA

DEPARTAMENTO DE
AVICULTURA

DEPARTAMENTO DE
PECUARIOS

DEPARTAMENTO DE
PACOS Y PERRAS

DEPARTAMENTO DE
NUTRICION ANIMAL

DEPARTAMENTO DE
DIAGNOSTICO

DEPARTAMENTO DE
EXPERIMENTOS
PARASITARIOS

DEPARTAMENTO DE
EXPERIMENTOS
INFECCIOSOS

DEPARTAMENTO DE
EXPERIMENTOS
GENERALES

ESTACION EXPERIMENTAL AGRICOLA DE LA NEBLINA

1.6.1

Zones administers and provides budget for the components of the DGIA located in that zone. As this relatively new structure has developed, there has been on the one hand centralized control over appointments and expenditures exerted by the DG de Administración in the Ministry and, on the other, a decentralized control of budget by the Agrarian Zones. This has made it difficult for the DGIA to exert sufficient administrative control over the National programs for which it is responsible.

Linkages

Present Interrelationship between the DGIA and Other Agencies

As has been indicated under Internal Structure the DGIA has enabling linkages within the Ministry of Agriculture with the Director Superior, the Oficina Sectorial de Planificación, and the Dirección General de Administración. On a day-to-day basis its strongest functional linkage inside the Ministry is with the DGPA, whose extension and promotion functions complement the research functions of DGIA in a number of National food commodity programs. But it also links with the other four executive Direcciones Generales (Aguas e Irrigación, Forestales, Caza y Tierra, Reforma Agraria y Asentamiento Rural, and Comercialización) and with the Instituto de Investigaciones Agro-Industriales (IIA), the Empresa Pública de Servicios Agropecuarios (EPSA) and the Centro de Capacitación e Investigación para la Reforma Agraria (CEMICRA). The linkages vary in strength depending on common interest and newness of the other agencies, but they appear to be cordial and reasonably effective.

Outside the Ministry the DGIA has increasingly effective functional linkages with the UNA and the Veterinary Program of the University of San Marcos, as well as several of the provincial agricultural universities. The linkages with the private sector are perhaps less strong but increasingly effective. Thus there are linkages with associations of Agriculturists in several irrigated valleys and with associations of producers, as well as with private industry in the areas of insecticides and fungicides, fertilizers, seed production, processors of cereals and rice etc.

The DGIA also has successfully maintained enabling linkages with several foreign and international agencies and foundations, including USAID, (mainly the HCSU Mission) the International Atomic Energy Commission, the Rockefeller Foundation, and the Interamerican Institute of Agricultural Science Andean Zone (IAS) programs.

Problems connected with Functional Linkages

There has been a deficiency of communication between the DGIA and the Dirección de Extensión of the DGPA. This results from an absence of Extensión subject matter specialists who transfer information on crops and livestock technology from DGIA to the extension agencies in the field. As a result, at times, the extension agencies neither received the information nor provided the demonstrations and field days necessary to bring about change from traditional practices. The training of Peruvian Extension subject matter specialists who work both in the DGIA and the Dirección de Extensión, in the four NCSU Commodity In-Depth projects, has demonstrated the value of this linkage.

In some cases, there has not been good coordination of activities of the seed production group in the DGPA Dirección de Agricultura and the basic seed production specialists in the DGIA. This results at times in failure to control and improve quality of new and established varieties needed by farmers. What appears to be needed is an active participation of variety specialists of the DGIA in the supervision of quality control in the seed production units of the DGPA.

DIRECCION GENERAL DE PROMOCION AGROPECUARIA

Doctrine

Roles

The principal role of the DGPA is in agricultural extension and promotion directed at the agricultural development of the country, the well-being of the rural population, and the production of the food and fiber required for a strong economy.

Goals and Objectives

The goals and objectives of the DGPA are to make available to the farmers and rural people of Peru, information, seeds, plant materials, animal breeding stock, and services basic to efficient agricultural production and the attainment of a satisfactory standard of living.

Innovation Desired

The DGPA is committed to carry on its functions through a decentralized national net work, in addition to central offices and laboratories in Lima, with regional centers, demonstration farms, service units and extension agencies in 12 Agrarian Zones. The desired focus is the campesino, reached through cooperatives and associations organized to facilitate the flow of information and services. The various functions are carried out through horizontally or vertically structured programs, depending on the character of the responsibility.

Complementarities with other Agricultural Institutions

The extension, promotion and regulatory activities of the DGPA complement the research activities of the DGLA, and the responsibilities of the other four Direcciones Generales of the Ministry of Agriculture. DGPA determines the plans and priorities for the DG's and the Director Superior coordinates the activities.

The functions of the DGPA also complement those of the UJA and other agricultural universities. Where there is common interest in an

adult education problem, as for instance in the training of Reforma Agraria staff on the basis of a series of meetings and lectures sponsored by CENCIRA, there has been cooperation between UJA and the DGPA in the offering of the program.

Complementarity with the private sector has seemed to be satisfactory, both in the offering of seeds and services, and in the diffusion of information.

Leadership

Strength, depth and quality

The DGPA with a professional staff of 709 is the largest of the three institutions under consideration. Its leadership is in the hands of experienced and competent individuals, mostly Ingenieros Agrónomos, who have come up through the ranks. Few have had advanced training or more than brief experiences outside of Peru. Although satisfactory, the leadership lacks the strength, depth, and quality exhibited by that of the DGIA and the UNA.

Influence in the "Power Structure"

The influence of the DGPA and its predecessor organizations, in the "Power Structure", has not been very apparent. As a result of general recognition of the role of extension and promotion activities in the "Green Revolution" the situation may have improved recently. Also, as with the DGIA, the communication to the Presidential level may have been strengthened as a result of the liaison between the DGPA and the National Planning Institute, through OSPA.

Stability of Leadership

The Military Government has changed the Minister of Agriculture three times in the period beginning October 1968. During that time, the Director General of Promoción Agropecuaria has also changed three times, the Directors and Subdirectors have changed less often. This represents a somewhat more stable situation than that prevailing under the previous government.

Success in Motivation and Dedication of Staff to New Goals

The DGPA has been more directly affected than the DGIA by the new Agrarian Reform law, through its influence on demand for services from the Extension Agencies. Not only have the agencies had to accommodate to the extra demands for services related to the new law, but basic changes have been made in extension procedures, which now provide only for services to organized groups of farmers, rather than to individuals. Although there has been some difficulty adjusting to the new situation, it appears to be taking place satisfactorily despite the need for more field staff.

Unfortunately, since 1966 motivation has been affected adversely by the inability of the government to provide an adequate salary structure for the professional and subprofessional employees of the DGPA.

Success in Collaboration with other Public and Private Institutions

Perhaps because of its large size and the diverse nature of its activities, which have emerged from the original responsibilities of SCIPA, the DGPA and its predecessor in SIPA have had stronger tendency to "go it alone" than the DGIA. However, this attitude has been changing in recent years. The DGPA has improved its collaboration with the DGIA in the development of extension specialists; through the vertically organized national food commodity programs its ties with DGIA and UWA have improved in the areas of seed production and livestock production, though there is still progress to be made. Collaboration takes place with the Agricultural Development Bank in the area of supervised credit and there is collaboration with the private sector in some aspects of the extension and promotion work.

