THE COLOMBIAN AGRICULTURAL AND LIVESTOCK INSTITUTE:

Suggestions Concerning Structure Program and Implementation

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SUGGESTIONS CONCERNING STRUCTURE

PROGRAM AND IMPLEMENTATION

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FOREWARD

After several years and several special reports, officials of Colombia, with the assistance of specialists from other countries, are now attempting various courses of action in order to achieve a rapid improvement of agriculture and rural life. Among these projects is the important function of coordinating agricultural teaching, research, and extension services. The coordination of these activities is considered by many specialists to be absolutely necessary if more efficient production is to occur in agriculture.

For this purpose, the Colombian Agricultural and Livestock Institute (ICA) was established in June, 1962. It proposes, as an autonomous organization of the national government, to undertake programs which will integrate, enlarge, and carry out national programs in the agricultural teaching, research, and extension fields. Since 1962 the Institute has been in the process of organization, the most notable events being the transfer by contract of the Department of Agricultural Investigations (DIA) from the Ministry of Agriculture to the Institute, the selection of some of its administrative leaders, and the decision to locate the Institute at Tibaitata, the home of the National Agricultural Research Center.

This report makes a number of suggestions about the programs, structure, and active implementation of the Institute. Requested by officials of the Colombian government, the present report represents a cooperative effort between several Colombian entities and officials and representative of the Ford, W. K. Kellogg, and Rockefeller Foundations. It comes at a time of early planning of the Institute and therefore lists in considerable detail a number of steps directed to its successful implementation. However, it is fully recognized that such ideas as this report advances represent only
suggestions from amongst a great many already underway in Colombia. Accordingly, the report serves only to stimulate and to focus plans and procedures which come out of the rigorous experience of Colombia itself. The leaders of the Institute must develop such plans as seem natural and best for Colombia.

This report gained much from an imaginative and prodigious effort on the part of five Colombian commissions which came together for the first reunion devoted to the establishment of the Colombian Agricultural and Livestock Institute. These commissions and the conferences which they conducted were convened under the leadership of Doctors Virgilio Barco, Minister of Agriculture, Pedro Gómez Valderrama, Minister of Education, Hernando Morales, Rector of the National University, and Jaime Sanín Echeverri, President of the Colombian Association of Universities. The commissions were in the fields of agronomy, animal industry, pathology, extension, and vocational and intermediate education. They compiled a series of comprehensive recommendations about the Institute which provide a strong influence on the present report, although its authors take full responsibility for its suggestions. It is hoped that the various reports of the Colombian commissions will be published at an early date.

In addition, the present report was influenced by the many discussions held with members of the Agency for International Development in Colombia, notably in the work of a special mission on agriculture, chaired by Dr. John B. Slack, whose efforts coincided in time with those of the authors of the present report.

This report is actually a summary of many ideas from as many sources. The Directors of the Institute were helpful in a consistent way. The chairman of the Board and Minister of Agriculture, Doctor Virgilio Barco, facilitated, inspired, and encouraged the authors. Such members as Doctor
Pedro Gómez Valderrama, Minister of Education, and Doctor Enrique Peñalosa, Manager of the Agrarian Reform Agency (INCORA), gave hours of creative cooperation. Another member, Doctor Rafael Samper, remained constantly at the side of the authors in an unusual display of hard work and loyalty. The Director General of the Colombian Agricultural and Livestock Institute, Doctor Fernando Peñaranda Canol, by his enthusiastic and able staff work, made this report possible in a much shorter period of time than would have otherwise been the case. Our unmatched thanks go to such loyal servants of Colombia as Doctors U. J. Grant of the Rockefeller Foundation, Robert S. Wickham of the Ford Foundation, Charles Fosson and Charles Seckinger of the Agency for International Development. The wisdom of such men steadied the authors just as their constant availability provided for every needed assistance. Finally, we were moved by the insights and vision of Doctor Hernando Morales, Rector of the National University, who helped us immeasurably to consider the various courses of action for the Institute; and Doctor Canuto Cardona, Director of the Department of Agricultural Investigations (DIA), whose dedication to Colombian agriculture and people has inspired more than one report about them.

