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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

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CAPITAL ASSISTANCE PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

BRAZIL - HIGHER AGRICULTURAL EDUCATION LOAN

AID-DLC/P-2004

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A.I.D.
Reference Center
Room 1653 HS

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

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AID-DLC/P-2004

June 20, 1973

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Brazil - Higher Agricultural Education Loan

Attached for your review are the recommendations for authorization of a loan in an amount not to exceed \$7,600,000 to the Government of Brazil to finance dollar costs of establishing and implementing a system for improving Government of Brazil programs in graduate education in general and in graduate agricultural education in particular.

This loan proposal is scheduled for consideration by the Development Loan Staff Committee at a meeting on Monday, June 25, 1973.

Development Loan Committee
Office of Development
Program Review

Attachments:

Summary and Recommendations
Project Analysis
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BRAZIL - HIGHER AGRICULTURAL EDUCATION

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SUMMARY AND RECOMMENDATIONS

1. Borrower

The Government of Brazil (GOB) represented by the Ministry of Finance. The Executing Agency at the Federal level will be the Ministry of Education and Culture's Department of University Affairs (MEC/DAU).

2. Loan

- a) Amount: Not to exceed \$7.6 million.
- b) Terms: Forty years including grace period of ten years, at 2% interest during the grace period and 3% thereafter.
- c) Local Cost Financing: None

3. Project Purpose

The purpose of the proposed loan is to enable the Government of Brazil, through its Ministry of Education and Culture, to develop and implement a system for establishing and improving its programs in graduate education in general and in agriculture in particular. The system itself will provide a firm planning base for making alternative investment decisions within a given chosen discipline.

The system to be developed will be implemented in the area of agriculture. MEC has chosen agriculture for several reasons: 1) Agriculture has long been one of Brazil's highest priority development areas. This fact has been stated in all of Brazil's major planning documents. 2) One of the principal bottlenecks in agriculture has been a deficiency in the number of highly trained researchers and planners available to confront Brazil's complex agricultural problems. 3) Due to several factors, including a history of USAID grant support, the agricultural universities are perhaps in the best condition to implement the PROGRAM described herein.

The loan supported program has two principal objectives; they are as follows:

- 1) The creation of an effective mechanism for the improved planning and coordination of graduate education in agriculture. This objective is basic to the entire project. It is this aspect that will provide a systematic approach that will maximize the effectiveness of the investment of scarce resources in graduate education in order to obtain specific, desired outputs. The degree to which this objective is reached can be measured by the cost/effectiveness of the agricultural graduate education

system in reaching its output goals and by the PROGRAM mechanism's applicability to and adoption for the planning and management of graduate education in other academic areas.

Activities related to the improvement of planning and management will be at both the central (MEC/DAU) and graduate center levels. Central level planning, to a large extent, will depend on the feedback received from the various agricultural graduate centers. The graduate centers, in effect, have the operational responsibility for the output targets which the overall mechanism must achieve. One measure of success in improvement at the graduate center level will be the extent to which there is adoption or imitation of the elements of the PROGRAM by graduate centers in academic disciplines other than agriculture.

- 2) Assist the GOB to expand and improve its graduate programs in agriculture on a selected basis as demonstrated by need. This will be achieved through the utilization of the mechanism mentioned above. The parameters of expansion and improvement requirements will be determined by the methodology of the developed mechanism. Ultimately, it is this output of developing degree programs of the highest priority that is directly aimed at providing Brazil with domestic educational resources, and increasing the productivity of those resources in order to fulfill needs for highly trained agricultural manpower.

Under a short term, experimental USAID grant project, a system is currently being set up whereby graduate agricultural centers give technical assistance to two lesser developed undergraduate schools in the North and Northeast of Brazil. Once this system is evaluated and appropriate adjustments are implemented, it is MEC's intention to expand such interuniversity assistance activities in conjunction with this loan program. All specific costs for this program aspect will be in GOB cruzeiros. All participating graduate centers will have assistance relationships with less developed undergraduate institutions. USAID will support this activity indirectly: a) through the loan program, by strengthening the graduate centers which will provide the technical assistance to those undergraduate schools and b) through the grant project, by helping to systematize that technical assistance.

4. History and Background

Since 1964, USAID has been assisting four Brazilian agricultural universities through a grant institutional development project. Starting from an extremely poor base, these universities (the Federal Universities of Ceará, Viçosa and Rio Grande do Sul and the Agricultural College of the State University of São Paulo) have

made tremendous strides toward becoming recognized centers of higher education. Their faculties have established stronger organization, structural and educational philosophies, improved their staff, facilities and curricula, and expanded the scope of teaching and research programs to include graduate training (to the M.S. level) in several critical areas. They have made organizational changes permitting more effective resource utilization within the universities, governmental agencies, and the communities which they serve. They have also begun to reach out to lesser developed schools which look to them for leadership.

The goals of the initial technical assistance project will have essentially been reached by December 31, 1973. These goals, which include the formation of four solid nuclear undergraduate agricultural programs and the beginning of Masters level graduate courses, were realistic in terms of the grant project as it was formulated in the early 1960's. In terms of Brazil's needs in the 1970's the grant project has also been successful and can stand as a valuable Brazilian resource that can be meaningfully utilized. However, while the grant project of the '60's will make an important contribution to the '70's it is not complete given Brazil's notable development over the ten year period.

Brazil is now developing itself instead of being developed. That is, Brazilians themselves are actively seeking to discover Brazilian solutions to Brazilian problems. Agriculture is one of the most basic problem areas. The problems of Brazilian agriculture are numerous and profound. Over the past several years the need for highly trained agronomists, agricultural planners, and researchers has increased notably. The completion of the agricultural education structure by the inclusion of Ph.D. programs is now important in order for Brazil to assemble its own manpower machinery to achieve its own on-going development.

It may be noted that the scope of this loan is somewhat broader than that stated in the IRR approved on August 7, 1972. In the intervening time period, the Mission, in intensive discussions with the Ministry of Education, has come to the conclusion that the intended input into the agricultural sciences could be significantly enhanced if utilized as a mechanism to strengthen Brazil's overall approach to graduate education. The Ministry, thus, has been very supportive of the concept of utilizing the development of graduate education in the agricultural sciences as a mechanism and of evaluating that mechanism as a potential for expansion and improvement of Master's and Ph.D.'s programs in other discipline areas.

In summary, then, it may be said that this loan paper presents two major categories of program goals: 1) those goals present in the

IRR (i.e. to assist the GOB to expand and improve its graduate programs in agriculture so as to supply the country with a sufficient number of highly trained agriculturalists to meet its on-going demand) and 2) the creation of an effective mechanism for improved planning and coordination of graduate education.

Summary Project Description

This project has two primary and one secondary operational foci. Ultimately, these three foci are intertwined in the normal functioning of the PROGRAM.

The first level of project activity is called the Central Administrative and Planning Unit (henceforth referred to as the central unit). This unit will be directly linked to DAU (the Department of University Affairs of the Ministry of Education). Its principal function will be that of serving as the hub of planning and decision making and will have responsibilities in the areas of training, finance, and technical assistance. A key role will be that of coordinating all the existing entities which have a part in the development of agricultural graduate education. Coordination would not necessarily imply controlling or changing any of these groups; what is called for is 1) a consensus on the identification of output goals for agricultural graduate education and the most cost/effective mix of inputs to achieve them, and 2) communication about the inputs of each group in order to maximize the effectiveness of the total investment in this sector.

The central unit will be responsible for planning and guiding the implementation of the types of studies which will contribute to the development of the overall PROGRAM. In conjunction with its planning coordination role, the central unit will develop a manual for the elaboration of development plans by the universities that will be eligible to participate for all U.S. and Brazilian technical assistance under the PROGRAM. Finally, this entity will also be charged with developing and implementing a plan for evaluating the progress of the PROGRAM.

U.S. loan resources will provide for a total of thirty-four man years of technical assistance to and through the central unit. Ten of these man years (2 men x 4 years each and 2 m/y of short term) will be located directly with the unit and related entities. These consultants will assist in the planning and detailing of the PROGRAM and will participate in the developing of the evaluation system which must accompany it. Another twenty-four man years (6 men x 4 years each) of technical assistance will work through the central unit to directly provide planning and administration guidance at the six graduate centers. These technicians would also provide a direct link between the universities and the central unit. Limited short term participant training will also be provided at the central level in university administration and planning.

The second level of project activity is at the university graduate agricultural centers themselves. At this level three types of technical assistance needs have been identified: 1) assistance in developing new academic programs, 2) assistance in improving existing academic programs, and 3) assistance in planning and mounting research programs - both those related to graduate theses and other research programs related to additional basic problems of agricultural production. At each university there will be a focus on the improvement of existing graduate programs and, if planning so indicates, on the expansion of graduate programs at both the masters and doctoral levels. A most important element of the PROGRAM is the development of criteria by which priority order can be established with respect to which programs, at which institutions, at what level must be developed.

For the development of new graduate programs, it is estimated that one full time technician per institution for four years (total 24 man years) should be sufficient. The use of this assistance will be determined by the central unit in DAU on the basis of plans submitted by the graduate centers. In addition, the equivalent of 1.3 man years per university per year (total 32 man years) assigned also on the basis of approved plans, will be provided to assist in planning and mounting research programs, improve on-going programs, and giving supplementary assistance to new degree program development.

Participant training is a key element at the graduate center level. The upgrading of staff is basic to the development of doctoral degree programs. In order to provide for a reasonable increase in staff competency, an average of five masters and fifteen Ph.D. degrees scholarships will be allocated to each of the six graduate centers. This will make a total of 30 masters and 90 Ph.D.'s. In addition to training in the U.S., 30 members of graduate center faculty will be trained to the M.S. level and another 12 to the Ph.D. level in Brazil with training funds provided by the GOB.

Short term training in the U.S. for 32 persons will also be provided. This will be in-service training for persons at the administrative, planning, and management levels. Approximately eight of the short term slots will be for personnel from the central operational level.

Along with the staff improvement requirements for expanding and improving the graduate agricultural centers, a necessity also exists for increasing the absolute number of teaching staff members. While development and testing of the model is expected to cause a variation in the number of staff needed, it is estimated that a total of 74 new M.S. level professors (financed by the GOB) will be required. This increase is also expected to permit more

attention be given to practical research designed to help solve agricultural production problems and to permit more emphasis on distributing knowledge about improved agricultural procedures through the university service program. The additional staff will also ensure that the portion of the faculty proposed for training abroad can be released by the universities.

MEC and USAID have surveyed the status of libraries in the various agricultural graduate schools and have concluded that most are very much in need of assistance. Loan funds will provide limited short term technical assistance for the development of libraries (or, more appropriately, learning resource centers) and for limited purchases in the U.S. (up to \$400,000 of materials (publications and teaching aids) which are unavailable in Brazil and are judged to be critical items of support to the instructional and research programs of the assisted graduate centers. Technical assistance will be utilized to: 1) analyze present library holdings, 2) identify learning resources required, 3) create a means for training learning resource center managers within Brazil, 4) develop a procedure by which learning resource centers in each of the agricultural graduate centers can effectively share their resources, and 5) expand and refine a presently existing Brazilian information system as a part of the learning resource centers.

The third but more indirect, level of project focus is strengthening the quality of undergraduate agricultural education in Brazil. U.S. technical assistance will support this indirectly by upgrading the graduate centers that will have assistance relationships with selected undergraduate schools.

As mentioned earlier, it is MEC's intention to expand, once evaluated, the pilot interuniversity assistance concept developed in an AID grant supported project. It will be required that any graduate center taking part in this PROGRAM must in turn be giving technical assistance to a selected lesser developed undergraduate institution. Assistance from the graduate centers will be given in planning and administration, as well as in course development and improvement.

COP financial resources will provide: 1) logistical support for Brazilian technical assistance, 2) in Brazil M.S. training for 140

professors from the six assisted schools, 3) in Brazil Ph.D. training for 35 professors from the six assisted schools, 4) in Brazil "special" short-term training for 200 professors from the six assisted schools, 5) the addition, in the six assisted schools, of a total of 60 new M.S. level staff, and 6) equipment and supplies identified as necessary to the strengthening of the assisted undergraduate programs.

It is expected that the total GOB financial contribution to the various related elements of this PROGRAM will be \$ 8,237,000

6. Summary Financial Plan

The following is a summary of the various cost elements of the program. A more detailed breakdown of estimated costs by year and line item can be found on Schedule I of the Financial Analysis section of this paper:

	<u>US\$ (000 eliminated)</u>	
	U.S. Contribution	GOB Contribution
<u>I. Central Level</u>		
U.S. technical assistance (long and short-term)	\$1, 552	\$ 393
GOB support costs:		
Personnel	-	542
Travel expenses	-	107
Office supplies and materials	-	133
Total Central Level Costs	<u>\$1, 552</u>	<u>\$1,75</u>
<u>II. Graduate Center Level</u>		
U.S. technical assistance (long and short-term)	\$2, 384	598
Training costs:		
In the U.S.	3, 250	171
In Brazil	-	280
Hiring of additional faculty	-	1,539
Increase of full time assignment of faculty	-	500
Other support costs:		
Books and learning materials	400	-
Office supplies	-	133
Total Graduate Center Level	<u>\$ 6,034</u>	<u>\$3,627</u>

<u>US\$ (000 eliminated)</u>	
U.S.	GOB
Contribution	Contribution

III. Undergraduate Level

Support costs for graduate center assistance	-	\$ 400
Additional training in Brazil	-	984
Hiring of additional faculty	-	1,242
Other support costs	-	865
	<hr/>	<hr/>
Total Undergraduate Level Costs	-	\$3,491
	<hr/>	<hr/>
Total Project Costs	\$7,586	\$ 8,287
	<u>=====</u>	<u>=====</u>

None of the proposed AID loan funds will go to finance local costs. All local costs associated with the U.S. technicians will be borne by the GOB. Of the \$8,287,000 GOB contribution to the project, approximately \$1.2 million will come from SUBIN out of two-step interest payments on other AID loans. The remainder will be contributed by MEC.

As can be seen from the above, the U.S. dollar contribution to the project will have its thrust at the central and graduate center levels.

At the central level, the GOB will contribute to logistical support for U.S. technicians and the management staff of the central level. At the graduate and undergraduate levels, the GOB will again provide logistical support as well as the management staff costs and additional in-country training.

7. Alternative Sources of Financing

- A. In its letter of August 23, 1972, the IBRD stated that it had no interest in participating in this project.
- B. The IBD in a letter dated September 19, 1972, stated that it was not interested in financing the project.
- C. In its letter of September 8, 1972, the Ex-Im Bank stated that it had no interest in participating in this project.
- D. Other efforts to obtain financing for this project were not undertaken due to the requirements for concessionary loan terms which are not known to be available from sources other than above.

*To be further readjusted based on a four-year rather than original 5-year program.

8. Statutory Criteria

All statutory criteria have been met. The statutory checklist is contained in Annex III.

9. Views of the Country Team

The Country Team supports this project as an important means for achieving the CASP-stated USAID objective of effecting high level transfers of modern science and technology through project support in Brazil's two priority sectors of agriculture and education. In addition, this loan will constructively build upon the past decade of successful USAID assistance in the agricultural education field.

10. Basis for the Amount of the Loan:

The proposed loan was originally presented to the L.A. Development Assistance Executive Committee (DAEC) as a five-year, \$9.4 million loan program. The DAEC concluded that the program should be cut back to a four-year implementation period and that the amount of the loan should be reduced accordingly

It is the judgment of the Project Committee that a minimum of \$7.6 million in loan funds will be required to assure the achievement of the program objectives. To reach this "bare-bones" level, the following reductions were made in the proposed program: technical assistance was reduced by approximately \$800,000; books and learning materials were reduced by \$100,000; and the entire \$900,000 proposed for equipment financing was cut out. It is anticipated that MEC will attempt to obtain financing for equipment through Ex-Im or other sources of export financing; Ex-Im has informally expressed its interest in financing these equipment costs.

11. Recommendations

On the basis of the conclusion of the USAID Mission that this project is technically, economically, and financially sound, it is recommended that a loan to the Government of Brazil for an amount not to exceed \$7.6 million be authorized subject to the following terms and conditions:

a. Interest and Terms of Repayment

- 1) Borrower shall repay the loan in United States dollars within forty (40) years from the date

of the first disbursement under the loan, including a grace period of not to exceed ten (10) years. Borrower shall pay interest in United States dollars on the disbursed balance of the loan of two percent (2%) per annum during the grace period and three percent (3%) thereafter.

b. Other Terms and Conditions

- 1) Prior to the first disbursement of loan funds or issuance of commitment documents, the Borrower will submit to A.I.D. in form and substance satisfactory to A.I.D.:
 - a) A detailed description of the central administrative and planning unit established for coordinating the program within the Ministry of Education and Culture's Department of University Affairs, including staff qualifications and proposed operating procedures;
 - b) Evidence that funds will be provided to cover local currency costs of the first year of the program;
 - c) A time phased implementation plan for the execution of the central level technical assistance and initial participant training activities. Initial participant training will be defined as up to 10% of the total masters and Ph.D. participant slots to be funded under the loan program.

- 2) Prior to the first disbursement of loan funds or issuance of commitment documents for project activities other than the central level technical assistance and initial participant training activities, the Borrower will submit to A.I.D. in form and substance satisfactory to A.I.D.:
 - a) A plan for the overall development of graduate education in agriculture based on the results of a thorough demand study;
 - b) A manual establishing guidelines for university participation in the program and for the preparation of university development plans;
 - c) A detailed description of the evaluation plan and methodology to be used for evaluating (at least annually) both administrative and agricultural technical assistance specific phases of the program.

- 3) Prior to the end of the first year of implementation of the program, and annually thereafter, the Borrower shall provide a revised financial plan for the dollar and local costs of the program for the following year. This revised financial plan shall be accompanied by evidence satisfactory to A.I.D. that funds are available to finance the local costs as shown in the revised plan.
- 4) The Borrower shall covenant:
 - a) That each university receiving assistance in the development of graduate centers will enter into a partnership with a lesser developed undergraduate school and provide assistance to strengthen the undergraduate school.
 - b) Unless otherwise agreed to in writing the scopes of work for the technical assistance contracts, the contractors, and contractor personnel financed under the loan shall be approved by A.I.D. prior to the execution of said contracts.
 - c) Annually, throughout the life of the A.I.D. financed program, the Borrower will conduct jointly with A.I.D. a review of the program's implementation. This review will follow in close sequence the execution of the evaluation referred to under condition precedent (b) 3) above.

12. Project Committee

Chairman: H. D. Lusk

Loan Officer: D. A. Cohen

Education Advisors: A.J. Dolio, F.C. Taylor, T. Piancastelli

Economists: J. Braga Costa, J.G. Thomsen

Agricultural Advisors: A.C. Chable, H.R. Johnson, W.L. Rodgers

Financial Analysts: J.R. Davison, A. Mulholland

Legal Advisor: D. D. Robertson

General Advisors: J.M. Miller, D.J. Mackell

AID/W TDY Consultants: C. Leonard, D. Rogers, K. Martin

Approved: W.A. Ellis - W.F. Gelabert

SECTION I. OVERVIEWS

A. GOB POLICY-MAKING IN THE FIELD OF GRADUATE EDUCATION

The search for a policy for the development of graduate education in Brazil is a recent phenomenon, and the formulation of that policy has proved to be a considerable challenge to Brazilian educators.

The traditional university in Brazil with its highly classical nature and restricted clientele survived into the early 1960's. Undergraduate education was the apex of the school system and provided, as it still does today, the training necessary to enter such valued professions as medicine and law. "Post undergraduate" level education has been available for many years to those few who wanted a more extensive academic background but who typically had the financial means to continue their studies in high quality graduate programs abroad. Furthermore, there was no significant economic incentive for training at the graduate level.

Only in 1965 did the GOB attempt to define the concept of graduate education. At that time Prof. Newton Sucupira, a prominent member of the Federal Council of Education (CFE), wrote a Parecer (Nº 977/65) outlining the basic conceptualization of Brazilian graduate education (for the most part adopted from the U.S. system).

Pressure mounted during the latter part of the 1960's for a modernized and more relevant university. During the decade, enrollment at the undergraduate level leaped 357% (from 93,000 students in 1960 to 425,000 in 1970) while graduate level enrollments grew by 100% (from 2,500 to 5,000). Highly trained and qualified teaching staff was not available to maintain standards of quality of instruction for such a mass of students. Furthermore, a booming and modernizing economy began to require the creation of institutions conducting research in the application of science and technology to Brazilian development and the graduate training programs to produce the researchers, if not the research as well. The increase in complexity of decision-making in all sectors of the economy also called for advanced training of its managers.

In 1968, the University Reform Law (Nº 5.540), which called for profound modernization and dynamization of the universities, gave the CFE the role of establishing norms for the organization and accreditation of graduate courses throughout the nation. In 1969, Sucupira in another well know Parecer (Nº 77/69) of the CFE provided these norms. However, accreditation of graduate courses proceeded very slowly for two basic reasons: 1) lack of CFE staff to adequately evaluate the qualifications of the courses requesting accreditation and 2) a desire to maintain strict control of the accreditation process in order to guarantee quality standards in those courses accredited. (Through March 16, 1973, 50 courses in 15 institutions of higher education have been accredited by the CFE).

In 1965, there were 69 M.A. and 23 Ph.D. courses in existence; by 1972, there were 361 M.A. and 131 Ph.D. courses operating. (It is interesting to note that in 1972, the State of Sao Paulo alone had 151 M.A. (42%) of the M.A. and 72 (59%) of the Ph.D. courses in the country and that the North and Northeast only had a total of 20 M.A. courses.) Enrollment at the graduate level jumped from 4,995 in 1970 to 8,125 in 1971. This recent rapid growth is probably due largely to a Decree passed in early 1969 which gave an important stimulus to the demand for graduate education. Decree Nº 465 stipulated that preference would be given in the selection of assistant professors at the university level to those candidates having a Masters Degree and that, in no more than six years from the date of the Decree, a candidate for that position must have the M.A. from an accredited course. Likewise, preference in the selection of candidates for the position of Associate Professor would be given to those with a Ph.D. Degree and a time would be stipulated subsequently by which all candidates must possess that Degree. Furthermore, any Assistant Professor acquiring a Ph.D. Degree would automatically be qualified to be an Associate Professor and would earn the salary of that level, even if a position were not open at the time. This legislation has caused strong pressures from the teaching staff within the universities for the provision of graduate degree programs.

In order to systematically promote the implantation of graduate courses in Brazil and to prevent wasteful duplication of programs and resources, Decree Nº 63.343 (of 1968) provided for the creation of regional graduate centers with the following objectives: 1) to train university professors to meet the needs of expansion and quality improvement of the higher education system; 2) to stimulate the development of scientific research by adequate preparation of researchers; 3) to provide the training of high level manpower required by national development; and 4) to create favorable conditions for scientific work in order to stimulate Brazilian scientists to stay in, or return to, Brazil.

CAPES (Coordenação do Aperfeiçoamento de Pessoal de Nível Superior) and the CNPq (Conselho Nacional de Pesquisas) were given the responsibility to take the steps necessary to create the centers. The CNPq was asked to survey the institutions having a capacity to offer graduate courses, and CAPES, CNPq, and FUNTEC (Fundo de Desenvolvimento Técnico-Científico of the Banco Nacional do Desenvolvimento Econômico) were specified as the principal financial agents to support the centers. Only those graduate courses accredited by the CFE were to receive financing from government entities, a provision that was liberalized by Decree Nº 65.310 (of October, 1969), which allowed financing of courses if they promised to request accreditation from the CFE within a period of 12 months. (In practice, FUNTEC and CNPq have financed only those courses recognized by the CNPq as centers of excellence and CAPES and MEC's Department of University Affairs (DAU) have financed on a priority basis those courses either accredited by the CFE or recognized by the CNPq.)

The only major actions taken as a result of Decree Nº 63.343 were the following: 1) the selection by CNPq of centers of excellence (120 to date) capable of developing graduate courses; 2) the gradual accreditation by the CFE of selected graduate courses; 3) a Decree (Nº 64.085 in early 1969) providing for an Executive Commission for the Implantation of Regional Graduate Centers but not defining its role very well; and 4) the provision of financial resources to individual graduate courses by the CNPq, CAPES, and FUNTEC.

In 1970, new impetus was given to graduate education and the idea of creating regional centers. Early in that year MEC presented a Sector Plan for 1970/73 with 21 priority projects, one of which was the implantation of graduate courses and regional centers. The major goal of the project was the upgrading of higher education staff. The executing agencies designated for the project were the CNPq, CAPES, FUNTEC, FNDE (Fundo Nacional para o Desenvolvimento da Educação), the universities, and the CFE. Coordination of the project was assigned to CAPES and the Commission named in Decree Nº 64.085.

In June 1970, CAPES was reformulated (by Decree Nº 66.662) and made into an autonomous entity of MEC. Its major duties were identified as follows: 1) to coordinate the upgrading activities for higher education personnel; 2) to collaborate in the implantation and development of the graduate centers and courses; 3) to grant scholarships for graduate study in Brazil and abroad; 4) to promote or support meetings whose objective is the improvement of higher education; and 5) to promote or carry out studies, research, and surveys of the regional or national requirements for the upgrading of higher education personnel.

Decree Nº 67.348 of October 6, 1970 created the "Intensive Program of Graduate Education", basically a scholarship program funded by the Fundo Nacional de Desenvolvimento Científico e Tecnológico (FNDCT) of the Ministry of Planning and General Coordination (MINIPLAN) and executed by CAPES and CNPq with concentration in the following areas: 1) technology; 2) health; 3) public and business administration; 4) economics; and 5) agriculture. On the same date another Decree (Nº 67.350) further specified the role of the regional graduate centers. The centers were defined as the set of graduate courses (public and private) accredited by the CFE, functioning "in a coordinated and organic manner", and corresponding to a specific region of the country. The role of the centers was to promote the "systematic implantation of graduate education, avoiding the waste of human and material resources". Each center was to have a coordinating commission made up of a representative of each university or institution having graduate courses that made up the center as well as a coordinator designated by the Director of MEC/DAU. Five regional centers were initially to be created and to be headquartered in one of the major universities in each region. Provision was also made for a National Commission of the Regional Graduate Centers to serve as an advisory body

to MEC/DAU. Its roles were as follows: 1) to suggest the basis for a national policy of graduate education and to submit it to the CFE; 2) to study the possibilities of implanting the regional centers, according to that national policy; 3) to accompany the activities of the centers orienting them in the policy; 4) to propose the allocation of resources to the institutions making up the regional centers; and 5) to propose the means necessary for the installation and adequate functioning of the centers. The Director of DAU was named the president of this Commission, whose members were to be one representative each of MINIFLAN, CFE, CAPES, CNPq, and FUNTEC.

The concept of the regional centers, which was proposed by Dr. Sucupira when he was the Director of DAU, met strong resistance from numerous university rectors who preferred national rather than regional decision-making on the allocation of funds to their graduate programs. It was obvious that there was a real fear that the university head-quartering the regional center would influence that decision-making.

Consequently, at the end of 1972, rigor mortis was unofficially proclaimed for the regional centers and the National Commission. That Commission had met several times and sponsored a national symposium on graduate education in early 1972, but it did not succeed in formulating a strategy for this area, again probably because of the lack of agreement about the appropriate mechanism to coordinate graduate education.

Nevertheless, investment in graduate education continues to grow as DAU seeks out an effective coordinating mechanism. The principal financial inputs in 1972 were as follows: 1) CNPq - US\$3.8 million (including \$.7 million from FNDCT); 2) FUNTEC - \$19 million; 3) CAPES - \$4.7 million (of which \$1.5 million was allocated to CAPES by DAU and \$.3 million by FNDCT); and 4) DAU - \$8.7 million. No data is available on the part of DAU's allocation to universities which is expended by them in their graduate programs. If this discrimination were possible, the above total for DAU would be significantly larger. Additional support for scholarships for graduate study was made available by the Ministry of Foreign Relations and the Secretaria de Cooperação Econômica e Técnica Internacional (SUBIN) of MINIFLAN. Grants for graduate level research were also made by the Fundação de Amparo à Pesquisa in São Paulo, Rio Grande do Sul, and Bahia.

Coordination of this investment is made difficult by the fact that each of the four major entities that invests in the same types of projects (scholarships, teacher salary supplements, equipment, etc.), have practically the same priorities for assistance by academic areas, and each has a very independent method of operation. However, there is evidence of recent improvements in communication and cooperation among them. This process is facilitated by the fact that each has a "deliberative council", which gives final approval on program investments, and

which includes representatives of the other entities. Typically, these entities find themselves for the most part reacting to solicitations for funds. The challenge to MEC now is to define a strategy so that these agencies, in collaboration with one another can seek out and support existing programs or stimulate the creation of new ones of the type considered priority by MEC.

CAPES, which has the most experience in graduate education, has been exerting creative leadership recently and could well become a major focal point of coordination. It has established itself, on the basis of excellent performance, as the clearing house for the preselection of scholarship grantees for many multilateral and bilateral entities assisting Brazil. In 1972, CAPES initiated a rather complete study of graduate courses, their needs for improvement, and the qualifications of professors. Alarmed by the large number of drop-outs among their M.A. scholarship holders in Brazil due to regional disparities in the adequacy of preparation at the B.A. level, they are the first to invest in "levelling courses" to bring the weaker students up to the readiness stage for graduate study. Recognizing the difficulties involved in meeting the demand in the short run for graduate degree programs for all university professors who only have the B.A. degree (Minister Passarinho recently estimated this group as 90% of the total university teaching corps.), CAPES is investing in short intensive upgrading courses in subject material and teaching techniques that award credits applicable eventually toward a graduate degree. They are also interested in such possibilities as the open university and correspondence courses as alternatives for providing graduate level training for university professors. CAPES has also taken what is a very courageous stand in trying to promote the implantation of a system of reimburseable scholarships for university students at both undergraduate and graduate levels as a necessary means for financing university expansion and improvement.

CAPES has been the most outspoken in reinforcing the position of the CFE that the expansion of graduate education must not risk the same consequences as undergraduate education has obviously suffered due to uncontrolled expansion. The expansionists, if you will, justify their call for rapid growth at the graduate level on the need to meet not only the "academic" but also the "non-academic" labor market demand, the latter which is as yet not well defined. This preoccupation with the speed of expansion, along with the realization that resources will be stretched tightly just meeting the need for upgrading university professors, are probably the most important factors explaining the GOB priority of first trying to meet the academic demand. Meeting the academic demand may indeed be a formidable task in light of the growth in enrollment at the undergraduate level (from 425,000 in 1970 to 600,000 in 1973!) and the corresponding need for increased numbers of qualified university professors.

This position, relevant to the issue of the demand for graduate education, is also supported by the influential leadership at the National Human Resources Center (CNRH) at MINIPLAN. CNRH takes the position that the most crucial manpower problem relative to higher education facing Brazil at this time is the poor quality of the product leaving the university (at the undergraduate level) and entering the labor market. They contend that popular reporting of the saturation of the labor market with economists or engineers, for example, and, therefore, of the over-production in certain areas by the universities is distorted. The demand is overwhelming in some cases but for adequately prepared graduates. Thus, there is a tremendous need to invest in graduate level education for the purpose of improving the staff and thereby the courses at the undergraduate level and the graduates entering the labor market.

MINIPLAN, through the CNRH, can be expected to make major contributions to the formulation of a policy for graduate education as well as to the planning mechanism for carrying out that policy. The relationship between CNRH and DAU is a good one based on CNRH's effective representation on the CFE and on their advisory capability which has frequently been solicited by DAU. Moreover, a recently initiated UNDP project in human resource development planning to be coordinated by CNRH, will provide 1) both international and Brazilian technical assistance to DAU in establishing an information system on higher education including thorough data on costs and financing and 2) results of educational research and manpower analysis relevant to decision-making at DAU.

The CNRH has also played a key role in graduate education by giving critical support to a DAU initiative to experiment with a planning and coordination mechanism which could become a model for an overall policy of investment in graduate education. ABEAS, the Brazilian Association of Higher Agricultural Education, is currently receiving USAID grant assistance to 1) institutionalize a Brazilian inter-university technical assistance system among graduate level agricultural education programs and 2) establish basic orientation norms for the overall planning of higher agricultural education in Brazil. ABEAS has not only gained the respect of graduate agricultural education programs around Brazil as an effective agent to represent them and to coordinate their requests for assistance but also has become an effective arm of DAU in analysing potential capacity and needs for development in this sector. It has technical expertise, objectivity, vision, and respect. As it has already gained the enthusiastic support of CNRH, it will surely prove effective in collaborating with, and in promoting a model of coordinated investment of, such entities as CNPq, CAPES, and FUNTEC.

All indications are that this sectoral approach, taking advantage of effective professional associations already existing, as is the case in Brazil in a number of strategic areas, has now gained the support of those

who formerly supported a regional approach and become the model of MEC's policy for investment in graduate education. For this reason MEC has requested USAID loan assistance in an experimental program to develop and test a model for the planning and management of agricultural education at the graduate level, which in its implementation will make significant contributions to the expansion and improvement of graduate programs in this sector. We believe MEC is firmly committed to this program and will give it the support necessary to succeed. The request to USAID gives USAID the unique opportunity of being a catalytic agent in support of a thoroughly innovative approach to educational investment at this level.

B. Agricultural Sectoral Overview

1. Setting

Despite Brazil's well-publicized recent industrial development, agriculture still remains, in terms of size, its most important economic sector. According to the 1970 census, 44% of Brazil's active labor force was still involved in agriculture. There were 2.6 million more Brazilians working in agriculture in 1970 than in 1960. In addition, also in 1970, agriculture accounted for over 22% of Gross Domestic Product and 80% of total exports.

Since its discovery in 1500, Brazil has always looked to agriculture for its main economic support. In colonial and imperial days, the main products were Brazil wood, sugar, and rubber. Each of these products virtually sustained the country during the period of time that world demand looked to Brazil as the main supplier of these specific commodities.

In the last century, Brazil's major crop has been coffee. Coffee, throughout virtually all of the twentieth century (until 1964), has been the country's major exchange earner and bolster to an otherwise weak economy. As such, Brazil, like other "one crop" countries, found itself at the mercy of such unpredictable elements as weather and world market conditions. Only as the 1960's approached, did the nation's planners and economic leaders take definitive steps to diversify their overly dependent economy.

On another level, perhaps more important than a country's major international economic activity, is what keeps its people alive. As noted above, almost half of Brazil's active working population is in agriculture. While, relatively speaking, this figure has decreased in recent years, it is still very substantial. Because of low productivity, traditional landholding patterns, and an oversupply of labor, among other reasons, rural incomes are low. Poor education, malnutrition, and poor health are among the results. The ultimate effect is the well known circle of rural poverty.

In addition to those directly employed in the agricultural sector, there also exists a vastly increasing number that have moved into the mushrooming

urban centers. This migration has had several effects. Urban food demand has increased and food prices have grown as a part of the general inflationary spiral. People who could live off of subsistence activity in rural areas cannot do this in their new urban slum homes.

Prior to the early 1960's, Brazilian government policy generally neglected the agricultural sector. In fact, after World War II, there were some policies that, in effect, discriminated against agriculture by means of import substitution for industrialization programs. Foreign exchange controls, tariffs, and direct assistance to selected industries were major policies employed. Traditional agricultural exports were largely ignored and little official effort was made to stimulate or diversify exports. By and large, these policies led to the de facto transfer of resources from agriculture to non-agricultural sectors. Agricultural programs that were undertaken on a stop gap basis during this period were largely forced by producer pressures, food crises, and urban unrest.

To a large extent, agricultural growth has been stimulated since the mid-1960's by a complex set of fiscal and monetary measures conceived and administered by the Ministry of Finance and the Central Bank. Heavy emphasis has been placed on product, input, and credit price incentives to induce rapid agricultural growth. Brazil, since the early 1960's, has also stressed minimum price support programs for basic commodities, such as wheat, as a means of encouraging production.

Since the late 1960's, the Government has declared agriculture to be a "priority" sector (along with education and health). This priority was restated in presidential addresses and in Brazil's two major planning documents ("Goals and Bases for Governmental Action" and the "First National Development Plan 1972-1976"). Illustrative are some economic policies recently adopted which are aimed at contributing to increased agricultural growth. The income tax system now provides substantial incentives to private individuals and firms to invest in reforestation and opening up of new land for cattle raising. Special credit and tax treatment are also being provided to encourage exports including many agricultural goods.

Huge government investments in the Transamazon Highway and colonization along its route may also have some far reaching impacts on Brazil's agriculture. The opening of roads and the implementation of programs such as PRODOESTE has stimulated the agricultural development of the Central West. In addition, promised land reform through the new PROTERRA program in the poverty stricken Northeast may bring some greater efficiencies and contribute to a more equitable distribution of income in that region. Other government investments in agricultural research, marketing facilities, and irrigation should also contribute to future agricultural growth.

Between 1930-32 and 1969-71, the real value of Brazilian agricultural exports more than tripled. This occurred even though the major policy emphasis was placed on stimulating industrial growth. In that forty-year period, agricultural exports were even notably (although without official stimulus) diversified (however, even in 1971, coffee still accounted for 31% of the agricultural total).

Agricultural growth in 1972 is estimated to be about 4.12%. This figure is rather low in comparison to a GNP growth rate of 10.4% in the same year. The major growth crops were soybeans and sorghum, while losses were sustained in wheat, cocoa, and coffee. Average per hectare yields in Brazil continue to be among the lowest in the world (e.g. in 100 Kg/Ha rice: Brazil 16.2, US 37.5, Mexico 21.3, Argentina 35.9; corn: Brazil 12.9; US 32.4, Argentina 17.0; potatoes: Brazil 56, US 196, Mexico 50, Argentina 86). In fact, yield rates for cotton, peanuts, rice and edible beans decreased in the 1960-70 decade. Yield increases for the same period were realized for cocoa, sugar cane, wheat, and corn.

Brazil's major commodities that are utilized principally for domestic consumption are: rice, wheat, manioc, tropical fruits, and assorted vegetables. Agricultural commodities that are important for their export value as well as domestic consumption are: coffee, sugar, soybeans, meat, corn, cotton, cocoa, and tobacco. Virtually all of the above are grown in the south of Brazil. Crops that are important in the Northeast are: cotton, sugar, cocoa, rice and manioc. Central Brazil is increasing its importance in the production of cattle.