Programs

Degree of Development of Programs

The programs of the DGPA are classified as horizontal and vertical. There are 17 broadly identified subprograms of the Horizontal Program. They include Educational Assistance, Technical Assistance, Credit Assistance, Plant Propagation, Agricultural Mechanization, Seed Selection, Plant Protection, Fertilizers, Soil Conservation, Animal Breeding, Assistance to Animal Businesses, Animal Nutrition, Agricultural Inspection and Control, Animal Inspection and Control, Support to Business Organizations and Support to Associative Organizations. In addition to the horizontal

subprograms there are 10 vertical Programs of Agricultural Products. These are Meat, Milk, Wheat, Oil Crops, Beans (menestras), Rice, Potatoes, Wool and Fibers, Poultry, Vegetables and Fruits. As can be seen the vertical programs cross the horizontal ones in various ways. These programs are administered under four Direcciones of the DGPA.

The vertical programs are identical with similar ones in the DGIA, and are associated with them through the National Commodity Programs. The association, however, is more permissive than budgetary and as a result, satisfactory coordination does not always take place. Furthermore, since much of the vertical program work both in the DGIA and DGPA takes place in the Agrarian Zones, which have independent budgets, there is further possibility of lack of coordination at the zone level.

At the present time, the DGPA is making a study of its programs, and it may find some means of improving the programming process. One must keep in mind, however, that the horizontal and vertical subprograms have developed over a long period of time and are the present basis for a working system.

Relevance of Programs to the Needs of the Country

The study which is being carried on by the DGPA will make possible an evaluation of the relevance of its programs to the needs of the country. The 10 vertical programs, with the exception of vegetables and fruits, are represented in the 3 priority groups of the Plan Agropecuario de Mediano Plazo, 1971-75. Included in the horizontal subprograms are extension, credit, seed production, and a number of other necessary services to the agricultural community. The role of the DGPA in development of new agricultural areas is also provided for in this group of subprojects, and is a priority matter in the Ministry of Agriculture.

Acceptance and Understanding of the Programs by the Professional Staff

Within each of the four Direcciones of the DGPA there appears to be an acceptance and understanding of the Programs by professional staff.

Coincidence of the New Programs with Doctrine

The Extension and Credit Programs in the Dirección de Extensión y Promoción Campesina, and the Subdirecciones of the Direcciones de Promoción Agrícola and Plenaria which are developing new colonizations are most

concerned with adaptations of procedures and attitudes to the effects of the new emphasis on social justice and human development. Since the campesinos and small farmers are provided information, services and inputs and will market their products through cooperatives and other associations according to the new doctrine, a readjustment of procedures is taking place, and DGPA personnel are receiving special orientation in connection with the changes in prospect. Thus, there should be satisfactory coincidence of the new programs with Doctrine.

Quality and Quantity of Results of the Programs

The Programs are at present under study by the Director General, and no attempt will be made to evaluate them here. Suffice it to say that at present the expanded demands for extension, credit, seed and animal sources have not been fully met.

In the case of extension, efforts are being made to improve the quality of results by developing a corps of extension subject matter specialists, but it is clear that additional staff and budget will be needed in order to provide for the necessary quantity of service from 150 agencies of the country.

Resources

Budget

For 1971-72, the DGPA will receive 16.7 percent of the total budget of the Ministry of Agriculture, or \$ 626,477,000.00 in each of the two years (approximately 14.4 million dollars). Seventy-five percent of this is allocated to the Agrarian Zones. The 1971 budget is 23 percent higher than that for 1970. The increase in the budget for the biennium appears to reflect an increasing awareness of the key role the DGPA plays in agricultural development. The projections in the "Plan Agropecuario a Mediano Plazo", 1971-75 should give the Ministry the basis for planning future increases appropriate to the level of activity needed.

Professional Staff

The DGPA employs a total of 709 professionals, of whom 79 percent work in the Agrarian Zones, and 21 percent are at the National level with headquarters in Lima. The Dirección de Extensión y Promoción Campesina employs 210 of these, including 100 Ingenieros Agrónomos and 30

Médicos Veterinarios. Due to the additional load placed on the 150 Extension Agencies, as a result of Land Reform duties, there is need for more staff posts in that area.

Programs for Staff Improvement

With the exception of a few professional staff members who have studied toward the M. S. degree in the United States, the main use of foreign training grants has been for short term study experiences. In-service short courses for the training of staff members in specialized subjects are offered from time to time to the professional and non professional staff.

Physical Resources, Library and Publications

The different programs of the DGPA require land, buildings and equipment in order to carry out their responsibilities. These include seed production fields, demonstration cattle farms, fruit tree nurseries, seed selection plants, milk cooling and pasteurizing plants, quarantine stations, oil extraction plants, etc. In general the programs have reasonably good facilities. Some \$ 200,000,000.00 was budgeted for capital expenditures in the 1971-72 biennium.

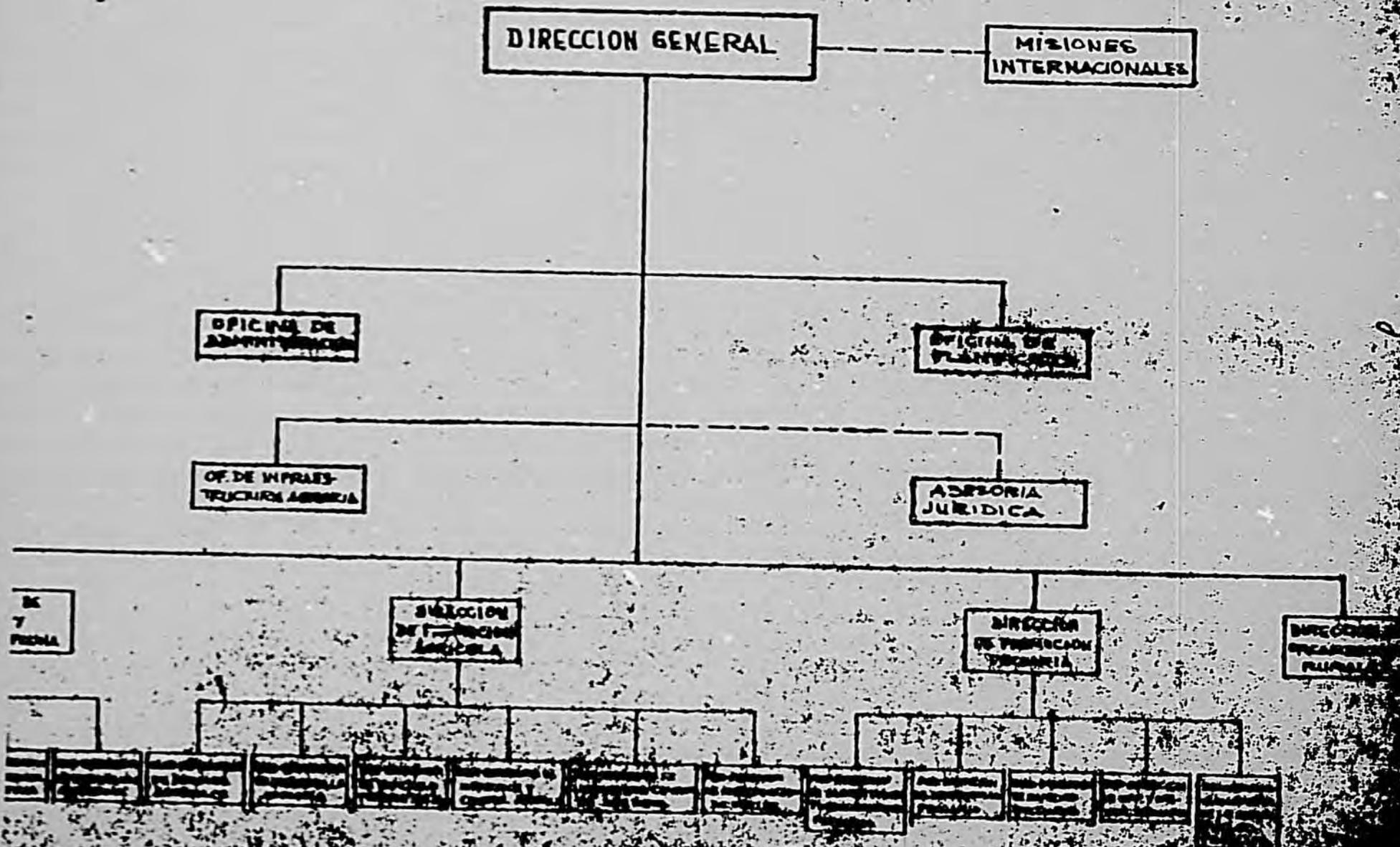
The DGPA does not have a library relying on those of the DGLA and JNA for its needs. A modest amount of money is budgeted for publications of extension and promotion.