It is not possible to list all those who went out of their way to assist the authors; accordingly, our general spirit of gratitude is extended to them, especially the members of the five study commissions. The authors hope that this report will be helpful to the development of Colombian agriculture generally and of the Colombian Agricultural and Livestock Institute specifically. However, regardless of the outcome, we shall be always grateful for this opportunity to share with our colleagues in Colombia and to wish them unusual success in leading the Institute into the full service of Colombian people.
Accordingly, this report is respectfully submitted to the Chairman and members of the Board of Directors, the Colombian Agricultural and Livestock Institute.

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I. Background and Situation

More than 60 percent of the people in Colombia are employed in agricultural production. Thus, agriculture plays a dominant role in the nation's economy. At the same time, the potential for further development of agriculture is great.

To help increase agriculture's contribution to the Colombian economy, means are sought whereby agricultural science, research, and education can be advanced. To bring agriculture in Colombia more nearly to its potential, the skills and know-how of the nation's agriculturists must be upgraded. More trained people are needed at all levels.

It is recognized that effective agricultural research, teaching and extension programs can contribute materially to increased productivity on the farms and ranches of Colombia. This increased efficiency and productivity as realized, in turn, contributes to:

--Higher living standards of all Colombians by making food and fiber products available at lower prices than would otherwise prevail.
--The release of rural manpower for non-farm employment.
--The generation of needed foreign exchange through exportation of agricultural products.
--The generation of capital (via savings) for investment in the farm and possibly non-farm sectors of the economy.
--The creation of productive employment opportunities in industries which supply needed production and consumption items used by farmers and farm families.
A. Colombian Agricultural and Livestock Institute

The Institute (ICA) is conceived as a new Colombian institution dedicated to the development of agricultural people and to the research solution of agrarian problems. Through ICA's stimulation, coordination and accelerated programs, it is hoped that agriculture's and the nation's welfare will be enhanced. Success in this undertaking, therefore, has tangible meaning to all citizens of the country.

ICA was established following study by domestic and international commissions, individuals and groups over a period of several years. It came into being with the signing of Presidential Decree No. 1562 on June 15, 1962. ICA is an autonomous governmental entity with its own board of directors. Its responsibility is "to develop, coordinate and carry out research teaching and extension activities." Especially sought is the integration of teaching, research, and extension functions.

Since ICA has just been organized and is now looking forward to active programs and operations, the purpose of this report is to set forth certain general suggestions about possible programs, structure, and early implementation. The Decree of June 15, 1962, outlines certain objectives for ICA, which have been interpreted and refined in the past several months. An over-all summary of these objectives follows.

B. General Guidelines

The authors, as well as many of those associated with ICA's legal creation hope that this new institution will:

1. Build upon the research accomplishment of DIA and develop added research competence under the organization of ICA.
2. Help strengthen and build existing worthwhile institutions; operate in a complementary, not competitive manner.

3. Involve itself in the direct performance of functions handled by other institutions only if no other feasible means of meeting the requirements of the decree can be worked out.

4. Innovate through contracts, joint appointments, organization and operation of pilot programs, and other techniques so that working integration of collegiate teaching, extension, and research is in fact achieved quickly at both national and regional levels.

C. Resources Available

The resources available to ICA include:

1. The assets of the Department of Agricultural Investigations (DIA): 13 experiment stations (26,600 acres), 145 technical workers, 1250 other employees, and a total present annual budget of approximately 22 million pesos. Within the technical group, 11 have M.S. and 4 have Ph.D. level training. In addition, 15 M.S. candidates and 17 Ph.D. candidates currently are studying in the United States.

2. An initial grant of five million pesos from INCORA (Agrarian Reform Agency).

3. Possible increased technical and financial assistance from public and private foreign institutions and agencies such as private U.S. foundations, the Agency for International Development and the Food and Agriculture Organization.
D. Important Factors in the Situation

Certain important factors support the suggestions in the report.