While the production of such crops as wheat and coffee have been somewhat modernized, use of new, more efficient agricultural technology and inputs is not widespread. Brazil finds itself in the somewhat uncommon position where both land and labor are disproportionately inexpensive relative to capital--a factor which is supportive of extensive over intensive farming practices. Government incentives to modernize agriculture are only just beginning to produce some results.

Despite some bright spots in Brazil's development picture, rural poverty is still a major unresolved problem. To date, the weight of Brazil's agricultural policies has been focused on increasing output. Rural employment and income distribution questions are just now being given increased attention. The huge lump of rural misery in the Northeast of Brazil has been much discussed but ineffectively treated, and has grown larger and more desperate during Brazil's years of rapid development since 1964. To many, Brazil's major challenge during the next decade is to spread the fruits of development much more widely in rural areas.

Domestic food supply still remains an important issue in Brazil. Crises in the supply of meat, milk, and some fruits and vegetables still occur. The government has refocused some of its export oriented policy to encourage the fulfillment of domestic demand first. In addition, however, the government has had to support some increased domestic agricultural prices which decidedly contradict the high priority inflation control program.

The above notwithstanding, the Brazilian government still also gives a high priority to its export promotion program. While many of the new exports are manufactured or semi-manufactured products, a large number of these goods are agricultural in origin (e.g. textiles, leather goods, etc.). Thus, for the government to continue to expand its export and industrialization capacity, an increasingly efficient agricultural sector is a necessity.

Brazil will have to carefully plan the modernization of its agriculture. It will have to take into consideration several highly important inter-related

factors. The most critical of these factors are employment, income (both size and distribution), and prices.

Both under and unemployment are closely linked to Brazil's expanding population problem. It is said by some agronomists, for instance, that given the most widespread application of agricultural technology, the Northeast, due to poor soils, a chronic lack of water, and a generally unpredictable climate, could never adequately support its population (30% of the national total). It is impartial recognition of this that the government is seeking to alleviate some of the pressures on the Northeast by promoting migration to the Amazon and, indirectly, to the cerrado of Central West Brazil. One can see in this solution the same rationale Brazil has historically used to solve its agricultural production problems, i.e., utilization of its abundant, mostly unsettled lands. This solution has a number of drawbacks. First the amount of population moved never equals population increase. Second, transplanting people is expensive. Third, relatively little is known agriculturally or otherwise about the settlement areas. There are other drawbacks; the above is meant only to be an illustrative list.

Along with employment/population pressures, there is the problem of under-nourishment. Few rural Brazilians (with the exception of people affected by the periodic droughts in the Northeast) actually starve. There are, however, large numbers who suffer from a deficient diet due primarily to low incomes and ignorance.

2. Agriculture and Brazil's Problems and Goals

It is important to take a deeper look into some of the problems and solutions mentioned in the above section. This is necessary to evaluate the government's ability to plan and execute agricultural policy.

As mentioned, one of the Brazilian government's largest current efforts is going into land reform, resettlement, and colonization. PROTERRA appears to be Brazil's first land reform program that will actually be carried out. It is supposed to break down (that is, reduce in size not eliminate) some of the larger (over 1,000 hectares) sugar plantations in the Northeast. The anticipated effect is likely to be twofold: 1) land parcels will be distributed along with readily available credit resources to small "have not" farmers, and 2) greater agricultural efficiencies will be neces-

sitated on the generally inefficient sugar plantations. In short, the program is aimed at solving to one degree or another, the Northeast's problem of overpopulation on underproductive and underproducing land. (An officially stated assumption is that eligible Northeasterners who do not get PROTERRA land will migrate to the Amazon.)

PROTERRA has run into a number of difficulties. Original planning for the project, despite its large budget (approximately US\$.67 billion), was weak. While it was understood why change was needed (i.e. good land was being wasted in an area where there was great human need), government planners did not have the knowledge or the ability to effectively bring about the desired change. An illustrative list of some of PROTERRA's inadequacies is useful: 1) There was little knowledge about the minimum size of economically viable land parcels to be distributed under the program. 2) While land was to be transferred to new farming "entrepreneurs," no technological transfers were planned. Never clarified was whether these new landholders were to commercially diversify, continue to plant sugar, or slip into a more comfortable subsistence. 3) No specific extension program was planned for the new landholders. In short, while the PROTERRA land reform program may indeed be carried out; it will, in all likelihood, produce few if any profound changes in the economically depressed lives of its primary recipient audience. In fact, there is even the possibility that PROTERRA may create increased unemployment by forcing partially employed landless laborers off the land.

The colonization aspect of the Transamazon program is also seriously jeopardized by both lack of knowledge and adequate planning. Agriculturally, the Amazon is all but unknown. Some scientists have stated that only 10% of the region's soils are suited to farming. However, even if the previous statement was to be considered a gross exaggeration, little or nothing is now known about agricultural production technologies in the Amazon. There is a lack of knowledge to "extend" to new colonists. Without a tried technological package, a colonist's chances for success diminish greatly.

Related to the "out migration" solution, are the technological and planning bottlenecks of opening new

frontiers. Along with the Amazon, another "new" Brazilian agricultural frontier being opened in the Central West (Goias, Mato Grosso) cerrado region. Neither the Amazon nor the cerrados are traditional farming areas. If these new lands are to be farmed, much first should be studied and researched about them. The cerrado is especially thought to have much potential. However, if farming is begun on a haphazard basis before much is known about how to deal with the special conditions of the land, the economic/ecological consequences could be severe.

Another of Brazil's major obstacles which is also agricultural in nature is that of supplying its domestic food production needs. This difficulty is also linked directly to two other major problems: inflation control and a desire to curtail food imports.

The Brazilian population, which continues to grow at a rate of approximately 2.9% per year, surpassed 100 million in 1972. This increase in people obviously creates a greater demand for food products. Traditionally, production gains for most crops have resulted more from increased land placed under cultivation than from increased yields. Thus, cultivation of new farm areas has been taking place at a rate roughly equivalent to the rate of growth of total agricultural output. The low productivity of the farmer and of traditional lands has come to be viewed by the Brazilian government as one of the principal constraints to the growth of the sector and a determinant of depressed rural incomes and underemployment.

Land is a finite commodity. Production increases will not always be able to be accounted for by planting additional area. Moreover, new lands are generally located progressively further away from the major demand centers. This fact generally causes increased costs due to the heightened cost of transportation and farming inputs. These increases are negative in two ways. First, the price to the consumer is increased and, second, the price to the farmer is decreased.

Brazil has begun to recognize that production technology research in both specific crops and livestock is essential to avert any future domestic food crises. Such research is being expanded and strengthened under the Ministry of Agriculture/USAID research loan. The research under the loan, however, is only a beginning.

In essence, the research accomplished is secondary to the coordinated government research mechanism established. Research results cannot be time planned. It is hard to say that after the breakthrough in beans, potatoes are next; no one knows when, if ever, there will be a breakthrough in beans. Important agricultural research programs, once identified, presently go undone due to a lack of researchers to carry them out.

Brazil's solution to its domestic food supply program must be met by a forward looking productivity research program and effective economic incentive and other policy mechanisms that will support greater agricultural production efficiencies. These elements are necessary to 1) feed the nation, 2) prevent food price increases (control inflation), and 3) avoid the necessity of spending foreign exchange needed to fund the industrialization program on needless imports of food commodities.

In line with item three of the above paragraph, Brazil is seeking to expand its export base to increase its foreign exchange earnings so as to be able to continue its general economic expansion to finance needed imports and to meet its heavy foreign debt obligations. Agricultural exports such as soybeans and cocoa are becoming increasingly important as Brazilian foreign exchange earners. Meat offers a good potential market if domestic production can grow fast enough to meet rising domestic demand and still have a surplus to export.

3. USAID and Other Donor Response to Identified Brazilian Agricultural Problems

Before embarking upon a new program of development assistance, it is useful to review the status of other segments of the agricultural sector. The intent of this section, using the "Key Problem Areas" approach, is to place the proposed loan into the overall context of agricultural development activity in Brazil.

a) Institutions to Guide and Serve Agriculture

- 1) Research - It is generally agreed that Brazilian agricultural research is inadequate. The Research Loan (AID 512-L-077) is designed to promote the development of an effective national

research network coordinated by the Ministry. This effort probably will be supported and strengthened by a new IBRD program. The principal GOB institution is the newly formed EMBRAPA, a semi-autonomous public company which will have wide responsibility and considerable flexibility.

- 2) Credit - The GOB has an elaborate, well-financed agricultural credit program which covers the entire sector. USAID has provided considerable assistance in the past. The principal weakness now is inadequate service to small farmers. This is a world-wide problem in developing nations. It is hoped by the Mission that the Spring Review on Small Farmer Credit will produce some useful guidelines for application by Brazilian policy makers.
- 3) Extension - Brazil possesses an extension system, ABCAR, which is essentially nationwide. This system is supplemented by the extension efforts of private industry, banks, cooperatives, and crop-specialized organizations. The Research Loan program has a strong extension component to strengthen the linkages between the researchers and the farmers.
- 4) Sector Analysis and Agricultural Economics Capability - The principal institution in this field is EAPA, the economic analysis section of the Ministry of Agriculture. EAPA is increasingly forging links with the several other institutions involved in agricultural economic analysis. The Mission is proposing for FY-74 an expanded program of technical assistance to EAPA. This activity would be closely coordinated with a UNDP/FAO project to strengthen SUPLAN, the planning section of the Ministry which includes EAPA. Of course, EAPA and its sister institutions would be beneficiaries of the proposed Education Loan.

b) Effective Production Systems

- 1) Major Food Crops - The Research Loan is focused primarily on corn, edible beans, rice, soybeans and cattle. This will help to correct the present imbalance in agricultural research which has tended to emphasize industrial and export crops.

- 2) Soil Fertility and Fertilizers - Brazil is becoming quite strong in this field and AID is actively supporting GOB efforts through the Research Loan and AID/W contracts with Cornell, TVA and North Carolina State University. There is close cooperation with the FAO Fertilizer Program. All work is coordinated by the Ministry's Division of Soil Research.
- 3) Crop Protection - The GOB has a number of on-going programs in this field but coordination is needed. Also, the Northeast has been relatively neglected. Therefore, the Mission has encouraged a TAB/Oregon State University project in herbicides which will address both problems. It is hoped that the TAB pesticide contract will eventually develop a similar project. Both would work closely with EMBRAPA and the Research Loan, with emphasis on the Northeast.
- 4) Environmental Protection - This is not yet a matter of great concern in Brazil, at least so far as agriculture is involved. However, the UNDP has an ongoing project in pollution control which will probably be working on agricultural problems eventually..
- 5) Seed Technology - The GOB has a strong and growing program in this area, ably assisted by a USAID/Mississippi State University project. A recently signed IDB loan will further fortify this area.
- 6) Farm Engineering - This is one of the agricultural fields in which Brazil is weakest, both in training and research. However, both the Research Loan and proposed National Academy of Sciences assistance will help strengthen this area. In addition, Canadian (CIDA) support is being given to the development of an agricultural engineering faculty in the State of Paraiba.
- 7) Forestry - The GOB is strongly committed to improving its programs in forestry, including education, research and reforestation incentives. FAO continues to give technical assistance, supplemented by other donors.
- 8) Aqua-culture - The COB is now giving some priority to development of fresh water fish production.

This effort is strongly tied to successful and continuing Mission assistance through Auburn University.

c) Rural-Urban Transfer Systems

- 1) Food Distribution - A high priority of the Ministry of Agriculture is the implantation of an integrated, coordinated, nationwide wholesale agricultural marketing system. The Northeast portion of this system is being supported by two USAID loans (512-L-083, construction; and 512-L-084, technical assistance). Operation of such a system will result in less food spoilage, improved farm incomes (by reduction in spoilage and in the number of middle-men), lower urban food prices, and the increased availability of more healthful foods (due to more sanitary handling and storage conditions)
- 2) Grain Drying and Storage - In part due to previous Mission assistance, the GOB now has a capable organization, CIBRAZEM, working in this field. The private sector is becoming increasingly active and competent. No further aid is indicated.
- 3) Commodity Protection - This is an area of prime concern to the GOB. Large-scale programs are in operation, both government and private. Mission assistance is now limited to certain activities under the NE Marketing Loans.
- 4) Private Sector Participation - This is rapidly growing segment of the economy, with respect to both inputs and outputs. Through its seed and fertilizer contracts, the Mission is assisting on two of the principal inputs. Japan is mounting a major assistance program on crop handling which will probably include some private sector activity. The IBRD livestock program may also include private industry.

4. The Need for Well-Trained Technicians

Well-trained technical manpower is involved in all of the previously mentioned problems and their proposed solutions. Problems are identified and solved by man. In the area of agriculture, the men who are involved in problem identification are divided below into five basic, but perhaps not all-inclusive sectors.

Research - Research in agriculture can be defined as the study into the kinds and combinations of input factors that can produce the greatest amount of product most economically. Research can result in the "breakthrough" that will produce more of crop X, at higher quality and a cheaper price.

Until the recent Agricultural Research Loan program, research in Brazil was poorly oriented and generally uncoordinated. Although it has improved somewhat, there is still room for improvement to be made. Not too long ago, there was much duplication of research effort and there existed programs that were not geared to meeting research demand needs.

In a purely economic sense, it is generally accepted that the pay-back on agricultural research is rather large. Now that agricultural research in Brazil is becoming better organized, the main ongoing need is for trained researchers. A basic first generation of researchers are being trained under the loan, but the need is for an expanded, ongoing supply of these specialists. Researchers are a virtually indispensable tool to regular progress in agriculture.

Extension - Extension is an educational delivery system used to transfer technology to the farmer. Brazil's extension system which dates back to the 1940's, with relatively few exceptions, has never been very outstanding.

The potential benefits of extension, or technical education, to the farmer are quite promising. Given the proper technical information, the farmer can raise his own income, waste fewer resources, lower per unit crop prices, etc.

The problems of Brazilian extension have been a shortage of money, strong leadership, and good information to extend. Theoretically, Brazil now produces a sufficient quantity of people to be extensionists. However, one critical problem is that the extension agencies do not have enough money to hire as many people as they need or to pay those that are hired enough that they will stay on the job very long.

The leadership lack is very critical. Extension leaders should put together and administer the implementation of effective extension packages. Clearly, such leaders need advanced training. Besides being able to maximize the transfer of research results, they must

be able to develop effective delivery systems which would involve a complete analytical understanding of the rural milieu.

Public/Policy Sector - This includes planners and analysts at the federal, state, and local levels.

In Brazil, in all areas of agriculture, the inadequate supply of trained personnel for agricultural positions was augmented by non-agriculturalists. This occurred and still occurs in both technical and policy positions. An illustration of this phenomenon is the situation where a biologist fills the position of a plant scientist. The biologist can perhaps perform the job, but, at best, only with vastly reduced efficiency.

In the policy making field, much the same sort of thing has occurred. Competent economists and politicians have been making agricultural policy without the benefit of sufficient agricultural input. Cited earlier were several cases of incomplete planning of federal government programs. At Brazil's critical developmental stage, it can ill-afford continued "incomplete" agricultural planning. Much of Brazil's agricultural planning has occurred outside of its agricultural circles. A primary reason for this is that the available agriculturalists were not considered to be trained well enough to participate in such a complex activity. Similar non-agricultural involvement in agricultural planning has also occurred at the state and local levels.

Only recently has the Brazilian Ministry of Agriculture begun to get more involved in national agricultural planning. This involvement can be related to the Ministry's formation of a research and planning section composed of M.S. and Ph.D. (the latter U.S. trained) personnel. This new section is rather small. It cannot be expected to meet all the demands that could be placed upon it.

There is in Brazil a continuing need for qualified agriculturalists at the policy level. If this need continues unfulfilled, the success of public sector agricultural planning will not show the improvement required for Brazil to be able to solve in an ongoing fashion its agriculturally based problems.

Private Sector - The private sector in agriculture combines many of the characteristics and needs of the areas mentioned in the above three sections.

The private sector is private enterprise. Its goal is to make a profit from agriculture. For this reason, research into greater production efficiencies is important to the private sector. A better, less expensive primary agricultural product makes for a better, less expensive final product all the way down the production line.

Planning and decision making in the private sector is also important. To maximize profits, managers must be able to understand agricultural complexities so that planning will result in the greatest corporate benefit possible.

Inadequate private sector planning and research can cost Brazil a great deal in development terms. Such inadequacies generally are translated into higher prices and poorer quality products. Higher prices domestically mean inflation; internationally, they will force Brazil into a less competitive position. Poor quality goods also affects international competition and relatively lowers the domestic standards of living.

Education - The education sector is the personnel training sector. It is the education sector that will determine the quality of the researchers and policy makers of the above summarized demand areas.

To train high quality researchers and policy makers, a regular supply of high quality "trainers" (professors) is needed. Currently, the bulk of the supply for this demand is fulfilled by training outside of Brazil. This method is proving costly in both economic and personal (in this sense of prolonged absence from home, language difficulties, and lack of relevance of educational environment to the specific problems of Brazil) terms.

5. Overview Conclusion

Brazil's most economically important sector is agriculture. Yet, Brazil still does not have sufficient quantities of well-trained manpower to fulfill its agricultural research, policy, and planning needs.

Agriculture has continued to expand despite its many inefficiencies. However, the standard of living of the great majority of individuals directly involved in the sector remains far below par. It is for these reasons that the Ministry of Education has selected agriculture as the priority discipline to receive expanded assistance and resources in the development of graduate education.

The "Brazilian Economic Miracle" has been such commented upon all over the world. Indeed, Brazil might be near to what some economists have called the developmental "take off" point. However, for a country to "take off" it should be able to maintain itself under its own power. In this sense, a sufficient supply of adequately trained technical and managerial manpower in critical sectors such as agriculture is essential.

SECTION II. PARTICIPATING INSTITUTIONS

A. The Department of University Affairs (DAU) of the Ministry of Education and Culture (MEC)

A growing awareness by Brazilian government leaders of the need to reform and modernize the higher education system and to provide greater enrollment opportunities culminated in a series of actions which have been called the University Reform Movement. The Ministry of Education and Culture (MEC) considers it essential that these university reforms take place, that a system of planning aimed at improving the utilization of resources be implanted, and that human resources needed for improving the capabilities of universities to carry out graduate instruction in priority areas be developed. The MEC entity responsible for the University Reform is the Department of University Affairs (DAU), which was established in 1970 and is directly responsible operationally to the Minister of Education. For the purpose of the loan program, DAU of the MEC will be the Borrower's executing agency.

1. Role

Within the Ministry of Education DAU is responsible for:

- a) promoting or encouraging activities leading to the development within Brazilian Universities of undergraduate and graduate staffs;
- b) providing technical assistance to subordinated and supervised entities to promote the expansion and improvement of higher education;
- c) promoting projects, studies, research and other activities in the area of higher education; and coordinating, controlling and evaluating such activities;
- d) overseeing the observance of educational laws and of resolutions of the Federal Council of Education;
- e) providing MEC with information needed for the establishment of guidelines for national higher education policy, goals and objectives regarding undergraduate and graduate education;
- f) distributing federal funds in support of higher education; and
- g) screening university requests for funds for plant development and maintenance and for equipment. (The Secretary

General's Office is responsible for screening requests for funds for university personnel).

2. Organization (See Annex V, Exhibit 1)

Under the Director and Assistant Director of DAU there is a Technical Advisory Office, eight Coordinating Offices, and a Support Services Division. The Technical Advisory Office advises the Director and Assistant Director and supervises the activities and projects of the Coordinating Offices. The responsibilities of the Coordinating Offices are summarized below:

a) Planning -

- 1) Conduct research on the supply of, and demand for, higher education;
- 2) conduct cost studies of Federal Universities;
- 3) suggest the type and size of planning departments within Federal Universities;
- 4) establish criteria for the size of universities;
- 5) establish criteria for the departmentalization of universities;
- 6) coordinate university research on the labor market for high level professionals;
- 7) organize and implant the Documentation Section in DAU;
- 8) structure the Unit responsible for planning and control of campus activities;
- 9) create a data bank on graduate education;
- 10) promote specialization courses for professors of North and Northeast regions;
- 11) Develop a national program for specialized studies for undergraduate professors;
- 12) Analyze the trends in undergraduate education to formulate alternatives to be adopted in graduate education;
- 13) Analyze graduate education on a national basis;

- 14) study the distribution of scholarships granted by CAPES (Coordination of Improvement of High Level Personnel), CNPq (National Research Council), FAPESP (Research Support Foundation of São Paulo), FAPERGS (Research Support Foundation of Rio Grande do Sul) by area of study, geographic location, kinds of scholarships and their monetary value;
- 15) study the distribution of assistance to graduate centers and courses by CAPES, CNPq, FAPESP and FAPERGS by area of study, geographic location, form of assistance and their monetary value; and
- 16) design a model questionnaire to be used by SEEC (MEC's Educational Cultural Statistics Service) for research in regard to universities or isolated higher education establishments.

b) Budget

- 1) Analyze and consolidate the budget proposals of universities and isolated higher education institutions;
- 2) distribute budgetary resources to universities and isolated higher education establishments; and
- 3) analyze requests for assistance and distribution of budgeted resources to non-federal higher education institutions.

c) International Affairs

- 1) Develop a planning document which systematizes projects, requests and needs of universities in the area of international cooperation;
- 2) analyze university projects seeking foreign technical and financial assistance;
- 3) monitor the processing of university projects until final approval by the proper organs;
- 4) advise the Federal Universities and isolated federal institutions in the identification, selection and development of projects, contemplating foreign cooperation; and
- 5) systematize contacts with higher education institutions

with a view toward increasing study opportunities for foreign students benefiting from cultural agreements.

d) Technical Assistance -

- 1) Maintain contacts with Brazilian organizations capable of administering courses and seminars for heads of departments and course coordinators of Brazilian universities;
- 2) maintain contacts with Brazilian and foreign organizations capable of providing in-service training to the planning groups in Brazilian universities; and
- 3) survey universities to determine resources and needs in planning and Promote exchange of experience.

e) Legislation and Norms -

- 1) Train inspection personnel in coordinating with CETREMEC (MEC's Training Center) and regional offices;
- 2) provide technical assistance to institutions either directly or in coordination with regional offices and federal universities;
- 3) train professorial staffs of institutions in the interior of Brazil with the assistance of federal universities;
- 4) train school directors and secretaries in coordination with regional offices;
- 5) install, by agreement, pedagogy courses modeled after the higher education schools of administration; and
- 6) conduct special inspections, especially in São Paulo, Guanabara and Minas Gerais, to improve the quality of instruction.

3. Financial Resources

DAU obtains its financial resources from the Secretary General out of budgetary allocations to MEC approved by the Ministry of Planning. Aside from funds for its operations, DAU is responsible for disbursing to universities federal funds which amount to well over half of the total MEC budget.

DAU's budget for 1973 is approximately \$288 million of which \$24.8 million represents operational support of DAU excluding DAU staff salaries (but including \$5.9 million for subsidies to non-federal universities and \$1.3 for the improvement of graduate education); \$202.0 million for support of the federal universities; and \$61.4 million for special projects including \$36.1 million to support salaries for full-time teaching programs (CONCRETIDE), and \$23.3 million for the expansion of the teaching of higher education.

4. Staff and Qualifications

DAU currently has a staff of 130, consisting of 45 professionals and 85 administrative. The following table summarizes the distribution of staff within DAU and their academic qualifications:

DAU STAFF

Office	Professional			Admin.	Total
	B.S.	M.S.	Ph.D.		
Director	5	-	2	11	18
Planning	9	-	-	-	9
Budget	3	-	-	1	4
International Affairs	2	-	-	-	2
Tech. Assistance	1	1	-	1	3
Legislation & Norms	13	-	1	18	32
Support Services	8	-	-	54	62
Total	41	1	3	85	130

Both the Director and Assistant Director of DAU are respected within the Federal Government and university communities for knowledge of the Brazilian higher education setting and their administrative abilities. The Director, Heitor Gurgulino de Souza, previously served as the Chief of the Education and Research Commission and President of the Interamerican Commission on Education and Culture of the OAS, and as the Rector of the Federal University of São Carlos in São Paulo. He undertook his graduate studies at the University of São Paulo and the University of Kansas. His assistant, Lynaldo Cavalcanti de Albuquerque, was, prior to joining DAU, Director of the Politechnical School and Coordinator of Graduate Programs at the Federal University of Paraíba and also a member of the Paraíba State Council of Education.

B. Teaching Commission of the Agricultural Sciences (CECA)

CECA was established as a nine^{1/} member commission of MEC, on December 27, 1972, and is presided over by the Director of the Department of University Affairs. This advisory body is basically responsible for assisting MEC in the formulation of policy and plans for agricultural education and is the third such body to be established - the previous being in Medicine and Engineering.

1. Role

Priority studies and programs to be undertaken by CECA include:

- a) the actual situation of agricultural science education at the undergraduate level and means for adapting these to national requirements;
- b) the geographic distribution of schools and the means for national integration;
- c) the supply and demand of professionals in agricultural sciences;
- d) the actual situation of agricultural science education at the graduate level and the demand for same;
- e) graduate education policy in agricultural science as it relates to national realities;
- f) requirements for authorization and recognition of courses;

1/ Current members include Professor Almiro Blumenschein, Superior School of Agriculture "Luiz de Queiroz" of the University of São Paulo; Professor João Carlos Athaide Dias, Veterinary Faculty of the Federal University of Rio Grande do Sul; Professor Faustino Albuquerque Sobrinho, Superior School of Agriculture of the Federal University of Ceará; Professor Joaquim Campos, Superior School of Agriculture of the Federal University of Viçosa; Professor Elias Sefer, Director of the Agricultural Sciences Faculty of Belem; Dr. Edson Machado de Souza, Executive Secretary of National Human Resources Center of the Ministry of Planning; Professor Pedro Pimpão de Azevedo, Vice President of the Brazilian Association of Higher Agricultural Education; Dr. Miguel Martins Chaves, Technical Advisor of the Executive Group on Irrigation and Agrarian Development of the Ministry of Interior; and Dr. Ady Raul da Silva of the National Department of Agricultural Research and Experimentation of the Ministry of Agriculture.

- g) minimum curricula;
- h) integration of education; research and extension within the university and with other official and private entities outside the university;
- i) technical assistance between Brazilian universities;
- j) international technical assistance;
- k) diversification of Agricultural Science Courses by specialties;
- l) agricultural technicians;
- m) short-term professional courses;
- n) graduate education data bank;
- o) technical assistance in administrative planning to isolated schools; and
- p) in-service training courses.

2. Organization - (See Annex V, Exhibit 1)

CECA is currently organized into three sub-commissions to deal with the various programs mentioned above. These sub-commissions are the following:

- a) a two-man sub-commission to organize a proposed questionnaire to be used during evaluation visits by members of CECA to the schools of Agricultural Science;
- b) a three-man sub-commission to perform studies and present suggestions regarding required minimums for authorization and accreditation of higher education courses in Agricultural Sciences; and
- c) a two-man sub-commission to conduct studies and submit proposals concerning minimum curricula of Agricultural Sciences courses.

Additionally, CECA will also study the process of authorization and accreditation by DAU and Federal Council of Education (CFE) of courses and schools of Agricultural Sciences.

Of the programs to be considered and studied by CECA, the following was given initial priority: studying the actual situation of

undergraduate education in Agricultural Sciences and means for adapting these to national needs.

During the first six months of operations dealing with the topics described above, CECA will hold at least one two-day meeting per month at various locations throughout Brazil.

3. Financial Resources -

CECA receives all of its operational support financing from the Ministry of Education (MEC).

4. Staff and Qualifications - (See introductory footnote)

C. Brazilian Association of Higher Agricultural Education (ABEAS)

In July 1950, the Directors of Agricultural and Veterinary Medicine Colleges in Brazil had their first meeting; others were held in 1952, in 1958 and in 1959. During the fifth meeting in July of 1960, the Association of Agriculture and Veterinary Schools (AEAVB) was formed. To enable other colleges - such as those of animal husbandry, forestry and home economics - to join the Association in July 1968, this organization was renamed the Brazilian Association of Higher Agricultural Education (ABEAS) and new by-laws were approved. ABEAS is a consultative group composed of many of the Colleges of Agronomy, Veterinary Medicine, Animal Husbandry, Forestry, Fishery, Agricultural Engineering, and Home Economics which acts as a national forum through which university concerns can be addressed at a national level. Originally organized as a vehicle to bring educators of the agricultural facilities together for a yearly consultation, ABEAS is now focusing on issues which affect the development of the agricultural education field at regional and national levels. ABEAS has become an important vehicle for cooperation and coordination between its member institutions. There appears to be a great interest on the part of the membership in strengthening the activities and role of ABEAS as a policy-making body and coordinator of national programming.

1. Role

The regular members of ABEAS are the schools, faculties, courses, institutes and other entities responsible for higher education in the agricultural sciences.

The objective of ABEAS is to continue strengthening higher agricultural education and the functioning of affiliated institutions by means of:

- a) more direct cooperation on subjects of common interest;
- b) continued exchange of information about common problems and means to resolve these, and about ideas and plans that might result in the general improvement in education, research and extension activities;
- c) clarifying aspects of current legislation, interpretation and legislation and promotion of legislation deemed necessary
- d) promotion of the interests of the Association in collaboration with competent entities.

2. Organization - (See Annex V, Exhibit 1)

The administrative structure of ABEAS includes an annually elect President, Vice President, Secretary and Treasurer. The day-to-day operations of ABEAS are supervised by a contracted Executive Secretary.

A Superior Council, represented by regular ^{1/}and special members is the deliberative organ of ABEAS and meets at least once a year to discuss and evaluate activities undertaken during the previous year and to plan future activities.

3. Financial Resources

ABEAS is currently financed by matching contributions from its members and the IICA (Interamerican Institute of Agricultural Sciences) through an agreement which amounts to approximately \$24,000 per year. IICA also provides ABEAS with additional support including the services of two IICA professionals; short-term consultants, as required; two secretaries, and office space and services. In addition, ABEAS is receiving approximately \$10,000 per year from MEC to support the provision of administrative and technical services by ABEAS. Additional funds for special projects are obtained from various official and private sources as required.

^{1/} Regular membership numbers 45 and includes schools, faculties and courses in Bahia, Ceará, Federal District, Goiás, Mato Grosso, Maranhão, Minas Gerais, Pará, Paraíba, Paraná, Pernambuco, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul and São Paulo.

4. Staff and Qualifications

The full-time staff of ABEAS currently amounts to an Executive Secretary, Eduardo King Carr, and one Secretary. ABEAS is currently selecting another technician (professor) to join its staff. In addition, IICA has designated one of its technicians - Dr. Juan Diaz Bordenave, who holds a Ph.D. in Communications - to work primarily with ABEAS and has approved funds for the contracting of an educator to work with ABEAS in its effort to coordinate the development of graduate education programs in the agricultural sciences.

The Board of Directors of ABEAS and its Executive Secretary frequently call on members to supply technicians from their staffs to participate in meetings, seminars, and special projects. The willingness with which members contribute of their time and expertise to assist in national and regional projects undertaken by ABEAS is an indication of the development of cooperative efforts that has taken place in higher agricultural education during the last decade.

In 1972, representatives of all institutions which offered graduate courses in agricultural sciences organized the Coordinating Council of Post-Graduate Agricultural Sciences as an entity of ABEAS. The objectives of this Council are to:

- a) promote the continued improvement of graduate education in line with development plans for the country;
- b) stimulate the integrated use of human and material resources to insure multiplier effects for maximum attainment of national objectives;
- c) collaborate in the development of education policy with the Ministry of Education and Culture and other official organs;
- d) collaborate for the continued structural and functional improvement of institutions affiliated with ABEAS;
- e) promote, in conjunction with national and international organs, support for the development of graduate agricultural sciences education; and
- f) promote the analysis of graduate programs in the country with a view toward improved development.

This Council has been selected as the group to assist the Department of University Affairs (DAU) of the Ministry of Education (MEC)

in the technical coordination of the Brazilian University to University Agricultural Education Project in the North/Northeast.

Another important activity in which ABEAS participates is in the Educational Commission on Agricultural Sciences (CECA) of DAU/MEC (See Section II.B). It is also expected that the Association will enter into an agreement with the recently established research organization, Brazilian Enterprise of Agricultural Research (EMBRAPA), which is responsible for all federal agricultural research throughout Brazil. This agreement should include the development of training programs for research personnel and the strengthening of research at Brazilian universities.

ABEAS is presently studying new by-laws for the Association and is preparing to take on additional and more responsible roles in higher agricultural education in Brazil. With this in mind, Dr. E. T. York, Vice President of the University of Florida, has been invited to visit Brazil in June and October 1973, to assist ABEAS in defining its anticipated new structure and responsibilities.

D. Federal University of Viçosa (UFV)

The Rural University of the State of Minas Gerais, a state supported educational institution became the Federal University of Viçosa (UFV) in August 1969. UFV has developed perhaps the strongest higher agricultural education program in Brazil and, possibly, in all of South America. However, several departments are still weak and even the strongest departments still need considerable assistance in developing Ph.D. programs.

1. Organization - (See Annex V, Exhibit 1)

Federalization has brought to the UFV an entirely new structure and organization. The University is still in the process of adapting itself to this new structure. Internal regulations have been written and five academic units - School of Agriculture, School of Forestry, School of Home Economics, Institute of Exact Sciences, and Institute of Biological Sciences - have evolved.

The Rector, the Dean of the School of Agriculture, the Directors of the Institutes of Exact Sciences and Biological Science, the Presidents of the Research and Post-Graduate Councils, the Heads of the Animal Science and Plant Science Departments all hold a Ph.D. degree, five being awarded by Purdue University.

2. Financial Resources

The Ministry of Education budget for the UFV for 1973 amounts to approximately \$3.7 million, of which \$3.1 million is for operational support and \$.6 million for construction and modification of facilities and buildings.

3. Enrollment (See Annex V, Exhibit 2, Table I)

In 1953, the UFV had an undergraduate enrollment of 202; by 1963, it had climbed to 768; and in 1973 totals 1455. Since 1952, 4005 individuals have graduated from the UFV, including 296 graduate students.

Programs of study leading to the Masters of Science degree in Plant Science and Agricultural Economics were started in 1961. These programs were the first in Brazil to offer the M.S. degree. Graduate studies in Animal Science began in 1962. More recently, additional areas have been offered and a total of 661 students have been admitted in all areas of study.

By 1972, students from twelve foreign countries^{1/} had engaged in graduate studies at the UFV. The number of foreign students total 57 or about 10 percent of all graduate students. To a lesser degree, foreign students are also enrolled in the undergraduate program.

4. Staff and Qualifications (See Annex V, Exhibit 2, Table V)

In 1973, nearly half of the UFV staff were enrolled in graduate training. Thus, over 90 percent of the staff have at least one graduate degree or currently are studying for such a degree. The faculty, in 1973, was classified as follows:

4%	- Full professors
21%	- Associate professors
36%	- Assistant professors
39%	- Instructors

E. Higher School of Agriculture "Luiz de Queiroz" (ESALQ) of the University of São Paulo (USP)

ESALQ was founded in 1901 as a specialized school of agriculture. In 1925, it was upgraded to the university level. Later, in 1935, with the founding of the University of São Paulo, ESALQ was made a division of the USP. Since then it has developed into one of the

^{1/} Peru, Japan, Colombia, Bolivia, Argentina, Ecuador, Uruguay, Panama, China, Venezuela, Paraguay and Costa Rica.

finest agriculture schools in Brazil and South America.

1. Organization - (See Annex V, Exhibit 1)

ESALQ was reorganized in 1970 into 15 departments. These departments are governed by a Council which elects the Chairman. These Department Councils have functioned well in directing the activities of the departments.

2. Financial Resources

For 1973, ESALQ's budget amounted to about \$4.3 million, including \$181,500 for new construction.

3. Enrollment - (See Annex V, Exhibit 2, Table I)

In 1962, ESALQ had an undergraduate enrollment of 462; by 1964, it had climbed to 790; in 1969, to 1029; and in 1972, an estimated 1300. During this same time-frame, graduate enrollment rose from zero in 1962 to 86 in 1964, 89 in 1969, and 252 in 1972. As of 1969, a total of approximately 1500 students had participated in ESALQ's graduate programs.

Eight areas are now offering graduate programs at the M.S. level. These are: 1) Rural Social Sciences; 2) Entomology; 3) Experimental Design and Statistics; 4) Plant Pathology; 5) Genetics and Plant Breeding; 6) Animal Nutrition; 7) Soils and Plant Nutrition; 8) Agricultural Economics; 9) Plant Science; and 10) Nuclear Engineering in Agriculture. In addition, four areas have started programs which lead to the Ph.D. (Doutorado) degree. These are: 1) Plant Pathology; 2) Soils and Plant Nutrition; 3) Genetics and Plant Breeding; and 4) Entomology.

4. Staff and Qualifications

(See Annex V, Exhibit 2, Table V).

F. Federal University of Rio Grande do Sul (UFRGS) - School of Agriculture and Veterinary and the School of Agricultural Economics

The Federal University of Rio Grande do Sul (UFRGS) was founded on November 28, 1934. Apart from its administrative structure, the UFRGS is made-up of nine faculties, three schools, and ten institutes. The faculties and schools are for the training of individuals in the humanities and professions such as agriculture, education, medicine and the institutes for training in basic subject areas such as chemistry, physics and mathematics.

1. Organization - (See Annex V, Exhibit 1)

In 1970, the Faculty of Agriculture and Veterinary was divided into two Faculties - one being the Faculty of Agriculture and the other the Faculty of Veterinary Medicine. Graduate courses are being given by both of these Faculties.

The Center of Economic Research and Studies (CEPE) maintained its organizational structure which is in the Faculty of Economic Sciences. The graduate program is located in the Agricultural Economics and Rural Sociology Department. The other departments within the Faculty have indirect involvement in terms of teaching some of the courses in the graduate program and in the orientation of these research.

In the last few years, significant improvements have been achieved in UFRGS's organization and structure. The old catedra system has disappeared from the whole University system, by Federal decree, and has been replaced by departments whose heads are elected. A new rank structure has been established beginning with instructors, then assistant, associate and full professorship. Most staff members are part-time and are engaged in teaching and/or research, being paid separately for teaching activities and work in research.