Internal Structure

As figure 3 shows, the DGPA presently has four Technical Direcciones: the Dirección de Extensión y Promoción Campesina with 3 subdirecciones, the Dirección de Promoción Agrícola with 6 subdirecciones, the Dirección de Promoción Pecuaria with 5 subdirecciones, and the Dirección de Organizaciones Rurales.

As with de DGLA, the DGPA operates as one of seven executive Direcciones Generales in the Ministry of Agriculture, under the Director Superior with common services provided by the Dirección General de Administración. Each of the 12 Agrarian Zones administers and provides budget for the components of the DGPA located in that zone.

MINISTERIO DE AGRICULTURA ORGANIGRAMA DE LA DIRECCION GENERAL DE PROMOCION AGROPECUARIA



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Linkages

Present Interrelationships between the DGPA and other Agencies

The DGPA has enabling linkages within the Ministry of Agriculture with the Director Superior, the Oficina Sectorial de Planificación, and the Dirección General de Administración. Its strongest functional linkage inside the Ministry is with the DGLA, whose research function complements the extension and promotion functions of DGPA. It also links with the five other executive Direcciones Generales of the Ministry, and with the Instituto de Investigaciones Agro-Industriales, the Empresa Pública de Servicios Agropecuarios (EPSA) and the Centro de Capacitación e Investigación para la Reforma Agraria (CENICRA).

There are satisfactory linkages with associations of Agriculturists in several irrigated valleys as well as with private industry related to agricultural supplies.

The DGPA also has enabling linkages with several foreign bilateral programs including those of France and Israel.

Conclusions

Chapter II indicates the status of and the progress that has been made in the development of the DGLA, DGPA and UNA.

Of these three institutions, UNA has advanced furthest toward the institutional goals and innovations that it has set for itself. This results from the fact that it is autonomous, its leaders and staff have had a clear idea of the development goals they wished to reach, and during the first eight formative years they were able to assemble the resources required to do the job. During the past three years of financial stringency its main problems have been to hold on to its professional staff and consolidate its position of leadership, developing its research and graduate training programs at the same time that the undergraduate student population was increasing. Future U.S. technical assistance should fully recognize the maturity of the university. There are fruitful opportunities in the development of its research capabilities. The University is providing the headquarters and In-Depth co-leadership in the NCSU-AID Forages and Animal Nutrition In-Depth project and is participating in the Potato In-Depth program. The present Economics project of the Mission, with funding from AID and the Ford and Rockefeller Foundations is aimed primarily at strengthening graduate research and at developing the involvement

of the Department of Economics in the new institute for Socio-Economic Research. Both kinds of collaboration have important possibilities in other departments. Exchange of professors and graduate students between U.S. institutions and IIA, in relation to research work in which the scientists at both places have common interest, is also an area that is worth developing. As new educational programs are undertaken, there is a place for U.S. technical assistance during their development period. And finally, in developing its research capabilities, IIA will benefit from AID Training grants for M.S. and PhD study in the United States and third countries.

The Dirección General de Investigaciones Agropecuarias is less advanced in institutional development than the IIA. This has resulted from relatively slow development during the eight years that it was the División de Experimentación Agropecuaria of SIPA and from the restricted budget during its three years as the DGLA. The basic problem is that the DGLA has technical responsibility for a large decentralized national agricultural research program which is somewhat under-implemented. Under the present leadership there has been improvement and there are plans for improvement in physical facilities at the National Center and several important regional and zonal Centers. Despite a shortage of professional staff, there has been an improvement in research productivity during the past year. Future U.S. technical assistance should continue on high priority National Food Commodity Programs such as the four presently supported by In-Depth projects, and to provide opportunity through the AID training office for advanced study for the M.S. and PhD in the United States and third countries. In addition provision should be made for in-country graduate training at IIA whenever appropriate at the M.S. level.

The Dirección General de Promoción Agropecuaria is the largest of the three institutions, and combines diverse responsibilities for extension, for material services such as seed production and machinery pools, and for regulatory services including quarantine. In the three areas of most concern to the Mission's activities, agricultural extension, seed production and animal nutrition, the advance in institutional development has been somewhat less than in the DGLA and IIA. Particularly in the Dirección de Extensión y Promoción Campesina, the demands have been very great as a result of the new Agrarian Reform Law, and there is need for increased staff at the professional and sectorista level. Future U.S. technical assistance should include extension, seed production, and animal nutrition components of National Food Commodity Programs carried out in collaboration with DGLA and IIA. Training at the M.S. level, mainly at IIA, should be sponsored, and programs of subject matter training for sectoristas involved in Commodity programs should be developed with help from technical assistance specialists.

The present collaboration in National Food Commodity Programs of the Ministry of Agriculture as a medium for institutional development

should be carried forward in a way that fully recognizes the stages of development of each project. At the beginning, the presence of full-time technical assistance personnel, and project support in the form of training grants, equipment and salary budget is required. As the project matures these inputs become less essential, and at full maturity, collaboration in research and advanced training through inter-institutional projects, is the relationship to be fostered by technical assistance. New projects should be considered as old ones are phased out.

As a complement to the commodity approach, another technical assistance orientation which can help both Peruvian institutional development and the national goals of food production is the regional approach. This approach emphasizes maximum effective use of land and water for food production on a regional basis. This approach can be combined effectively with the commodity approach. Linkages between regional institutions and the DGIA, DGPA and UNA should be fostered, providing for the development of the regional institutions, and maximizing the use of programs, personnel and facilities of the other institutions.

CHAPTER III

Evaluation of Project Components

This chapter will be devoted to an analysis of the status and an evaluation of the degree of success of the principal project components of the present NCSU Mission program. These components are the four Commodity In-Depth Projects on Potatoes, Rice, Beans, and Forages and Animal Nutrition, and one other on Agricultural Economics.

The Potato Project

The NCSU Mission Commodity In-Depth Project on Potatoes was initiated in October, 1966, in order to accelerate and strengthen the development of a National Integrated Potato Program to increase the production in the country. At that time the National Program was relatively weak and uncoordinated. There was a deficiency of trained personnel in the Direcciones of SIPA concerned, and no linkage with JMA.

The original Technical Assistance team consisted of a co-leader, a seed production specialist and an extension specialist, backstopped by NCSU campus cooperators* in Plant Pathology, Soils, Nematology, and Breeding who visited Peru 2 or 3 times a year to take a continuing role in the development of their specialities in the project. Subsequently a plant pathologist was added to the staff for 3 years, and a plant physiologist for a year. Table 1 shows the staffing pattern, including the Peruvian counterpart staff members associated with each of the NCSU Mission representatives. Basic to the primary institution-building commitment of NCSU was the development of linkages between the Ministry of Agriculture and the National Agrarian University. The project, therefore, was constructed to encourage collaboration and provide support for work within the National Potato Program both in the Ministry and the JMA. In 1970, twenty-three staff members and graduate students of JMA worked in a coordinated program which included, in addition, more than 40 professional staff members employed by the DSI and the DGPA.