1. Agricultural research has been the responsibility of the Ministry of Agriculture, through its Department of Agricultural Investigations (DIA). This is a strong program which has had substantial assistance by the Rockefeller Foundation for 13 years.

2. Education is the responsibility of the Ministry of Education and the state governments. There also exist important private educational institutions. The National University has faculties of agronomy at Medellín, Palmira, and Bogotá and a faculty of veterinary medicine and animal husbandry at Bogotá. At present, however, the only apparent means for effectively integrating the research and extension programs sponsored by the National University and the Ministries is by contract.

3. Agricultural extension is presently conducted by five major institutions at the national level including the Ministry of Agriculture and various commodity federations. Extension programs also are conducted at the state level.

4. Agricultural education at all levels, including vocational, primary and secondary teaching, and intermediate technical education is in need of urgent qualitative and quantitative improvement.

5. Graduate level programs of instruction leading to the M.S. degree in agricultural science areas do not presently exist in Colombia.
II. Program

It is clear from the foregoing review that ICA was established to make significant national contributions to agriculture and rural life by means of activities in teaching, research, and extension. At the same time, since other entities are also pursuing these same activities, it is also clear that ICA should foster cooperation and coordination rather than duplicate the services of others. Accordingly, it is important that early and continuous attention be given to the program of ICA, in order that it may fulfill this special mission. The following definitions and suggestions are made to assist this task.

A. Research

ICA has succeeded the Department of Agricultural Investigations (DIA) as Colombia's chief center of research in the agricultural sciences. ICA should assume a much broader and more important role in the development of Colombian agricultural research by inaugurating high quality intramural and extramural research programs directed principally to the nation's quality schools of agronomy and veterinary medicine.

1. Intramural Research Program

One of the chief strengths of ICA and Colombian agriculture is the excellent agricultural research program conducted at Tibaitata and the other experiment stations. This program has been eminently successful in increasing the efficiency and productive capacity of Colombian agriculture, particularly in the area of basic food crops. Such research must remain the key of rural development in Colombia.

The expansion of this program should be given high priority in ICA. The research staff should be sustained without dilution and
the program of improving the competence of the staff continued. The authors believe that it would be a grave error to reduce the funds presently allocated to the research program. On the contrary, it should be expanded; several areas will require particular attention:

(1) Research in social sciences (agricultural economics and sociology)
(2) Research in food science and technology
(3) Research in home economics
(4) Research in agricultural engineering
(5) Research in forestry

2. Extramural Research Program

ICA should stimulate through its research leadership, competence, and by the use of funds, the development of research programs in other agencies and institutions. Colombia's ultimate requirements for agricultural research will be so great that it is unrealistic to expect that the intramural program of ICA alone can adequately meet Colombia's future needs. At the same time the lack of adequate research opportunities for faculty members of the agronomy and veterinary medical schools greatly reduces the ability to develop dynamic teaching programs. Furthermore, Colombia can ill afford to waste talented human resources for research by depriving creative faculty members the opportunity to contribute to Colombia's development through scientific investigation. An extramural research program directed toward agricultural scientists anywhere in Colombia would be a highly effective means of expanding Colombia's agricultural research potential.
The authors recommend that mechanisms be devised to support agricultural research in agencies and institutions outside ICA. Especially useful would be the research project proposal and grant or contract system used so effectively for this purpose elsewhere. Under this system a faculty member would submit through proper channels an outline of a research proposal. ICA would determine whether it is worthy of support. The research project would be budgeted and the researcher would conduct the research at his home institution or, in certain instances, at an ICA research facility.

B. Teaching

ICA should play a very important role in all agricultural education in Colombia. Initially ICA will contribute to present teaching programs in the schools of agronomy and veterinary medicine by making available to these units some of their talented agricultural scientists to assist with teaching. As more resources become available to ICA, the teaching program can be expanded to vocational and continuing education programs. It is recommended that the following areas in agricultural education be assumed by ICA.