Capable academicians and administrators head both the Faculties and Departments described above and cooperation between the various entities, which at one time was on an arm's length basis, is growing increasingly close.

2. Financial Resources

The Ministry of Education budgeted approximately \$11.6 million for UFRGS in 1972. About \$10.1 million was for operational support and \$.8 million for construction of facilities and buildings.

3. Enrollment - (See Annex V, Exhibit 2, Table I)

In 1972, UFRGS had an undergraduate enrollment of 10,500; of these 289 were in the Faculty of Agriculture, and 303 were in the Faculty of Veterinary Medicine (CEPE only has graduate students).

The graduate programs at the M.S. level were initiated in 1961 in CEPE, in 1965 in the Faculty of Agriculture, and in 1969 in the Faculty of Veterinary Medicine. Though growth was rapid

during the yearly years it has slowed somewhat in the last few years, with a fairly high number taking the coursework and doing research, but not writing theses nor taking their final exams. Job demand appears to be high enough that people so trained have not had difficulty locating positions.

The majority of research projects conducted in the CEPE, Faculty of Agriculture and Faculty of Veterinary are being conducted by the university staff and involving the graduate students in the various areas.

A summary of the number of research projects conducted during 1972 is shown below:

Research Projects in 1972

Area	Completed	Research & Technical Publications
Agricultural Economics	8	8
Rural Sociology and Communications	5	5
Animal Production	7	4
Soil Science	17	10
Veterinary Science	6	6
Crop Production	22	

4. Staff and Qualifications - (See Annex V, Exhibit 2, Table VIII)

Although the Agricultural Faculties at UFRGS have been very small and slow to grow in size, there has been a continual interest in self improvement and a corresponding increase in academic qualifications. At the present time practically all of the staff engaged in the Graduate Studies program are qualified at the M.S. level and they are rapidly improving as capacities and funds permit.

G. School of Agriculture, Federal University of Ceará (EAUFC)

The School of Agriculture was founded as a private school in 1918. It was incorporated into the State of Ceará educational system on

May 7, 1935. In 1951, it was placed under the administration of the Federal Ministry of Agriculture. In 1954, when the University of Ceará was created, the School of Agriculture became a part of that institution under the Federal Ministry of Education.

1. Organization (See Annex V, Exhibit 1)

The School of Agriculture is headed by a Director who is assisted by a Vice Director, four Coordinators, one Assistant Coordinator, and five Department Heads.

The twelve members of the administrative staff together hold four M.S. and eight bachelor degrees.

At present, there are five departments (Agricultural, Economics, Agricultural Engineering, Plant Sciences, Rural Technology, and Animal Sciences) with the Department Heads selected by members of the department each year.

Two previously independent agricultural institutes are now under the direction of EAUGC: the Institute of Rural Technology and the Zootechnic Institute.

2. Financial Resources

EAUGC's budget for 1972 was approximately \$3.2 million excluding salaries. About \$1.2 million was operational support, and \$2.0 million derived from contracts and other agreements.

3. Enrollment - (See Annex V, Exhibit 2, Table I)

In 1964, there were 278 students enrolled at EAUGC; at the present time enrollment has leveled off at slightly more than 600. Approximately 1,320 individuals have graduated from the EAUGC since its beginning.

4. Staff and Qualifications

(See Annex V, Exhibit 2, Table III).

H. Federal University of Minas Gerais (UFMG) - Veterinary School

The Veterinary School of the Federal University of Minas Gerais (UFMG) was created by state decree on March 30, 1922. Until 1942 the Veterinary School was located in the city of Viçosa and operated jointly with the School of Agriculture. In that year, however, the Veterinary School was transferred to Belo Horizonte where it has since been located. In 1961, the Veterinary School was integrated into the Federal University of Minas Gerais.

1. Organization (See Annex V, Exhibit 1)

The Veterinary School is organized into four departments (Preventive Veterinary Medicine, Pathology and Veterinary Clinic, Technology and Inspection, and Animal Sciences), two centers (Research and Extension), an Administrative Services unit, and a Documentation and Information Service unit.

The library at the Veterinary School consists of approximately 18,000 volumes plus 1,000 current scientific and technical publications.

The School of Veterinary began offering a Masters degree program in 1968. In 1969, the School was recognized by the National Research Council (CNPq) as the regional center for graduate studies in Animal Pathology and Animal Science. On October 2, 1970 the graduate program was accredited by the Federal Council of Education.

In 1972 the School of Veterinary offered graduate studies leading to a Masters degree in the Department of Preventive Veterinary Medicine, Pathology and Veterinary Clinic, and Animal Sciences. These courses are offered in collaboration with other entities of the Federal University. It's expected that by the end of 1973 post-graduate studies will also be offered in the Technology and Inspection Department.

2. Financial Resources

The Ministry of Education budgeted approximately \$13.5 million for UFMG in 1972. Approximately \$11.5 million was for operational support and \$.7 million for construction of facilities and buildings.

3. Enrollment

(See Annex V, Exhibit 2, Table I).

4. Staff and Qualifications

(See Annex V, Exhibit 2, Table IV).

I. Federal Rural University of Rio de Janeiro (UFRRJ)

UFRRJ was founded as a School of Agriculture and Veterinary Medicine on July 4, 1913. In 1939, a graduate training program in the areas of agriculture and veterinary science was undertaken. In 1965, the

University became officially named the Federal Rural University of Rio de Janeiro. In 1967, direction and supervision of UFRRJ passed from the Ministry of Agriculture to the Ministry of Education and Culture.

1. Organization - (See Annex V, Exhibit 1)

Excluding its administrative structure, UFRRJ is organized into three basic science institutions, six applied science institutes and thirteen Courses or Departments which replaced the various Schools existing prior to 1967

2. Financial Resources

The Ministry of Education budget for UFRRJ for 1973 amounts to approximately \$4.3 million, of which \$3.8 is for operational support and \$.4 million for construction and modification of facilities.

3. Enrollment

(See Annex V, Exhibit 2, Table I).

4. Staff and Qualifications

(See Annex V, Exhibit 2, Table VI).

III. PROGRAM DESCRIPTION

A. The PROGRAM

As noted earlier, the GOB has placed a high priority on the expansion and improvement of graduate education, not only because of its impact on research but primarily as a means of improving the quality of undergraduate level education through producing a sufficient supply of well trained professional teaching staff. Furthermore, the search for a viable mechanism to improve the planning, management and coordination of graduate education has led to a general Brazilian consensus that such a mechanism can perhaps be most effective if its focus is on the national development of graduate programs by individual academic areas, such as medicine, engineering, agriculture, etc. Consequently, the GOB is interested in the development and implementation of a PROGRAM in the area of agriculture and has requested USAID assistance in this undertaking.

The major functions required of the proposed mechanism are the following: 1) analysis of: (a) the status of agricultural graduate education; (b) the benefits and costs of graduate education and the demand for it; and (c) the relationship of graduate to undergraduate education; 2) interpretation of national development goals in agriculture into investment priorities, output targets, and policy recommendations for agricultural graduate education; 3) identification of the inputs (including curriculum, instructional technology and resources, administrative organization, planning, management, students, etc.), the optimum mix of those inputs, and the appropriate prices to pay to get the quality and kind of inputs necessary to produce the desired outputs (graduates, research, community service, etc.); 4)- identification of the financial and human resources required to provide the inputs needed by the graduate education programs to be assisted; 5)-identification of a financial system (including the possibility of the provision of new sources of financing, such as a revolving scholarship fund for graduate study) capable of providing, on a consistent basis, the resources required; 6)- identification of financial and technical assistance resources needed; 7)- coordination of resource utilization throughout the system (involving potential for sharing of human and material resources among institutions and programs); 8)- design of an improved administrative structure and coordination of the implementation system at both

federal and university levels (including a clarification of roles and interrelationships of various entities with responsibility in this area); 9) development of a system by which university graduate programs in agricultural education provide technical assistance to other universities with weaker undergraduate programs in this area so that the latter may strengthen their courses and develop the capacity to eventually offer graduate level programs; and 10) development of planning, management, and evaluation tools to assist in the implementation, evaluation, and redesign of the PROGRAM as it operates for agricultural education, within DAU, and the respective universities and their graduate programs.

The following characteristics are recognized by both MEC and USAID as being essential for the effective operation of this PROGRAM: 1)- authority from MEC to carry out the overall coordination functions required by the PROGRAM and involving DAU, CAPES, etc.; 2)- assignment of full-time, highly qualified, long-term and short-term Brazilian advisors; 3)- participation and support of all the principal entities presently involved in graduate education; 4)- flexibility to experiment with various planning, management, implementation and evaluation structures and approaches as well as flexibility to change its form as required to consistently refine the PROGRAM.

The area of agricultural education was selected by MEC as the one offering the best potential in support of the development of such a PROGRAM. MEC has chosen this area for immediate development because the number of graduate programs in operation is small and because it means to correct some existing distortions in the regional distribution of graduate courses.

Furthermore, MEC will be able to train the qualified high-level manpower necessary to implement its action program in the agricultural sector and to reinforce the research programs of the Ministry of Agriculture (which has received a loan from USAID) and EMBRAPA.

B. PROGRAM Objectives

There are two major objectives of this PROGRAM. The first objective is the creation of an effective mechanism for improved planning and coordination of graduate education in agriculture at the level of DAU and CAPES, and at the universities. The development

and refinement of this mechanism is basic for the attainment of the second objective. There are deficiencies to be corrected in the following areas: identification of outputs for the education system, coordination of the application of financial inputs, management of the inputs and the process by which they are converted into desired outputs, and evaluation of alternative mixes of inputs to achieve outputs. The major importance of this aspect of the PROGRAM will be in providing a systematic approach to maximize the effectiveness of the investment of scarce resources in graduate agriculture education in order to obtain specific, desired outputs. The degree to which this objective will be reached can be measured by: 1) the cost-effectiveness of the agricultural graduate education system in reaching its output goals, and 2) the mechanism's applicability to, and adoption for, planning and management of other graduate education programs in agriculture, to be determined by DAU and by CAFES, and in other academic areas as appropriate.

The need for improved planning and management at the university and individual graduate center level is equal to the need at the federal level. The improvement at this level will depend, to a great extent, on how well the PROGRAM is developed and implemented in the individual graduate centers because these centers have the operational responsibility for the output targets which the education system must achieve.

The GOB has been undertaking intensive analysis of its higher education system, especially in the agricultural sector, and already has concluded that the present system is not adequate in either quantitative or qualitative terms to produce the graduates and research needed now, and even more so in the future, to support its agricultural sector development program. Techniques to measure the exact parameters of sectorial expansion and improvement required will be improved as the planning mechanism is further developed. The second objective of this PROGRAM, therefore, is to assist the GOB, through MEC, to expand and improve its graduate programs in agriculture on a selected basis as demonstrated by need. Through the implementation of this mechanism, assistance will be provided to selected graduate programs. The GOB, through MEC, will create an effective decision-making process which will assure improved guidance as future resources are allocated to PROGRAM expansion and improvement.

There is a marked variation from one Brazilian university to another in their capacity to offer high quality graduate education programs. The GOB has decided that one means to upgrade the general level of these programs is the assignment of new responsibilities to the stronger graduate centers to offer technical assistance and staff training to selected undergraduate programs in order to develop the latter's capacity to eventually also offer some graduate programs. The Mission believes this is a viable idea and one which could serve as an effective means to multiply the results of development and external assistance throughout the country in other academic areas, according to the special characteristics of each area. In response to MEC's previous request, USAID is providing assistance, as well, through a grant project to systematize this approach on an experimental basis in the field of agriculture. As a result of this grant project two graduate programs will supply technical assistance to two undergraduate schools. Therefore, an important aspect in carrying out this PROGRAM's second objective of strengthening the graduate agricultural education centers will be the involvement of all the six participating centers in this inter-university technical assistance system. The inputs to finance this activity will be provided exclusively by the GOB.

C. PARTICIPATING INSTITUTIONS

1. Graduate Centers

Brazilian universities are, at present, offering 44 graduate courses in Agricultural Sciences, nine of which were started in 1973. Thirty-seven of these are at the M.S. level and seven at the PhD level. These courses are concentrated in seven universities - The Federal Universities of Ceará, Viçosa, Minas Gerais, Rio Grande do Sul, Santa Maria, Rural of Rio de Janeiro and the State University of São Paulo. (Data on these schools is provided in Annex V, Exhibits 1 and 2.)

Four of these universities - The Federal Universities of Viçosa, Ceará, Rio Grande do Sul and the State University of São Paulo - have been assisted by USAID through a grant institutional development project since 1964. (A pilot project was begun in 1958 at the Federal University of Viçosa.) They are offering 28 of the 37 MS programs and all of the seven PhD programs.

These seven universities were selected for this PROGRAM because they represent the schools with the greatest potential for development. Although they are still in the process of structuring their graduate programs and developing their own faculties with respect both to numbers and quality and although there are many gaps to fill, they have reasonably strong graduate programs. Also, they have now reached the point where they are in a position to help, through technical assistance, upgrade the quality of undergraduate level agriculture schools in Brazil.

The level of development and number of graduate programs offered by the seven universities vary considerably. The State University of São Paulo and the Federal University of Viçosa are the most advanced. The Federal University of Santa Maria is presently initiating its courses, under the technical and financial assistance of FAO. Consequently, that university will not participate in the present PROGRAM from a financial standpoint, but will participate in planning and in the use of management and evaluation processes as they are developed under the orientation of MEC. No one school has, or is planning to develop, a graduate program in all disciplines. The present geographic distribution of the graduate centers and the number of courses by Region are somewhat distorted. The GOB plans to correct these in accord with its policy to offer equal educational opportunities for inhabitants of all regions of the country. Therefore, under this PROGRAM, determination will be made of the need for the development of new courses in these seven graduate centers, as well as for the strengthening of existing courses.

This PROGRAM will provide financial resources (US and Brazilian) to six graduate centers, excluding Santa Maria, basically for the following:

1. Staff improvement through foreign and in-country advanced level long-term and short-term training programs. Training emphasis will be at the PhD level, but some short-term training programs will also be provided, especially in the planning and administration area.
2. Expansion of faculty size needed to carry out the responsibilities of the graduate centers and to provide assistance to undergraduate schools to be assisted by the graduate centers.
3. Long and short term foreign technical assistance, mainly for: a) planning and the development of new teaching and research programs at the graduate centers; b)- cooperation in

the establishment of a specific planning and administrative system for this PROGRAM; and improvement in university administration in general. Foreign T.A. will be required for the organization and implementation, both at the central unit (MEC/SEG/DAU) and at the graduate centers; c)- strengthening of the capacity of the graduate centers to provide T.A. to lesser developed undergraduate schools.

4. Improvement, expansion and organization of library materials, including the development and acquisition of books, periodicals and other teaching materials .

2. Undergraduate Assisted Schools

Each one of the six graduate centers of agricultural education assisted under this PROGRAM will assume the responsibility for providing assistance to an undergraduate school of agriculture in another university. The specific schools to be assisted will be selected by DAU according to the following criteria: 1) results of the demand study for agricultural graduate education; 2) geographical coverage of Brazil; 3) commitment of the schools for change and improvement; 4)- evaluation of their plan to receive and to utilize technical assistance and staff training; 5)- required assistance and time needed to reach stage of readiness to offer graduate programs. Additional criteria for selection will be developed as part of the PROGRAM.

The types of assistance which MEC/SEG/DAU plan to provide these schools is as follows: 1) staff training in Brazil; 2)- expansion of full-time teaching staff; 3) technical assistance in planning and management and in program development; 4)- expansion and improvement of facilities, equipment, and supply of instructional and research materials; and 5) expansion and improvement of libraries.

It may not be possible through the life of the loan PROGRAM to supply the level of resource requirements necessary to get the six undergraduate schools to the point of meeting DAU's criteria for readiness/capacity to provide graduate programs. What is more important, however, is that the loan PROGRAM will support the development of a system by which these schools will receive the major assistance required, will establish close institutional ties with the better developed centers, and will have elaborated a development plan which will clearly specify the kind of additional resource requirements they need over a specific time span to reach that "take

off" point. Their improved resourcefulness and the continued assistance of MEC and the universities should carry them the rest of the way.

D. Administration and Management of the PROGRAM

The seven graduate centers involved in this PROGRAM were asked to submit their plans for expansion of their graduate programs through 1978. The survey revealed that they, by the end of 1973, would be offering 37 master's level and 7 doctoral level programs. Of these, 6 master's and 1 doctoral program were to be initiated during 1973. By 1978 an additional 11 master's and 11 doctoral programs were expected to be instituted. These plans for expansion, representing the universities' expectations, have no overall coordination or rationale, and, in some cases, represented the interest of individuals. The universities, concerned about the results of this survey and the possibility of an uncoordinated expansion of graduate programs, created within ABEAS a special commission responsible for discussing principles which could be suggested for the universities regarding orderly planning for the development of graduate level programs. As one activity related to this effort, ABEAS, with the support of the Ministry of Education and Culture, the Ministry of Planning and USAID, contracted for the completion of a study of demand for graduate education in agriculture in order to provide some basic data for planning the development of programs at this level.

In addition, the Ministry of Education and Culture has created, under DAU, a commission (CECA) to study the whole field of agricultural education in order to provide guidelines for the development of all education programs in this field.

The present PROGRAM seeks to build on this already demonstrated recognition of the need for coordinated planning, to take advantage of the existence of organizations already active in this field, and to develop alternative approaches to planning and developing graduate programs which will be applicable in other fields as well.

1. Central Administrative and Planning Unit

To administer and implement this PROGRAM MEC will create and maintain, as a part of and subordinate to DAU, a central administrative and planning unit. This unit, which will be headed by a coordinator, will be directly linked to DAU which is responsible for the coordina-

tion of all graduate education activities. The unit will have an administrative support staff and a professional staff covering the areas of training, finance and technical assistance in planning. The staff will be full time and of sufficient size to carry out the responsibilities of the PROGRAM. The designated U.S. technical assistance as well as CECA and ABEAS will assist the professional staff of the Central Unit in planning the PROGRAM and DAU, through its close relationship with the universities, will assist them in planning and in implementing approved plans. (See Project Management Chart in Annex V, Exhibit 5.)

An important element of the overall PROGRAM plan will be to improve consistently the coordination of the PROGRAM with other existing entities, which have a role in the development of agricultural graduate education, such as the CFE, CNPq, CAPES, FUNTEC, FAPERGS, FAPESP, DAU, ABEAS, CECA, Ministry of Agriculture, and EMBRAPA. Coordination would not necessarily imply controlling or changing the roles of any of these groups; what is called for is 1) a consensus on the identification of output goals for agricultural graduate education and the most cost/ effective mix of inputs to achieve them and 2) communication about the inputs of each group in order to maximize the effectiveness of the total investment in this sector.

It will be the responsibility of the central unit to plan and guide implementation of the types of studies which will contribute to the constant improvement of this overall PROGRAM. ABEAS and CECA will serve in an advisory role in developing these studies. It will be the responsibility of the central unit to develop the plan for overall development of graduate education in agriculture based on the recommendations of DAU, the demand study results, and on the recommendations of CECA, ABEAS and of the technical advisors. This plan will be submitted to the Secretariat General and to the Minister of Education for approval.

The central unit will also develop a manual which will be used for the elaboration of development plans by the universities wanting to participate in this PROGRAM. The manual will specifically detail the type of information required on the present operations of the graduate centers as well as requiring a specific definition of what operational changes are to be made. The manual will require information on present and projected costs, teaching loads and their definition, facilities, administrative organization, libraries, etc.

The central unit will develop, as part of the manual, the forms which an institution must submit to present a request for technical or financial assistance.

The central unit will coordinate the provision of U.S. and Brazilian technical assistance for the preparation of these development plans in the universities requesting such assistance. These plans will then be submitted to the central unit for review, based on their conformance with the manual guidelines. An assessment of its validity will be made and recommendations will be forwarded to the general coordinator. He will review the proposals and, if found acceptable, will recommend them for approval to the Director of DAU. The central unit will then make provisions for U.S. and Brazilian technical assistance required to assist the accepted universities in implementing their development plans.

The central unit will serve as the host country contracting agent in obtaining and distributing agreed upon technical assistance, either U.S. or Brazilian. Similarly, it will, in cooperation with CAPES, process all requests for upgrading staff for participant training in the U.S. or Brazil and will, in cooperation with U.S. technical advisors, seek U.S. placement of approved applications. Any approval of individual participants will be based on approval of a university staff development plan. The requirements for such a plan will be detailed in the manual mentioned above. The central unit will also be responsible, along with the Evaluation and Control Advisory Unit of DAU, for developing and implementing a plan for evaluating the progresses of the PROGRAM. It will require evaluation at all institutions involved in the PROGRAM for each major input in order to provide valid bases for continuing such inputs or revising existing plans.

2. Operation at the University Level

At the university or isolated school level the PROGRAM will have three main thrusts: (1) improving general planning and administration; (2) improving and expanding graduate programs; and (3) implementing the system through which graduate centers will deliver technical assistance to relatively lesser developed agricultural schools. U.S. Technical assistance will be required in the first two of these three areas.

Each participating university will have or will establish a university development planning committee composed of at least two full time staff responsible directly to the rector of the university. It will be the responsibility of this committee to work directly with the DAU central unit and with the technical advisory body of DAU in implementing the planning and evaluation process to be developed as a part of the PROGRAM and to test their applicability in the university-wide planning process in the participating universities. The commission should carefully evaluate the effectiveness of the procedures being used in the PROGRAM as well as their effect on the university as a whole. For example, they must evaluate the effect of the staff development program proposed as a part of the PROGRAM on university-wide staff development and must evaluate the extent to which the selection procedures used will have applicability in other university departments. All communications from the DAU central unit to the participating university will go to the rector, then to this planning commission before being sent to the person designated as the University Coordinator for the PROGRAM. This is expected to ensure total university involvement in the PROGRAM and to enable the university to obtain maximum administrative improvement from participation in the PROGRAM.

Each university will appoint a PROGRAM coordinator who, working with the university planning committee, will be responsible for developing university proposals for participation in the PROGRAM, in accordance with MEC guidelines, and for directing implementation of approved proposals. He may or may not be assisted by a subcommittee consisting of representatives of the departments involved in the PROGRAM. It is expected that in most universities he will receive such assistance, but one of the objectives of this PROGRAM will be to experiment with a variety of planning and administration mechanisms and to attempt a comparative evaluation of the effectiveness of such mechanisms. Suffice it to say that the coordinator must ensure the involvement of all affected parties in planning, implementing and evaluating the PROGRAM as it develops at the given university. The coordinator and the university planning committee will receive technical assistance as needed and assigned by the MEC central unit. The coordinator will work directly with DAU and with the advisory body in planning the total PROGRAM. Thus, the administrative structure will be permitted to vary according to the complexity of the PROGRAM to be mounted at each university and in accord with the recommendations for experimentation approved by MEC. However, it will provide for

involvement of the total university in the planning process. The types of administrative and planning processes introduced by this PROGRAM should assist in improving total university planning and management. For example, each university, to the extent possible, will be expected to gather sound cost data on existing programs, to examine these costs to determine their validity, to project costs for the life of the PROGRAM, to relate these costs to expected availability of funds, etc. As another element, a study of faculty loads (present and projected) will be made in order to define criteria governing faculty load which then can be used as a basis for projecting needed faculty. It is expected that several approaches to such questions will be experimented with, evaluated, refined, and reapplied in order to arrive at processes that could be usable in other programs.

It is also expected that the process of development of criteria for assessing the priority of varied proposals for this PROGRAM within an agricultural graduate center will be applicable throughout the university; this process is fundamental to the improved relationship between the financial allocation process and the overall development plans of the university and MEC.

It will also be the responsibility of the university coordinator and the university planning committee to ensure that all aspects of the PROGRAM are well conceived, well administered and well evaluated. It is expected that the above efforts will result in improved university administration in general. At the same time, increasing interrelationships among the universities with DAU/MEC, through CECA, ABEAS, and other mechanisms, will help to increase the perception of agricultural education as a mutually reinforcing system.

At each university there will be a focus on the improvement of existing graduate programs, and possibly on the expansion of graduate programs at both the masters and doctoral levels. While each university has already, as a result of the earlier mentioned survey, indicated what it believes it needs to do, actual decisions on areas to be developed will result from a plan for the overall development of graduate education in agriculture based on the results of studies currently underway. This plan will be used as a basis for decisions by the central unit, through DAU, with the assistance of CECA and ABEAS, on the areas of study which need further development, the number of such programs and the universities most suited for developing them. The major part of the U.S.

effort in assisting in the implementation of the resulting will be through sponsoring participant training needed to improve staff competency in selected fields and through supporting long and short term technical assistance. Long term technical assistance will be necessary for the development of selected new graduate programs. Short term consultants will be needed to assist with some existing programs but primarily to help the existing staff to plan and to implement the research activities associated with master's and doctoral candidates theses requirements and with the research efforts of the faculty which are directed at critical agricultural productivity problems in the country.

Preliminary studies indicate a considerable need for improved faculty training. A recent survey conducted by ABEAS, covering the seven universities considered as graduate centers showed the following staff distribution: total 550; earned Ph.D., 73; doctoral equivalent*, 122; master's, 203; bachelor's, 152. A major element in improving the functioning of graduate courses must be staff development.

In addition, it is essential that the number of doctoral programs be expanded to enable the Brazilian agricultural science sector to develop the ability to train, within Brazil, a sufficient number of doctoral level graduates to permit it to reduce or eliminate its dependency for such training abroad. Thus, the establishment of more doctoral courses within Brazil will permit the development of an education system capable of regenerating itself through the production of additional Ph.D.'s. In addition, the products of doctoral level are essential in producing the type of basic research needed to improve agricultural productivity.

One element of the PROGRAM will be the development of criteria by which priority order can be established with respect to which programs, at what level must be developed. Once such priority ordering is established and programs selected, the graduate to be produced by the PROGRAM will be defined in terms of what he must be able to do, as well as what he must know; such definitions will then be used to describe the training program needed. Subsequently, the training program's costs will be carefully established, the

*A doctoral equivalent is defined as a level of training and experience demonstrated by the defense of a thesis before one's faculty peers after a long period of study, usually self study, and research activity beyond that represented by the thesis. Successful defense of the thesis results in a classification called "livre docente."

facilities needed for it described, etc., before a program is approved for implementation. Once approved, it is expected that each step of the PROGRAM implementation process will be evaluated and the results used to improve future planning in this and other fields.

The third basic thrust at the university level is the implementation of a mechanism (now being developed by a grant project) for delivering technical assistance to relatively lesser developed agricultural schools which will result in the improvement of the undergraduate offering at said schools. It is expected that by the close of the PROGRAM some of the presently lesser-developed schools will have reached the point of being able to begin the development of graduate programs. This effort is essential for two major reasons. First, there is not at present a uniform geographical distribution of graduate course offerings in Brazil. Of the seven schools now offering graduate work, only one exists in the whole North/Northeast area; four are found in the Center/West region; and two are in the South. While the exact geographical distribution of graduate courses to be offered will only be known from the studies under way, it is apparent that much of the country has little direct access to the benefits of such centers. This is especially critical since regional differences in agriculture in Brazil are marked. Second, it is essential to develop the Brazilian university capacity to give technical assistance to relatively lesser developed schools in order to promote the process of improving undergraduate education throughout the country. Initial studies have indicated a wide range of difference in certain critical quality factors. To state only one example, one undergraduate school with 27 faculty (almost all, (90%), part-time) has two professors with the master's degree and one laboratory, but enrolls 271 students. MEC's concern for improving this situation is evidenced by its appointing a special commission to study the situation and to recommend planned action to improve it. Establishing this PROGRAM as suggested herein could also help to build a unified concern within the agricultural education field for improved quality throughout.

A precondition of university participation in the PROGRAM will be its commitment to assist in the improvement of one lesser developed undergraduate school. The technical assistance to be received by the schools which already maintain graduate courses will give them the capability of assisting these schools.

Further assistance of the type recommended is already being given ABEAS under the USAID grant project will develop a mechanism by which this inter-university assistance aspect as proposed in the PROGRAM can function effectively. A careful evaluation of this mechanism and its operation will be used as a basis for its expansion under the PROGRAM. Brazilian technical assistance as required to expand the number of graduate centers which will help undergraduate schools will be assigned by the central unit in DAU. In carrying out this element of the PROGRAM the universities will assign appropriate staff, and will assist the lesser developed schools to create development plans in accord with planning criteria developed through the central unit which, when approved by that unit, DAU, and the Secretariat General will be funded by MEC.

Thus, the overall program at the seven universities will be administered by a coordinator with the involvement of the university planning commission and will have three foci:

- 1) improvement in university planning and administration;
- 2) improvement and expansion of graduate programs;
- 3) provision of technical assistance to relatively lesser developed schools.

Operation at Assisted Undergraduate Schools

The general basis for selection of undergraduate schools to be assisted by the six university graduate centers has been presented earlier. More detailed criteria for selection will be developed by the central unit and approved by DAU. While any school will be eligible to apply for such assistance, the selection criteria to be applied by MEC, through DAU will be published for the guidance of this process. The decision on which schools will be assisted will be made by MEC through DAU after recommendations by the advisory boards of CECA, AREAS, and the universities.

In order to participate in the PROGRAM the assisted school will need to organize itself for administering the program in much the same fashion as the universities. It will appoint a coordinator for the program. It will have or will establish a school planning commission directly responsible to the rector. It will be the responsibility of the planning commission, together with the coordinator, the rector and the technical assistants provided, to organize and to make an overall plan for school improvement based on planning guidelines developed by the DAU central unit. This plan will completely portray the present status of the institution, the changes which must be made to bring the institution to the desired level of functioning, the end status of the institution at the close of the program, the various types of inputs needed to achieve this status, etc. It will agree to 1) use as much as possible modern planning methods as defined by the central unit as a part of the PROGRAM such as improved cost accounting, measures of student flow, faculty load analyses, full facility utilization and need analysis, etc., and 2) incorporate such additional methods throughout the life of the PROGRAM as they are gradually tested and proved efficient.

As a plan for development of the undergraduate school is completed, it will be submitted by that university, through the Rector, to DAU's central unit. If the development plan is approved by MEC through DAU, the resources needed by the undergraduate school to implement the plan will be provided. At any rate, a part of the school development plan will include staff improvement. Such staff improvement programs will be funded by MEC through the proper institutions. If the improvement plan requires an increase in staff on a programmed basis, school resources provided by MEC will be increased by an appropriate amount. If the plan calls for continued technical assistance in improving a specific curriculum, the assisting university will allocate sufficient staff time to provide the specialized assistance.

Thus, the assisted institution is a participating part of the total PROGRAM although it operates through the intermediary of the assisting graduate center. It has the same responsibilities for planning, implementation and evaluation as do other elements of the PROGRAM.

E. U.S. Inputs

The general types of inputs to be made in the development of this PROGRAM have been identified earlier. In this section a quantification of such inputs is presented with the provision that these quantifications are subject to revision as the PROGRAM develops. In other words, the presentation represents the best approximation possible based on an extensive analysis of estimated PROGRAM requirements.

Inputs from the U.S. loan will be limited to those items which require dollar costs. All local currency requirements will be provided by the Government of Brazil. The U.S. inputs will be directed to three areas: 1) technical assistance, 2) training outside Brazil, 3) and a limited amount for teaching and library materials not available in Brazil but essential for the development of graduate programs. Furthermore, the U.S. input will be restricted to the central level and to the support of the graduate centers. Only indirectly, that is through the provision of technical assistance to the graduate centers so they can develop the capacity in turn to give technical assistance to the lesser developed undergraduate schools, will the U.S. assistance reach these latter schools. It is the USAID position that resources from the dollar portion of the loan should be concentrated on the development of the PROGRAM for planning and developing graduate education. The actual development costs of the undergraduate schools are the responsibility of the Government of Brazil.

1. Central Management and Operation Level

At the central management and operation level there will be a need for two long term consultants for four years (total eight man years) to work with the central unit in DAU and, as assigned by that unit, with CECA and ABEAS. These consultants should have a specialization in University Academic Administration and Planning and in University Finance and Management Systems. Their responsibility will be to assist the central unit to plan, in detail, the PROGRAM and to assist in developing the implementation and evaluation systems which must accompany it. At the end of four years the Brazilian group should have no further need for long-term assistance. In addition, there will be a need for two man years of short term consultant services for specific problem areas.

In order to have maximum effect at the university level, some technical assistance will be assigned from the central unit to give assistance in administration and planning at the graduate centers. These advisors, on a regular basis, will also provide limited assistance to, and consult back with, DAU and its advisory bodies. One man year of technical assistance will be provided to each of the six graduate centers for each year of the PROGRAM. (Total 24 man years.) While the major portion of the work of these technical advisors will be at the graduate centers, working with the Rector, the planning team and the university coordinator, their links with CECA, ABEAS and DAU's central unit will facilitate their participation in overall PROGRAM design and redesign. They will also help the universities assure concordance with the requirements established at the central level.

The limited amount of technical assistance provided herein to the central unit is believed sufficient since the PROGRAM will have a high training component at the central level. The training envisioned will be given at the central level for university management personnel who will be able to apply their training in the university itself.

2. Graduate Centers

a) Technical Assistance for Course Development

At the graduate centers, both technical assistance and staff training programs are required for the purpose of improving and expanding graduate programs. Three types of technical assistance needs have been identified: 1)- assistance in developing new academic programs; 2)- assistance in improving existing academic programs, and 3)- assistance in planning and mounting research programs, both those related to graduate theses and other research programs related to additional basic problems of agricultural production. Although the universities participating in this loan activity have indicated a desire to mount 11 additional master's and 11 additional doctoral degree programs, the actual number of new degree areas (i.e., forestry, animal husbandry, etc.) to be developed will be decided on the basis of the overall plan for development of agricultural education to be constructed as a part of the PROGRAM. The development of new graduate degree programs will require long term assistance; accordingly, one man year per graduate center per year will be provided. The assignment of this assistance, however, will be determined by the central unit in DAU on the basis of their overall plan and of plans submitted by the graduate centers. The total

of such assistance (24 man years) should be sufficient.

In addition, the equivalent of 1.3 man years of short term technical assistance per university (total 32 man years), assigned also on the basis of approved plans, will be provided annually to assist in planning and mounting research programs, improving ongoing programs, and giving supplementary assistance to new degree program development. One element of the PROGRAM will be the determination of the proper mix of technical assistance to meet PROGRAM needs as demonstrated by the Demand study and the MECA study. The total amount of technical assistance available to the centers (56 man years) should be sufficient to meet the goals of a carefully defined PROGRAM.

b) Staff Training

The universities will also require training opportunities to upgrade their staff, particularly as greater effort is expanded in developing doctoral level programs. In addition, there is a need for a critical mass of persons trained to the doctoral level not only for the development of graduate programs, but also for the purpose of preparing persons who can guide and carry out research related to agricultural productivity. For this reason a participant training program for staff development will give emphasis to doctoral level training and will support training abroad in master's level programs which do not now exist in Brazil and where such M.S. level staff is needed for proper functioning of Brazilian graduate programs. In order to provide for a reasonable increase in staff competency, it is proposed that staff training be provided in the following amounts:

Master's level: 30 (ea. 1.5 years) for a total of 45 man years

Ph.D. level : 90 (ea. 3 years) for a total of 270 man years

This training program will add an average of five M.S.'s and 15 Ph.D.'s at each of the six universities. The exact numbers and mix at each university will depend upon approved staff development plans. While this portion of the present staff is in training abroad, the GOB will increase the staffs at the universities by a total of at least 75 persons. In addition, Brazilian funds will be made available to provide full time employment to approximately 100 staff members who are now employed part time. Moreover, the four universities which have been assisted by USAID have been able to release more personnel annually for training than will be necessary to meet the numerical targets given above. Therefore, it is concluded that the number of participants proposed herein can leave for training without jeopardizing the present programs. Additionally, 30 members of the university faculties will be trained to the M.S. level and 12 to the Ph.D. level within Brazil with Brazilian funds.

The following chart shows the approximate increase in training levels of the total staff of the departments offering

graduate courses in agriculture in the six participating universities and the University of Santa Maria from 1973 to the close of the PROGRAM (as a result of M.S. and Ph.D. training abroad and within Brazil and staff increases at the M.S. level):

Level	1973		Close of Program	
B.A. (152-30-30)	152	27.6	92	14.7
M.S. (203+74+60-45)	203	36.9	292	46.3
Doctors Equivalent (122-45-12)	122	22.2	65	10.4
Ph.D. (75+20+12)	73	13.3	175	27.1
Total Staff	550	100.0	624	100.0

In addition to the formal academic training discussed above, there will be a need for short-term, in-service training for persons at the administrative, planning and management levels. This should be in the form of internships of approximately three months each at appropriate U.S. institutions. This training should be provided for at least 32 persons, 24 from the graduate centers and eight from the central organizations (DAU, CECA and ABEAS).

c) Learning Materials and Resources

MEC and ABEAS have surveyed the status of libraries in the various agricultural graduate schools and have concluded that most are very much in need of assistance. Loan funds will provide limited technical assistance for the development of libraries (or more appropriately, learning resource centers) and for limited purchases in the U.S. of materials which are judged to be critical items of support to the instructional and research programs of the assisted graduate centers.

Limited technical assistance will be provided as part of the PROGRAM to assist the graduate centers to:

1. analyze present library holdings and operations;
2. identify learning resources required. (No graduate center improvement plan will be financed without an analysis of the need for learning resources.);
3. create a means for training learning resource center managers within Brazil;

4. develop a procedure by which learning resource centers in each of the assisted agricultural graduate centers can effectively obtain needed resources; and
5. refine and expand the information system now being created at the University of Viçosa as a part of its learning resource center. (This information system integrates the identification of need of agricultural producers for technical information and research results, as communicated by agricultural extension agents, with the information and research results available throughout the university. This is an innovative Brazilian initiative to stimulate increased relevance of the agricultural graduate program with a multi-disciplinary approach to problem solving in the agriculture sector.)

Technical assistance in the above areas will be limited to those agricultural learning resource centers that are integrated into a "central university library" concept. This is essential in order to affect other areas of graduate education, if not higher education as a whole.

A separate funding allocation for this technical assistance has not been made since it is expected that the foreign technical assistance needed can be derived from the centrally assigned technical assistance described earlier, and if necessary, from the short term assistance provided for the universities.