* A campus cooperator is a NCSU professor who has a continuing relationship with a project of the Peru Mission, spending 1/4 to 1/3 of his time working on it in Peru and at Raleigh.

Table 1. Mission Staff and Peruvian Counterparts in the Potato Project, 1966-1970

<u>Staff and Responsibility</u>	<u>Counterparts</u>				
	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
R. Sawyer, Leader (E. French, July-Dec 1970)	J. Christiansen	J. Christiansen	F. de la Puente	F. de la Puente	A. Martin
S. Tuten, Extension	—	—	P. Jaimes	P. Jaimes and C. Villanueva	P. Jaimes* and C. Villanueva
J. Bryan, Seed	—	—	H. Vargas	H. Vargas	H. Vargas and C. Vise
E. French, Pathology	—	C. Vise	H. Torres and T. Ames de Icochea	T. Ames de Icochea	H. Torres T. Ames de Icochea
R. Fox, Physiology	—	—	A. Vejarano		
<u>On-Campus Cooperators</u>					
F. Laynes, Breeding	M. Quijandría	M. Quijandría	M. Quijandría	M. Quijandría	M. Quijandría
R. McCollum, Soils	F. Quevedo and S. Villagarcía	F. Quevedo and S. Villagarcía	F. Quevedo and S. Villagarcía	F. Quevedo and S. Villagarcía	C. Valverde and F. Zapata
J. Sasser, Hematology	A. Martin	A. Martin	J. Franco	J. Franco	J. Franco
L. Nielsen, Pathology	—	C. Vise	H. Torres	H. Torres	H. Torres

* Died at mid-year, replaced in March 1971 by O. Hidalgo.

Advanced Training

Advanced training of professional staff is one of the commitments of the project, in order to provide the leadership and technical capability necessary for a strong National program. Eighteen staff members of the Ministry or UNA who are concerned with the National Potato Program either are in the United States studying for advanced degrees or have completed their work since 1967. Of these 10 received their support from USAID. In addition, several short-term fellowships for foreign study and some assistantships for graduate study at UNA have been granted Potato Program personnel, from NCSU contract funds.

Leadership

The NCSU Co-leader and his Peruvian counterparts have provided effective organization and coordination of the National program. The work has been conducted principally in three of the Agrarian zones of the sierra (Cajamarca, Huancayo, and Cuzco) and one of the coast (Lima) with headquarters at La Molina. In three principal subject matter specialties (Seed production, Plant Pathology, Extension) leadership has been provided by full-time NCSU specialists with Peruvian counterparts. In four other (Germplasm and Breeding, Soil Fertility, and Nematology) leadership has been provided by NCSU campus cooperators and their Peruvian counterparts. The remaining specialties covered (Physiology, Entomology, Economics and Engineering), have been given minor attention, and, with the exception of Physiology, leadership has been in the hands of Peruvians with some support from the NCSU contract.

Program

Progress has been excellent in the field of Germ Plasm and Breeding, with the NCSU Campus cooperator working mainly with 2 Peruvian counterparts and 4 others. The Germ Plasm collections, at Huancayo and Cuzco have been put in order and have been enlarged as a result of a recent expedition in southern Peru and Bolivia. A Peruvian counterpart has received intensive training in the United States and plans to go to England for further training. In the Breeding program, with the objectives of higher yields, improved quality, earlier maturity, and resistance to disease and nematodes, four new varieties have been named, and sources of resistance to golden nematode, and to late blight and wart have been found. One Peruvian potato breeder has returned from training in the United States with a PhD and two are currently there working toward advanced degrees.

In Seed Production, the NCSU specialist has worked principally with 2 counterparts and 8 other Peruvians. Primary concentration has been on the production of disease free basic seed of the best varieties.

As this has been accomplished, increasing emphasis has been placed on foundation and certified seed production. Schools have been held for foundation seed producers. One Peruvian in this area has received an M.S. degree at Chapingo, Mexico, and 3 have had short study periods in Mexico or the United States.

In Plant Pathology, the full-time NCSU Mission specialists and the campus cooperators have worked mainly with 13 Peruvians of the Plant Pathology Departments of the DGIA and the UNA. A survey of potato diseases was completed in 1958, and as a consequence research was begun on the most important ones. Search for resistant varieties and for chemical control measures was undertaken. During the past year, there has been concentration of effort on reducing the spread of bacterial wilt (*Pseudomonas solanacearum*) which at present is in northern Peru but threatens to move southward. Four Peruvians working in potato plant pathology have received M.S. degrees under the NCSU Mission program.

In Extension, the Mission full-time specialist has worked primarily with two counterparts. He has worked mainly on the production of information materials, the training of extension personnel, including U.S. Peace Corps volunteers, and the planning and programming of result demonstrations. A large amount of effort has been in the in-service training of extension subject matter specialists.

In Nematology, the NCSU Mission Campus cooperator has worked mainly with a Peruvian counterpart and a Peruvian graduate student. The work has been concentrated on a search for genetic resistance to and control measures for golden nematode, which has been found in all of the potato areas of Peru. Some resistant and tolerant varieties have been selected, and will be further tested.

The NCSU Mission Campus cooperator on Soil Fertility and Fertilization has worked mainly with eleven staff members of the Soils Departments in the DGIA and the UNA. On the basis of research done in the period from 1959 to 1964 and current experiments correlating with soil analysis data, fertilizer recommendations based on soil tests have been formulated. Evaluation of these has indicated that the soil tests predict the needs for nitrogen and phosphorus accurately but not for potassium. Accordingly, present studies are concentrated on the mechanism of potassium availability in potato soils of Peru. One soils specialist of UNA studying for the Ph.D. in the United States and three graduate students studying in the UNA graduate school are receiving financial assistance from the NCSU Mission.

Resources

The number of well-trained Peruvians engaged in the work of the National Potato Program has been increased substantially. However, even after those who are absent in training return, there will be need for additional technical personnel in most fields of this program, and it is estimated that at least 10 more should have advanced training.

The physical resources for this program have improved considerably, with the acquisition of land for research and basic seed production at the Ministry's regional centers in Huancayo and Cuzco. The improvement of facilities and equipment at these centers and land acquisitions and arrangements with private growers for seed production in other areas remain to be completed.

Linkages

The Linkages that have been established during the past four years, between the DGLA and DCPA, particularly in Seed Production, and Extension, between the DGLA and the UIA, particularly in Soil Fertility, Physiology and Breeding and between the National headquarters and Agrarian Zone offices have been essential to the development of a strong program. These need to be strengthened and improved. Linkages with private growers are essential to the seed production aspect of the program and need to be amplified. The newly established International Potato Center for Research and Training with headquarters at La Molina will interact intimately with the National Potato Program.

Conclusions

The progress of the In-Depth Potato Project during the past 4 1/2 years has been very satisfactory. It has accelerated the development of the National Potato Program greatly, and as a result the Program may reach self-sufficiency by 1974.

In the intervening period, continuation of technical assistance is needed in the areas of extension and seed production, in order to provide in-service training for Peruvian counterpart personnel who will take over these responsibilities. Technical assistance in Breeding, Hematology and Plant Pathology should also be continued until the International Potato Center for Research and Training has undertaken collaboration with the National Program in these areas.

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The Rice Project

The NCSU Mission Commodity In-Depth Project on Rice was initiated in 1968, in order to accelerate and strengthen the existing National Rice Program whose main purpose is to increase rice production in the country. At the time of initiation of this collaboration, the National Rice Program was well established with a breeding and agronomy research program at Lambayeque and Bagua and excellent linkages with the Rice Growers Association. The NCSU co-leader began his tour of duty in July 1968. Subsequently a Campus cooperator in Plant Pathology was appointed, and in January 1970 a rice breeder joined the staff. Temporary salaries have been provided from Contract funds for a Peruvian assistant agronomist, an agricultural engineer, an economist and a plant protection specialist. Temporary salary supplements have been provided for a Peruvian rice breeder and a communications specialist. Table 2 indicates the staffing pattern including the Peruvian counterpart staff members of the National Rice Program in 1970.

Advanced Training

Six members of the National Rice Program have obtained the degree of M.S. Several others have had short-term training assignments outside the country. None are outside of the country studying at present.

Leadership

Very effective leadership has been provided by the Sub-director and Supervisor of Research at the Ministry's Regional Center, and the Director of Research of Pedro Ruiz Gallo University at Lambayeque, working in close cooperation with the NCSU Mission Co-leader. They have brought together elements of three institutions into a single well coordinated program. A fourth component was recently added when the Agricultural Mission of Taiwan undertook rice promotion work at Tingo Maria.

Program

The headquarters are at the Ministry of Agriculture's Regional Research Center at Lambayeque.

The program has six subject matter components: Varietal Improvement, Agronomy, Plant Protection, Economics, Communications, and Agricultural Engineering. The NCSU Mission has provided Technical Assistance personnel (a Rice Breeder, and Agronomist Co-leader and a Plant Pathologist

Table 2. Mission Staff and Peruvian counterparts in the rice project, 1968-70.

<u>Staff and responsibility</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
P. Sanchez, Co-leader (6/68-7/71)	P. Contreras	P. Contreras	J. Hernandez
E. Kawano, Breeding (1/70-1/72)			S. Velásquez
<u>Campus Cooperator</u>			
T. Hebert, Pathology		H. Huerta	H. Huerta

Campus cooperators) for the first three of these components. In the other three it provides support in the form of temporary salaries, supplies and equipment used in the program.

In Varietal Improvement, the NCSU Mission Rice Breeder has worked principally with 12 Peruvians, including 8 at Lambayeque on the coast, 1 at Tulumayo, 1 at Bagua and 1 at Tarapoto in the selva. The quest has been for new varieties with high yield and quality, short growth duration, resistance to lodging, cold temperature, Periculisia blast, and Helminthosporium injury. Selections of introductions from the International Rice Institute in the Philippine Islands have provided three promising new varieties which combine the characteristics needed for coastal rice growing. Crosses between Peruvian varieties of high quality and introductions have yielded some materials interesting because of their high productivity, high quality and disease tolerance needed in the selva.

In Agronomy, the NCSU Mission Co-leader has worked principally in cooperation with 12 Peruvians, 5 of whom are stationed at Lambayeque, with 1 at Piura, 2 at Tarapoto, 2 at Bagua, and 3 at Tingo Maria. The project encompasses work with the newer short straw varieties such as IR8, as well as the established varieties, on transplanting age, planting systems, nitrogen fertilizer sources and timing of application, chemical weed control, and date of harvest. After three years, some important results are established which are being recommended to growers.

In Plant Protection, the NCSU campus cooperator in Plant Pathology has worked with 10 Peruvians concentrating on selection of rice varieties tolerant to Periculisia blast and Helminthosporium disease. A new disease, leaf scald, was also studied.

The Communications work of the National Rice Program has been carried on well by Peruvians with some minor guidance by the NCSU Potato Extension Specialist. A large number of information publications was prepared and distributed, and an extension program of result demonstrations (in which 15 Peace Corps Volunteers cooperated at the agency level) and Field days was carried forward.

As in Communications, the Economics work was carried on by a Peruvian trained to the M.S. level who received some guidance from NCSU Mission Economics Advisor.

The field of Agricultural Engineering was not represented in the National Rice Program during the first three years, and has just been undertaken in 1971, with Peruvian personnel.

Resources

The number of Peruvians working in the National Rice Program has been increased substantially and there has been some improvement in training. However, in order to adequately staff the program at a satisfactory level of training, more technical personnel is needed, and a more active training program is required. The physical resources of the Program have improved greatly, with the acquisition of the new site and buildings for the Centro Regional de Investigación at Vista Florida, and the substation at Yurimaguas. Additional land will be required for seed production in several other locations, and the equipment and salary budget need to be appropriately augmented.

Linkages

The linkages between the DGLA and the DGPA in relation to rice extension and rice seed production are relatively good. Strong linkages have been established between the DGIA and the National University Pedro Rufiz Gallo at Lambayeque particularly in relation to rice breeding, agronomy, and plant protection. There are good linkages of the National Rice Program and the National Rice Growers Association. Likewise, at the international level, the National Rice Program interchanges information and seed with the International Rice Research Institute (IRRI) at Los Baños, Philippine Islands, and the International Center for Tropical Agriculture (CIAT) at Cali, Colombia.

Conclusions

The In-Depth Rice Project has progressed satisfactorily in the three years of its life. The relatively well developed organization and resources of the National Rice Program, coupled with enthusiastic acceptance of new leadership and ideas, has made a rapid evolution possible. Contributing to the opportunities for success has been the knowledge and improved rice varieties available from IRRI in the Philippines.

The Plan Agropecuario a Mediano Plazo, 1971-75, calls for an increase of about 50 percent in rice production; approximately one third of this would come from increased productivity and the rest from increased hectareage largely in the selva. As in the National Potato Program the technical basis for success in the areas of research and extension is present in the National Rice Program. In the next three critical years the gains that have been made in the research and promotion activities of the National Rice Program need to be consolidated and strengthened, so that they may complement the other necessary inputs effectively.

Additional technical staff with advanced training will be needed; at least 20 of the total staff should hold the degree of M.S., as contrasted with the present 6. The work in communications needs to be reinforced by a stronger linkage within the DGPA Dirección de Extensión and the formation of 2 Rice Extension Specialists, one for the coast and one for the selva. Additional emphasis should be given to Economics, with a focus on production problems. The field of water management engineering needs to be developed.

The National Bean (Menestras) Project

The NCSU Mission Commodity In-Depth Program on Beans was created in 1968 in order to reinforce the Programa Nacional de Investigación de Menestras through research and extension, with the primary objective of increasing production of the six major edible dry legumes: common bean, chickpea, lima bean, broadbean, pea and lentil. For the first two years, the technical assistance team consisted of a co-leader plant pathologist and an economist with Peruvian assistants in Plant Pathology, Entomology, Breeding, and Communication. This group has worked with the Head of the Department of Menestras at the Experiment Station of La Molina as leader and with the part-time collaboration of about 12 Peruvian technologists working at La Molina and 7 in the Agrarian zones. This staffing pattern continued in 1970, except that the NCSU economist was no longer employed, and a campus cooperator, plant pathologist, had been added (see table 3).

Advanced Training of Professional Staff

During the three years of the project, one staff member has returned from study in the United States with the degree of Ph.D., and three are on leave of absence studying for the M.S. degree. Three Peruvian staff members are engaged in work toward an M.S. degree in their speciality at UNL.

Leadership

The problem of leadership in the National Bean Program has proven to be difficult. Thus far, it has not been possible to develop a strong integrated program of research and extension, as a result of the deficiency in coordination at the level of co-leaders. The appointment of a Bean breeder recently returned from advanced studies to the position of Peruvian co-leader is expected to overcome this difficulty.