When clearly demonstrated to be necessary, additional learning materials and resources, not available in Brazil, will be purchased in the U.S. up to a total amount not to exceed \$400,000. Preference will be given to the purchase of innovative and cost/effective materials such as cassettes, films, and microfiches, and to provide subscriptions to professional journals and research information systems. Subscription fees will only be purchased for graduate centers which agree to assume the cost of the subscriptions at the end of the loan period.

F. Brazilian Inputs^k

1. Administration

The Brazilian inputs for this PROGRAM are designed to cover the local costs of the PROGRAM. Basically, funds are provided for personnel costs, supplies and materials, and travel required for the administration of the planning, implementation, and evaluation aspects of the PROGRAM at the central level (DAU/ABEAS/CECA) and at the level of the universities. While an allocation of funds for this purpose has been made, one of the conditions precedent to loan disbursement will be a demonstration from MEC that the initial administrative mechanisms proposed will, in fact, be capable of carrying out the PROGRAM and that sufficient funds have been allocated to permit it to function adequately and in a practical way in implementing the PROGRAM. As a result of the proposed flexibility, it is expected that the administrative mechanism as initially designated will be refined and improved throughout the PROGRAM. Such changes may require more funding than initially foreseen, or less funding as more efficient ways of carrying out this function are developed.

^kThis may be further adjusted to reflect a 4-year program instead of the original 5-year program.

2. Graduate Centers

At the level of the graduate centers, Brazilian inputs are also directed at providing the resources needed for qualitative improvement in graduate courses, for the expansion of graduate offerings, and for increased research activity. These have been provided for as follows:

- a) Financing of the training of 12 existing staff members of the Ph.D. level within Brazil.
- b) Financing the training of 30 existing staff members to the M.S. level within Brazil. This activity is designed to improve staff competency as well as to provide experimentation with the process of gaining master's level competency and a master's degree through work taken during vacation periods. This will permit the staff members to work at their university during the regular academic year. The use of several vacation periods to complete the master's degree, while a relatively standard practice in U.S. education circles, is an innovative practice in Brazil although teachers for elementary and secondary education are now being prepared through a program of "licenciatura parcelada" which is based on study during vacation periods. While 30 is not a numerically large number, this added to the other 30 to be trained in the U.S. with U.S. funds represents more than 11% of the total staff of the graduate centers and more than one third of the present bachelor's degree staff at these institutions. This will result in a considerably reduced level (approximately 92) of staff with only the bachelor's level of preparation.
- c) The addition of 74 new staff with M.S. degrees. This is directed at providing for an enrollment increase to be carefully controlled, based on the demand study, and a determination of a faculty load policy which will allocate staff time to teaching, research, administrative functions, public service, and other activities as a part of the PROGRAM. While development

and testing through the PROGRAM is expected to indicate a variation in the number of staff needed, the total of 74 is seen as the largest possible number needed. The increase also is expected to permit more attention to practical research designed to help solve agricultural production problems and to permit more emphasis on distributing knowledge about improved agricultural procedures through the university service program. This additional staff will also ensure that the portion of the faculty proposed for training abroad can be released by the universities. Staff additions will be made on the basis of the university development plan approved by the central unit.

d) Expansion of the number of full-time staff.

One of the persistent characteristics of the Brazilian university has been the high proportion of part-time staff. MEC has recognized this as a problem and has organized a program called CONCRETIDE to attempt a planned approach to its resolution by placing a constantly increasing number of professional staff on full-time assignment. This is a particularly critical need in the agricultural institutions where full-time dedication to teaching and to research on agricultural problems is needed both in order to improve the quality and relevance of graduate courses and to increasing agricultural productivity. This aspect of the PROGRAM will be implemented in accord with the approved university plan and will be carried out in coordination with the central unit and with CONCRETIDE, whose Director is also the Director of DAU.

e) Increased financing for supplies, materials and equipment.

While the six graduate centers are relatively well equipped, there will be a need for small amounts of specialized research equipment, particularly when new graduate courses are developed in fields not now covered. In addition, the increase in supplies and materials required for an expanded program with greater responsibilities accruing to the universities has been budgeted. While the exact amount needed cannot be determined until the PROGRAM begins to operate and university plans are fully developed, the increase provided herein appears adequate as an initial estimate.

It should be understood that the input estimates discussed herein are the best that can be made prior to development of detailed MEC/university plans. They are based on the judgment of MEC/AREAS as to the probable needs. In developing these estimates extensive use was made of Brazilian experts in agricultural education tempered with the judgments of the DAU staff advisors, CECA and AREAS. U.S. staff now serving as technical advisors at the four AID assisted universities were also consulted.

3. Assisted Undergraduate Schools

At the level of the six undergraduate schools to be assisted, the COB inputs follow a pattern similar to that described for the graduate centers. A larger financial investment is proposed since all of the staff training will be provided within Brazil and since supply and equipment needs are greater. The technical assistance to be provided to these schools will be Brazilian and will be financed by Brazilian funds.

a) Technical Assistance

The technical assistance provided will come from the graduate centers and will be provided by means of a contract between the two institutions approved by the central unit of DAU. Assistance will be given in diagnosing the present functioning of the school, in creating a school development plan based on the results of the diagnosis, and in identifying the objectives of the school, elaborating an implementation plan, and in carrying out the plan. Evaluation will be built into each aspect of this process. It is anticipated that at least one person from each assisting institution will be required on a long term basis throughout the life of the program. In addition, short term consultants will be required in the equivalent of approximately one additional full time person. The financial allocation provided for this function is adequate.

b) Staff Training

All assisted schools will require improved staff preparation levels; the exact amount needed is expected to vary from institution to institution. Three levels of training are proposed with the emphasis being given to refresher and upgrading training in courses called "especialização", most of which will take place during vacation periods. A total of 160 professors from the six undergraduate schools will receive training at this level during the program. A major

emphasis will also be given to masters level training, which will be given to a total of 112 professors from the six schools during the program. Again, much of this training will be given during vacation periods. Training will be given to 28 professors from the six schools to obtain the Ph.D. degree. Since the lesser developed schools tend to be smaller and since one goal of the overall program is to bring some of these to a point where they can begin to offer graduate training, the proposed training mix appears to be adequate. The refresher courses at the graduate level will be designed to immediately improve instruction, but they will not in themselves lead to a degree. One function of the PROGRAM will be an attempt to develop procedures and understandings which will permit such course work to be counted as a part of a degree program. The master's level programs will, in addition to providing greater depth in a given field, increase research capacity and provide the schools with a sufficient core staff to begin local research effort related to local agricultural problems. The doctoral training programs will produce a maximum of five Ph.D.'s per assisted school. Properly programmed, they can serve as the core staff for beginning graduate course offerings. They can also serve as the core for continuing development and improvement in the assisted schools.

c) Staff Additions

The lesser developed schools presently tend to be understaffed to carry out teaching, research, and public service. Consequently, most of their effort is directed at the teaching function. Staff increases will be provided for the same purposes as those described earlier for the graduate centers. However, in these schools, which are expected to be selected mainly from the North/Northeast region, added emphasis must be given to the public service aspect to facilitate transmittal of knowledge about improved agricultural processes to the producers. Research efforts on local problems also must be emphasized. The proposed addition of 60 master's level staff should be adequate.

d) One of the major needs of the assisted schools will be the provision of adequate equipment for the course work being offered. As a general rule, the undergraduate agriculture schools are poorly equipped. Similarly, these schools suffer from a shortage of funds to equip libraries, to buy supplies for existing laboratories, and at times, even for critical items

such as seed, fertilizer, etc. Consequently, it is foreseen that an increased Brazilian investment will be made in these two areas.

e) Logistic Support

The GOB through SUBIN, (an Agency of the Ministry of Planning and Coordination, responsible for coordinating international technical assistance projects to Brazil), will finance all the local logistic support costs of the U.S. technical advisors as well as the international travel costs for participants to be trained in the U.S..

As was stated earlier, the estimates contained in this section are based on the present judgment of Brazilian and U.S. experts in agricultural education. Since funds will not be released except on the basis of approved plans which will detail and justify each expenditure, it is probable that the amounts described herein will vary somewhat in the implementation stage. The judgment of the Mission is that these represent adequate parameters and that they, in fact, do represent an investment sufficient to permit a major improvement in the functioning of these institutions.

G. Evaluation

The first and predominant objective of this PROGRAM is to develop a mechanism for improving the planning, implementation, and evaluation of the process of improvement and expansion of graduate level agricultural education in Brazil. The development and implementation of this mechanism necessitates a process of consistent and ongoing evaluation which would facilitate continuous revisions and improvements of that mechanism. In the text of the PROGRAM Description many references are made to the evaluation which must accompany each aspect of the PROGRAM. A detailed evaluation plan will be described in the manual to be developed by the central unit of DAU. Examples of issues which must be addressed by the central unit in developing this evaluation plan are as follows: at what efficiency level must the mechanism function in order to be judged effective; what measures should be made of its adaptability to, and application by, the various institutions and courses specifically involved in the PROGRAM as well as of its possible utility for other academic areas; how to determine what specific improvements in planning and management processes are required and are instituted at the participating universities; how are quality improvements and outputs of the participating graduate agricultural programs measured; how does the effectiveness of an inter-university technical assistance system get measured, and how can an evaluation be made of the basic characteristics required in undergraduate agricultural programs in order for them to be judged capable of offering graduate level courses.

Measurements will be made of the progress in attaining all of the PROGRAM objectives from the initial planning stage through completion. Within the administrative structure at each level of implementation (DAU, the central unit, the university, and the department) personnel will be assigned the specific responsibility for carrying out evaluation and for seeing that its results are linked back into the PROGRAM in the form of revisions.

There will be three major emphases in the evaluation. A first emphasis will be on the cost/effectiveness with which the various inputs to graduate level agricultural courses (such as curriculum; kinds, quality, and methods of utilization of instructional and research staff, materials, equipment, and facilities; students; technical assistance, etc.) are combined to produce the outputs desired of the system. A second emphasis will be on the kind of administrative and planning techniques and systems which prove most effective in combining those inputs and converting them into the desired outputs. The third emphasis will be on the frequency of the adoption of the procedures used in this PROGRAM by other academic sectors in graduate education.

H. Need for External Assistance

The Ministry of Education and Culture has stated the following specific reasons for their request for assistance to USAID:

1. The prior grant program has begun the process of developing an agricultural education system related to the U.S. Land Grant college structure with an emphasis on extension and service programs as well as on practical through very advanced educational programs in the field of agriculture. This loan will be of assistance in further developing this type of agricultural education in Brazil; consequently it is appropriate to continue to use U.S. assistance.
2. The U.S. graduate education training is important since it will be carried out primarily in institutions similar to the type of institution being developed in Brazil. In addition to the academic training the students will absorb with necessary modifications some of the institutional philosophy which will be of assistance in extending this type of education in Brazil.
3. There will be a definite advantage in purchasing equipment and educational materials from the U.S. One principal advantage will be that newly trained professional staff will be able to go to work using equipment and materials already familiar to them. In the absence of AID financing, MEC will seek to negotiate a \$900,000 line of credit with the Ex-Im Bank for equipment.
4. The proposed PROGRAM is complex and technical assistance is needed in structuring and implementing the total mechanism for improving the planning, implementation, and evaluation associated therewith.
5. A particularly crucial need is for technical assistance in improving university planning and administration. The focus of the prior grant program had been on the development of specific graduate programs, but this has had little influence on the administrative practices at the universities.
6. While the universities have been the recipients of technical assistance, they have not had experience in giving technical assistance to lesser developed schools. They will need some assistance in learning this important technique which creates the multiplier effect for assistance already received.
7. As new and complex graduate programs are implemented, there will be a need for technical assistance in the specific program area. At the same time some of the programs already

in operation still require technical assistance to ensure continued improvement of the programs to the point where they can become self sufficient.

Another particularly critical need is for technical assistance, principally short term in nature, to assist in conceiving and implementing research programs specifically directed at resolving Brazilian agricultural problems.

I. Budget

<u>Central Organization and Management</u>		\$1,552,000	<u>Administration</u>	Cr\$ 4,692,000
<u>Technical Assistance</u>	10 my	\$443,000	<u>MEC</u>	
MEC/AEAS			Personnel	1,872,000
- Academic Administr. and Planning	4		Supplies	156,000
- Finance & Management Systems	4		Travel	240,000
- Short-term	2			<u>2,268,000</u>
<u>Technical Assistance shared with and assigned to universities</u>	24 my	\$1,104,000	<u>ADEAS</u>	
University Administration & Planning	24		Personnel & Expenses	402,000
<u>University Level - for graduate education</u>		\$6,034,000	<u>Universities</u>	
<u>Technical Assistance</u>	56 my	\$2,364,000	Personnel	1,380,000
Long-term	24		Supplies	240,000
Short-term	32		Travel (includes assisted schools)	402,000
<u>Books, Learning Materials Library Impr.</u>		\$400,000		<u>2,022,000</u>
<u>Training in the U.S.</u>			<u>University Level - for Graduate Education</u>	17,112,000
Masters Level	30	\$450,000	<u>Training in Brazil</u>	
Ph.D. Level	90	\$2,700,000	30 Faculty to MS Level	1,080,000
Short-term	32	\$170,000	12 Faculty to Ph.D Level	600,000
TOTAL		<u>\$7,558,000</u>	<u>Additional Faculty</u>	
			74 at MS level	9,214,000
			<u>Supplies, Materials and Services</u>	2,400,000
			<u>Increase in Full-time assignment of faculty (100)</u>	3,000,000
			<u>Equipment</u>	798,000
			<u>Assisted Schools</u>	20,946,000
			<u>Technical Assistance from graduate centers</u>	2,400,000
			<u>Training in Brazil</u>	
			112 MS level	4,032,000
			28 Ph.D. level	1,392,000
			160 Refresher	480,000
			<u>Additional Faculty</u>	
			60 MS level	7,452,000
			<u>Services, Supplies and Materials</u>	1,998,000
			<u>Equipment</u>	3,192,000
			<u>MEC Total</u>	<u>42,750,000</u>
			<u>Miscellaneous Costs - Funded by SUBIN</u>	6,972,200
			<u>Local logistic costs of foreign technical advisors</u>	5,946,000
			<u>International travel for participants</u>	1,026,000
			TOTAL	<u>Cr\$49,722,000</u>
			\$ Equivalent at 6/1	\$8.287 million

SECTION IV - ECONOMIC ANALYSIS *

A. Economic Value of Higher-Education

The fact that investment in education pays high returns relative to investment in physical capital has been well documented in various countries. In Brazil, available evidence points to generally high private and social returns to the various levels of education, especially higher education. The evidence comes from studies done in the recent past and which are summarized in Annex VI, Exhibit 1, with principal results presented in Table 1.^{1/} This table, shows a rather high rate of return to higher education. The range is 7.5% - 22.1% for social returns and 16.7%-44.5% for private returns. It may be noted that returns to higher education are greatly increased when the estimated amount of foregone income is reduced by half, under the assumption that not all income need be foregone during the period of university attendance. This assumption has been confirmed by data from the 1970 demographic census^{2/}. The census data show for all university students aged 18-25 in Brazil an average of declared earnings which is 15% above the average for graduates of high school (2º ciclo) of the same age. Thus returns to higher education may be expected to be substantially higher than those in the table if a correction of the overestimation of foregone earnings implicit in these studies is made.

One of the studies being referred to, that by A.J. Rogers, for four states, using 1960 census data, provided rates of return by faculty of study. Unfortunately, the study was limited to the North of Brazil and the states of Espirito Santo, Guanabara, and Santa Catarina. Thus, important agricultural regions such as Minas Gerais, Goiás, São Paulo and Rio Grande do Sul were not included. By and large, this study shows very high private rates of return throughout the regions studied with the faculties of Philosophy, Dentistry and Pharmacy showing the lowest returns and with returns for the other faculties varying within the range of 11%-45%. The data are presented in Table 3 of Annex VI, Exhibit 1. The faculty of Agronomy showed returns varying from 1% to 41%. For social returns, however, the scientific and technical disciplines showed consistent relatively smaller returns. The range for Engineering, for example, is 8% to 14%; Medicine falls within 4%-6% and Agronomy from 2% to 8%. Rates for Law,

1/ The studies are Moura Castro's "Investment in Education in Brazil: A Study of Two Industrial Communities", 1970; S.A. Hewlett's "Educational Investment in Brazil", June 1972; A.J. Rodgers' "Returns to Higher Education in Brazil", 1969; Frank Taylor's "Analysis of the Utilization of Resources in Industrial Technical Education at the Secondary Level in the Northeast Brazil", 1970; and S. Levy's "An Analysis of Investment in Education in São Paulo", 1970.

2/ Special tabulations made for the study conducted by Samuel Levy "The Demand for Higher Education and the Labor Market for Professionals in Brazil" Mimeographed, Rio, Oct. 1972. Table 2 of this report is reproduced in Annex V, Exhibit 2.

* - For data given in Brazilian cruzeiros (Cr\$) in this section and related annexes, the dollar conversion factor is US\$1 = Cr\$6.06

TABLE 1
RETURNS TO EDUCATION IN BRAZIL

	<u>SOCIAL RATES OF RETURN</u>				<u>PRIVATE RATES OF RETURN</u>			
	<u>P</u>	<u>G</u>	<u>C</u>	<u>U</u>	<u>P</u>	<u>G</u>	<u>C</u>	<u>U</u>
a) Hazlett (1961-1962)								
Crude Rates	10.7	17.3	17.0	14.5	11.3	22.2	20.3	33.2
Adjusted Rates (50% foregone income)	11.3	14.2	18.3	22.1	12.0	17.4	21.5	44.5
b) Rogers (1960)								
Espírito Santo	-	-	-	8.2	-	-	-	25.0
North	-	-	-	9.0	-	-	-	20.7
Guanabara	-	-	-	10.4	-	-	-	16.7
Santa Catarina	-	-	-	7.5	-	-	-	21.9
c) Levy (São Paulo) before Tax, 1968								
Full foregone income	20.3	15.5	15.3	14.9	-	-	-	-
50% foregone income	-	17.6	17.7	18.8	-	-	-	-

USAID/PREP, March 30, 1973

Source: Annex V, Exhibit 1.

Notes: a) the number in parenthesis following the author's name is the year the data were compiled;
b) except as indicated, the studies cited are based on full foregone earnings in estimating educational indirect costs;
c) except for Rogers' private rates all other were calculated on the basis of before tax income.

P = primary education
G = ginásio
C = colégio
U = universidade

Economics and Social Sciences returns vary from 10 to 31%. Relatively low social returns for the technical disciplines clearly reflect the high cost to society of such education in Brazil. In the case of Agronomy, since the government is the largest employer of Agronomists, salary differentials for agronomists are greatly influenced by administered prices, thus greatly biasing productivity differentials against these professionals. Of course, this is one of the shortcomings of rate of return analysis and indicates that it cannot be taken as the sole instrument for educational planning.

None of the studies conducted to date focused on graduate education, the target level of this loan. Thus, only indirectly do they have relevance in regard to the program to be assisted by this loan. The calculation of returns to graduate education in Brazil has been impeded by the fact that census and other regularly undertaken surveys do not differentiate between earnings related to different levels of college education. A special survey intended to provide such data is now underway and, while final results are not yet available, partial results from this survey, along with other pieces of information, seem to provide considerable support for the generally accepted notion among Brazilian educators and planners that returns to graduate education in Brazil, including agricultural education, largely exceed that of undergraduate education. These partial results are analyzed below in relation to the market for advanced degree agronomists.

B. Market for High-Level Agricultural Professionals

1. Current Supply

Estimates of the supply of agricultural professionals in Brazil vary according to different sources. A sample of 1.3% of the 1970 demographic census suggests a total of 7,343 agronomists ^{2/}. In the Brazilian ten-year plan 1966-76, a stock of 5,804 agronomists and 2,626 veterinarians was estimated for 1966. The same document projected these totals for 1970 to be 8,576 and 3,867, respectively. Other sources provide different data. Prof. Samuel Levy, in analyzing these data, suggests that the census numbers may be on the low side, first because they come from a very small sample and, second, because they refer only to those actually exercising their professions ^{4/}. In spite of this, the census numbers are used here for agronomists. For veterinarians the 10-year plan estimate will be utilized.

In addition to the stock of agriculturists, it is desirable in connection with this loan to have a numerical estimate of the level of training received by this manpower, that is, the number of those professionals holding a Master's or a doctorate degree. Such an estimate was attempted on the basis of information on returned

^{2/} Special tabulation for Samuel Levy study "Demand for Higher Education and Labor Market for Professionals in Brazil", mimeographed, Oct. 1972.

^{4/} Samuel Levy, op.cit.

participants from training programs abroad and graduates from advanced degree programs in Brazil. The data on returned participants are from the Getulio Vargas Foundation (GVF) and come from a survey called "Projeto Retorno" 5/. Based on these and other data it was estimated that through 1970, some 430 Brazilian agronomists and veterinarians returned from graduate training abroad where some 360 earned a Master's and 70 a Ph.D. degree (See Annex VI, Exhibit 3 for details on how these numbers were derived). Based on a survey of the seven agricultural schools offering graduate education, it was possible to estimate that through 1970 a total of 364 agronomists and veterinarians have graduated in Brazil at the Master's level with no graduates at the Ph.D. level 6/. According to these numbers, the 1970 stock of agronomists and veterinarians with advanced degrees would be 724 holders of Master's degree and 70 Ph.D. degree holders, or 6% and 0.6%, respectively of the total stock of these professionals. If these numbers are reasonably close to reality, the extent of high level agricultural manpower in Brazil may be considered rather small. The averages would amount to some 55 Master's degree holders and some 5 Ph.D. degree holders for every one million people engaged in agriculture in 1970. It seems evident by any standard that this composition of the college degree labor supply to the Brazilian agricultural sector is quite unsatisfactory in view of the complexity of the problems facing Brazilian agriculture as extensively discussed in Section I of this paper. This is specially true in view of the widely acknowledged low qualification of the undergraduate courses in many of the Brazilian agricultural colleges. The traditional four-year undergraduate professional training offered by these colleges has proved to be insufficient to prepare the needed labor for the highly complex problems underlying modern agriculture, especially in the areas of research, planning, and extension. Attempts to improve the qualifications of undergraduate agricultural professionals through short term courses are considered insufficient, despite the apparent large number of professionals who have completed such courses. What has been estimated above as indicating a relatively small number of agriculturists with advance degrees is reasonably close to what has been surveyed in regard to the faculty composition of agricultural schools. A 1970 survey by ABEAS indicated for these schools a teaching staff of 1168 professionals, of which 305 or 26.8% had a Master's degree and 27, or 2.4% had a Ph.D. degree. The survey also indicated that 164 teachers, or 14%, who have had some post-bachelor's training (121 did not declare level of training).

2. Demand Indicators

Given the absence of rate of return analysis for graduate education, a review will now be made of the market indicators of the demand

5/ GVF-CETRHU-FBAP, "Projeto Retorno", Reports 1 thru 5, Rio, 1971.

6/ Engelbert L. E. et al, "Levantamento sobre o Desenvolvimento dos Cursos de Pós-Graduação nas Ciências Agrárias" Report to MEC, ABEAS, USAID, March, 1973. See Also Annex V, Exhibit 3.

for post-graduate agronomists in Brazil. Several indicators of the nature of the market can be investigated: agronomist's earnings relative to others with similar amounts of training or education, the nature of the work they are doing relative to their training, the unemployment rate, the time between jobs, the number of vacancies existing, and the demand for education to the masters or doctorate level. Again, data limitation precludes an examination of all those characteristics, so the analysis that follows is restricted to the question of the extent to which different levels of training do influence earnings among agricultural professionals, and to the effective use of training.

3. Earnings

Earnings are certainly a strong indicator of the market demand for individuals, although several difficulties are associated with utilizing earnings data for this purpose. First, monopsonistic powers interfere with the functioning of the market. Many professionals, such as physicians and lawyers, can control the price of their services to some extent. In other cases, the user of services, such as the government or educational institutions, is very large relative to the total market and can therefore determine to a degree the price of those they hire. In addition, training is certainly not the only determinant of income and often it is not possible to isolate the other influences.

Given all this, what do earnings figures suggest? One might start with the only national data presently available and which came from a 1.3% sample of the 1970 census. When it comes to a sub-group such as university trained agronomists, a 1.3% sample yields a small number in the sample - in this case only 95 individuals, and the breakdown of earnings by age is based on even smaller groups: 48, 26, and 21 in the three age groups considered. The data are in Table 2. These show average earnings by age for all university graduates by occupation, but without separating out advanced degree holders. It may be noted then that agronomists earn less at each age level than did the average university graduate.

However, if professionals (dentists, physicians, engineers and lawyers) are taken out, it may be noted that the lowest age group of agronomists did almost as well as the groups of non-professional university graduates as a whole, possibly indicating a trend toward a better market for agronomists. Since the data do not differentiate by level of higher education, it is possible that agronomists with higher degrees may have significantly higher earnings than agronomists as a whole. Some evidence is found below that this seems to be the case. It may be pointed out, however,

TABLE 2

BRAZIL: UNIVERSITY GRADUATES BY PROFESSIONS AGE-GROUP AND AVERAGE ANNUAL EARNINGS, 1970

	%	NUMBERS a/	AGE DISTRIBUTION %	AVERAGE ANNUAL EARNINGS CR\$
ALL UNIV. GRADUATES				
TOTAL	100.0	539,131	100.0	24,732
20-34		203,572	37.8	18,929
35-49		204,443	37.9	28,087
50 and over		131,116	24.3	28,356
LAWYERS				
TOTAL	7.3	39,195	100.0	27,852
20-34		14,104	36.0	21,168
35-49		16,179	41.3	29,988
50 and over		8,852	22.6	34,668
AGRONOMISTS				
TOTAL	1.4	7,343	100.0	19,788
20-34		3,700	50.4	16,344
35-49		1,982	27.0	23,700
50 and over		1,661	22.6	23,196
DENTISTS				
TOTAL	6.1	33,066	100.0	18,732
20-34		11,943	36.1	15,240
35-49		14,368	43.5	21,852
50 and over		6,600	20.0	18,468
ECONOMISTS				
TOTAL	1.8	9,559	100.0	27,144
20-34		5,073	53.1	22,644
35-49		3,536	37.0	34,416
50 and over		876	9.2	23,640
ENGINEERS				
TOTAL	8.6	46,113	100.0	35,892
20-34		21,165	45.9	29,184
35-49		17,909	38.8	41,220
50 and over		7,040	15.3	42,444
PHYSICIANS				
TOTAL	8.8	47,244	100.0	31,788
20-34		14,451	30.6	24,972
35-49		21,133	44.7	35,676
50 and over		11,660	24.7	33,132
ALL UNIVERSITY GRADUATES EXCEPT PROFESSIONALS (Engineers, Lawyers, Dentists, Physicians)				
TOTAL	69.2	373,573		22,666
20-34		141,907		16,862
35-49		134,255		25,589
50 and over		96,964		26,855

Source: Special tabulations of the 1970 census in Sam Levy, op. cit.

Notes: a/ Incomplete information on age may result in the figures for all age-groups not being equal to the totals.

that relatively lower earnings for undergraduate agronomists conform with generalized feeling about the low qualifications of a large portion of these professionals.

The 1970 survey made by ABEAS and mentioned above contains useful information for the labor market analysis pursued here. Preliminary tabulations from this survey were made by IDEG (the Development Institute of Guanabara) and furnish information on salaries for 1047 professionals and allow the derivation of age-earning patterns by levels of higher education, except for doctorates. ^{7/} Results are presented in Table 3.

The overall average monthly salary for an advanced degree agronomist is Cr\$2.298. On an annual basis, this amounts to Cr\$28-30,000 (depending on whether the 13th salary is included) which might be compared with average earnings for all agronomists in Table 2: Cr\$19,788. This indicates, then, that university employed agricultural professionals earn significantly more than what is shown for agronomists in a national average.

In a comparison by type of degree earned, it may be seen that holders of a Master's degree earn considerably more than those with only a bachelor's degree, or some post-bachelor's extension or specialization course, at any age level. On the average, the income difference favoring the Master's holders over the bachelor's is 47%, increasing at the age of 30-40 and declining slightly towards the age of 50 and over. In the case of doctorates, average earnings are more than double (225%) that of bachelor's, and almost double (192%) that earned by those having less than the Master's degree training. The Ph.D. holders earned on the average 50% more than M.S. holders. It is also interesting to note that less than Master's degree graduate training had very little, if any, influence on earnings. Graph 1 allows a ready visualization of what has just been described. This seems to represent good evidence that an advanced degree was an important determinant of salary among agricultural professionals employed in universities in 1970.

Another source of information about the market for agronomists and veterinarians refers to partial returns from a survey underway, which was contracted by ABEAS with IDEG, on the demand for advanced degree agriculturists. This is a national

^{7/} Of a total of 27 doctorates listed only 10 declared salaries, two of whom ranked themselves in the second lowest salary bracket, which in all probability represents error. The number of doctorates, then, becomes too small for an analysis of their age-earning pattern.

TABLE 3
AGE-EARNINGS PROFILE TEACHING STAFF OF BRAZILIAN
SCHOOLS OF HIGHER AGRICULTURAL EDUCATION - 1970
(Average monthly earnings Cr\$)

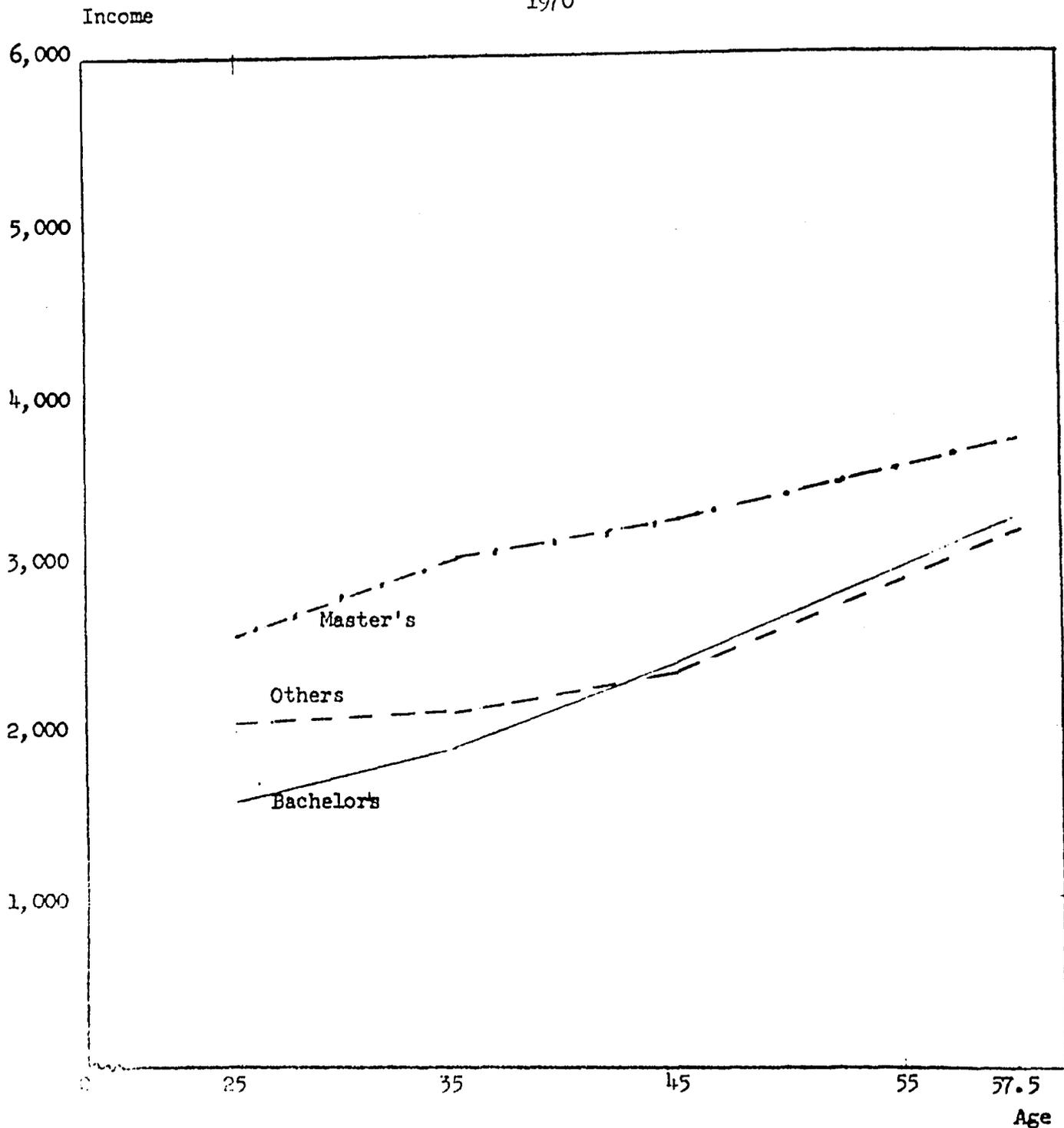
	AGE BRACKETS				Averages & Totals
	20-30	30-40	40-50	Over 50	
<u>Bachelor's degree</u>					
Earnings	1,562	1,894	2,358	3,154	1,969
Nº of People	227	178	74	65	541
<u>Master's degree</u>					
Earnings	2,517	2,888	3,118	3,380	2,818
Nº of People	115	130	38	25	308
<u>Doctor's degree</u>					
Earnings	-	-	-	-	4.438
Nº of People	1	4	2	1	8
<u>Other Post-Bachelor's</u>					
Earnings	1.984	2.040	2.273	3.079	2.310
Nº of People	31	63	55	38	187
<u>Total</u>					
Earnings	-	-	-	-	2.298
Nº of People	374	375	169	129	1.047

USAID/B-PREP

Source of basic data: Tabulations of the 1970 ABEAS survey of Agricultural Schools in Brazil, IDEG, March 1973.

TEACHING STAFF OF BRAZILIAN
SCHOOL OF HIGHER AGRICULTURAL EDUCATION

1970



USAID/B - PREP, May 1973

Source - Table 3

survey, covering all potential employers of graduates from agricultural schools. The survey was designed to compile information on the numbers of employees in 1972 or 1973, past employment and projected needs through 1976, type of undergraduate course of employee, level and type of graduate education, place of training, year of graduation, age, earnings, and function actually performed by title and type. In addition, data on expenditures and other characteristics of the institution analyzed was to be asked so as to help in making projections. Other professionals than agronomists were also surveyed. At the time this paper was being prepared a package of questionnaires containing information on 1,372 technicians was made available to USAID. Of the technicians listed, 1,116 were working for government non-academic organizations (833 federal, 283 state), 153 working in public and private enterprises, and 103 in a few academic institutions. USAID tabulated these questionnaires, except those for the academic institutions, as more comprehensive information on these at this time can be secured from the ABEAS survey, already referred to. Not all questionnaires were complete so the tabulation of employees according to one or another characteristic does not add to the overall total mentioned above. Table 4 summarizes the distribution of technicians by level of training and employers.

Data on earnings cover 1,218 employees and are presented in Table 5. The data relate earnings by agronomists, veterinarians and other professionals according to degree earned. The numbers are respectively 847,69 and 302, thus the participation of veterinarians in this sample is very small. Over 80% of these professionals have only a bachelor's degree; 171 have the Master's and 30 the doctor's degree; 33 of them received some post-bachelor's training. It is easily seen from the table that in a sub-grouping of the data, the numbers become rather small and a further breakdown by levels of age, for the purpose of deriving age-earnings patterns, makes the data somewhat useless for an analysis at this level of detail. The examination of the FBO earnings data is then confined to the overall averages. 8/

The average monthly salary of all professionals, in the period Nov. 72-Feb. 1973, was Cr 2,653. Average agronomists' earnings came close to this average. In regard to the level of training, the figures for all professionals indicate below the average

8/ The data containing age-income detail total 1,078 employees only, and are in Annex VI, Exhibit 4.

TABLE 4

DISTRIBUTION OF AGRICULTURAL PROFESSIONALS BY LEVEL
OF TRAINING
PARTIAL RESULTS FROM A DEMAND SURVEY

Employers	Levels of Training				
	Infor- mers	Bachelor's Degree	Master's Degree	Doctor's Degree	Others
Federal Government ^{1/}	833	723	88	14	8
%	100.0	84.6	10.2	1.7	3.5
State Government ^{2/}	283	192	68	19	4
%	100.0	67.8	24.0	6.7	1.5
Public & Private Enterprises ^{3/}	153	125	25	3	-
Total	1269	1040	181	36	12
%	100.0	82.0	14.3	2.8	.9

USAID/3 - PREP

Source: Questionnaires of IDEG Demand Survey.

^{1/} Ministry of Agriculture, with 17 units; Ministry of Interior, 2 units;
Ministry of Industry and Commerce, 1 unit.

^{2/} Secretariat of Agriculture, Bahia; Secretariat of Agriculture, São Paulo,
4 units.

^{3/} Itorzem, Federal; São Paulo Cessa, Anda, and Agroceres; Guanabara Docenave,
Abcar and COPL and Rio Grande do Sul Ferticop and C.T. Serrano.

Table 5

LEVEL OF TRAINING AND MONTHLY AVERAGE SALARY

Professions and Employer	Bachelor's No of Info	Average Salary	Other No of Info	Post-BS Courses Average Salary	Master's No of Info	Average Salary	Doctor's No of Info	Average Salary	Total No of Info	Average Salary
<u>Private</u>										
Agronomists	67	3.596	6	9.665	16	5.038	2	7.026	91	4.325
Veterinarians	6	3.251	-	-	-	-	-	-	6	3.251
Others	41	4.523	1	4.345	8	4.699	-	-	50	4.470
Average	114	3.839	7	8.905	24	4.925	2	7.026	147	4.339
<u>Government</u>										
Agronomists	606	2.142	24	1.913	101	3.321	25	4.275	756	2.362
Veterinarians	55	2.365	-	-	8	2.424	-	-	63	2.373
Others	209	2.526	2	2.316	38	3.489	3	4.679	251	2.706
Average	870	2.248	26	1.855	147	3.316	28	4.318	1070	2.443
<u>ALL</u>										
Agronomists	673	2.286	30	3.463	117	3.556	27	4.479	847	2.573
Veterinarians	61	2.452	-	-	8	2.424	-	-	69	2.449
Others	250	2.821	3	2.992	46	3.304	3	4.679	302	2.915
Average	984	2.432	33	3.421	171	3.435	30	4.499	1218	2.653

earnings for bachelors and above the average earnings for Master's and doctors, or for technicians with some post-bachelor's training. As may be noticed, average earnings for this latter category are quite high, reflecting high level earnings by agronomists employed by firms. There are 6 of these with some post-bachelor's training short of a Master's degree, four of whom are executives. Since directors, managers and other executives in the private sector earn considerably more than technicians, an obvious distortion of the market for technical labor is introduced when executive's salaries are included (one, among the six reported a monthly salary of Cr\$19,350, almost 3 times the overall average salary) 9/. Thus, in analyzing data in Table 5, especially at the firm's level, the intermediate class between bachelor's and Master's should be ignored. As it may be seen from Table 5, the level of training seems to be highly correlated with salary level. The averages for all professionals show those with Master's degree earning 42% more than those with a bachelor's. The percent earnings differential of doctorates for bachelor's is 85% and over Master's degree is 31%. Among agronomists there is a similar earning pattern, the salary differential relative to the bachelor's being as follows: 56% for Master's and 96% for doctors; in the case of veterinarians, whose number in this sample is quite small, a professional with a Master's degree earned roughly as much as the bachelor's degree holder. In regard to other professionals' advanced training, a Master's degree represented 17% gain over the bachelor's and doctor's degree a 42% over the Master's degree.

The above results thus seem to confirm what was shown by the data on the academic employment, that is, the great influence of advance training on earnings. The data for the private sector point also to the large influence of hierarchy; if executives salaries were excluded, it is apparent from the data that the post-bachelor's training, other than in Master's or Ph.D. programs, would have very little, if any, positive effect on earnings. Therefore it seems not unreasonable to conclude from the above, notwithstanding the limitations of the data, that the market for advanced degree professionals both in agriculture and other areas is reasonably tight, thus providing evidence that a policy to gradually increase the stock of these professionals over the medium run is warranted.

9/ This aspect has been detected by Jose Pastore in his recently completed survey on the São Paulo industrial labor market "Profissionais e Especialistas no Mercado de Trabalho", IFE, São Paulo, April 1973, p. 11. Pastore's sample includes directors, managers and instructors whose salaries are in the range of Cr\$18.5-22.9 compared to technicians' salaries which were found to be Cr\$10.6-11.0.

C. Expertise and Training

In the present study measured, the relationship between the level of training and the level of activity performed by high-level professionals will be a good indicator of the tightness of the market for qualified labor and of demand training. If for example a substantial proportion of highly trained professionals were found in the performance of activities requiring an expertise considerably below that suggested by their training, a slackened market for their services would be indicated, implying that these professionals would be taking jobs that could be filled by less qualified personnel, and therefore, that their extra education was not necessary.

There are however considerable difficulties for an analysis of this type. The first is concerned with the concept of expertise required in a given function and the expertise implied by a given level of training. Second, many functions apparently of a lower level qualification are usually necessary for the performing of a higher level function or are closely associated with it, and it is not always possible to draw the dividing line. This analysis then requires that data be available in considerable detail, which is not the case at the moment. Available data are from the IDEG survey, the USAID returned participants' profiles and the GVF "Projeto Retorno", and are briefly reviewed in the following.

In the IDEG survey, participants were asked about the level of training, field of study, activity function actually performed (planning, supervision, administration and others - for non-academic organizations) and teaching, research extension and others - for academic organizations) and speciality performed (animal scientist, plant scientist, etc.). In the questionnaires made available to USAID, not more than 100 of the 1000 GVF technicians filled the function performed area, and of these only 100 had a degree and 24 Ph.D. holders. Among the 1000 technicians performing strictly technical functions, 10 reported as occupying a director's position and 20 as performing some other activity. Among the latter, 15 were in technical functions, 7 as director's positions. Thus, among the professionals with a master's degree the proportion of those not performing a strictly technical function is rather small. However, among the doctorates, the proportion of those occupying a director's position were to eliminate all the technical functions actually performed by personnel in a director's position. It is thus difficult to know the nature of the technical functions actually performed. It is not possible to derive definitive conclusions from the data available.

The GVF technicians' profiles of returned participants is being processed and analyzed. Information to be obtained, employer and position title. The available information, however, on function actually performed so far is limited to the following: works for an academic or non-academic organization and whether or not he holds a director's position. The processing of this information all trainees apparently would be expected to be available. However, one cannot tell the degree

to which the technical function performed is compatible with training (in a partial tabulation intended to cover academic training in the area of agriculturists, it was found a total of 124 technicians trained through FY-75, of which 37 at the Master's level and 27 at the Ph.D. level. Most of these were reported to be teaching).

The aspect of effective use of training explored by the "Projeto Retorno" survey was in terms of the returnee personal's evaluation of the work he was performing and his satisfaction with it. Of the 600 who answered this item, 89.9% had a permanent job, 68.7% felt they had a work compatible with their training and 45.2% said they were satisfied with the work performed. Data by area of specialization are presented in Table 6, from which it may be concluded that over 30% of the informers felt a lack of training-work compatibility, this percentage being smaller among specialized engineers and larger among agriculturists. Within those interviewed, the feeling about satisfaction with work performed is rather weak, as less than half declared satisfaction or very much satisfaction, although only 8% declared complete dissatisfaction. Since the "Projeto Retorno" refers to training abroad, these percentages may indicate more of an inadequacy of training to local conditions than a sub-utilization of training.

Summarizing up what was discussed above, the indicators available do not allow a complete examination of the relationship between training and work performed. Thus, for an assessment at this time of the market for the professionals that are the target of this program, the best information, though meager, is the earnings data. Obviously, the latter does not stand before a more severe criticism. But it does provide a first approximation of reality which in all probability will be confirmed by the total result from the complete survey and other studies anticipated under the program.

D. Impact of Program

1. Graduate Education and Agricultural Development

As analyzed in the foregoing sections has indicated, a major problem facing higher-agriculture education in Brazil is that the system is not producing the number of highly trained agricultural professionals needed for the development of Brazilian agriculture. The latter has greatly lagged behind income in Brazil's development. For example, Brazil is not realizing potential export earnings, because of the inability of the agricultural sector to respond without damaging internal consumption to a growing international market for several agri-products (meat and soybeans, to cite just two). Furthermore, social development is affected as a retarded agricultural growth means decreased agricultural income, with a serious detrimental effect on the welfare of large masses of the rural population. The insufficiency of highly trained manpower to service agriculture in research, planning, teaching, and also leadership, is certainly an important element in perpetuating this imbalance. It also contributes to weaken the statement of agriculture as a top development priority, when it comes to

TABLE 6

EVALUATION OF ACTUAL WORK BY AREA OF SPECIALIZATION (%)

<u>Specialization</u>	<u>Permanent jobs</u>	<u>Work compatible with training</u>	<u>Satisfied or very much satisfied with work performed</u>	<u>Dissatisfied or very much dissatisfied with work performed</u>
Agriculture	86.8	60.5	39.4	5.2
Engineering	88.3	67.4	48.8	9.3
Specialized Engineering	95.1	75.4	51.5	8.0
Biology	94.8	74.3	49.0	2.5
Administration	85.4	66.6	59.3	12.6
Education	87.0	74.1	35.4	3.2
Basic Sciences	93.7	67.1	42.1	3.0
Medicine	92.0	66.0	32.0	18.0
Languages	93.7	71.8	43.7	6.2
Social Sciences	89.3	65.3	43.9	12.2
Others	79.6	68.7	43.6	6.1
TOTAL	89.9%	68.5%	45.2%	8.4%

Source: Reports of the "Projeto Retorno" - FGV - Rio de Janeiro, 1971.

actual allocation of resources to this sector development.

There is a technological aspect associated with a deficient supply of highly trained agriculturists which cannot be overlooked. It is related to the fact that while Brazilian industry, like industry elsewhere in the developing world, could successfully rely on the importation of technology for its development, this has not been the case with agriculture, whose technology has come to be recognized as not being as suitable for direct transference as industrial technology. Importation of the latter brings with it readily usable know-how and applicable research results, which, in the case of agriculture has proved not to be so. Thus, to a considerable extent, advanced training requirements have not been as crucial for industrial development, at least until recently, as it has been for agricultural development. Therefore, any deficiencies that might exist in regard to the education system serving industry certainly are not as damaging to development as those affecting agricultural education. This sets graduate agricultural education as a priority in the development of graduate education in Brazil. Unfortunately, recognition of this fact is somewhat recent.

One main thrust of the loan program is to develop a self-sustained agriculture education system, to provide the Brazilian agriculture sector with top quality human capital required for its development. The market analysis undertaken in the preceding pages made it reasonably evident that this type of capital is largely demanded by the market. In terms of education economics, it is not unreasonable to expect that the benefits which will accrue from a program aimed at meeting this demand will certainly far exceed its costs. Other benefits will result in terms of educational efficiency and advantages of domestic versus foreign training.

Quality of Education

The program to be supported by this loan places heavy emphasis on improving educational quality. At the bachelor's level, an improved quality output will represent important benefits to result from an increased number of advanced degree holders who will be providing better teaching, thus improving quality. Through its planning and managerial aspects, a better assessment of the market will be wide possible. Thus it is possible that no increase in the growth of output at this level of education might take place, thereby freeing resources for other needy educational sectors or for further quality improvement. At the graduate level, increased quantity and improved quality of output, the program's major target, will greatly contribute to increase the problem solving capacity of the personnel serving agriculture. In addition, an increased supply of

highly trained agronomists and other agricultural professionals will be available for ensuring that the direct and indirect benefits expected from planned investment in research and extension can be realized.

3. Domestic Training and Training Abroad

Considerable advantages should accrue to Brazil in having a domestic graduate training program, thus reducing the reliance on foreign advanced training for top quality manpower development. The lack of data on the domestic graduate programs, many of which represent recent ventures, precludes a direct cost comparison at this time, but there is every reason to believe that over the medium to long run the costs associated with the domestic program will be far less than those associated with advanced foreign training. Actually, more efficient, thus less costly, domestic programs will in part be a direct result of the IDB loan which will finance external training and technical assistance directly related with program needs. Domestic programs certainly will be of more relevance to Brazilian environment than foreign training. Research associated with academic work will be done on Brazilian problems and themes, thus allowing more detailed consideration of regional and local peculiarities, which are of fundamental importance in the diagnosis of agricultural problems. The absence of the language problem will also be of relevance, as it can reduce the length of training required for earning a degree. Also, the development of domestic programs will permit more interaction between the academic and the non-academic communities. The conditions for research at the academic level will be improved and there should be considerable opportunity to make this research, and also teaching, more relevant to the potential users.

4. Planning and Coordination System

An essential aspect of the loan related program is the development and institutionalization of a system for planning and coordination of graduate education. This dimension of the program has been extensively discussed in the preceding sections.

Two important elements in this dimension might be recalled here. One refers to the provision of the analysis and studies which will permit a better definition of the system's education output; in both quantitative and qualitative terms. The second refers to the replication to the other education sectors of the best aspects of the program in agricultural science, which will greatly enlarge the value of benefits referred to above.

Section V - Financial Analysis

A. Financial Plan

1. U.S. Contribution

As indicated in the "Four-Year Summary of Costs and Sources of Financing" shown on Schedule I, the U.S. contribution to the project will be mainly for technical assistance at the Central and Graduate Level (50% of the total U.S. contribution will be for technical assistance) and for post-graduate degree training in the U.S. (representing 42% of total U.S. contribution). The remainder of the U.S. contribution is for short-term training in the United States and books and other learning materials to improve the current status of libraries in the various agricultural graduate schools.

It is anticipated that the program will include two AID loan financed technicians working at the Central Level for four years. These consultants will work with the Central Level in DAU. In addition, there will be a need for two man years of short-term consultant services. These services will more than likely be needed during the second, third, and fourth years of the program, giving the two previously mentioned technicians time to identify specific problem areas. There will also be a need for other full-time technicians to work at the Central Level. They will devote their efforts to university administration and planning in coordination with CESA, ABEAS and the Central Unit.

At the Graduate Center Level, technical assistance will be needed on both a long and short-term basis. The long-term consultants will be required to assist the six graduate centers in developing new graduate degree programs. It is anticipated that 27 man years of assistance will be needed at the six centers, beginning in the second year of the program. In addition, 32 man years will be needed at the Graduate Center Level to assist in planning new research programs, improving on-going programs and giving supplementary assistance to new program development. It is anticipated that these consultants will serve on a short-term basis.

The costs for all consultants as shown on the "Four-Year Summary of Costs and Sources of Financing" only include an estimate of the contract fees plus transportation and other related costs of sending a technician from the States.

All logistical support (in-country housing, transportation, etc.) of U.S. technicians will be supported by the GOB.

2. GOB Contribution

As noted above, the GOB contribution for the U.S. technical assistance will be for logistic support. MEC and ABEAS will also provide various support costs at the Central Level.

At the Graduate Center Level the GOB contribution will be mainly for logistic support of U.S. technicians and the maintenance of the Graduate Center staff. The most important single cost item at this level will be the hiring of an estimated 74 new teachers with M.S. degrees.

About 45% of the GOB contribution to the project will be directed toward the Undergraduate Level. The emphasis here will be for teacher training and the hiring of additional faculty members.

It should be noted that the GOB input estimates are the best that can be made prior to the development of detailed MEC/University plans. They are based on the judgement of MEC and ABEAS as to what future needs will be. Cost estimates were reviewed with MEC and ABEAS representatives using current monthly salary figures for personnel and historical educational cost data for training.

National Funding of Education

1. Federal Level

The Ministry of Education and Culture (MEC) is the primary agency through which Federal Funds flow into the education sector. However, the Federal Government's primary responsibility is for higher education, and education other than higher education is the responsibility of the states and municipalities. Nevertheless, MEC remains as the major source of funds for education in the states and municipalities.

In addition to MEC, other Ministries budget funds for education within their specialities, e.g. the Naval Academy is maintained by the Ministry of Navy; the Air Academy and the Institute of Aeronautics (engineering) are maintained by the Air Ministry; the Ministry of Foreign Affairs runs a school for diplomatic personnel, the Rio Branco Institute; and so on. These amounts, however are not significant in relation to total government education expenditure. However, the Ministry of Planning has budgeted increasing amounts, starting in 1970, which are made available for specific education projects developed and sponsored by MEC.

Schedule II shows education expenditures by year realized by MEC, Ministry of Planning and other ministries. The amounts are expressed at 1972 prices.

*Subject to further adjustment reflecting a four-year rather than the original five-year program.

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In addition to budgeted resources, funds for education are available from another category of sources. These are the following special funds:

- a) Salario Educaçao (Education Salary) which is levied from private and public entities and was instituted in 1964. The proceeds are transferred in equal portions to the states and municipalities, and to MEC. These proceeds must, by law, be used for fundamental level education.
- b) Federal Lottery Special Fund: 20% of the net proceeds must be used, by law, for education in general;
- c) Sporting Lottery: 30% of the net proceeds must be used for the Federal MOBREAL adult literacy program.

2. State Level

At the state level, education is the responsibility of state Secretaries of Education. Although the municipalities are independent government entities, they work closely with, and under the authority of, the state Secretaries of Education. Thus, despite the political distinction between states and municipalities, for practical purposes they should be treated as a consolidated unit within each state, since the municipalities are financially and technically dependent on the states and are integrated into the state development plans.

In addition to their own budget resources, the states receive funds in support of their education programs from MEC and from the Federal Government.

Federal funds, other than MEC, are transferred to state and municipal "Participation Funds". Under a 1970 Federal Law 20% of these funds must be applied to elementary and secondary education.

Schedule I shows GOB expenditures in education. The amounts shown for the states and municipalities also include funds received from Federal sources other than MEC, and the Federal expenditures include transfers of funds to the states. The Special Funds shown in the table are described earlier. The substantial growth in education expenditures by the states and municipalities is a reflection of the GOB's emphasis on the development of elementary education.

HIGHER AGRICULTURAL EDUCATION SYSTEM

SCHEDULE I

**FOURYEAR SUMMARY OF COSTS AND SOURCES
OF FINANCING
(000 Eliminated)**

	YEARS									
	US Contribution					GOB Contribution				
	1	2	3	4	Total	1	2	3	4	Total
CENTRAL LEVEL										
Technical assistance:										
Central administration and planning	\$ 46	\$ 46	\$ 46	\$ 46	\$ 184	\$11	\$11	\$12	\$12	\$ 46
Finance and management systems	46	46	46	46	184	11	12	12	12	47
Short-term technical assistance	-	20	20	40	80	-	5	5	10	20
University administration and planning	276	276	276	276	1,104	70	70	70	70	280
Total technical assistance costs	<u>\$368</u>	<u>\$388</u>	<u>\$388</u>	<u>\$408</u>	<u>\$1,552</u>	<u>\$92</u>	<u>\$98</u>	<u>\$99</u>	<u>\$104</u>	<u>\$393</u>
MEC:										
Personnel	\$ -	\$ -	\$ -	\$ -	\$ -	\$78	\$78	\$78	\$78	\$312
Travel Expenses	-	-	-	-	-	10	10	10	10	40
Office Supplies	-	-	-	-	-	6	6	7	7	26
Total MEC costs	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$94</u>	<u>\$94</u>	<u>\$95</u>	<u>\$95</u>	<u>\$378</u>
ABEAS:										
Materials and Supplies	\$ -	\$ -	\$ -	\$ -	\$ -	\$16	\$17	\$17	\$17	\$ 67
University Support Costs:										
Personnel	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57	\$ 57	\$ 58	\$ 58	\$ 230
Office Supplies	-	-	-	-	-	10	10	10	10	40
Travel Expenses	-	-	-	-	-	-16	17	17	17	67
Total University Support Costs	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ 43</u>	<u>\$ 84</u>	<u>\$ 85</u>	<u>\$ 85</u>	<u>\$ 337</u>
Total Central Level Costs - Forward	<u>\$368</u>	<u>\$388</u>	<u>\$388</u>	<u>\$408</u>	<u>\$1,552</u>	<u>\$285</u>	<u>\$293</u>	<u>\$296</u>	<u>\$301</u>	<u>\$1,175</u>

	YEARS									
	US Contribution					GOB Contribution				
	1	2	3	4	Total	1	2	3	4	Total
Central Level Costs Brought Forward	\$368	\$388	\$388	\$408	\$1,552	\$285	\$293	\$296	\$301	\$1,175
II GRADUATE CENTER LEVEL										
Technical Assistance:										
Long term	\$204	\$300	\$300	\$300	\$1,104	\$ 50	\$ 75	\$ 75	\$ 75	\$ 275
Short term	90	400	400	400	1,280	20	101	101	101	323
Total technical assistance costs	\$284	\$700	\$700	\$700	\$2,384	\$ 70	\$176	\$176	\$176	\$ 598
Training in U.S.:										
Masters level	\$ 40	\$120	\$150	\$ 140	\$ 450	\$ 1	\$ 6	\$ 8	\$ 8	\$ 25
PHD level	120	420	720	1,440	2,700	6	21	38	75	140
Short-term training	100	-	-	-	100	8	-	-	-	8
Total training costs	\$260	\$540	\$870	\$1,580	\$3,250	\$ 15	\$ 27	\$ 46	\$ 83	\$ 171
Training in Brazil - increase of 30 faculty to MS level and 12 to PHD level	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 56	\$ 56	\$ 56	\$112	\$ 280
Hiring of additional 74 faculty members at the MS level	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 81	\$270	\$522	\$666	\$1,539
Increase in full-time assignment of faculty	\$ -	\$ -	\$ -	\$ -	\$ -	\$125	\$125	\$125	\$125	\$ 500
Other Costs:										
Books, learning materials, etc	\$100	\$100	\$100	\$100	\$ 400	\$ -	\$ -	\$ -	\$ -	\$ -
Equipment	-	-	-	-	-	33	33	33	34	133
Office supplies	-	-	-	-	-	100	100	100	100	400
Total Other Costs	\$100	\$100	\$100	\$100	\$,400	\$133	\$133	\$133	\$134	\$ 533
Total Graduate Center Level Costs	\$644	\$1,340	\$1,670	\$2,380	\$6,034	\$480	\$787	\$1,058	\$1,296	\$3,621
Totals Carried Forward:	\$1,012	\$1,728	\$2,058	\$2,788	\$7,586	\$765	\$1,080	\$1,354	\$1,597	\$4,796

	US Contribution				YEARS					Total
	1	2	3	4	Total	1	2	3	4	
Totals Brought Forward	\$1,012	\$1,728	\$2,058	\$2,788	\$7,586	\$765	\$1,080	\$1,354	\$1,597	\$4,796
III UNDERGRADUATE LEVEL										
Technical assistance from graduate centers	\$ -	\$ -	\$ -	\$ -	\$ -	\$100	\$ 100	\$ 100	\$ 100	\$ 400
Training in Brazil										
112 MS level	\$ -	\$ -	\$ -	\$ -	\$ -	\$168	\$ 168	\$ 168	\$ 168	\$ 672
28 PHD level	-	-	-	-	-	58	58	58	58	232
100 refresher course	-	-	-	-	-	20	20	20	20	80
Total Training Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$246	\$ 246	\$ 246	\$ 246	\$ 984
Hiring of additional 60 faculty members at the MS level	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 81	\$ 216	\$ 405	\$ 540	\$1,242
Other Costs:										
Office supplies	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 83	\$ 83	\$ 83	\$ 84	\$ 333
Equipment and buildings	-	-	-	-	-	133	133	133	133	532
Total other costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$216	\$ 216	\$ 216	\$ 217	\$ 865
Total Undergraduate level costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$643	\$ 778	\$ 967	\$1,103	\$3,491
Total Program Costs	\$1,012	\$1,728	\$2,058	\$2,788	\$7,586	\$1,408	\$1,858	\$2,321	\$2,700	\$ 8,287

NOTE: Brazilian counterpart contribution has been converted to US\$ at the rate of 6 Brazilian Cruzeiros to 1 Dollar.

GOB EXPENDITURES IN EDUCATION

(Millions of Brazilian Cruzeiros at 1972 Prices)

YEAR	FEDERAL	STATES	MUNICIPALITIES	SPECIAL FUNDS	TOTAL
1965	1,732	2,571	294	106	4,703
1966	1,542	2,836	375	172	4,925
1967	1,436	3,416	497	151	5,500
1968	1,675	3,802	739	293	6,509
1969	1,952	4,594	793	362	7,701
1970	2,057	4,718	894	162	7,831
1971	2,022	5,393	834	286	8,535
1972	2,098	5,668	830	807	9,403

FEDERAL LEVEL EDUCATION EXPENDITURES

(in Billion of Brazilian Cruzeiros at 1972 Prices)

DESCRIPTION	1968	1969	1970	1971	1972 *
MEC	Cr\$1,509	Cr\$1,774	Cr\$1,684	Cr\$1,603	Cr\$1,652
Ministry of Planning	-	12	127	169	232
Other Federal	166	166	240	250	214
T O T A L	Cr\$1,675	Cr\$1,952	Cr\$2,051	Cr\$2,022	Cr\$2,098
MEC % of Total	90	91	82	79	79
MEC + Planning % Total	-	91	88	88	90

* Budgeted, not actual expenditures

Project ImplementationPreliminary Execution Plan

The following plan indicates the sequence of actions which must occur in order to meet initial conditions precedent and other covenants of the loan and proceed with the implementation of the project in a timely manner.

<u>Action</u>	<u>Target Date</u>
1. Loan Authorization	June, 1973
2. USAID/GOB Loan Negotiations	June/Aug. 1973
3. Sign Loan Agreement	(A) expected September 1973
4. Designation of MEC/DAU Central Administrative and Planning Unit	(A) + 1 month
5. Planning and Organizational Activities Related to Meeting Initial Set of Conditions Precedent.	(A) + 2 months
6. Contract Approvals and Execution for Central Level Technical Assistance and Begin Initial Participant Training Activities. ¹	(B) = (A) + 5 months

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Initial participant training will be defined as up to 10% of the total Masters and Ph.D. participant slots to be funded under the loan program. This limited amount of training will begin in advance of the approval of specific university development plans in order to prevent a hiatus in agricultural education participant training (grant funding due to expire December, 1973) and to even the flow of returning participants during the course of the loan program. Selection of participants and courses of study will be subject to USAID and DAU approval to ensure relevance with future program activities.

	<u>Action</u>	<u>Target Date</u>
7.	Planning and Organizational Activities Related to Meeting Second Set of Conditions Precedent (e.g. completion of a) plan for overall development of graduate agricultural education based on demand study results, b) manual establishing guidelines for university development plans, and c) plan for evaluation)	(B) + 4 months
8.	Preparation and Submission of University Development Plans	(B) + 5-7 months
9.	Commence Implementation of University Development Plans	(B) + 6 months.
10.	Joint Project Evaluation	(B) 12/24/36/ months plus terminal evaluation.

4. Contracting and Procurement Procedures

The loan project envisions basic contracts between the Ministry of Education and Culture and U.S. institutes or universities. The scope of work of these contracts shall be approved by AID in writing prior to their execution. Unless otherwise agreed to in writing, AID shall also approve in writing the contractors and contractors' personnel prior to the execution of such contracts. Commodities (textbooks, instructional material) procured under the loan shall have both their course and origin in countries included in Title 22 of the AID Geographic Code Book.

5. Loan Monitoring

Whenever possible, primary responsibility for administering the program will be left to MEC/DAU; USAID involvement is expected to be limited to the early phases of the program, i.e., until conditions precedent are met. Thereafter, USAID's role is expected to be principally one of monitoring loan performance. USAID monitoring will be the responsibility of a Project Committee chaired by USAID's Latin American Office. The Project Committee will periodically review relevant activities financed under the loan, and frequent contact will be maintained with the central administrative and planning staff of MEC and the technicians contracted to assist that unit

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in the model program administration. The central unit will submit to AID semi-annual reports covering all program activities and progress toward attainment of program objectives. USAID will review these reports to assess the progress of MEC/DAU and the participating universities in carrying out their respective commitments. Representatives of USAID will discuss the reports and suggest changes in implementation which might be beneficial to the program.

Although these progress reports will provide much information of a precise and objective nature, periodic reviews of program implementation will also be conducted jointly with the Borrower. It is anticipated that these reviews will be conducted at least quarterly during the first year of implementation and then be gradually decreased in frequency as program operations are refined. At the end of the first year of implementation, and every year thereafter, an annual review of the program will be made jointly with the Borrower. In order to maximize interchange, this review will follow in close sequence the execution of the evaluation model to be developed by the MEC/DAU central unit. It is expected that outside expert assistance will be required for in-depth evaluation, and if so the services of technicians sponsored by U.S. institutions or universities will be utilized.

Disbursement Procedures

1. AID's Standard Letter of Commitment

Since loan financing will be restricted to dollar costs, it is expected that financing of contracts between the Borrower, represented by MEC/DAU, and the U.S. institution providing the required technical assistance and off-shore procurement of certain instructional materials will be disbursed in accordance with the Standard Letter of Commitment, rather than Credit procedures.

2. Participant Costs

Participants to be trained in the U.S. will be funded through a letter of commitment at the beginning of each year of the program to MEC for the estimated cost of training for that year. MEC will then reimburse the particular U.S. institution from which the participant is receiving training. In the fourth year of the program, an estimate of the remaining training costs to be funded by AID will be made.

Local Costs

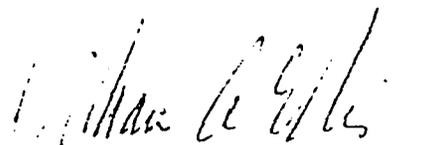
Cruzeiro costs of the program will be financed by the Borrower. These funds will be deposited in a special account of the FNDE (Fundo Nacional para o Desenvolvimento de Educação) from which releases for program activities will be made.

CERTIFICATION PURSUANT TO SECTION 611 (e)
OF THE FOREIGN ASSISTANCE ACT OF 1961,
AS AMENDED

Subject: BRAZIL - Capital Assistance

Having taken into account, among other things, the maintenance and utilization of projects in Brazil previously financed or assisted by the United States, I certify that in my judgement Brazil has the financial capability and the human resources to maintain and utilize effectively the proposed Loan to the Government of Brazil for higher agricultural education.

This judgement is based primarily on the facts developed in the Capital Assistance Paper for the proposed loan of US\$7.6 million which discusses in detail the capabilities of the Government of Brazil and finds that it possesses adequate financial and human resources capability to maintain and utilize the project effectively. The relationship between the proposed loan and prior U.S. assistance to higher agricultural education in Brazil is discussed in detail in the Capital Assistance Paper.



Director



Date

TRANSLATION

Letter No. 704.13513

June 8, 1973

Your Excellency
Dr. William A. Ellis
Minister, USAID/Brazil

Dear Minister:

As you know, one of the highest priorities of the Brazilian Government, defined by the Ministry of Education and Culture, in the area of higher education is the improvement and expansion of graduate education. Investment in this priority area is essential not only to produce the high-level manpower and research required to sustain Brazil's economic and social development but also as a means to improve the quality of the instructional staff at the undergraduate level.

The Ministry of Education and Culture has recently been studying the feasibility of alternative systems to stimulate the development of the Sector, as well as to improve the planning and coordination in this area, using the academic field approach.

Due to the experience already gained by the Department of University Affairs in the area of agricultural education, it is our opinion that a Program with the stated objectives can be developed in this area. On the basis of an analysis made by the Department of University Affairs of the technical and financial requirements for the improvement and expansion of graduate agricultural education, we hereby request a loan from USAID in the amount of \$9.4 million which together with an amount of cruzeiro funding equivalent to a little more than US\$10 million, as counterpart funds from MEC will constitute the financial scheme of this program.

The loan funds provided by USAID will be used to cover the dollar costs of technical assistance, staff training, instructional materials, and equipment. We judge each of these elements to be important to the development of a complete program.

We appreciate the assistance which USAID has already given us in this sector including the assistance given in developing this document prepared jointly with the technical staff of the Department of University Affairs. The Ministry of Agriculture and the Ministry of Planning will also participate in the process of planning this program.

Because of its importance for our educational development, the necessary counterpart funds will be included in the pluri-annual budget of the Government of Brazil.

We avail ourselves of this opportunity to renew to you the expression of our esteem and consideration.

(Signed)
Jarbas Gonçalves Passarinho
Minister of Education and
Culture

AVISO Nº 101/1973

Em 8 de junho de 1973

Senhor Ministro

Como é do conhecimento de Vossa Excelência uma das mais altas prioridades do Governo Brasileiro de finidas pelo Ministério da Educação e Cultura, na área do ensino superior, é a melhoria e expansão da educação' ao nível de pós-graduação. Investir neste setor é essencial não somente para formação de pessoal especializado de alto nível e para execução de pesquisas necessárias ao desenvolvimento econômico e social do Brasil, mais também um meio de melhorar a qualidade do corpo docente' em nível de graduação.

O Ministério da Educação e Cultura vem estudando, recentemente, a viabilidade de sistemas alternativos para estimular o desenvolvimento do setor, bem como para melhorar o planejamento e coordenação nessa área, atuando por campo de conhecimento.

A Sua Excelência o Senhor
Dr. WILLIAM A. ELLIS
DD. Ministro/USAID no Brasil

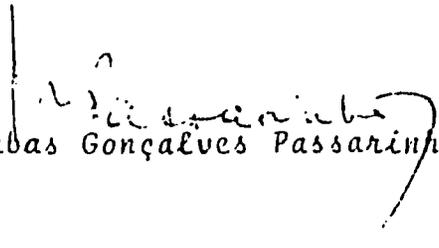
Devido à experiência já adquirida pelo Departamento de Assuntos Universitários, em Ciências Agrárias, somos de opinião que um programa com os referidos objetivos pode ser desenvolvido nesta área. Com base em análise feita pelo DAU, sobre necessidades técnicas e financeiras para a melhoria e expansão de pós-graduação em Ciências Agrárias, solicitamos através da presente, um empréstimo da USAID no valor de US\$ 9,4 milhões, os quais, juntamente com uma quantia em moeda nacional equivalente a pouco mais de US\$ 10 milhões, como contrapartida por parte do MEC, constituirão o esquema financeiro deste programa.

As verbas de empréstimos fornecidas pela USAID serão utilizadas para cobrir as despesas em dólares com assistência técnica, treinamento de pessoal, material de instrução e equipamento. Consideramos cada um destes elementos importantes para o desenvolvimento de um programa completo.

Apreciamos a assistência que a USAID já nos forneceu neste setor, incluindo a assistência dada ao desenvolvimento deste trabalho realizado com os técnicos do Departamento de Assuntos Universitários. O Ministério da Agricultura e o Ministério do Planejamento participarão, também, no processo de planejamento deste programa.

Vada sua importância para o nosso desenvolvimento educacional serão as verbas necessárias à contrapartida incluídas no orçamento plurianual do Governo Brasileiro.

Aproveitamos a oportunidade para renovar nossos protestos de estima e consideração.


Jarbas Gonçalves Passarinho



INTER-AMERICAN DEVELOPMENT BANK
WASHINGTON, D. C. 20577

ANNEX II
Exhibit 2
Page 1 of 3
CABLE ADDRESS:
INTAMBANC

September 19, 1972

Mr. Frederick W. Schieck
Assistant Director
Development Finance
Office of Development Resources
Agency for International Development
Washington, D. C.

Dear Mr. Schieck:

In response to your letter of 17 August, 1972, the Bank is not interested in financing the proposed loans to Brazil for higher agricultural education and a research management and production technology program.

With regard to the second loan for research management and production technology, the IDB has been in contact with AID officials to determine its possible impact on the science and technology loan currently under Bank consideration. As a result of various discussions, it has been tentatively determined that the two programs are complementary, in that the IDB program concentrates on improving the technical capability of Brazilian technological research institutions, while the AID program emphasizes the establishment of working links between these institutions and industry.

Sincerely,

Sidney Schmukler
Assistant Program Advisor



INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

1818 H Street, N.W., Washington, D. C. 20433, U.S.A.

Area Code 202 • Telephone • EXchange 3680 • C.A.B. All. Int. • INTBAFRAD

August 23, 1972

Mr. Frederick W. Schieck
Assistant Director
Development Finance
Office of Development Resources
Department of State
Agency for International Development
Washington, D. C. 20523

Dear Mr. Schieck:

This is to acknowledge your letter of August 17, 1972, relating to 2 loan proposals received by AID for respectively higher agricultural education and a research management and production technology program, both in Brazil. In answer to your query, I hereby inform that the World Bank is not interested in financing the above mentioned projects.

Sincerely yours,

Gunter K. Wiese
Deputy Director
South America Department

MINUTES

Export-Import Bank - AID Liaison Group

811 Vermont Avenue, N. W. - Room 1275

September 8, 1972

PRESENT: Export-Import Bank
Seymour Pollack

AID
Raymond Malley

The Eximbank representative stated that the Board of Directors had reviewed the following applications and decided to return them to AID for the reasons indicated. (See agenda of 9/8/72)

Honduras - Banco Nacional de Fomento (BNF) \$2 million
(Agricultural Credit & Storage)

This type of loan would seem entirely outside the scope of Eximbank operations and appears to be largely for the purpose of providing the BNF with working capital. Therefore Eximbank is expressing no interest in this proposal.

CABEI - Central American Bank for
Economic Integration \$10 million
(Manpower and Social Development Fund)

The Bank is returning this application to AID since most of the loan funds will be used for local cost financing.

✓ Brazil - Government of the State
of Sao Paulo \$25 million
(Research Management and
Production Technology
Program)

The Bank is expressing no interest in this loan proposal since concessionary financing of technical and other services are required to make this project feasible.

✓ Brazil - Ministry of Education
Government of Brazil \$14 million to
(Higher Agricultural \$16 million
Education)

Since concessionary repayment terms are necessary the Bank is returning this proposal to AID.

- 3) Increasing the public's role in the developmental process.

Brazil has encouraged an increased public role in the developmental process by its very successful tax incentive programs to encourage private savings and investment.

- 4) a. Allocating available budget resources to development.

Brazil is allocating large amounts of budget resources to development.

- b. Diverting such resources for unnecessary military expenditure and intervention in affairs of other free independent nations.
(See also Item no. 17.)

Brazil is spending about 2.3 percent of its GNP for defense. In 1971 this was about US\$1.05 billion. This is a substantial amount but not excessive in view of the special defense burdens created by long borders (4,600 miles coast and 8,700 miles of land frontier) and a vast sparsely populated interior. Defense Agency budgets include expenditures of a non-military nature for such things as subsidies to civilian airlines, civilian airport construction, maintenance of flight control and communications and mail delivery to remote areas. Identifiable items of this kind approach 10 percent of Defense Agency budgets. Brazil is not intervening in the affairs of other nations.

- 5) Willing to contribute funds to the project or program.

See the Financial Analysis section of the paper for a discussion of Brazil's contribution.

- 6) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.

Although progress toward a return to democratic government still is hindered by the military's determination to hold on to Revolutionary leadership, state legislatures elected Governors from among the candidates either selected or approved by the President. Elections for the national Congress

and Senate were held in November 1970 after preliminary screening process. Cassations, the stripping of political rights for ten years and the firing from government jobs or deprivation of elected office, continue sporadically. All the State legislatures have been reopened, membership altered, of course, by cassations. Municipal elections continue to be held. In October 1969 the Federal Congress reopened after having been closed by former President Costa e Silva for ten months. At the same time the Constitution was amended, with Congressional ratification, to strengthen the President's powers. Although censorship still exists and new laws precensoring for pornography have been issued, a certain latitude in the press and in expression is allowed insofar as fundamental concepts of the Revolution are not challenged nor articles published which lend support to subversives. On the other hand, there have been incidences of police intimidation of individual journalists.

The GOB appears convinced that private enterprise with government assistance will keep the economy growing at the same rapid rate of the past several years. Outside the government there is some concern expressed at the extent of U.S. investment in certain sectors and at amount of foreign profit remittances.

- 7) Adhering to the principles of the Act of Bogota and Charter of Punta Del Este.

Brazil is adhering to these principles.

- 8) Attempting to repatriate capital invested in other countries by its own citizens.

Brazil's efforts to encourage investment, promote rapid economic growth and reduce the rate of inflation contribute to the return of capital invested in other countries by its citizens.

- 9) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

Since assuming power President Medici has voiced concern for the desquilibrium in standards of living among Brazilians of different regions and classes. GOB has embarked on significantly needed land reform projects.