Table 3. Mission Staff and Peruvian counterpart in the Bean Project, 1967-1970

<u>Staff and responsibility</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
E. Echandi, Co-leader (3/67-3/69)	S. Bocanegra	S. Bocanegra	S. Bocanegra	-
D. Strider, Co-leader (1/70-1/72)				S. Bocanegra
G. Sanford, Economist	-	-	-	-
<u>Campus Cooperator</u>				
E. Echandi, Pathologist				A. Gsores

Program

Varietal improvement work carried out by Peruvian assistants has been concentrated largely in the selection of improved bean and chickpea varieties. In beans, the long-term objective has been to find high yielding Canario or Cocacho types which are resistant to mosaic and root rot and tolerant to rust. A highly productive variety of white bean acceptable in Peru, Pananito Sanilac, has been introduced and the seed is being increased in anticipation of demand for it as a summer variety adapted to the coast.

Agrology and Soils work by Peruvian counterpart technicians has dealt with planting distances for new bean varieties and for broadbean, and studies of fertilizer responses. Phosphorous and nitrogen responses were obtained in most experiments.

In Plant Pathology, major attention has been given by Mission and Peruvian pathologists to characterization of bean mosaic strains, and the identification of important diseases, and resistances to them, in bean, chickpea, lentil and broadbean. Special attention has been given to Rhizoctonia, to bean rust (*Uromyces phaseola*) and wilt and root rot caused by *Fusarium oxysporum*.

Attention has been given to Entomological problems by Peruvian assistants.

Economic studies were carried out during the first two years by the NCSU Mission economist on bean and chickpea production in the coastal valleys of Camaná, Ica, Pisco, Chincha, Trujillo and Lambayeque.

One of the commitments of the National Bean Program has been the attainment of a satisfactory supply of disease-free foundation seed of the most important menesteras varieties. Progress has been made toward this end by the Peruvian leader.

The program developed by the Peruvian Communications specialist within the In-Depth Bean Project has been effective. Information materials, including a newsletter, bulletins and a manual have been provided to Extension personnel. Result demonstrations, field days and schools have also been organized in key bean producing areas.

Resources

The human resources for the development of the National Bean Program are limited in number and in technical training, and will have to

be considerably improved in most of the fields of specialization if the Program is to make the required impact. Physical resources have improved in recent years, but there is need for more land for seed production and some additional laboratory and field equipment.

Linkages

The basic linkage between DGIA and DGPA in the area of seed production is relatively weak; in extension the linkage has been strengthened recently. There are good linkages with U.S.A. institutions having bean breeding programs.

Conclusions

The Bean Project is the smallest of the four Commodity In-Depth Projects and it provides technical assistance to a National Program (Programa Nacional de Henestras) which is less well-developed than the National Potato and Rice Programs. In the four years of its existence the progress has been modest. A concentration of effort, a strengthening of leadership, improvements in linkages, better coordination of the work, and additional staff and resources in some fields would be necessary in order to raise the contribution of the Program to the required level.

Forage and Animal Nutrition Project

The NCSU Commodity In-Depth Project in Forages and Animal Nutrition began as the Forage and Livestock Project in 1967. Its purpose was to join with the National Programs concerned with Forages, Beef, Milk, Sheep and Alpaca production, catalyzing a coordinated effort among the institutions concerned. At maximum staffing in 1968 the project had a co-leader, an animal nutrition specialist, one dairy production and two dairy extension specialists, a beef production specialist, a coastal feed and forage specialist, a tropical forage specialist and an economist on the long-term staff, along with two campus cooperators. This relatively large group complemented Peruvians in the Ministry of Agriculture and the JNA. Due to the unfortunate differences between the United States Government and the new Peruvian Military Government in October 1968, the number of NCSU participants was reduced, at completion of 2 year contract periods in 1969, to 1, the coastal Feed and Forage specialist. In January 1970, the project was reinstated at a lower level of activity as the Forage and Animal Nutrition project and a co-leader, Animal Nutritionist who was previously with the project returned to Peru. The two long-term specialists are complemented by two campus cooperators: a Forage agronomist and a Range Management specialist. Three Peruvian technicians in the project are

on contract payroll, and approximately 25 members of the cooperating institution staffs (Principally Ministry DGLA and DGPA, UIA and the University of San Marcos Veterinary Program, IVITA are associated with the project. Since the major technical staff commitment is in the UIA, headquarters of the co-leader are located there.

Table 4 indicates the staffing pattern together with the Peruvian Counterpart staff members.

Advanced Training

Since 1967 ten staff members of the UIA, DGLA and one of the University of the Altiplano at Puno have completed or are in process of studying for the M.S. or PhD degrees in United States Universities, in the areas covered by this project. Several short-term grants for foreign study have also been made, and assistantships have been provided for several UIA graduate and undergraduate students with thesis topics relevant to the program.

Leadership

The NCSU Mission Co-leader has developed effective collaboration between the co-leaders in the UIA, the Ministry and the USA Veterinary program. The problem of coordinated leadership is more difficult than in the other commodity In-Depth Programs because of the institutional, geographical and subject matter complexities. However, satisfactory progress has been made.

Program

The original Forage and Livestock Project could be divided into eight components: beef cattle improvement, dairy extension, dairy cattle feeding, economics, coastal forages, tropical forages, range management and a survey of mineral deficiencies and excesses by plant and soil analysis.

The beef cattle improvement and tropical forages work had their headquarters at Granja San Jorge of DGPA near Pucallpa in the low selva. The beef cattle subproject involved a basic experiment on cross breeding which was started before 1967. This was closed out in 1968 due to lack of satisfactory cooperation by the DGPA in Pucallpa. The tropical forages work involved identification of native pasture plants and weeds, fertilizer and weed control trials, and work with introduced forages. It was terminated in 1969 due to the reduction in NCSU Mission staff, and was not renewed subsequently.

Table 4. Mission Staff and Peruvian Counterparts in the Forage-Livestock-Animal Nutrition Project, 1967-1970

<u>Staff and responsibility</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
D. Gross, Co-leader (2/67-5/69)	T. Terry A. Flores E. Rojas	T. Terry O. de Córdova R. Zambrano	T. Terry O. de Córdova R. Zambrano	-
W. Johnson, Co-leader (1/70-1/72)	-	-	-	G. Parodi J. Muro
W. Johnson, Dairy (11/66-12/69)	R. Zeppilli	R. Zeppilli	R. Zeppilli	-
E. Dillard, Beef Production (2/67-1/69)	J. Lozano M. Jara Almonte	J. Lozano M. Jara Almonte	-	-
L. Lancy, Livestock Extension (5/66-6/68)	F. Jahnoke	E. Soto	-	-
K. Beeson, Animal Nutrition (9/66-7/69)	G. Gómez	G. Gómez	G. Gómez	-
F. Doggett, Coastal Forage (5/68-6/72)	J. Muro A. Flores	J. Muro O. de Córdova	J. Muro O. de Córdova	J. Muro G. Parodi
R. Conover, Dairy Ext. (Arequipa) (3/66-8/67)	E. Díaz Bornas	-	-	-

Table 4. (cont.)