B. Are above factors taken into account in the furnishing of the subject assistance?

The above factors have been taken into account in recommending approval of this loan.

Treatment of U.S. Citizens

2) FAA §. 620 (c). If assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?

Brazil is not known to be so indebted.

3) FAA §. 620 (c) (1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?

No such action has been taken.

4) FAA §. 620(o); Fishermen's Protective Act. §. 5. If a country has seized, or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters.

No case of seizure, penalty or sanction against U.S. fishing vessel is known to exist.

a. has any deduction required by Fisherman's Protective Act been made?

Not applicable.

b. has complete denial of assistance been considered by AID Administrator?

Not Applicable.

Relations with U.S. Government and Other Nations

- 5) FAA §. 620 (d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

Not applicable.

- 6) FAA §. 620 (j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction by mob action, of U.S. property?

Brazil has not permitted such acts.

- 7) FAA §. 620 (l). If the country has failed to institute the investment guaranty program for the specific risks of expropriations, in convertibility or confiscation, has the AID administration within the past year considered denying assistance to such government for this reason?

Brazil has actively instituted a guaranty program.

- 8) FAA §. 620 (c). Is the government of the recipient country in default on interest or principal of any AID loan to the country?

No such default exists.

- 9) FAA §. 620 (t). Has the country severed diplomatic relations with the U.S.? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?

Brazil has not severed relations with the U.S.

- 10) FAA §. 620 (u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearage taken into account by the AID Administrator in determining the current AID Operating Year Budget?

Brazil is meeting its U.N. obligations.

- 11) FAA §. 620 (a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba?

Brazil does not furnish assistance to the present Government of Cuba. Brazil has taken appropriate steps to prevent ships or aircraft under its registry from engaging in any Cuban trade.

- 12) FAA §. 620 (b). If assistance is to a government, has Secretary of State determined that it is not controlled by the international Communist movement.

The Secretary of State has determined that Brazil is not controlled by the International communist movement.

- 13) FAA §. 620 (f). Is recipient country a Communist country?

No.

- 14) FAA §. 620 (i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the U.S. or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?

No.

- 15) FAA §. 620 (n). Does recipient country furnish goods to North Viet-Nam or permit ships or aircraft under its flag to carry cargoes to or from North Viet-Nam?

Brazil does not traffic or knowingly permit trafficking with North Viet-Nam.

- 16) FAA §. 481. Has the government of recipient country failed to take adequate steps to prevent narcotic drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?

The Government of Brazil is taking adequate steps to prevent narcotic drugs and other controlled substances from being sold illegally.

Military Expenditures

- 17) FAA §. 620 (s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points to be coordinated with PPC/RC).

Expenditures for military purposes are about 17 percent of total central government expenditures, or about 7.0 percent of total public sector expenditures including states and municipal governments, (estimates for 1971).

Brazil's foreign exchange disbursements for military equipment are projected to increase from \$20 million in 1967 to \$58 million in 1973. These expenditures would range from 1.19% of total imports (defined as goods plus net services) in 1967 to 1.85% in 1973. Brazil's foreign exchange reserves were at about 3.5 billion at the end of October 1972. For about 10 years (1955-1965) Brazil bought little military equipment. A re-equipment and modernization program now underway to improve efficiency in the defense establishment by replacing aged and obsolete equipment will increase expenditures for equipment, but will increase overall military expenditures only slightly.

CONDITIONS OF THE LOAN

General Soundness

- 18) FAA §. 201 (d). Information and conclusion on reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.

The terms of the proposed loan are legal under both U.S. and Brazilian laws, and are considered reasonable.

- 19) FAA §. 251 (b) (2); §.251 (e). Information and conclusion on activity's economic and technical soundness. If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner.

This project is considered to be economically and technically sound. Application has been submitted by the Government which includes assurances that the funds will be used in an economically and technically sound manner.

- 20) FAA §. 251 (b). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects.

Brazil is considered able to repay the proposed loan.

- 21) FAA §. 611 (a) (1). Prior to signing of loan will there be
(a) engineering, financial, and other plans necessary to carry out the assistance and
(b) a reasonably firm estimate of the cost to the U.S. of the assistance?

Necessary technical and financial planning has been completed. A reasonable firm estimate of the costs of the loan is presented in Section V.

- 22) FAA §. 611 (a) (2). If further legislative action is required within recipient country what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishments of purposes of loan?

No legislation is required.

- 23) FAA §. 611 (e). If loan is for capital assistance, and all U.S. assistance to project now exceeds \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?

Yes. See the Director's Certification in Annex I.

- 24) FAA §. 251 (b). Information and conclusion on availability of financing from other free-world sources, including private source within the United States.

See Summary and Recommendations Section.

Loan's Relationship to Achievement of Country and Regional Goals.

- 25) FAA §. 207; §. 251 (a). Extent to which assistance reflects appropriate emphasis on: (a) encouraging development of democratic, economic, political and social institutions; (b) self-help in meeting the country's food needs; (c) improving availability of trained manpower in the country; (d) programs designed to meet the country's health needs; or (e) other important

areas of economic, political, and social development, including industry, free labor unions, cooperatives and voluntary agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws.

- (a) The loan will encourage the development of educational institutions.
- (b) This is one of the ancillary purposes of this loan.
- (c) This project includes a substantial training component which aims to increase the availability of trained agricultural manpower in Brazil.
- (d) Not applicable.
- (e) The contribution of this project to the economic development of Brazil is discussed in Section IV.

26) FAA §. 209. Is project susceptible of execution as part of regional project? If so why is project so executed?

Project is not a regional project. In the long run it is planned that project will be source of country-wide use.

27) FAA §. 251 (b) (3). Information and conclusion on activity's relationship to, and consistent with, other development activities, and its contribution to realizable long-range objectives.

See Section I, Overview.

28) FAA §. 251 (b) (7). Information and conclusion on whether or not the activity to be financed will contribute to the achievement of self-sustaining growth.

This project is responding to the creation of self-sustaining growth through developing Brazilian institutions which are designed to carry on activities after the U.S. portion of this program has been completed.

- 29) FAA §. 281 (a). Describe extent to which the loan will contribute to the objective of assuring maximum participation in the task of economic development on the part of the people of the country, through the encouragement of democratic, private, and local governmental institutions.

The objectives of this program are coincidental with those set forth in FAA Section 281 (a) in that this program will strengthen both private and governmental institutions and facilitate the flow of information coming therefrom which is essential to sustained economic development in Brazil.

- 30) FAA §. 281 (b). Describe extent to which program recognizes the particular needs, desires, and capabilities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

The program recognizes the great need of developing the country's scientific and agricultural resources to encourage both private and public institutional development for the continued economic development of the country. The objectives are therefore coincidental with those outlined in FAA Section 281 (b).

- 31) FAA §. 601 (a). Information and conclusions whether loan will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; and (f) strengthen free labor unions.

(a) Not directly applicable;

(b) Not directly applicable;

(c) Not applicable;

(d) Not applicable;

(e) Improved technical efficiency in agriculture, industry and commerce can be concomitant results of this project.

(f) Not applicable.

- 32) FAA §. 619. If assistance is for newly independent country; is it furnished through multilateral organizations or plans to the maximum extent appropriate?

Not applicable.

- 33) FAA §. 251 (b). Information and conclusion on whether the activity is consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress in its annual review of national development activities.

The loan is consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress in its latest annual review. The project will help Brazil to improve the strengthening of indigenous capabilities to transfer technical skills.

- 34) FAA §. 251 (g). Information and conclusion on use of loan to assist in promoting the cooperative movement in Latin America.

Not applicable.

- 35) FAA §. 209; §. 251 (b) (8). Information and conclusion whether assistance will encourage regional development programs, and contribute to the economic and political integration of Latin America.

Not applicable.

Loan's Effect on U.S. and A.I.D. Program

- 36) FAA §. 251 (b) (4); §. 102. Information and conclusion on possible effects of loan on U.S. economy, with special references to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving the U.S. balance of payments position.

Not applicable.

- 37) FAA §. 601 (b). Information and conclusion on how the loan will encourage U.S. private trade and investment abroad and how it will encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

Not applicable.

- 38) FAA §. 601 (d). If a capital project, are engineering and professional services of U.S. firms and their affiliates used to the maximum extent consistent with the national interest?

Not applicable

- 39) FAA §. 602. Information and conclusion whether U.S. small business will participate equitably in the furnishing of goods and services financed by the loan.

U.S. small business will have an opportunity to furnish goods. Services for the most part will come from universities and foundations.

- 40) FAA §. 620 (h). Will the loan promote or assist the foreign aid projects or activities of the Communist-Bloc countries?

No.

- 41) FAA §. 621. If Technical Assistance is financed by the loan, information and conclusion whether such assistance will be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis. If the facilities of other Federal agencies will be utilized, information and conclusion on whether they are particularly suitable, are not competitive with private enterprise, and can be made available without undue interference with domestic programs.

The technical assistance to be financed under this loan will be, for all practical purposes, furnished by U.S. universities and foundations.

- 42) FAA §. 252 (a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use for private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources.

None of the loan money will be going directly to private enterprise. For a description of the program and the use of loan funds see Section III, Analysis of Program and AID Project and Section V, Financial Analysis.

Loan's Compliance with Specific Requirements

43) FAA §. 201 (d). Is interest rate of loan at least 2% per annum during grace period and at least 3% per annum thereafter?

Yes.

44) FAA §. 608 (a). Information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items.

The Loan Agreement will provide that the Borrower will procure U.S. Government-owned excess property to the maximum extent practical.

45) FAA §. 604 (a). What provision is made to prevent financing commodity procurement in bulk at prices higher than adjusted U.S. market prices?

Not applicable.

47) FAA §. 604 (d). If the cooperating country discriminates against U.S. marine insurance companies, will loan agreement require that marine insurance be placed in the United States on commodities financed by the Loan?

Yes.

48) FAA §. 604 (e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?

Not applicable.

49) FAA §. 611 (b); App. §. 101. If loan finances water or water-related land resource construction project or program, is there a benefit-cost computation made, insofar as practicable, in accordance with the procedures set forth in the Memorandum of the President dated May 15, 1962?

Not applicable.

50) FAA §. 611 (c). If contracts for construction are to be financed, what provision will be made that they be let on a competitive basis to maximum extent practicable?

Not applicable.

51) FAA §. 620 (g). What provision is there against use of subject assistance to compensate owners for expropriated or nationalized property?

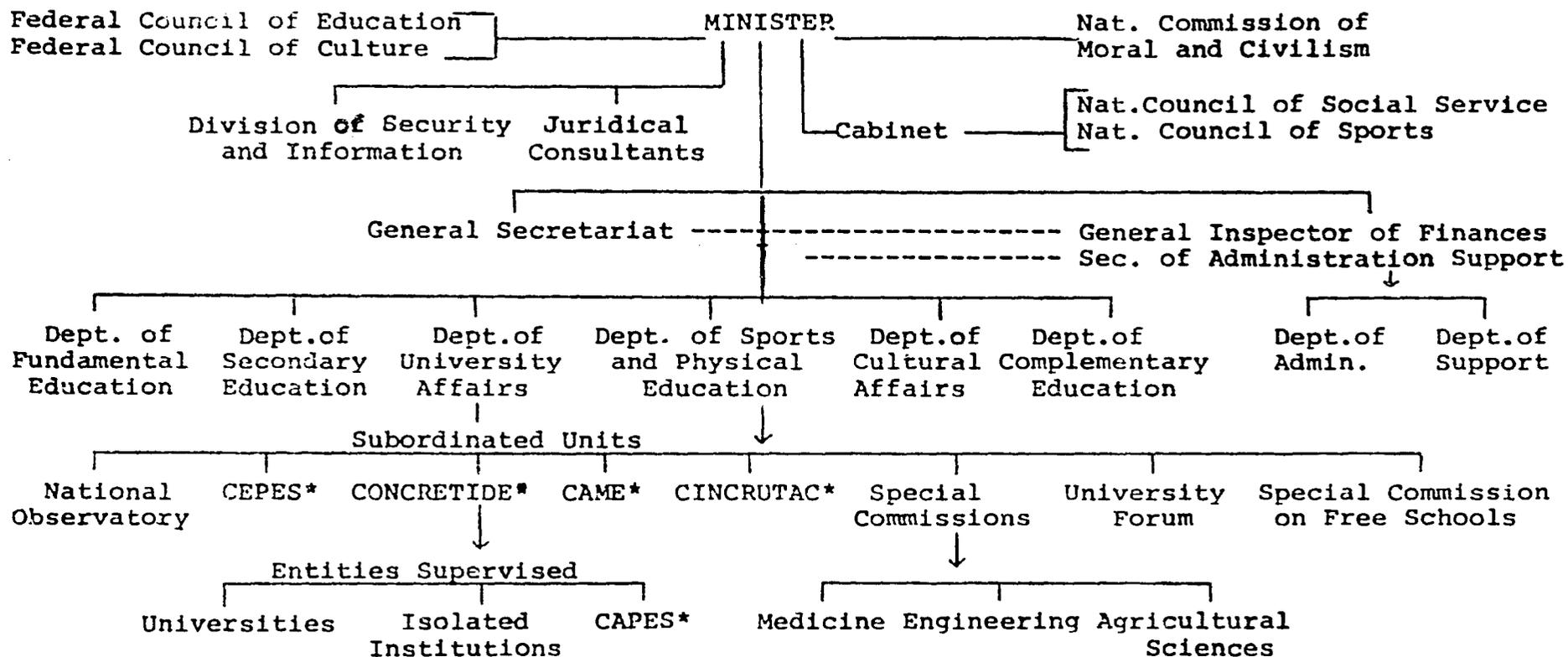
The loan agreement will not permit such use.

- 52) FAA §. 612 (b); §. 636 (h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the United States are utilized to meet the cost of contractual and other services.
- The borrower is providing all local currency costs of the project. The financial analysis section lists local currency contributions.
- 53) App. §. 104. Will any loan funds be used to pay pensions, etc for military personnel?
No.
- 54) App. §. 106. If loan is for capital project, is there provision for AID approval for all contractors and contract terms?
The loan is not for a capital project.
- 55) App. §. 108. Will any loan funds be used to pay U.N. assessments?
No.
- 56) App. §. 109. Compliance with regulations on employment of U.S. and local personnel for funds obligated after April 30, 1964 (AID Regulation 7).
Not applicable.
- 57) FAA §. 636 (i). Will any loan funds be used to finance purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States, or any guaranty of such a transaction?
No.
- 58) App. §. 501. Will any loan funds be used for publicity or propaganda purposes within the United States not authorized by the Congress?
No.
- 59) FAA §. 620 (k). If construction of productive enterprise, will aggregate value of assistance to be furnished by the United States exceed \$100 million?
Not applicable.
- 60) FAA §, 612 (d). Does the United States own excess foreign currency and, if so, what arrangements have been made for its release?
Not applicable.
- 61) MMA §. 901 (b). Compliance with requirements that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed with funds made available under this loan shall be transported on privately owned U.S. flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.
The Loan Agreement shall make such provision.

LOGICAL FRAMEWORK MATRIX

Summary	Objectively Verifiable Indicators	Important Assumptions
<p>Improved planning and coordination of the Brazilian graduate education system.</p>	<p>A.1. Measurement of Total Achievement Procedure developed and used permit: 1. Identification of output required of graduate education system. 2. Identification of most cost/effective mix of inputs to achieve those outputs. 3. Improved system of financing those inputs. 4. Development of an evaluation system linked into decision making process.</p>	<p>A.3. (as related to inputs) Planning and coordination are, in fact, the principal bottlenecks in Brazilian graduate education.</p>
<p>B.1. Purpose 1. The creation of an effective mechanism for improved planning and coordination of graduate education in agriculture. 2. Improved planning and management at/selected agricultural education centers. 3. Expanded and improved graduate programs in agriculture on a selected basis as determined by need. 4. Expanded interuniversity assistance program to include the six participating graduate centers. 5. Improvement of selected undergraduate programs in agricultural education. (at least 6.)</p>	<p>B.2. (as related to purpose) 1. MEC will have established, through working with the mechanism a system for making alternative investment decisions in graduate education 2. A regenerative Brazilian agricultural education system. 3. Sufficient agricultural M.S. and Ph.D. graduates are being graduated in Brazil to reduce or eliminate its dependency on graduate degree training abroad.</p>	<p>B.3. (as related to purpose) 1. Communications between central, graduate and undergraduate levels will be facilitated. 2. GOB general acceptance of the program purposes. 3. Agriculture is a valid discipline area in which to carry out the program concept. 4. Graduate centers will really commit themselves to assisting less developed undergraduate schools.</p>
<p>C.1. Outputs 1. Central Level a) An effective central administrative and planning unit in DAU. 2. Graduate Level a) Effective university planning structure and plans. b) Successful administration, implementation & evaluation of graduate program planning. c) Increased capacity to give assistance to less developed schools between 6 graduate and 6 undergraduate schools d) Unrestricted university libraries e) Undergraduate Level a) Improved planning structure and output. b) Strong practical relationship w/ assist.univ</p>	<p>C.2. Output Indicators 1. Central Level a) Unit clearly exists and is functioning by loan agreement plus 2 months. b) Existence and proper use of planning manual and studies which provide rational, pragmatic planning parameters for graduate program and development, T.A. inputs and evaluation. 2. Graduate Level a) Acceptance of university plans by central unit. b) Graduate programs are being developed according to plans & are beginning to fulfill demand as identified. c) Assistance, planning and implementation is effective as shown by evaluation. d) Libraries are evaluated as reasonably sufficient for information needs. 3. Undergraduate Level a) Specific identifiable plans. b) Successful assistance relationship in terms of program and staff improvement as determined by evaluation.</p>	<p>C.3. (as related to outputs) 1. Effective communications can exist between 3 levels of project activity. 2. The establishment of pragmatic, integrated planning mechanism is possible. 3. The program in agriculture will be of sufficient size as to be valid experimental experience for MEC. 4. Strengthening undergraduate schools utilizing internal assistance is a valid endeavor.</p>
<p>D.1. Inputs A. USAID 1. T.A. a) Central Management and Operation Level. b) Graduate Centers 2. Training: a) Graduate Centers b) Central Management Level 3. Commodities B. GOB 1. Central 2. Graduate Centers 3. Undergraduate Level</p>	<p>D.2. Input Schedule A. USAID 1. T.A. (Total \$2 m/y) a) - 2 long term x 4 years ea. to work with DAU, AEEAS & MEC - 6 long term x 2 years ea. to work in 6 universities (2/m/y) - 2 man years of short term services in specific problem areas b) - 1 long term at six univ. for 4 yrs. ea. (24 m/y) total to work in graduate program development. - 3 short term to assist in graduate program implementation. 2. Training a) - 12 MS scholarships - 12 Ph.D. 90 scholarships - 24 short-term scholarships - 8 short term 3. Commodities - \$400,000 of publications and learning materials. B. GOB 1. Local costs of U.S. technicians and international transportation of participants. - Administrative costs (personnel, travel, supplies, etc.) of central level operations. - 12 Ph.D. scholarships in Brazil to upgrade current staff in graduate centers. - Addition of 74 new MS level staff at graduate centers. * Increase of full-time staff. * Increased financing for equipment, materials, & supplies. 3. Full financing for six assistance partnerships T.A. and logistic. - Training for "assisted" staff - i.e. "especialização", 12 MS, 25 Ph.D. - 60 additional MS level staff at 6 "assisted" schools - Adequate equipment and materials for "assisted"</p>	<p>D.3. (as related to inputs) 1. Both U.S. and GOB TA inputs are sufficient to attain outputs. 2. MS level individuals will be available for appointment in 134 new teaching positions to be opened. 3. Returned participants will remain in jobs planned for them. 4. U.S. technicians will be able to reasonably participate in Ministerial planning decisions. 5. Limited T.A. and commodities will be able to have a long term positive effect on university libraries. graduate centers. in graduate centers.</p>

MINISTRY OF EDUCATION AND CULTURE (MEC)



* - CEPES - Special Commission for the Execution of the Plan for Improvement and Expansion of Higher Education.

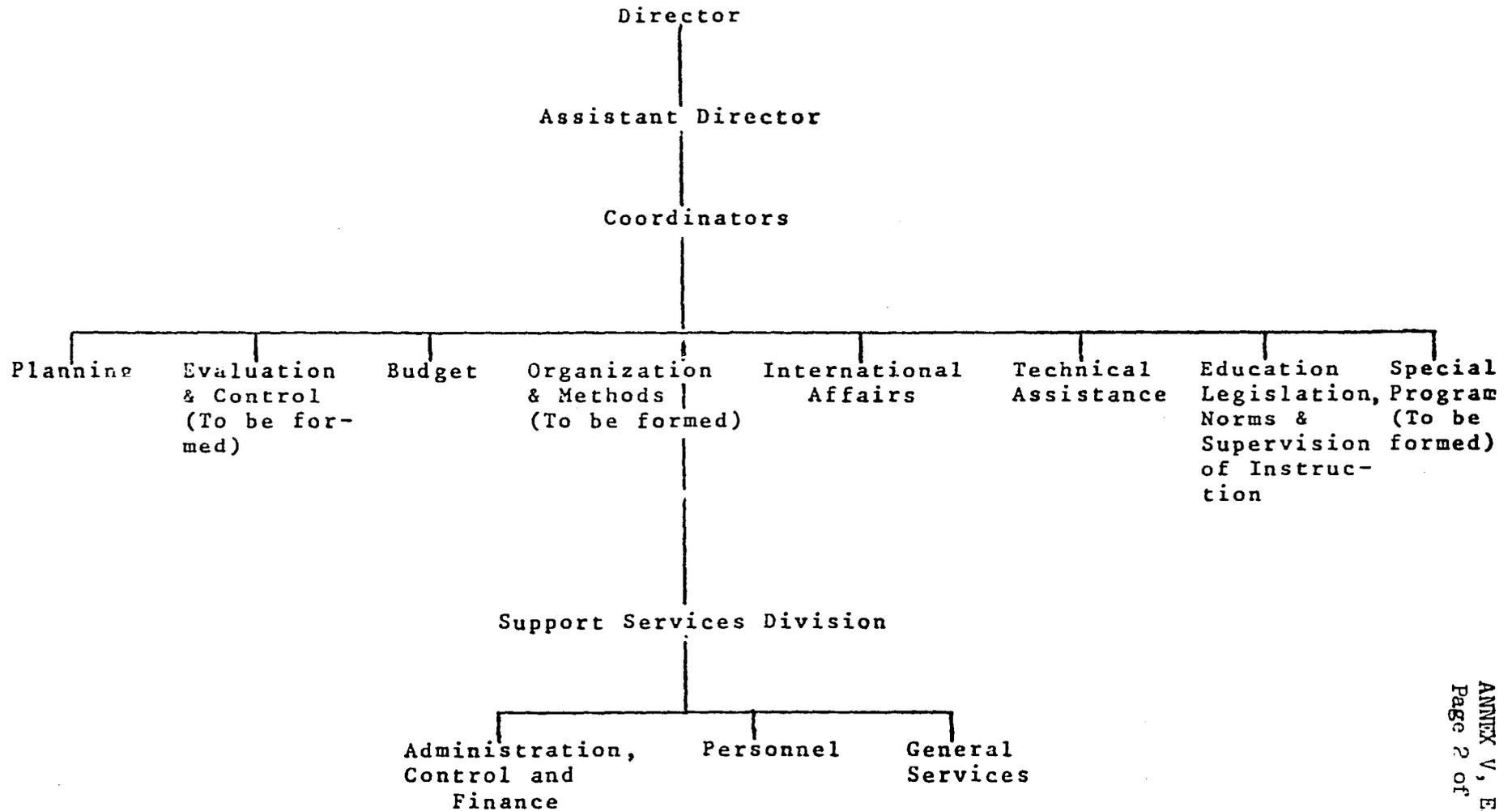
CONCRETIDE - Coordinating Commission for Admin. of Full-time Teaching and Exclusive Dedication by Professors.

CAME - Campaign for the Formulation of Meteorologists.

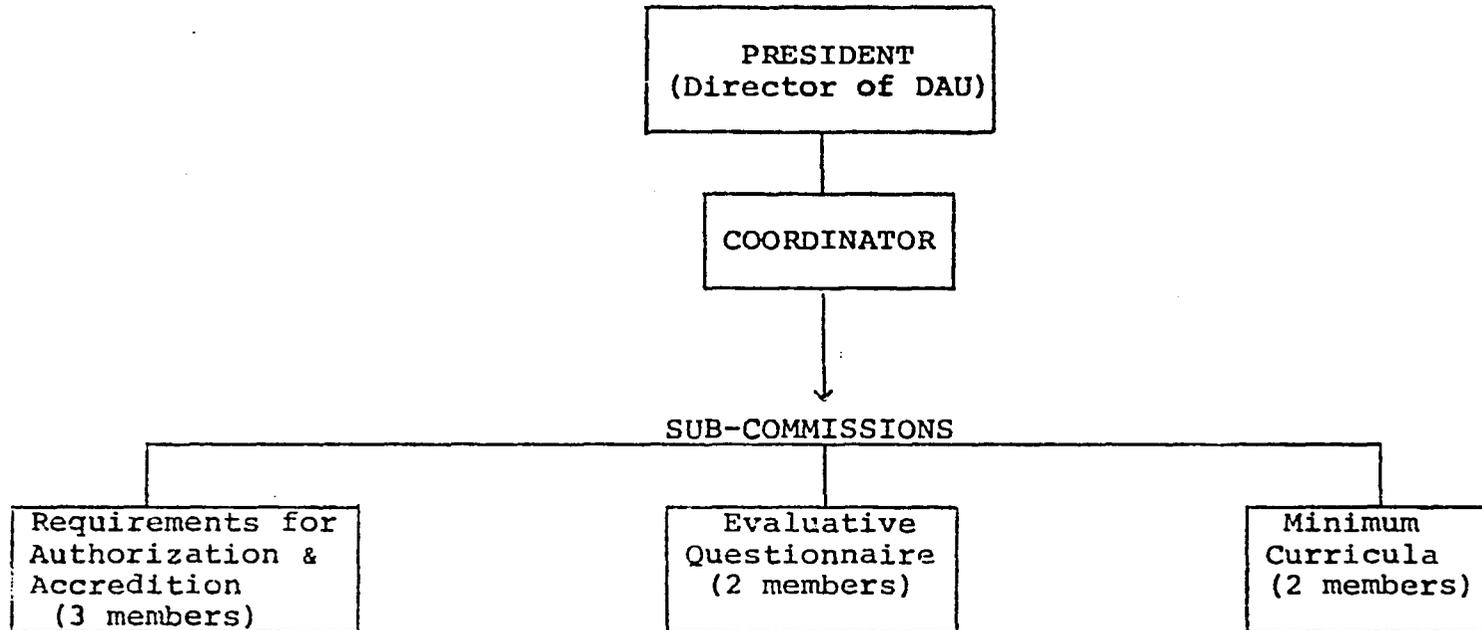
CINCRUTAC - Commission for the Integration of Rural University Centers of Community Training and Action.

CAPES - Coordination of Improvement of High Level Personnel.

DEPARTMENT OF UNIVERSITY AFFAIRS (DAU)

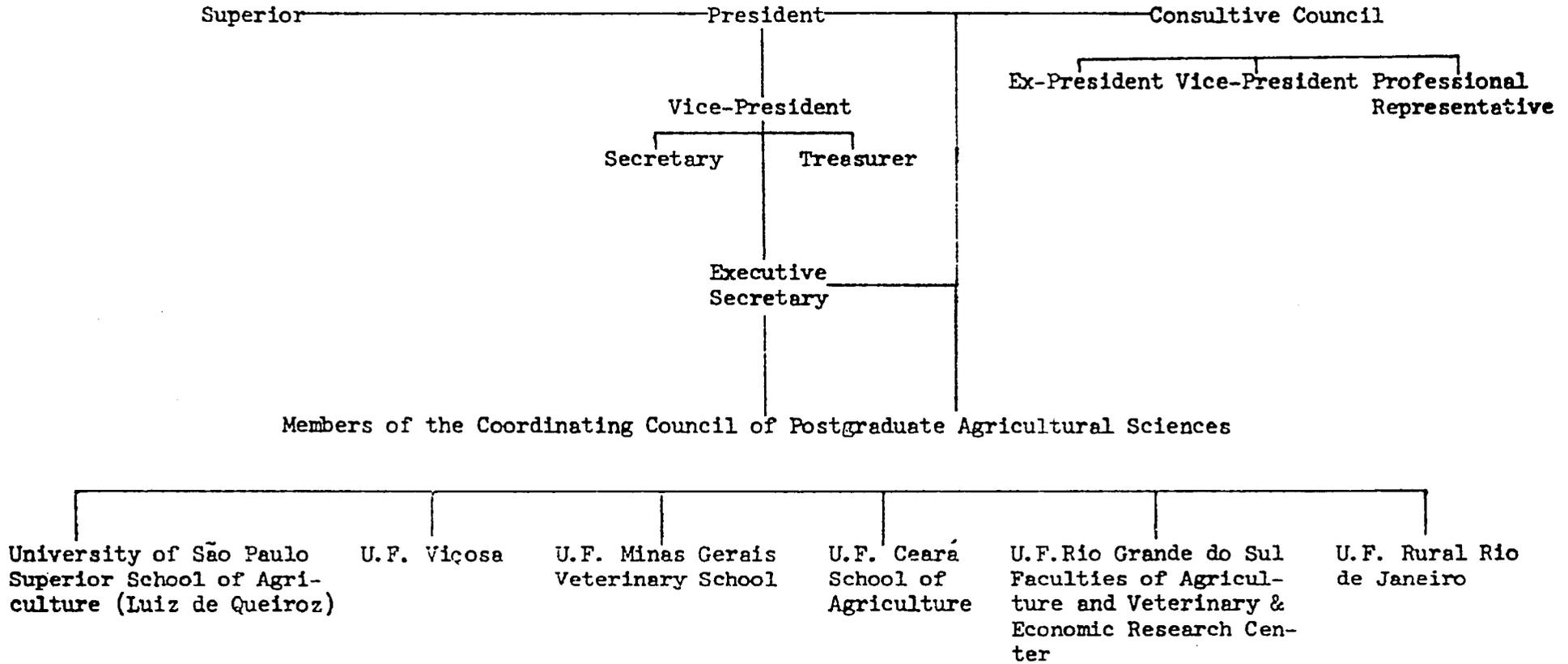


EDUCATION COMMISSION ON AGRICULTURAL SCIENCES (CECA)

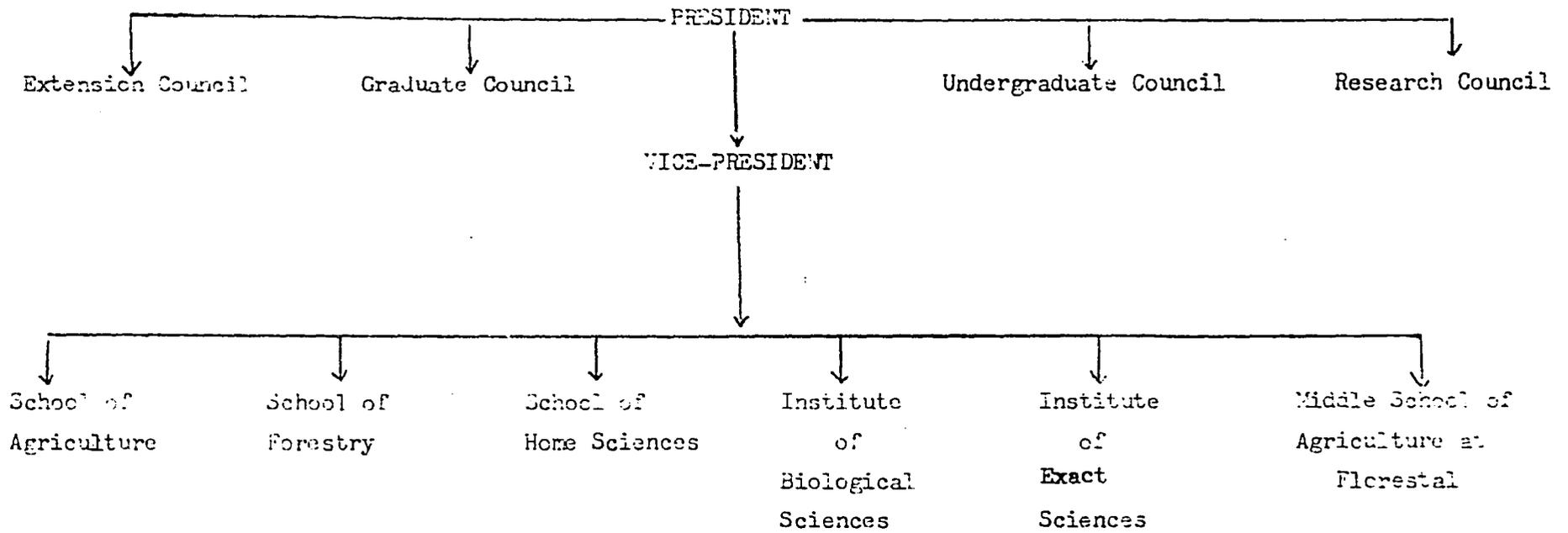


1/- Sub-commissions are temporary sub-units to deal with specific areas of concern and will disband as action in these areas is undertaken.

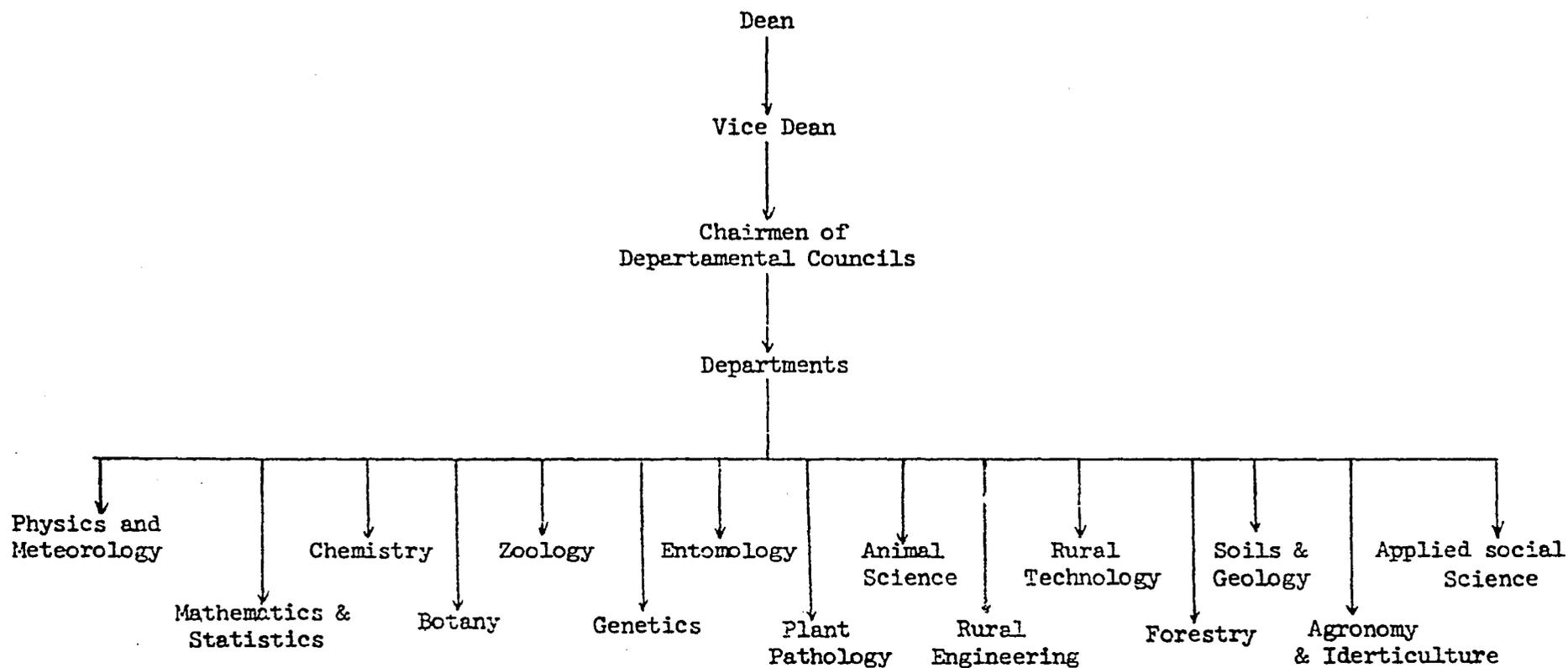
BRAZILIAN ASSOCIATION OF HIGHER AGRICULTURAL EDUCATION (ABEAS)



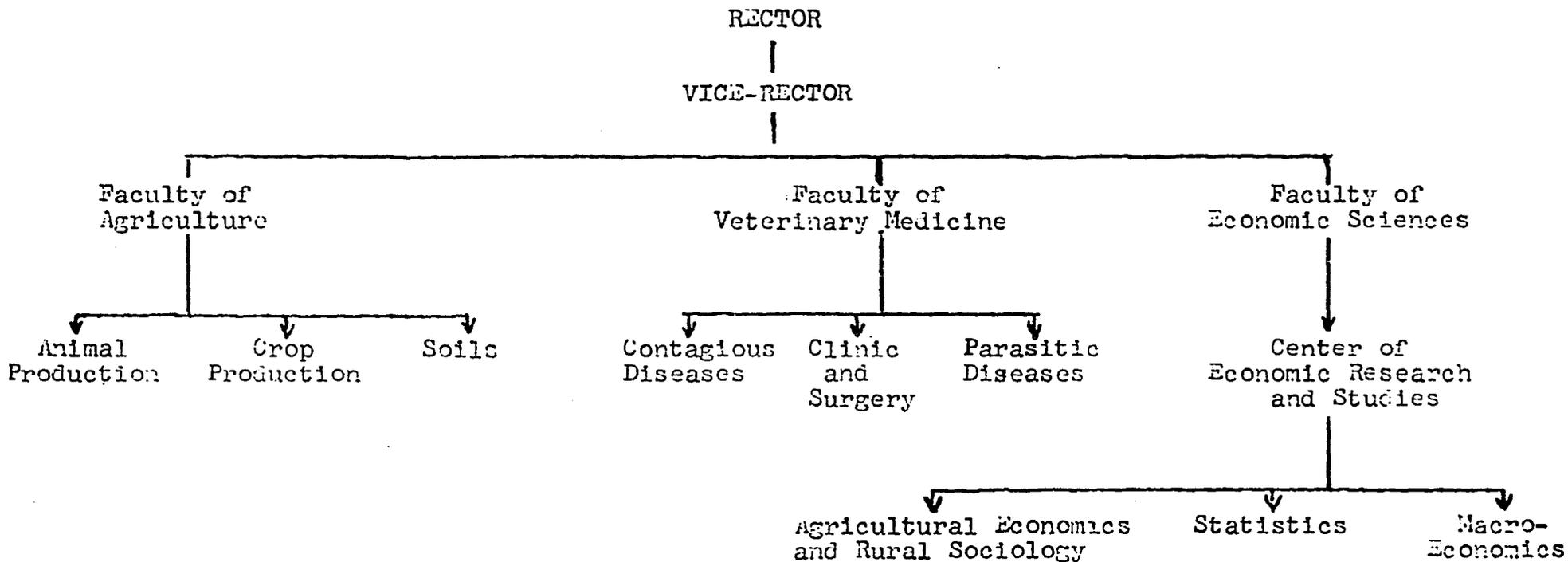
FEDERAL UNIVERSITY OF VIÇOSA (1973)



HIGHER SCHOOL OF AGRICULTURE LUIZ DE QUEIROZ (ESALQ) OF THE
UNIVERSITY OF SAO PAULO



FEDERAL UNIVERSITY OF RIO GRANDE DO SUL
Faculties of Agriculture, Veterinary and Agricultural Economics



FEDERAL UNIVERSITY OF CEARÁ

SCHOOL OF AGRICULTURE

(EAUFC)

DIRECTOR

Zootechnic
Institute

Institute of Rural
Technology

VICE DIRECTOR

COORDINATORS

Arizona Project

Assist. Coordinator

Research and
Graduate
Programs

Undergraduate
Instruction

Extension

DEPARTMENT HEADS

Agricultural
Economics

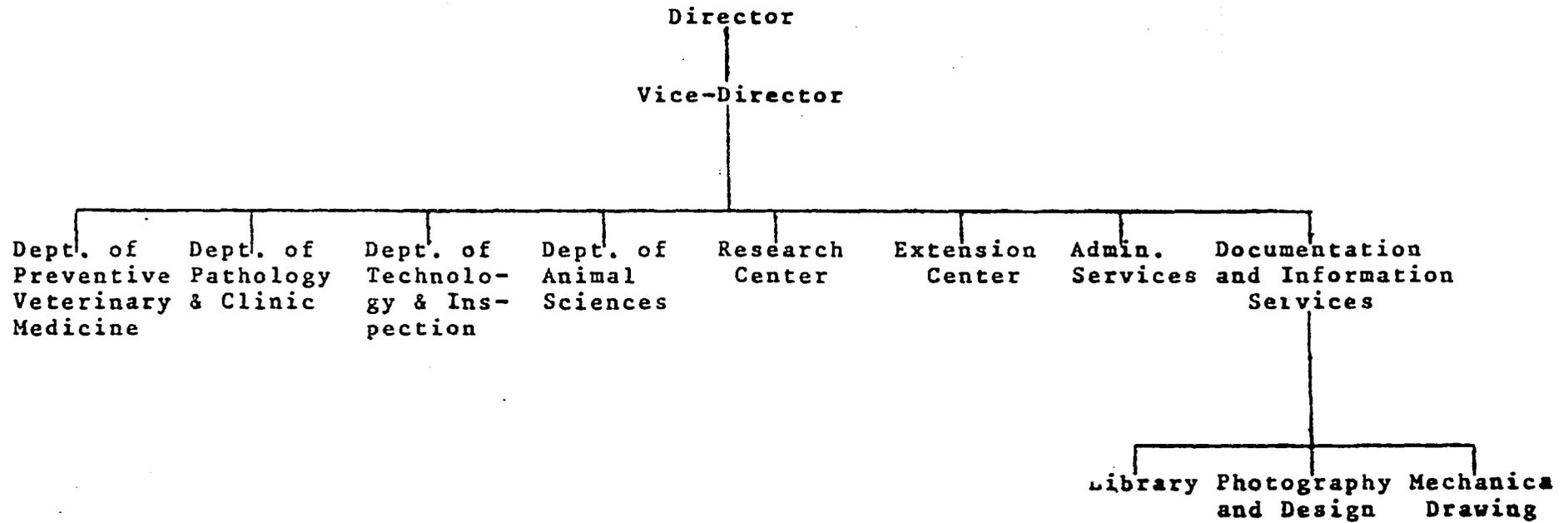
Agricultural
Engineering

Plant
Science

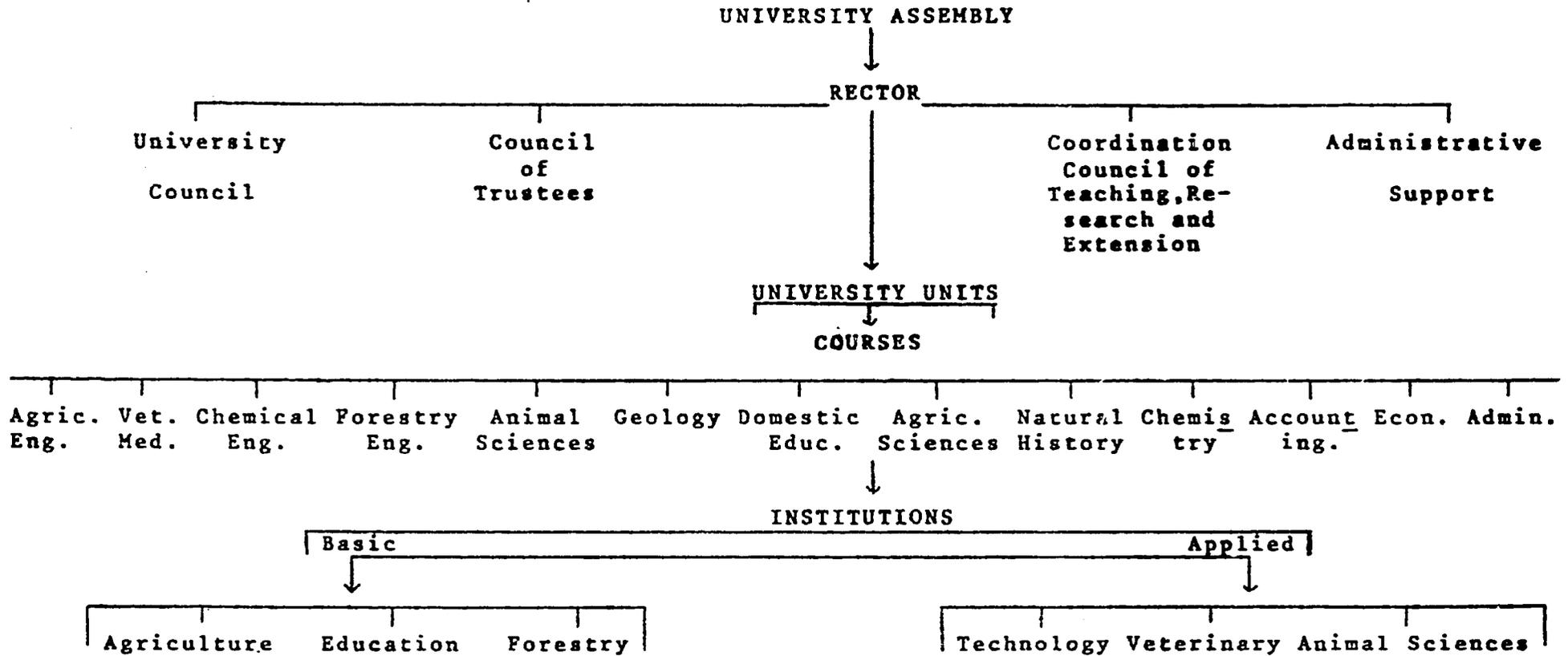
Rural
Technology

Animal
Science

VETERINARY SCHOOL, FEDERAL UNIVERSITY OF MINAS GERAIS



FEDERAL RURAL UNIVERSITY OF RIO DE JANEIRO (UFRRJ)



PARTICIPATING UNIVERSITIES

SUMMARY TABLE I
(By University)

	- 1972 -					Nº of Students		Nº of Courses Offered by the End of 1973	
	Total Nº of Staff Members & *					MS	PhD	MS	PhD
	Level of Qualification								
	BS	MS	D1**	D2**	Total				
Fed. Univ. of Ceará	16	46	-	6	68	14	-	2	-
Fed. Univ. of Minas Gerais (Vet.)	27	17	16	2	62	87	-	4	-
Fed. Univ. of Viçosa	47	79	8	30	164	126	8	10	3
Fed. Rural Univ. of Rio de Janeiro	5	10	10	2	27	-	-	2	-
Univ. of São Paulo	3	5	71	20	99	225	27	10	4
Fed. Univ. of Rio Grande do Sul	17	25	14	8	64	82	-	6	-
Fed. Univ. of Santa Maria	37	21	3	5	66	26	-	3	0
T O T A L	152	203	122	73	550	560	35	37	7

* The number of faculty is the total number for all departments offering graduate courses. These departments also offer undergraduate courses and staff time is spent teaching at both levels.

** D1 - Doctoral Equivalent

** D2 - Earned PhD

PARTICIPATING UNIVERSITIES

SUMMARY TABLE II
(By Agriculture Area)

1 9 7 2

	<u>Total Number of staff members & level of qualification</u>					<u>Number of students & level of programs</u>		<u>Number & level of courses offered by the end of 1973</u>	
	BS	MS	D ₁ *	D ₂ *	Total	MS	PhD	MS	PhD
Rural Economics	2	18	6	12	38	60	5	4	1
Rural Sociology	2	3	7	1	13	14	-	2	-
Rural Extension	8	2	0	0	10	13	-	1	-
Plant Sciences	7	33	14	22	76	117	-	4	1
Genetics	1	6	10	5	22	34	7	1	1
Phytopathology	0	15	6	5	26	30	2	2	1
Entomology	4	4	7	0	15	13	5	1	1
Veg. & Ecol. Physio- logy-	10	8	1	3	22	1	-	1	-
Forestry	11	7	0	0	18	-	-	1	-
Soils	4	24	22	7	57	91	13	4	1
Animal Sciences	31	34	16	8	89	79	3	4	1
Vet. & Clinical Pathology-	26	16	14	0	56	41	-	2	1
Vet. Preventive Medicine -	6	5	10	2	23	16	-	4	-
Food Inspection & Technology-	8	10	5	3	26	-	-	2	-
Agriculture En- gineering -	26	17	0	3	46	24	-	2	-
Home Economics	6	1	0	1	8	-	-	-	-
Experimentation & Statistics	0	0	4	1	5	12	-	2	-
Nuclear Agricul- ture Engineering	**					15		1	
	152	203	122	73	550	560	35	37	7

** Data not available.

* D₁ - Doctoral Equivalent / D₂ Earned PhD.

TABLE III

ANNEX V
Exhibit 2
Page 3 of 9

FEDERAL UNIVERSITY OF CEARÁ -- UFCE
TEACHING STAFF BY LEVEL OF QUALIFICATION*

	BS	MS	D1**	D2**	TOTAL
Rural Economics	-	5	-	-	5
Rural Sociology	-	-	-	-	-
Rural Extension	-	-	-	-	-
Plant Sciences	3	13	-	3	19
Genetics	-	1	-	1	2
Phytopathology	-	3	-	-	3
Entomology	-	2	-	-	2
Veg. Ecol. Physiology	-	-	-	-	-
Forestry	-	-	-	-	-
Soils	1	5	-	1	7
Animal Sciences	5	6	-	-	11
Vet. Clin. Pathology	-	-	-	-	-
Vet. Preventive Medicine	-	-	-	-	-
Food Inspection & Technology	1	4	-	1	6
Agriculture Engineering	6	7	-	-	13
Home Economics	-	-	-	-	-
Experimentation & Statistics	-	-	-	-	-
Nuclear Agriculture Engineering	-	-	-	-	-
Total	16	46	-	6	68

* Staff time is spent teaching at both graduate and undergraduate levels
** D¹ Doctoral Equivalent
D² Earned Ph.D.

TABLE IV

FEDERAL UNIVERSITY OF MINAS GERAIS
TEACHING STAFF BY LEVEL OF QUALIFICATION*

	BS	MS	D1**	D2**	TOTAL
Rural Economics	-	-	-	-	-
Rural Sociology	-	-	-	-	-
Rural Extension	-	-	-	-	-
Plant Sciences	-	-	-	-	-
Genetics	-	-	-	-	-
Phytopathology	-	-	-	-	-
Entomology	-	-	-	-	-
Veg.Ecol.Physiology	-	-	-	-	-
Forestry	-	-	-	-	-
Soils	-	-	-	-	-
Animal Sciences	11	4	5	1	21
Vet.Clin.Pathology	9	8	7	-	24
Vet. Preventive Medicine	4	1	2	-	7
Food Inspection & Technology	3	4	2	1	10
Agriculture Engineer- ing	-	-	-	-	-
Home Economics	-	-	-	-	-
Experimentation and Statistics	-	-	-	-	-
Rural Agriculture Engineering	-	-	-	-	-
Total	27	17	16	2	62

* Staff time is spent teaching at both graduate and undergraduate levels
 ** D¹ Doctoral Equivalent
 D² Earned Ph.D.

TABLE V

ANNEX V
Exhibit 2
Page 5 of 9

FEDERAL UNIVERSITY OF VIÇOSA
TEACHING STAFF BY LEVEL OF QUALIFICATION*

	BS	MS	D1**	D2**	TOTAL -
Rural Economics	-	6	-	8	14
Rural Sociology	-	-	-	-	-
Rural Extension	-	-	-	-	-
Plant Sciences	3	17	3	9	32
Genetics	-	3	1	2	6
Phytopathology	-	9	1	1	11
Entomology	2	2	-	-	4
Veg.Ecol.Physiology	10	8	1	3	22
Forestry	11	7	-	-	18
Soils	-	8	-	2	10
Animal Sciences	5	11	1	3	20
Vet.Clin.Pathology	-	-	-	-	-
Vet. Preventive Medicine	-	-	-	-	-
Food Inspection & Technology	-	-	1	1	2
Agriculture Engineering	10	7	-	-	17
Home Economics	6	1	-	1	8
Experimentation & Statistics	-	-	-	-	-
Nuclear Agriculture Engineering	-	-	-	-	-
T o t a l	47	79	8	30	164

* Staff time is spent teaching at both graduate and undergraduate levels
** D1 Doctoral Equivalent
D2 Earned Ph.D.

TABLE VI

ANNEX V
Exhibit 2
Page 6 of 9

FEDERAL RURAL UNIVERSITY OF RIO DE JANEIRO
TEACHING STAFF BY LEVEL OF QUALIFICATION*

	BS	MS	D1**	D2**	TOTAL
Rural Economics	-	-	-	-	-
Rural Sociology	-	-	-	-	-
Rural Extension	-	-	-	-	-
Plant Sciences	-	-	-	-	-
Genetics	-	-	-	-	-
Phytopathology	-	-	-	-	-
Entomology	-	-	-	-	-
Veg. Ecol. Physiology	-	-	-	-	-
Forestry	-	-	-	-	-
Soils	1	5	1	1	8
Animal Sciences	-	-	-	-	-
Vet. Clin. Pathology	-	-	-	-	-
Vet. Preventive Medicine	-	3	7	1	11
Food Inspection & Technology	4	2	2	-	8
Agriculture Engineering	-	-	-	-	-
Home Economics	-	-	-	-	-
Experimentation & Statistics	-	-	-	-	-
Industrial Agriculture Engineering	-	-	-	-	-
Total	5	10	10	2	27

* Full time is spent teaching at both graduate and undergraduate levels
**D1 Doctoral Equivalent
D2 Earned Ph.D.

TABLE VII

ANNEX V
Exhibit 2
Page 7 of 9

UNIVERSITY OF SÃO PAULO
TEACHING STAFF BY LEVEL OF QUALIFICATION*

	BS	MS	D1**	D2**	TOTAL
Rural Economics	1	2	4	1	8
Rural Sociology	-	1	5	-	6
Rural Extension	-	-	-	-	-
Plant Sciences	-	-	10	9	19
Genetics	1	1	9	2	13
Phytopathology	-	1	4	4	9
Entomology	1	-	7	-	8
Veg.Ecol.Physiology	-	-	-	-	-
Forestry	-	-	-	-	-
Soils	-	-	18	2	20
Animal Sciences	-	-	10	1	11
Vet.Clin.Pathology	-	-	-	-	-
Vet. Preventive Medicine	-	-	-	-	-
Food Inspection & Technology	-	-	-	-	-
Agriculture Engineer- ing	-	-	-	-	-
Home Economics	-	-	-	-	-
Experimentation & Statistics	-	-	4	1	5
Nuclear Agriculture Engineering	-	-	-	-	-
Total	3	5	71	20	99

* Staff time is spent teaching at both graduate and undergraduate levels
** D1 Doctoral Equivalent
D2 Earned Ph.D.

TABLE VIII

FEDERAL UNIVERSITY OF RIO GRANDE DO SUL
TEACHING STAFF BY LEVEL OF QUALIFICATION*

	BS	MS	D1**	D2**	TOTAL
Rural Economics	1	5	2	3	11
Rural Sociology	2	2	2	1	7
Rural Extension	-	-	-	-	-
Plant Sciences	1	3	1	1	6
Genetics	-	1	-	-	1
Phytopathology	-	2	1	-	3
Entomology	1	-	-	-	1
Veg.Ecol.Physiology	-	-	-	-	-
Forestry	-	-	-	-	-
Soils	1	4	1	1	7
Animal Sciences	4	6	-	1	11
Vet.Clin.Pathology	5	1	6	0	12
Vet. Preventive Medicine	2	1	1	1	5
Food Inspection & Technology	-	-	-	-	-
Agriculture Engineer- ing	-	-	-	-	-
Home Economics	-	-	-	-	-
Experimentation & Statistics	-	-	-	-	-
Nuclear Agriculture Engineering	-	-	-	-	-
Total	17	25	14	8	64

* Staff time is spent teaching at both graduate and undergraduate levels
 ** D1 Doctoral Equivalent
 D2 Earned Ph.D.

TABLE IX

ANNEX V
Exhibit 2
Page 9 of 9

FEDERAL UNIVERSITY OF SANTA MARIA
TEACHING STAFF BY LEVEL OF QUALIFICATION*

	BS	MS	D1**	D2**	TOTAL
Rural Economics	-	-	-	-	-
Rural Sociology	-	-	-	-	-
Rural Extension	8	2	-	-	10
Plant Sciences	-	-	-	-	-
Genetics	-	-	-	-	-
Phytopathology	-	-	-	-	-
Entomology	-	-	-	-	-
Veg.Ecol.Physiology	-	-	-	-	-
Forestry	-	-	-	-	-
Soils	1	2	2	-	5
Animal Sciences	6	7	-	2	15
Vet.Clin.Pathology	12	7	1	-	20
Vet. Preventive Medicine	-	-	-	-	-
Food Inspection & Technology	-	-	-	-	-
Agriculture Engineer- ing	10	3	-	3	16
Home Economics	-	-	-	-	-
Experimentation & Statistics	-	-	-	-	-
Nuclear Agriculture Engineering	-	-	-	-	-
Total	37	21	3	5	66

* Staff time is spent teaching at both graduate and undergraduate levels

** D1 Doctoral Equivalent

D2 Earned Ph.D.

STATUS OF THE PILOT GRANT PROJECT

The PROP for project 512-11-110-094.6, Brazilian University to University Agricultural Education Improvement - North/Northeast, was approved by AID/W August 25, 1972. The stated purpose of the project is to establish a permanent, functioning administrative mechanism for planning and implementing technical assistance in agricultural education and administration between agricultural colleges in Brazil.

American inputs are aimed solely at establishing the inter-university assistance system at the central level; direct assistance to assisted Brazilian institutions is to be provided and paid for by Brazilian resources. Since PROP approval, the Ministry of Education, with assistance by already in-country U.S. technicians, has laid the groundwork for the implementation of this project. The Brazilian name for this project is PAICA - the Agricultural Sciences Interuniversity Assistance Project.

PAICA is being administered through ABEAS, which has been designated official action agent by DAU. DAU has specifically provided funding to ABEAS for this purpose. ABEAS has established criteria for the selection of participating "assisting" and "assisted" schools. A survey of possible "assisted" schools was carried out. It has been resolved that the pilot partnerships will be Viçosa with the Faculty of Agricultural Sciences of Pará and ESALQ with the Agronomy School of the Federal University of Paraíba (located in and referred to as Areia).

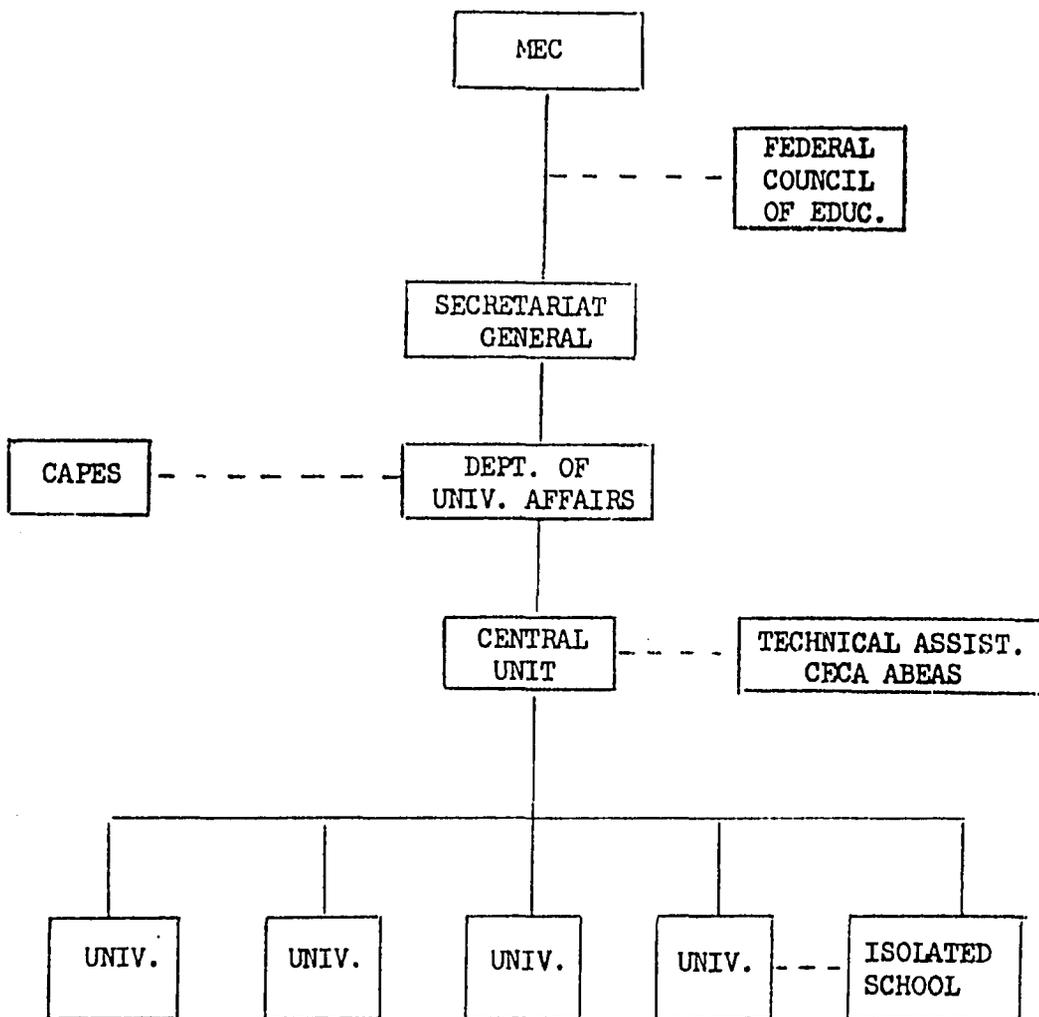
Currently, MEC/DAU is negotiating with three U.S. universities for the foreign T.A. portion of this project. Two long term technicians for two years each (plus limited short term assistance) will aid in getting the interuniversity system on the ground.

The pilot project is intended to support the formulation and experimentation stage of a system that, once evaluated and proven, will be expanded as a Brazilian counterpart activity to the USAID loan. It is MEC's conviction that there be an institutional basis for the transfer and multiplication of resources received from foreign assistance projects. The grant project is aimed at providing this basis.

GLOSSARY OF ABBREVIATIONS

ABEAS	- Brazilian Association of Higher Agricultural Education
CAPEB	- High Level Personnel Training Coordinating Body (of MEC)
CECA	- Teaching Commission of the Agricultural Science (of DAU)
CFE	- Federal Council of Education
CNPq	- National Research Council
CNHR	- National Human Resources Center (of MINIPLAN)
CONCRETIDE	- Central Commission for Full-time Teaching
DAU	- Department of University Affairs (of MEC)
DNPEA	- National Department of Agricultural Research (now EMBRAPA)
EAPA	- Office of Economic Research and Analysis (of the Ministry of Agriculture)
EAUFC	- School of Agriculture of the Federal University of Ceará
EMBRAPA	- Brazilian Enterprise of Agricultural Research
ESALQ	- Superior School of Agriculture "Luiz de Queiroz" (of the University of São Paulo)
FAPESP	- Research Support Foundation of São Paulo
FAPERGS	- Research Support Foundation of Rio Grande do Sul
FNDCT	- National Science and Technology Development Fund (of MINIPLAN)
FNDE	- National Fund for Educational Development
FUNTEC	- National Technology and Science Fund (of the National Development Bank)
GOB	- Government of Brazil
MEC	- Ministry of Education and Culture
MINIPLAN	- Ministry of Planning and General Coordination
SUBIN	- Secretariat of International Technical and Economic Cooperation (of MINIPLAN)
UFMG	- Federal University of Minas Gerais
UFRGS	- Federal University of Rio Grande do Sul
UFV	- Federal University of Viçosa

PROJECT MANAGEMENT AND COORDINATION GROUP
OF THE AGRARIAN SCIENCES PROGRAM



Note: The CNPq, MINIPLAN, the BNDE are represented on the Deliberative Council of CAPES.

Summary of
Five Studies on the Economics
of Education in Brazil

The studies are Moura Castro's "Investment in Education in Brazil: A Study of Two Industrial Communities," 1970; S.A. Hewlett's "Educational Investment in Brazil," June 1972; A.J. Rodgers' "Returns to Higher Education in Brazil," 1969; Frank Taylor's "Analysis of the Utilization of Resources in Industrial Technical Education at the Secondary Level in the Northeast Brazil," 1970, and S. Levy's "An Economic Analysis of Investment in Education in São Paulo," 1970. A brief comment on these studies is presented here, followed by a summary of the same.

While the studies are concerned with the economic value of education in Brazil, they are addressed to different types of education, and deal with different categories of people, at different periods in time, and are based on different set of data and assumptions, thus making comparisons of results a rather difficult and risky task. In the summaries presented below the major differences are spelled out.

The studies which attempted to calculate returns to education reached results which seem to point to large gains to be expected from investment in education as compared to non-human capital investment. The yardstick used to make such a comparison the opportunity cost of capital taken as in Castro's and 12% in Hewlett's and Rodgers'. On the basis of these rates, the results obtained are quite favorable to educational investment. Recently published studies on the opportunity cost of capital in Brazil, however, such as those by Langoni and Bacha, suggest considerably higher rates for this cost: something in the range of 15 to 18%. In this case the social rates of return presented in these studies would be somewhat lower. Given the wide discrepancies between private and social rates of return, the former exceeding the latter, higher educational costs to society implicit in the rates of return would be too high, unless the expenditure data used in the studies mentioned grossly overestimate educational costs, which to some extent might be the case. Another source of underestimation of returns is the implicit overestimation of foregone income (see text).

Of the studies being considered, the Rodgers' research would be of the greatest interest for the higher Agricultural Education loan,

since it contains estimates of rates of return for the various university curricula, including agronomy. The rates appear in table 4. They are based on data from the 1960 demographic census, which unfortunately was not completely tabulated. Because of this, Rodgers was able to calculate rates of returns for a few areas only: the North region and the States of Espirito Santo, Guanabara and Santa Catarina. Thus important agricultural regions such as Minas Gerais, Goiás, São Paulo and Rio Grande do Sul were excluded from the analysis. This fact makes policy implications regarding agricultural education planning particularly hazardous. Sticking, however, to the areas analyzed, Rodgers' results suggest an orientation for allocating resources to higher education in Brazil that are strongly in opposition to common sense regarding this problem. Social investment in education, at least in the areas examined, ought to be concentrated in Law and Economics as these are the fields indicating the highest social returns.

The technical disciplines showed consistently smaller returns than the liberal art disciplines. The discrepancy between the liberal and technical professions may be considered due to the high cost of technical education in Brazil and to distortions in the labor markets, contrary to what is usually assumed in regard to these markets, (i.e., that they are competitive and pay labor the value of its marginal product). Liberal professionals in Brazil, particularly lawyers, have traditionally been largely able to administer their prices, thus receiving in excess of their marginal contribution to total product. The issue is a quite difficult one and certainly cannot be attempted to be resolved here..

1. Claudio de Moura Castro, "Investment in Education in Brazil: A Study of Two Industrial Communities", (Ph.D. diss., Vanderbilt University, 1970).

In this research the economic returns to education in two industrial towns in Brazil are analyzed. The industrial communities are Belo Horizonte and Itabirito, located in Minas Gerais, where the author has lived for some time.

In this study almost all of the data was generated specifically for this piece of research. The data on costs came directly from the accounting and register books of two elementary schools in Itabirito, and one in Belo Horizonte. The cost figures were further refined with the help of unpublished census data. All the statistics in income, education, age and other personal characteristics were collected by means of two sample surveys. A small survey was initially undertaken in Belo Horizonte with the main purpose of testing the methodology and the questionnaire. A larger and more thorough survey was then run in Itabirito.

Rates of return were computed for elementary and secondary education using a number of alternative cost formulations, (e.g., with and without capital costs, with different assumptions regarding the length of schooling etc.) and the results were as follows:

Belo Horizonte. The social rates of return to primary education range from 31-42%. The basic rate (with capital costs and assuming a four-year course) is 38%. The private rate of return is 126% (assuming no costs).

The social rates of return to ginasio range from 14-25%. The basic rate (assuming that foregone income is counted from the 2nd year, with capital costs and taking the time-span to be 4 years) is 22%. When the only costs assumed are personal foregone income the private rate of return is 29%.

The social rates of return to technical education range from 37-43%. The private rate of return (assuming foregone income to be the only cost) is 55%.

Itabirito. The social rates of return to primary school range from 17-47%. The basic rate (with capital costs and assuming a five-year course) is 21%. If the student completes the elementary course in 4 years the rate goes up to 25%. These rates are considerably lower than for Belo Horizonte but the sample size is much larger.

The social rates of return to ginasio range from 12-22%, the former being the rate of return when foregone income is taken into account. The figure of 22% assumes no foregone income and a 4 year course.

The social rates of return to colegio range from 26-107%. If a student attends night school and there is no income foregone the rate is 107%. If all income is foregone the return is 26%.

2. S.A. Hewlett, "Educational Investment in Brazil" (Ph.D. dissertation, London Univ., June, 1972.

The aim of the study is to demonstrate the economic worth of education to the Brazilian society. The author calculates private and social rate of returns to various levels of education in urban Brazil for the period 1961-63, namely, primary education, ginasio, first cycle, ginasio, second cycle, and college (university). The crude rates of return were adjusted for such factors as the secular growth of income, the high drop-out and repetition rates at the primary level of education, the fact that university students are usually able to earn an income in either part-time or full-time employment and for the influence of inter-correlated variables such as inherited intelligence, family background and community environment. As a standard of comparison for private educational investment the author adopted 6% as a reasonable risk-free return on private capital, and 12% for the alternative rate of return for society. This rate was estimated by Carlos Langoni as the typical return from public investment in manufacturing, and also as the average that the government expects to realize from all sectors. *

* Comment: The author made this statement on the basis of the preliminary results of Langoni's research. Final results point to higher rates as prescribed in Langoni's article, "As Fontes de Crescimento Economico," Review of Economic Studies, IFE, São Paulo, Vol. 2, No. 4, 1972, pgs. 3-34.

The study was carried out on the basis of estimates for direct cost of various levels of education made by the author and other people. The indirect costs of education or foregone earnings, were estimated by the author for students over the age of 14 taking the earnings of those people already in the work force with just an inferior level of education. Data on earnings are from the 1961-62 Getulio Vargas Foundation Family Budget Survey, covering the capitals and cities of the interior in 9 Brazilian states (5 in the Center-South, 3 in the Northeast and 1 in the North), covering some 70% of the Brazilian population.

Results. Tables 1, 2, and 3 summarize the various rates of return. In the first instance, both crude and adjusted rates of return are impressively high.

Both the crude and the adjusted social rates of return compete very well with other types of investment (this is assuming that 12% is the opportunity costs of social capital in the Brazilian economy). Only investment in primary education falls below the chosen yardstick, and that only slightly.

Ideally, an extra value should be attached to primary education because it constitutes a necessary preliminary for the other levels. However, it would be difficult to advocate more primary education "now" by using this particular argument: at the present time in Brazil, there appears to be a pool of primary school graduates who are unable to attend secondary school because of various financial and institutional reasons.

The adjusted returns clearly show that the levels of education become progressively more worthwhile from the economic standpoint. That is to say, there are increasing returns to scale at the intensive rather than at the extensive margin.

The fact that returns to the higher levels of education are impressively high indicates that at these levels demand exceeds supply. This may well imply that the Brazilian economy needs a relatively sophisticated labor-force, one which has received, at least, the benefits of secondary school education.

As to private rates of return, both the crude and the adjusted returns compete extremely well with other types of private investment. If we take 7% as constituting a reasonable return on risk free investment, the rate of return to all levels of education is well above this figure and the rate of return to university schooling is six times this figure.

Again, there are increasing returns to scale at the intensive margins, i.e., each incremental year is more valuable in the economic sense, from the point of view of the individual. Private rates of return are considerably higher than social rates and this is particularly pronounced at the university level.

Conclusions: This type of analysis facilitates educational planning on the levels of generality. Firstly, relative rates of return indicate that Brazil is not spending enough on education vis a vis other sectors of the economy. Secondly, discrepancies between the returns on different types of education, and between the private and social rates, indicate that within the educational sector, investment is not distributed in the optimal fashion.

TABLE 1

Social Rates of Return on Investment
 in Education, Urban Brazil, 1961-63

Level of Education	Crude rate of return	Adjustments			
		alpha coefficient	wastage	indirect cost	growth
Primary	10.7	8.6 ($\sigma = 0.65$)	8.3	8.3	11.3
Ginasio	17.3	11.2 ($\sigma = 0.50$)	11.2	11.2	14.2
Colegio	17.0	15.3 ($\sigma = 0.75$)	15.3	15.3	18.3
University	14.5	13.0 ($\sigma = 0.75$)	13.0	22.1	25.1

TABLE 2

Private Rates of Return on Investment
 in Education, Urban Brazil, 1961-63

Level of Education	Crude rate of return	Adjustments			
		alpha coefficient	wastage	indirect cost	growth
Primary	11.3	9.0 ($\sigma = 0.65$)	9.0	9.0	12.0
Ginasio	22.2	14.4 ($\sigma = 0.50$)	14.4	14.4	17.4
Colegio	20.5	13.4 ($\sigma = 0.75$)	13.4	13.4	21.4
University	33.2	30.8 ($\sigma = 0.75$)	30.8	41.5	33.5

Table 3
Rates of Return, Summary Table

Level of education	Social rates		Private rates	
	Crude	Adjusted	Crude	Adjusted
Primary	10.7	11.3	11.3	12.0
Ginasio	17.3	14.2	22.2	14.4
Colegio	17.0	18.3	20.5	21.5
University	14.5	22.1	33.2	44.5

3. A.J. Rogers, "Professional Incomes and Returns to Higher Education in Brazil," (Ph.D. diss., Michigan State University, 1966).

The main objectives of this study are to measure the intensity of market forces for the products of higher education and to determine the relative rates of return resulting from specialization in various curricula. Rates of return are expressed as percentages of total investment in education. Important by-products are also obtained, including approximation of expected life-time earnings for university graduates; the relationship between income differences and twelve classes of variables such as religion, race, environment, and family composition; and comparative cost data for several university curricula. (Philosophy, Medicine, Pharmacy, Dentistry, Engineering, Law, Agronomy, Econ./Pol. Science and others).

The main source of data is the 1960 Brazilian census sample containing 25% of all households enumerated. Persons who had completed secondary school training or any higher educational level are included in the sample.

Calculations of lifetime income flows are made for the graduates of the several curricula. Taking into account the costs of education, net income flows are converted into rates of return on educational investment. These are then compared between states and professions. The areas are: North, Espirito Santo, Guanabara, and Santa Catarina.

Table 4

The Social and Private Rates of Return to
the Main Courses of Higher Education in
1960 - Broken down by Regions.