<u>Staff and responsibility</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
J. Zimpel, Dairy Ext. (Arequipa) 8/67-9/69)	E. Díaz Bornas	E. Díaz Bornas	E. Díaz Bornas	-
R. Murdoch, Dairy Ext. (Cajamarca) (6/67-6/69)	J. Calderón	A. Arce	A. Arce	
P. Motooka, Tropical Forages (Pucallpa) (10/67-10/69)	J. Toledo	J. Toledo	J. Toledo	
E. Jansen, Economics (7/67-12/68)	-	-	-	-
<u>Campus Cooperators</u>				
D. Gross, Range Management	-	-	-	G. Parodi
D. Chamblee, Forage Agronomy	-	-	-	G. Parodi F. Pacheco
Marvin Senger, Dairy Records	-	E. Díaz Bornas	E. Díaz Bornas	
Richard Myer, Artificial Insemination		E. Díaz Bornas	E. Díaz Bornas	

The dairy extension work had centers in Arequipa and Cajamarca. This activity was discontinued in 1969 when the two-year contracts of the specialists came to an end. The Arequipa extension work predated the Forage and Livestock project, and left behind a well-established dairy records program.

The economics work which involved a dairy cost of production study in Arequipa, and a study of land use, terminated in 1968 with the departure of the specialist.

The survey of mineral deficiencies and toxicities, which began before the Forage and Livestock project, was carried to a satisfactory point of conclusion before the specialist departed in 1969. A well-equipped Plant-Soil-Animal laboratory with trained staff was developed in the Animal Nutrition department of UNA. The survey revealed several areas in the selva and sierra where there appeared to be serious mineral deficiencies or unbalances. Studies of mineral supplements have been initiated as the next stage of the project.

The present In-Depth Forage and Animal Nutrition Project, which has carried on aspects of the original project, has been limited mainly to work on the coast, with forages and feeds for dairy cattle and for fattening beef cattle, with work in the sierra on range management in relation to sheep and cattle production, and in the Communications and Extension program associated with these efforts.

One of the valuable research projects carried on under the NCSU Mission is the nutritive evaluation of forages using laboratory and live animal techniques. From this, the quality of green and dried forages available in Lima dairy farms, and the effects of season of cut and nitrogen fertilization on several grasses have been determined.

A major experiment in progress in the Central Sierra is complementary grazing trial, where cattle follow sheep as they rotate on fertilized or unfertilized native pastures. Both fertilization and the systematic grazing treatments have increased the carrying capacity, weight gains and wool yields greatly. This is carried on under UNA leadership, with the collaboration of the NCSU Mission campus cooperator on Range Management,

In the Communications and Extension program, in addition to the publication of newsletters and bulletins and publication of research results there has been concentrated attention to the in-service training of two Peruvian extension forage specialists who spend part of their time in the DGIA and part in the Dirección de Extensión, of DGPA. This training is

in association with an active field program, short courses, field days and field demonstrations.

Seed production of alfalfa forage has been taken on a trial basis on the south coast, under the leadership of this Program.

Studies of the forages best adapted to the region have been undertaken at the Regional Center in Lambayeque, under the leadership of the National Conservation specialist. Several varieties of alfalfa have given good results.

At La Molina, there are various studies on the most important forages, in coordinated work with specialists, with help from the ICSU Mission. Studies include comparisons of alfalfa ecotypes, of napier grass and of forage corn varieties; studies of phosphorus and of nitrogen phosphorus and potassium nutrition; spacing and variety studies of forage sweet sorghum.

Resources

The number of technically trained personnel in Forage and Animal Nutrition has increased in the last project. There is need for more, however, and this is a concern. Physical facilities have also improved, and the cooperation of additional institutions is needed in the Sierra and Selva. Certain equipment must be filled.

Linkages

The linkages are very well developed. The linkages have improved between the University of San Marcos Veterinary Program (IVITA) and the Asentamiento Rural is providing an important link. Operations at Corpacancha and others have been developed with the Provincial Government of Cajamarca, Ayacucho, and Puno. There are also linkages with the Livestock and Forage Program of the International world sorghum collection at Purdue, Indiana.

General Conclusions

The liquidation of the staff of the In-Depth Forage and Live-stock Project after its first two years resulted in untimely termination of a number of important activities. Reconstituted in 1970 as the Forage and Animal Nutrition Project with a staff of 2 full-time specialists and two campus cooperators it has been able to move forward again on a more limited front. Progress has been made in the fields of Communications and Extension, Coastal Forages, Range Management, and Dairy and Beef Cattle Feeding. More effective coordination of the efforts of the Peruvian institutions involved is beginning to emerge, but more time is needed in order to consolidate the gains, and strengthen institutional ties.

Because of its relative immaturity, the long range character of work with ruminants, and the priority status assigned by the Peruvian government to increase in meat and milk production, additional technical assistance should be provided. Attention should be given to economic problems of milk and meat production by an economist in the Economics Project.

Agricultural Economics

The development of a strong Social Sciences Program, and specifically Agricultural Economics department in UIA has been one of the objectives of the NCSU Mission Program since 1963, when two agricultural economists were brought to Peru under the auspices of a grant from the Ford and Rockefeller Foundations. For the first three years the concentration was on staff training, and the initiation of the five year undergraduate curriculum. The second phase, beginning in 1965 concentrated on the development of a postgraduate training program, which leads to the degree of M.S. This was accomplished by the end of 1968, and the number of staff members with advanced degrees was increased greatly. During the second phase an NCSU-AID Mission staff member collaborated with three financed by the Ford-Rockefeller grant. The third phase, which began in 1970, has focused on the development of a strong research program, to complement the graduate training program. An AID contract NCSU staff member has been joined by a Ford-Rockefeller financed staff member to collaborate with the department in that endeavour. The staffing pattern and counterpart participation is indicated in Table 5.

Advanced training

During the period since 1962, 26 staff members of the UIA have received long-term fellowships for foreign study in Agricultural Economics and seven in Rural Sociology. Most of these received the degree of M.S.

and several have completed or are in the process of completing PhD requirements. The Ford-Rockefeller grant has financed eleven of these training grants, and fifteen have been financed by the AID contract.

Program

The program for research development has taken two forms: 1) advisory work concerned with the development of organization and procedures, (2) involvement in the selection, design and execution of research studies.

The UIA now has a functioning Socio-Economic Research Center and participates in an Institute for Socio-Economic Research which involves several institutions having economists on their staffs. Several contracts have been accepted by the new Institute for studies to be undertaken by UIA personnel.

The NCSSU Mission economists have devoted most of their energies to advisory work concerned with the research projects of staff members and students. Projects concerned with water resources, Rice, Beans, Potatoes, and Animal Feeding have been included in these studies.

Resources

The loss of members of the Economics Department of UIA to other institutions which offer much higher salaries has reduced the full-time staff to six in mid 1971 from more than twenty-two in years before, despite the return of a number from foreign study assignments. The small remaining personnel now limits the potentialities of the Economics research program. This has taken place despite supplementation of some staff salaries through the Institute of Socio-Economic Research and the Ford-Rockefeller grant.

Office resources are satisfactory as a result of the offices provided in a new building. The UIA computer Center provides the services of an IBM 1620 computer.

Linkages

The linkages to other Institutions concerned with Economics that are provided directly and through the new Institute of Socio-Economic Research appear very promising. Principal among them are the Agricultural Development Association, the Association for the Advancement of Science

Mission Staff and Peruvian Counterparts in the Combined Social Sciences
 Project Supported by the Ford-Rockefeller Grant and AID

<u>Staff and Responsibility</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
<u>Economists:</u>				
R. Simmons (1965-1969)	J. Bravo C. Sarria	J. Bravo A. Aste	A. Aste	—
R. Manning (1965-1968)	E. Fernandez A. Febres	A. Febres	—	—
J. Seagraves (1965-1967)	A. Febres E. Fernandez	— —	— —	—
E. Jansen (1967-1968)	L. Hidalgo	—	—	—
G. Mathia (1970-1971)	—	—	—	A. Febres C. Delgado
<u>Sociologists:</u>				
W. Craig (1965-1967)	C. Fajardo	—	—	—
Q. Jenkins (1968-1969)	—	O. Flores	O. Flores	—

and Culture, the Agricultural Development Bank and the National Planning Institute. There is active collaboration with the Iowa State University Mission in areas of research concerned with planning, and a close interest of the local office of the Ford Foundation. There are linkages with the Ministry of Agriculture's DGL and DGP through the In-Depth projects of the NCSU Mission.

General Conclusions

The development of organizations which provide research resources and financing for them has been brought about successfully and the program of research has been strengthened. A means must be found to re-integrate members of the staff who have gone to other institutions in the teaching and research programs at UIA at least on a part-time basis. In addition the full-time staff must be increased at least to twelve. During this period of rebuilding, continued technical assistance participation will be important.

Limiting factors that are entirely Peruvian in nature

Two serious limiting factors can only be solved by Peruvian administrative action. These are the low salary scale, and the policies that restrict advanced study in foreign countries. The problem with salary scale is so serious that it is sometimes not possible to keep technical personnel in key roles of the projects. The need for a salary scale, and an associated budget, that recognizes advanced training and productivity adequately is one that must be recognized in the appropriate administrative offices, if the Ministry and UIA are to contribute fully to agricultural development. Along with this need is one to provide opportunities for key personnel of the Ministry and UIA to carry on advanced studies in foreign countries. The problem is especially serious in the Ministry of Agriculture where the recent policy has been to deny leaves of absence for long-term study.

Observations concerning the In-Depth Projects

As indicated in the preceding pages, the In-Depth Projects show differences in their degree of development and coordination within the research components of the DGL and the UIA, and the extension and fomento components of the DGP. The project maturity was measured in terms of the probable ability of those components to make a maximum coordinated contribution toward the objectives of the National Commodity Programs involved, without further technical assistance from outside. We have seen that the Potato and Rice Projects are more developed, in these terms, than the Bean

and the Forage and Animal Nutrition Projects. The reasons for the differences are, to a large extent, due to variations in the effects of the following five matters:

- 1) the focus of the project: simple or complex goals
- 2) the NCSU input: training, technical assistance leadership and specialists, project support
- 3) the Peruvian human and physical resource substrate
- 4) the coordination of cooperating institutions
- 5) the effects of external circumstances: policy and continuity

Focus. The ability to concentrate on a single crop and to deal in depth with limiting genetic, agronomic, ecological, economic and extension problems concisely has been a help to the Potato and Rice Projects. In the Bean Project, with six species produced in various parts of the coast and sierra the problems of focus have been more difficult. The original Forage and Livestock Project covered so much territory - geographical and in terms of animal and crop enterprises that a clear focus was probably not attainable. The more limited present Forage and Animal Nutrition Project has much better focus but is more diffuse in its nature than either the Potato or Rice Projects.

NCSU Mission Input

The technical assistance input of the NCSU Mission, over the 1967-70 period, has been greatest in the Potato Project and least in the Bean Project. After restructuring the Forage and Livestock Project, which was very large, to limit it to Forage and Animal Nutrition, it became intermediate in size along with the Rice Project. It is significant that the Rice Project with only two technical assistance specialists and considerable project support, developed very rapidly.

Peruvian Human and Physical Resource Substrate

There were very substantial investments of Peruvian technical personnel, land, facilities, and services devoted to the National Programs with which these four In-Depth Projects were associated. Probably 80 per cent or more of the total program cost has been provided by the GOP. The National Potato and Rice Programs involve larger staff, facilities and service commitments of the GOP than does the Bean Program. The Forage and

Animal Nutrition Project contributes to several National Programs, and to several research projects of JIA, so that in the aggregate the Peruvian investment of staff, facilities and services is greater than in the other three Program areas. However, much of this is in projects not directly related to Forages and Animal Nutrition.

Coordination of Cooperating Institutions

The National Programs supported by the In-Depth Projects are not budgetary entities, and therefore receive their staff, facilities and services from the separate institutions involved, including the twelve Agrarian Zones. Coordination of activities, through the DGLA or DGPA coordinator of a National Program is therefore negotiated and to some extent informal. The four In-Depth Projects have developed with different degrees of coordinated activity among the Peruvian institutions involved. Coordination has been strongest in the Rice Project, moderately strong in the Potato Project and weak in the Bean Project. In the Forage and Animal Nutrition Project, coordination has differed in different subprojects. It has probably been strongest in the Forage activities.

External Circumstances: policy and continuity

External circumstances have had marked effects on the rate of maturation of the different In-Depth Projects. The Potato Project started early in 1967, and there was continuity of staff, and opportunity for training a large group of Peruvians during the first four years of its existence. The Rice Project also has had continuity of staff in the three years of its existence, but a conservative GOP policy has deterred sending more than a few Peruvians off for training. The Bean and Forage and Livestock Programs both started in 1967 and were interrupted in 1969 by the events following October 1968. Training of Peruvians was begun, however, in the time of the liberal policy on leaves of absence.

The table below sums these five factors in terms of their influence on development of the In-Depth Project (a rating of 1 = favorable, 2 = intermediate, 3 = unfavorable).

<u>Project</u>	<u>Focus</u>	<u>NCSU Input</u>	<u>Resource Substrate</u>	<u>Coordination</u>	<u>External Circumstances</u>
Potato	1	1	1	1	1
Rice	1	1	1	1	1
Bean	3	2	2	3	2
Forage & An. Nut.	2	1	1	2	3

In drawing the previous conclusions that the two most mature projects will be ready for phasing out during the next two years, the assumption is made that the GOP would, at a minimum, take responsibility for the aspects now financed by and under the initiative of the NCSU Mission. It is assumed that in order to justify the Bean Project for another two years, there will be an improved focus, better institutional coordination, and no decrease in NCSU input or Peruvian Resource Substrate.

Criterion of Success: Institutional development or increased production?

The institution-building goal, institutional maturity or self-sufficiency at high productivity, is the criterion of success used in this evaluation. The objectives of the National Commodity Programs are, on the other hand, primarily increased production and stability of supply. Success of the research and extension programs on the basis of support from an In-Depth Project should result in higher production and more stable supply if the other factors affecting supply were also present. A difficulty with the National Programs at the present time is that effective research and extension work may be provided under conditions in which price policy, marketing and storage, credit availability or availability of fertilizer and plant protection supplies may be limiting factors.

After several years of deficit, the supply of rice in 1971 is sufficient to satisfy market demand. Certain of the elements in the In-Depth Project stimulated increased production. Most important were availability of extension information and field demonstrations showing the increased yields to be obtained from a new variety and a new fertilizer practice, the availability of seed of the new variety and the nitrogen fertilizer. Price policy was favorable. It is probable that part of the increase in production was due to these inputs, and part results from a

plentiful supply of water during the growing season. There is some likelihood that the satisfactory supply of potatoes coming from the past season was partly the result of improved seed and improved fertilizer practices stimulated by extension information and farm demonstrations brought about through the In-Depth Project. This occurred in spite of relatively unfavorable price policies and inadequate storage facilities.

Thus, the translation of the improved, integrated institutional research and extension services, into increased production and market stability of the commodity under consideration depends on the presence of components in a production-marketing system that are beyond the scope of the present In-Depth Projects. Originally, it will be recalled, there was to have been an AID loan program which would support the marketing part of such a system, for each of the commodities. The attainment of the production goals set up in the GOP Plan a Mediano Plazo, 1971-75 will depend on the provision of adequate price policies and marketing services, in addition to satisfactory coordinated research and extension services. In fact, the way the GOP can best take advantage of the improved research and extension services developing from the In-Depth Projects may be to incorporate them into Production-marketing systems for each of the commodities.