Region	Courses	Social Rate of Return (w/capital costs)	Social Rate of Return (w/o capital costs)	Private Rate of Return
Espirito Santo	All Univ. Grades	8.22	14.88	24.95
	Philosophy	5.19	15.58	23.90
	Medicine	4.35	10.85	25.26
	Pharmacy	0	0	0
	Dentistry	3.65	9.04	18.27
	Engineering	8.27	16.70	28.06
	Law	17.38	21.96	24.88
	Agronomy	7.57	16.14	35.86
	Econ./Pol. Sciences	31.22	36.59	45.07
	Others	6.54	11.89	20.44
North Region	All Univ. Grades	9.03	15.03	20.73
	Photography	0	0	0
	Medicine	5.64	11.87	21.47
	Pharmacy	0	3.36	11.66
	Dentistry	3.64	8.41	13.43
	Engineering	10.58	17.30	24.12
	Law	14.73	17.39	18.03
	Agronomy	1.70	5.16	11.76
	Econ./Pol. Sciences	10.83	16.13	16.45
	Others	13.26	21.45	28.42
Guambara	All Univ. Grades	10.23	14.08	16.74
	Philosophy	4.02	6.50	7.28
	Medicine	5.03	8.96	13.21
	Pharmacy	0	0	2.75
	Dentistry	1.83	4.94	7.68
	Engineering	14.27	19.92	22.70
	Law	13.83	16.75	15.90
	Agronomy	4.89	8.70	15.18
	Econ./Pol. Sciences	16.83	18.86	20.32
	Others	12.08	16.36	19.38
Santa Cruz	All Univ. Grades	7.52	13.70	21.88
	Philosophy	0	0	0
	Medicine	6.73	13.98	27.16
	Pharmacy	1.80	4.40	11.51
	Dentistry	4.08	8.42	14.15
	Engineering	8.14	15.28	24.41
	Law	16.38	20.37	21.33
	Agronomy	6.74	16.22	20.53
	Econ./Pol. Sciences	10.06	12.40	16.32
	Others	6.06	16.18	26.39

Results. Tables 4 and 5 summarize the various rates of return. With notable exceptions, university education generally returns to the individual a rate in excess of the market rate of interest on non-human capital (estimated by Roger's to be twelve per cent at the time of the Census). If educational capital costs are ignored, the social rate is equal to or slightly above the non-human capital rate of return. With the inclusion of Roger's estimate of capital costs, the social rate drops well below the non-human rate in most cases. The results are summarized below:

Rates of return to investment in the curriculum of Philosophy are negative in the North region and Santa Catarina. In Espírito Santo the private rate of 23.90% ranks sixth out of the nine curricula studied. The social rate without capital costs of 15.58% ranks fifth, and the social rate with estimated capital costs of 5.19% ranks sixth. In Guanabara, the private rate of only 7.28% ranks eighth in the state, while the two social rates of 6.50 and 4.02% both rank seventh. The relatively high rates of return in Espírito Santo are almost exclusively the result of the high earnings of this University group relative to their secondary counterparts in the early earning years. The private rates of return to Medicine are relatively high in all areas except in Guanabara. Of the nine curricula studied it ranks fourth (25.26%) in Espírito Santo, third (21.47%) in North Region, sixth (13.21%) in Guanabara, and second (27.16%) in Santa Catarina. Both social rates of return, with and without capital costs, ranks among the highest (6.73% and 13.98%) in Santa Catarina and lowest in Espírito Santo (4.35 and 10.85%).

In Espírito Santo and Guanabara, Pharmacy yields the lowest private rates of return among all curricula studied. In Espírito Santo and Santa Catarina, it was higher only than Philosophy.

In Dentistry, the private rate of return ranks sixth out of the nine curricula studied in the North Region, seventh in Guanabara and Santa Catarina and eighth in Espírito Santo. Calculations of social costs, with and without capital, change the ranking only in Guanabara, (from seventh to eighth).

The rates of return to investment in engineering are among the highest found in this study. Private rates of return range from 22.70% rank highest in Guanabara to 28.06% in Espírito Santo. Within the areas these returns rank highest in Guanabara, second in the North Region, third in Espírito Santo and fourth in Santa Catarina. Social returns including capital costs range from 8.14% to 14.27. The ranking of social returns with Santa Catarina, third; and the North Region fourth.

Private rates of return to Law rank in the middle of the educational specialties studied: fourth in the North Region and Guanabara; fifth in Santa Catarina and Espírito Santo. Social rates with capital costs, however, rank much higher: first in the North Region and Santa Catarina; second in Espírito Santo; and third in Guanabara. With the exclusion of capital costs, the social rate of return is greater than the private rate for Guanabara (16.75 versus 15.90%).

Interviews indicate several reasons for the high early earnings of Law students. The most important being that a much higher portion of the activities engaged in by these students is considered by them to be related to their primary occupation and training, and hence, would be reported. It is interesting to note the relatively broad distribution of lawyers among the several classes with higher levels of income in all categories compared to liberal professions. This seems to indicate that the Law curriculum does prepare graduates for productive work outside the narrow field of Law.

In the case of Agronomy, the rates of return show extreme variance between regions, both in their ranking within the region and their absolute values. Private rates and internal ranking of these rates are: Santa Catarina, first; Espírito Santo, second; Guanabara, fifth; and North Region, seventh.

Without allowance for capital costs, the annual cost per student of Agronomy is the highest of those studied. Addition of capital costs change its rank to second (after Medicine). These relatively high costs contribute to a substantially lower ranking of social rates within the several areas: fourth in Espírito Santo, fifth in Santa Catarina, sixth in Guanabara, and seventh in the North Region.

It is difficult to define or measure "modern" as opposed to traditional agriculture in an aggregate sense for any given area or region. Nevertheless, there is little doubt that Santa Catarina and Espírito Santo would rank higher in "modern" production than the North Region.

Private rates of return to investment in Economic Sciences rank comparatively high in Espírito Santo (first) and in Guanabara (second) and relatively low in the North Region (fifth) and in Santa Catarina (sixth). Social rates with capital rank internally as: Guanabara and Espírito Santo, first; Santa Catarina, second; and the North Region, third.

Interviews indicate that the market for graduate economists in Brazil was just beginning to develop in 1960, and the high earnings of the younger graduates reflects this development. Since 1960, demand for this specialty has increased considerably which means a high probability of greater expected earnings in older age groups than is exhibited by the 1960 cross-section profiles. The per-student cost of this curriculum is second lowest amongst those studied. As with Law the general business training received in this course results in flexibility in performing various classes of productive work.

The composition of "other courses" varies from region to region, but in all cases a substantial proportion consists of graduates of military schools at the university level. Private rates of return to these "other courses" rank relatively high in the several regions: Guanabara and Santa Catarina, third; in the North Region, first; and Espirito Santo, seventh. Social rates rank second in the North Region, fourth in Guanabara and Santa Catarina and fifth in Espirito Santo. It is possible that this may be the result of a general training making possible a wide range of job opportunities.

All of the sub-samples described were aggregated into a sample of all university graduates for each region studied. Private rates of return and social rates of return with capital for each region are as follows: Espirito Santo, 24.95 and 8.22% respectively; Santa Catarina, 21.88 and 7.52%; the North Region, 20.73 and 10.23%; and Guanabara, 16.74 and 10.23.

Although comparison of the results between major curricula is useful for planning purposes it should be noted that some of the intercurricular rate of return differentials presented in Table 1 are too small to permit meaningful evaluation. The intercurricular results are summarized below.

University graduates in Law produces the highest social rates of return of all curricula studied. Including capital costs, the rates range from 13.8 to 17.4% - generally higher than the non-human capital interest rate. Private rates of return are also quite substantial ranging from 15.9 to 24.9%. The same rate of return patterns exist for graduates in Economic sciences. This curriculum is also comparatively very low in social costs per student.

Medicine is the curriculum with the highest cost per student of any of the disciplines studied. Compared with Law and Engineering, the social rates of return to medicine curriculum is the lowest. On the other hand, private rates of return are among the highest encountered. The private rate of return to engineers is consistently high, ranging from 22.7 to 25.1%.

Both private and social rates of return for graduates of Philosophy are among the lowest calculated in Roger's study. The cost per student in this curriculum is comparatively low (only Law is lower) and the earnings pattern of the early earnings years, important to high rates of return, is not unusually low.

The immediate usefulness in planning of the results for other curricula is limited. For example, the large industrial-agricultural areas of Rio Grande do Sul, São Paulo and Minas Gerais should be included before returns to agronomists are used in policy formation.

Policy Implications. In 1960 and in the regions studied, Law and Economic Sciences produce significantly larger social and private returns than those received from non-human capital investment. Small divergences between private and social returns, plus inexpensive costs per student in these curricula suggested additional investment might have been in order in those regions at that time.

Medicine and Engineering showed high divergences between social and private rates of return. These divergences plus comparatively high costs per student indicate a need to examine the efficiency with which current levels of investment were being utilized in the regions studied.

Table 5

Rates of Return to University Education in Brazil, 1960

	All Graduates		
	Social Rate of Return (incl. capital costs)	Social Rate of Return (excl. capital costs)	Private Rate of Return
Variation between the four regions	7.5 - 10.2%	13.7 - 15.0%	16.7 - 24.9%

4. F.C. Taylor, "An Analysis of the Utilization of the Resources Invested in Industrial Technical Education at the Secondary Level in the Northeast of Brazil," (Ph.D. Diss., Columbia University, 1970).

Industrial technical high school systems in developing countries have been particularly criticized for their high costs and low effectiveness in training the middle-level technicians so essential to industrial development and to economic growth.

The objective of this study was twofold: (1) to identify the economic costs of educating and placing middle-level technicians in industry in the Northeast of Brazil. Estimations were made with present and with "full" internal and external resource utilization of the technical high schools. (2) To show the cost implications of achieving the output of graduates forecasted by Brazil's manpower plan with a continuation of present under-utilization of resources. Internal resources utilization was measured in terms of enrollment capacity, teacher utilization, and student flow, and external utilization was measured in terms of graduate employment. "Full utilization" of resources was that defined by the standards officially set by the system for each of these measures.

The pre-pupil budgetary costs of technical education were seen to be about five times that of academic education at the same level, yet in both types of schools personnel costs were at least 80% of the total expenditures. Economic costs (including private and public indirect costs) in both the academic costs were very sensitive to alternative assumptions of the value of capital charge and foregone earnings, especially the latter.

It was found that the enrollment of the industrial schools was on average only 50% of their standard enrollment capacity, and that generally "full enrollment" could have been achieved by requiring instructors to teach the number of hours for which they were actually hired. Pre-pupil budgetary costs, with full teacher utilization, would have fallen approximately 40%, and economic costs would have decreased approximately 35%. It was also determined that, as a result of existing student drop-out and repetition, per-graduate economic costs were generally double those possible with perfect student flow through the system.

A follow-up study of technical school graduates of 1965 and 1966, showed that only about 35% of them went into industrial employment as technicians, and that those in industry were already studying to upgrade themselves to the engineer level. Consequently, the unit costs of obtaining the desired standard of man-years of technicians in industry from the technical schools becomes astronomical, in one of the schools as much as 2,000% above the hypothetical costs with full utilization and over thirty times the per-graduate costs of academic secondary education.

TABLE 7

Social Rates of Return to Investment in Education by Completed Levels
 of Schooling, Assuming that 50% of Earnings are Foregone

São Paulo, 1968

	Public Sector			Public & Private Sector		
	(1) Male	(2) Female	(3) Male & Female	(4) Male	(5) Female	(6) Male & Female
First Cycle Secondary Educ.	22.75	13.21	17.71	22.52	18.01	17.57
Second Cycle Secondary Educ.	20.77	24.72	22.73	20.50	24.03	17.71
College	12.44	5.25	12.90	17.76	12.09	15.30

TOTAL UNIVERSITY STUDENTS BY AGE-GROUPS, EARNING-DECLARATIONS, AND AVERAGE ANNUAL EARNINGS AS COMPARED TO EARNINGS OF 2º CICLO GRADUATES, BRAZIL, REGIONS AND SELECTED STATES, 1970

	Brazil	Center -South	All Other States	Guana- bara	São Paulo	Ceará	Pernam- buco
1. University students	582 600	445 048	136 752	78 039	195 141	15 678	23 167
2. Age 18-25	429 704	329 347	100 357	57 698	141 127	11 318	15 954
3. Age 26 +	152 896	116 501	36 395	20 341	54 014	4 360	7 213
4. Declaring earnings	304 362	236 922	67 440	39 766	105 415	7 182	11 360
5. Age 18-25	178 199	139 939	38 260	22 852	60 379	3 696	6 513
6. Age 26 +	126 163	96 983	29 180	16 914	45 036	3 486	5 347
7. Average annual earnings of those declaring	7 572	8 124	5 628	8 244	9 828	5 616	5 700
8. Age 18-25	5 508	5 964	3 876	6 048	7 284	4 224	4 032
9. Age 26 +	10 464	11 244	7 908	11 208	13 224	7 104	7 740
10. Average annual earnings of those with 2º ciclo completo							
11. Age 17-25	4 776	5 064	3 672	6 240	6 276	2 904	3 204
12. Age 26-34	8 736	9 300	6 660	11 088	11 004	5 124	5 928
13. = (8) + (11)	1.154	1.178	1.056	.970	1.161	1.455	1.259
14. = (9) + (12)	1.198	1.209	1.188	1.011	1.202	1.387	1.305

Source: IBGE - Special tabulation of the 1970 census.

SUPPLY OF AGRICULTURAL PROFESSIONALS
WITH ADVANCED DEGREES

An attempt is made here to estimate for 1970 the stock of agricultural professionals holding a Master's or a Ph.D. degree earned either in Brazil or abroad. This was done on the basis of information on returned participants from training programs abroad and from advanced degree programs in Brazil. The only attempt to date to survey on a comprehensive basis training abroad of Brazilians was made by the Getulio Vargas Foundation's CETRU-EBAP-IBRI (Human Resources Center - School of Public Administration - and Brazilian Institute of International Relations) through the "Projeto Retorno."^{1/} The CETRUHU estimated that between 1960 and 1970, there were 3,881 Brazilians who studied abroad and returned. Of these, the CETRUHU listed 2,051 by their level of training and field of specialization, identifying 786 individuals with a Master's degree (38.3%), 441 with a Ph.D. degree (21.5%) and the remainder with non-degree post-bachelor's academic courses (40.2%). In the listed Master's, the participation of agricultural training was 15.9% and in the Ph.D.'s, 7%. Thus, assuming these percentages to hold in the overall total of 3,881, one would have in the CETRUHU survey some 237 Masters and 58 Doctors. Before 1960, there is practically no information. However, CAPES granted 205 scholarships for agronomy and veterinary in the 1953-71 period, half of which might have been for Master's degree courses and some doctorate courses. Thus, for CAPES and other donors, it seems not unreasonable to assume that before 1960, at least some 100-150 Brazilians would have got a Master's Degree in Agronomy and Veterinary and probably some 10-20 have got a Doctor's degree. Brazil's stock of advanced degree agriculturists trained abroad would then rise to some 360 Master's degree holders and some 70 Ph.D. holders.

In regard to agricultural professionals trained in Brazil, a survey of the seven agricultural schools offering graduate education indicated a total of 551 M.S.'s granted by these schools through 1971, and no Ph.D. degrees conferred in the same period.^{2/} This survey provided information on the starting date of the various graduate programs so it was possible to make an educated guess of the number of degrees earned before 1970, the total being 354. Thus, assuming no attrition, the stock of advanced degree agronomists and other agricultural professionals (mostly veterinarians) in 1970 might have been on the order of 794 of which 724 were M.S. holders and 70 Ph.D. holders. Accepting the 1970 Census figure for agronomists and the Plano Decenal estimate for veterinarians, the percentage of the stock of agricultural professionals in 1970 having advanced training is then quite small: 6.4% for Masters and 0.6% for Doctorates.

^{1/} Reports 1 thru 5 of the "Projeto Retorno" - GVF - CETRUHU - EBAP, Rio de Janeiro, 1971.

^{2/} Engelbert, L.E. et.al., "Levantamento sobre o Desenvolvimento dos Cursos de Pós-Graduação em Ciências Agrárias," Report to MEC, ABEAS, USAID, March 1973.

AVERAGE MONTHLY EARNINGS (CR\$) - AGRONOMISTS

1972

Government

Level of Training	Age-Bracket				Average & Total
	20-30	30-40	40-50	+ 50	
<u>Bachelor's Degree</u>					
Earnings	2,424	2,557	2,536	3,051	2,557
Nº of People	233	187	72	66	558
<u>Master's Degree</u>					
Earnings	2,951	3,699	4,923	2,009	3,436
Nº of People	33	50	7	1	91
<u>Doctor's Degree</u>					
Earnings	-	4,268	5,362	5,419	4,615
Nº of People	-	18	3	5	26
<u>Non-Degree Post-Bachelor</u>					
Earnings	-	-	1,700	-	1,700
Nº of People	-	-	1	-	1

Firms

<u>Bachelor's Degree</u>					
Earnings	3,179	4,156	4,840	5,149	3,831
Nº of People	31	13	8	6	58
<u>Master's Degree</u>					
Earnings	3,356	5,446	7,153	-	5,215
Nº of People	4	7	3	-	14
<u>Doctor's Degree</u>					
Earnings	-	-	9,051	-	9,051
Nº of People	-	-	1	-	1
<u>Non-Degree Post-Bachelor</u>					
Earnings	5,500	12,983	-	6,770	9,665
Nº of People	1	3	-	2	6

AVERAGE MONTHLY EARNINGS (CR\$) - VETERINARIANS

1972

Government

Level of Training	Age-Dracket				Average & Total
	20-30	30-40	40-50	+ 50	
<u>Bachelor's Degree</u>					
Earnings	2,110	2,209	2,473	2,422	2,254
Nº of People	11	20	9	3	43
<u>Master's Degree</u>					
Earnings	3,094	2,022	-	-	2,424
Nº of People	3	5	-	-	8
<u>Doctor's Degree</u>					
Earnings	-	-	-	-	-
Nº of People	-	-	-	-	-
<u>Non-Degree Post-Bachelor</u>					
Earnings	-	-	-	-	-
Nº of People	-	-	-	-	-

Firms

<u>Bachelor's Degree</u>					
Earnings	3,060	3,666	-	3,526	3,367
Nº of People	2	1	-	2	5
<u>Master's Degree</u>					
Earnings	-	-	-	-	-
Nº of People	-	-	-	-	-
<u>Doctor's Degree</u>					
Earnings	-	-	-	-	-
<u>Non-Degree Post-Bachelor</u>					
Earnings	-	-	-	-	-
Nº of People	-	-	-	-	-

AVERAGE MONTHLY EARNINGS (CR\$) - OTHER AGRICULTURAL PROFESSIONALS

1972

Government

Level of Training	Age-Bracket				Average & Total
	20-30	30-40	40-50	+ 50	
<u>Bachelor's Degree</u>					
Earnings	2,578	2,609	2,689	2,695	2,621
Nº of People	56	70	30	17	173
<u>Master's Degree</u>					
Earnings	2,604	3,326	4,203	5,856	3,470
Nº of People	15	16	6	4	41
<u>Doctor's Degree</u>					
Earnings	-	2,876	5,581	-	4,679
Nº of People	-	1	2	-	3
<u>Non-Degree Post-Bachelor</u>					
Earnings	-	2,059	3,170	-	2,614
Nº of People	-	1	1	-	2

Firms

<u>Bachelor's Degree</u>					
Earnings	3,948	4,178	4,321	4,842	4,314
Nº of People	14	9	5	12	40
<u>Master's Degree</u>					
Earnings	4,535	5,130	-	4,642	4,920
Nº of People	2	5	-	1	8
<u>Doctor's Degree</u>					
Earnings	-	-	-	-	-
Nº of People	-	-	-	-	-
<u>Non-Degree Post-Bachelor</u>					
Earnings	-	-	-	-	-
Nº of People	-	-	-	-	-

USAID BRAZIL RESPONSE TO CAEC ANNOUNCEMENT OF

MINAG AGRICULTURAL EDUCATION IRR APPROVAL ON AUGUST 7, 1972

REF ID: A153415 UNCLASSIFIED Received 23 August 1972

AID comments relative to CAEC Approval appear below by sections of incoming cable:

MISSION SHOULD EXAMINE EXPERIENCE GAINED UNDER POWER TRAINING AND OTHER TA LOANS TO DETERMINE WHAT LESSONS OR PARALLELS MAY BE APPLICABLE TO PROPOSED LOAN.

Response:

The Mission has examined its experience with L-070 and L-085 Power Training Loans and finds them not applicable to the present situation. Given the dispersed nature of the organizational structure of the partner agency (ELETROBRAS) under the power training loan, comparison with the present loan proposal has disclosed few relevant and transferable techniques which could be applied effectively to the present program.

On the other hand, many closer parallels exist with the Agricultural Research Loan (L-077) in which the University of Wisconsin, Purdue University, and the University of Florida have entered directly into contracts with the Brazilian Ministry of Agriculture. To date, contracts have been let for an approximate total of \$3,000,000 and 22 technicians are now physically housed in seven experiment station sites in South, Northeast and Center Brazil. Under the arrangements in the above, 28 technicians from Departamento Nacional de Pesquisa Agronomica (DNPCA) are now undergoing Master's degree training in cooperation with Brazilian universities to be included in the agricultural education loan program. An additional 17 are undergoing graduate studies in the U.S.

Approximately 40 MinAg technicians have entered into contractual agreements with the graduate schools of the cooperating universities to do selected research in their post-graduate facilities. All international training scholarships from the Ministry of Agriculture are channeled through a local coordinator who is responsible for planning, coordinating, administration, and promotion of training courses for MinAg technicians.

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Finally, in the case of training proceeding under Loan 077, the MinAg, which has full responsibility for this element, has utilized the USAID participant training system as a model and has adapted and adopted pertinent parts of it to develop its system.

- 3) LOAN PAPER SHOULD DESCRIBE RELATIONSHIP BETWEEN EXISTING AG RESEARCH LOAN AND PROPOSED LOAN; AND SHOULD OUTLINE MEANS BY WHICH RESEARCH ACTIVITIES WILL BE MESHED INTO INTEGRATED PROGRAM.

Response:

The research loan, now in its second year of operation, is a five-year program to intensify and expand the Ministry of Agriculture program in research and training. It will do this by providing U.S. technical assistance components to primarily develop the Ministry of Agriculture's capacity to: 1) plan and execute a national research program; 2) assist these programs, through the MinAg, to coordinate federal research projects with those of state and university research centers while, at the same time, increasing the research capacity of research staff through academic and professional training.

Private resources presently account for more than 50% of the resources going into agricultural research in Brazil. In the public sector, research personnel are fairly well distributed between the universities, Ministry of Agriculture (Departamento Nacional de Pesquisa Agropecuária - DNPEA), and the State Governments. DNPEA presently has about 300 researchers of which 10% have graduate degrees (principally Master's with very few Ph.D's).

The determined effort on the part of DNPEA to systematize and coordinate agricultural research training in the universities is a commentary on Ministry of Agriculture recognition of the importance of Brazil having adequate post-graduate programs to meet national research requirements. The present Director of DNPEA is emphasizing the importance of universities orienting their graduate students to thesis areas which correspond to national research priorities and is urging that this be accomplished by students doing their thesis work under the direction of U.S. research technicians provided under the Agricultural Research Loan L-077. An added advantage to the above is that it tends to build a practical approach into the development of national research priorities.

The area of training is seen as the basis of the programming goal to increase productivity through the transfer and application of science and technology. Specifically, the \$11.9 million Agricultural Research Loan (077) is directed principally to the following priorities which are mutually supportive to the proposed Higher Agricultural Education Loan proposal.

- a. Research programs will be concentrated on a very limited number of high priority agricultural productivity problems;
- b. the very best scientific talent, both Brazilian and U.S., is being mobilized in a concerted effort to make breakthroughs in making agricultural technology useful in the solution of productivity problems;
- c. the leading Brazilian agricultural research and educational institutions are now cooperating more closely to form a more coordinated effort in developing research programs.

A research and teaching environment conducive to the attraction of the best Brazilian and U.S. scientists and educators is now being created and sustained.

The research program has been conceived, organized and operated in a manner which contributes simultaneously to:

- a. a sharp increase in useful scientific knowledge;
- b. a rapid expansion of the number of well-trained Brazilian agricultural scientists; and
- c. the evolution of a more effective and efficient coordinated national system of agricultural research and graduate education.

The research program has been pragmatically oriented to the needs of the Brazilian farmer and includes the extension and other technological and development linkages necessary to get research results effectively to the farmer and his farm.

It should be noted, however, that, at best, the training to be given under the research loan is for a first generation of researchers. The demand for well trained researchers who will be needed to meet technological advances will continue indefinitely. On the other hand, it should be pointed out that personnel trained under the research loan are Ministry of Agriculture employees and will not be teaching at the universities. Thus, the agricultural education loan will, in effect, provide the base for Brazilians fulfilling the country's research manpower needs of the future.

- c. INCLUSION OF DOLS 1 MILLION FOR EQUIPMENT FINANCING WILL REQUIRE STRONG JUSTIFICATION. PAPER SHOULD EXPLAIN HOW UNIVERSITIES NORMALLY GET FX TO FINANCE IMPORTED EQUIPMENT AND INDICATE WHAT ARE CONSTRAINTS ON THIS OR OTHER NON-AID MEANS OF FINANCING EQUIPMENT.

Response:

No equipment is to be financed under this loan.

- D) PAPER SHOULD EXPLAIN CRITERIA USED BY MISSION TO ASSESS ADEQUACY OF BRAZILIAN FINANCIAL CONTRIBUTION IN SUPPORT OF PROJECT. CAEC RECOGNIZED THAT LOAN NOT INTENDED TO LEVERAGE MAJOR INCREASE IN RESOURCE FLOW INTO AG EDUCATION RELATIVE TO OTHER HIGHER EDUCATION AREAS.

Response:

1. Mission criteria used in assessing adequacy of Brazilian financial contribution is based on the determination that the joint Brazilian-U.S. inputs provide sufficient funding to carry out what is described in the Loan Paper (See Sections III and V). In addition, the letter of request for this loan from the Minister of Education (see Annex II - Exhibit 1) indicates a similar assessment of adequacy on the part of the GOB.
2. A further evidence of adequacy is demonstrated by the commitment--budgetwise-- of the Ministry of Education to higher education expressed in terms of DAU's share. It is as follows:

	MEC's Total Budget (Cr\$ Billion)	DAU Share	% DAU
1971	1.729	.946	54.7%
1972	2.098	1.168	55.7%

In 1971, total public expenditures in education represented nearly 4% of the Brazilian GNP, ranking Brazil favorably among the countries of the world high investments in education.

- D) PROJECT SHOULD BE PRESENTED ON BASIS OF ALTERNATIVE FINANCING PLANS OF 3 AND 5 YEAR DURATIONS; TOGETHER WITH MISSION'S ASSESSMENT OF RELATIVE ADVANTAGES AND DISADVANTAGES. DEPENDING ON FY 73 LEVEL APPROVED, BUREAU MAY NOT BE IN POSITION THIS YEAR TO FORWARD FUND BEYOND 3 YEARS. LOAN PAPER SHOULD INCLUDE DESCRIPTION OF TYPES AND DEFINITION OF NUMBER OF ADVISORS AND OF OTHER INPUTS TO BE FINANCED UNDER LOAN, AS WELL AS REASONABLY FIRM ESTIMATE OF COST OF INPUTS FINANCED OVER LIFE OF PROJECT.

Response:

The Mission has determined that the 3-year funding option would be non-viable from the institution building standpoint. See Sections III and V for description, definition, and cost of inputs to be financed under the loan.

- F) IN VIEW OF RECENT GAO CRITICISM THAT BRAZIL EDUCATION SECTOR LOANS DID NOT CONTAIN ANY RATE OF RETURN ANALYSIS TO JUSTIFY USE OF LOAN RESOURCES AT SECONDARY LEVEL OF EDUCATION SYSTEM, LOAN PAPER SHOULD SEEK TO JUSTIFY LOAN IN TERMS OF QUANTIFIED RETURNS ON TYPE OF HUMAN RESOURCE INVESTMENT PROPOSED. IN THIS CONNECTION, WE UNDERSTAND IPE/SAO PAULO ABOUT TO RELEASE STUDY BASED ON CENSUS DATA CORRELATING INCOME DISTRIBUTION AND EDUCATIONAL ACHIEVEMENT. PLEASE ADVISE IF MISSION REQUIRES TDY ASSISTANCE FOR ECONOMIC ANALYSIS OF PROJECT. CAEC RECOGNIZED THAT PROPOSED TECHNICAL TRANSFER PROGRAM UNLIKELY TO HAVE SIGNIFICANT IMPACT ON IMPROVING INCOME DISTRIBUTION OR ON EMPLOYMENT LEVELS.

Response:

1. Experience in Brazil with other rate of return studies has pointed up several shortcomings in this approach for this type of project.
 - a. Quantitative attempts are highly speculative and inventive, the efficacy of which depends upon the quality of the researcher's analytical and interpretive skills.
 - b. There is also a problem with costing out the rate of return of a Ph.D in Brazil in that the market for Ph.D's is not very highly developed. Thus, the current earnings of a Ph.D. are still not greatly differentiated, in terms of reflecting the social or economic rate of return in the market place for services, from those of the B.S. or M.S..
 - c. A third problem is the paucity of data in Brazil. This makes it practically impossible to evaluate the cost-benefits of investments in innovations of educational technology if costs of the present educational methods are not known.
 - d. Finally, even among the experts, there is not agreement upon methodology and procedures to follow in such studies.
2. Recognizing these shortcomings, a synthesis of five rate of return studies (including those listed in State 041909 dated March 8, 1973) is contained in Annex VI, Exhibit 1.
3. The Mission feels that while the direct impact of high level technical transfer programs on improving income distribution and on increasing employment levels is virtually non-existent, the long-term indirect benefits in these areas could be substantial. Results

from research programs can potentially give the most marginal farmers the tools to make themselves economically viable. If research results were to bring a greater direct benefit to larger commercial farmers, more jobs could conceivably be created at the farm and industry levels. Similarly, improved agricultural policy-making at all levels could clearly result in improved income distribution and employment levels. The direct result of this loan will be improved high level agricultural manpower; the result of Brazil's having this kind of manpower available will, no doubt, have a direct impact on improving the lives of the least well-off Brazilians.

- G) PAPER SHOULD EXPLAIN HOW LOAN STRATEGY WILL PRODUCE BETTER TRAINED BA'S THROUGHOUT AG EDUCATION SYSTEM, AS WELL AS TRACE PROJECTED IMPACT OF PROGRAM ON PRACTICAL PROBLEMS FACING BRAZILIAN AGRICULTURE IN NEAR TERM.

Response:

The enrollment in universities has more than doubled since 1968. In 1973, nearly 6% of the population or nearly 600,000 students were enrolled in Brazilian universities. Of these, less than 10,000 are pursuing graduate studies. College teachers, even for teaching at the undergraduate level, should have at least an M.S. degree or equivalent. Brazil, in its University Reform Law of November 27, 1968 (modified by Decree-Law No. 465 of February 11, 1969), has reorganized this and is requiring that by 1975, any new staff members added to University faculties at the rank of assistant professor and above, must have an M.S. degree or equivalent.

The Mission experience in graduate education in agriculture, engineering, economics and chemistry over the past five years has demonstrated measurable improvements in the level of undergraduate training. Instead of theoretical lectures, the new professors are bringing to their classes the results of actual field experimentation and, as such, are able to present more relevant and meaningful subject matter topics to their students. This has developed in the following manner:

1. Scholarship students obtaining a foreign advanced degree are required to do part of their teaching in the undergraduate school.
2. Motivation for graduate attendance causes gravitation of best students toward graduate training.
3. The build-up of graduate scholarship returnees on the local university staffs increases the quality of teaching at the undergraduate level, thus ensuring a more and better prepared candidates for the

graduate students of the 100 Brazilian agricultural universities which have received assistance in past years have now been named Centers of Excellence by the Conselho Nacional de Pesquisas (National Research Council).

The loan will also have a direct impact on providing better trained EA's through the inter-university assistance component whereby the advanced graduate centers will assist less developed schools with undergraduate programs (see Section III). The loan's impact on Brazilian agriculture will result from the building of a research competence directed at the solution of Brazilian farmer's problems. Future researchers, in the numbers projected to meet Brazil's future requirements, can only be produced economically in Brazil. The economic and institutional development impact on agricultural productivity can best be compared with the impact of expanded graduate education in agriculture during the past 25 years in the U.S. and the effects on its problem-solving capacity. (See Section IV).

- H) MISSION SHOULD EXAMINE THE FEASIBILITY OF REQUIRING THE UNIVERSITIES RECEIVING ASSISTANCE TO REPLY FOR A PORTION OF TA COSTS AS MEANS OF ASSURING CAREFUL EXAMINATION BY RECIPIENTS OF QUALIFICATIONS AND PERFORMANCE OF TECHNICAL ADVISORS.

Response:

MEC will contact directly with the individuals and/or institutions selected to provide the necessary assistance. Since MEC provides virtually all of the funds available to the universities (98%), implementation of the above recommendation would merely result in a re-transfer of funds back to MEC. MEC's desire to develop a workable model for the formulation of graduate education programs will assure careful examination of qualifications and performance of technical advisors.

- I) WITH RESPECT TO THE PROPOSED REQUIREMENT FOR PLAN FOR USE OF INPUTS FINANCED BY USA, TECHNICAL STUDY OF NATIONAL POST-GRADUATE EDUCATION REFERENCED IRR PAGE 2 WOULD PROVIDE BASIS FOR PLAN AND WILL JUSTIFY PROPOSED ALLOCATION OF ASSISTANCE AMONG UNIVERSITIES.

Response:

Referenced study is currently being performed by the Development Institute of Guanabara (IDES) and preliminary results have been utilized in the USAF's economic analysis. The plan for use of loan inputs and cost estimates are detailed in the loan paper (Section III and V) in keeping with the following:

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- J) WITH RESPECT TO MECHANISM FOR IMPLEMENTING PROGRAM, LOAN PAPER SHOULD DESCRIBE ESSENTIAL MANAGERIAL AND TECHNICAL FUNCTIONS WHICH MUST BE PERFORMED (BY ABEAS OR OTHER ENTITY) TO CARRY OUT ACTIVITIES CONTEMPLATED UNDER THE LOAN. PAPER SHOULD ALSO ASSESS ADEQUACY EXISTING ABEAS STAFF AND DISCUSS STEPS TO BE TAKEN TO AUGMENT STAFF SUFFICIENTLY TO SUPPORT CONCLUSION ABEAS WILL HAVE THE COMPETENCE AND TECHNICAL CAPACITY TO MANAGE PROGRAM EFFICIENTLY.

Response:

See Section II for a discussion of DAU, ABEAS, and other participating institutions' capacities.

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LOAN AUTHORIZATION

Provided from: Alliance for Progress Funds

BRAZIL: Higher Agricultural Education Loan

Pursuant to the authority vested in the Administrator, Agency for International Development by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby authorize the establishment of a loan ("Loan") pursuant to Part I, Chapter 2, Title VI, Alliance for Progress to the Government of Brazil ("Borrower") of not to exceed seven million six hundred thousand dollars (\$7,600,000) to finance dollar costs of establishing and implementing a system for improving Government of Brazil programs in graduate education in general and in graduate agricultural education in particular, subject to the following terms:

1. Interest and Terms of Repayment

- (a) Borrower shall repay the Loan in United States dollars within forty (40) years from the date of the first disbursement under the Loan, including a grace period of not to exceed ten (10) years. Borrower shall pay interest in United States dollars on the disbursed balance of the Loan of two percent (2%) per annum during the grace period and three percent (3%) thereafter.

2. Other Terms and Conditions

- (a) Except for marine insurance and ocean shipping, goods and services financed under the loan shall have their source and origin in countries included in A.I.D. Geographic Code 941. Marine insurance financed under the Loan shall have its source and origin in Brazil or in any country included in A.I.D. Geographic Code 941, provided, however, that such insurance may be

financed under the loan only if it is obtained on a competitive basis and any claims thereunder are payable in convertible currencies. Ocean shipping financed under the Loan shall be procured in any country included in A.I.D. Geographic Code 941.

- (b) Evidence, satisfactory to A.I.D. of the availability of funds for the program at the central levels will be submitted annually as a condition for continued disbursement of Loan funds.
- (c) Prior to the first disbursement of loan funds or issuance of commitment documents, the Borrower will submit to A.I.D. in form and substance satisfactory to A.I.D.:
 - 1) A detailed description of the central administrative and planning unit established for coordinating the program within the Ministry of Education and Culture's Department of University Affairs, including staff qualifications and proposed operating procedures;
 - 2) Evidence that funds will be provided to cover local currency costs of the first year of the program;
 - 3) A time phased implementation plan for the execution of the central level technical assistance and initial participant training activities. Initial participant training will be defined as up to 10% of the total masters and Ph.D. participant slots to be funded under the loan program.
- (d) Prior to the first disbursement of loan funds or issuance of commitment documents for project activities other than the central level technical assistance and initial participant training activities, the Borrower will submit to A.I.D. in form and substance satisfactory to A.I.D.:
 - 1) A plan for the overall development of graduate education in agriculture based on the results of a thorough demand study;
 - 2) A manual establishing guidelines for university participation in the program and for the preparation of university development plans;
 - 3) A detailed description of the evaluation plan and methodology to be used for evaluating (at least annually) both administrative and agricultural technical assistance specific phases of the program.

- (e) Prior to the end of the first year of implementation of the program, and annually thereafter, the Borrower shall provide a revised financial plan for the dollar and local costs of the program for the following year. This revised financial plan shall be accompanied by evidence satisfactory to A.I.D. that funds are available to finance the local costs as shown in the revised plan.
- (f) The Borrower shall covenant:
- 1) That each university receiving assistance in the development of graduate centers will enter into a partnership with a lesser developed undergraduate school and provide assistance to strengthen the undergraduate school;
 - 2) Unless otherwise agreed to in writing the scopes of work for the technical assistance contracts, the contractors, and contractor personnel financed under the loan shall be approved by A.I.D. prior to the execution of said contracts;
 - 3) Annually, throughout the life of the A.I.D. financed program, the Borrower will conduct jointly with A.I.D. a review of the program's implementation. This review will follow in close sequence the execution of the evaluation referred to under condition precedent 2. (3) above;
 - 4) That, where appropriate, training financed under the program shall include studies of income distribution and how income distribution is affected by decisions in the agricultural sector;
 - 5) That, to the extent feasible, provision shall be made for the development of courses or studies on income distribution in Brazil.
 - 6) That, except as A.I.D. may otherwise agree, all training outside Brazil which is financed from the A.I.D. loan shall have commenced prior to the end of the fourth year of the program;
 - 7) To provide a total financial contribution to the program the cruzeiro equivalent of at least US\$8.0 million;

(g) The loan shall be subject to such other terms and conditions as A.I.D. may deem advisable.

Deputy U.S. Coordinator

D a t e

GC/LA, Levy _____ Date _____

PPC/DPR, Handly _____ Date _____

LA/BR, Schwab _____ Date _____

SER/FM/C, Flinner _____ Date _____

LA/DR, Kimball _____ Date _____

LA/DR, Brown _____ Date _____