1. Graduate Education

The authors recommend that planning begin immediately in reference to a graduate education program in the agricultural sciences. No such program exists in Colombia today. However, a graduate program is recommended only if all the educational resources available in Colombia are marshalled and directed toward the development of a high quality program. There is considerable strength in the agricultural sciences in
ICA while similarly important strengths in the basic sciences and in related fields exist at the National University and other Colombian universities. None of these units alone is capable of developing a high quality program. However, together their resources are adequate if careful planning and continued attention to high standards are practiced.

(1) Ingredients of a Graduate Education Program

Graduate education in the agricultural sciences involves the principles and research techniques in one of the agricultural disciplines. Its main objective should be to provide research and subject matter competence in depth for researchers, teachers, and extension workers. It must combine at an optimum level both applied and basic sciences. It must not limit itself to the techniques of research although the importance of techniques must not be depreciated. It must concentrate on basic principles in order that the student may be prepared for a productive life in creative research in rapidly changing fields of science. It must condition the student for a life of scholarship and continued learning. Graduate education is not an end in itself, but only a means by which an individual may enter a life of creative scholarship. Its main objective should be to develop productive scholars who are qualified to address their creative ability to the solution of important agricultural problems. There is no substitute for quality in graduate education. One outstanding researcher can make a greater contribution to human welfare than can a hundred who are poorly prepared.
(a) **Agricultural Scientists**

A highly qualified resident faculty of competent agricultural research scientists is required. These individuals must be specialists in narrow areas such as genetics, statistics, entomology, plant or animal physiology, parasitology, nutrition, soil chemistry, and soil physics. They must hold the Ph.D degree or have obtained equivalent competence. They must be actively engaged in quality research programs and have adequate facilities and support to conduct meaningful research. Some such qualified individuals are available now or soon will become available in ICA. A great many more with much deeper knowledge will be required before this program reaches a level of adequate quality.

(b) **Basic Science and Supporting Courses and a Total University Environment**

It is equally important to a modern graduate program to have available highly competent basic science course offerings. Graduate level courses in such fields as mathematics, biological and physical chemistry, and physics are absolutely essential. Courses in microbiology, physiology, pathology and similar subjects are highly important to graduate study in the animal sciences. In addition, courses in economics, sociology, the humanities, law, and many other areas are required for adequate graduate programs in the various agricultural sciences. These
course offerings currently are available at the National University, at the University of the Andes, and other Colombian universities.

It is equally important for graduate students in the agricultural sciences to have available to them a general library of good quality as well as a library specializing in agricultural science. Too much cannot be said in favor of the impact of a total university environment on the development of a graduate student. Experience everywhere has shown that seldom do truly high quality educational programs develop when they are isolated from the environment of a total university. These environmental factors are present currently at the National University and other Colombian universities.

(2) Cooperation between ICA, the National University and Other Universities

Every effort should be made to make all graduate programs truly cooperative between ICA, the National University and other universities. ICA should provide not only the faculty to teach the courses in the agricultural sciences but opportunities and training as well. The National and other universities should provide the course offerings in the basic and supporting fields, as well as classroom and laboratory space for teaching these courses.

ICA will determine the requirements and methods whereby degrees will be conferred as well as the qualifications of the teachers
and all academic questions relating to courses presented by its own staff. The appropriate universities will decide all academic questions relating to the courses, which they provide the faculty teaching the courses, and the qualification of students taking them.

The authors recommend that contracts be made between ICA and the appropriate universities in order that the universities providing specific courses in the overall graduate education program may be remunerated.

(3) What Programs Should be Established
The authors recommend that ICA be extremely cautious in establishing graduate programs in the various specialties within the agricultural sciences in order that only high quality graduate programs will be offered. Nothing could be more damaging to graduate education in agriculture in Colombia than to authorize an inadequate program of graduate instruction. We strongly recommend that initially no more than one program be authorized: a master of science in plant sciences. As sufficient strength is developed, additional programs may be authorized.

(h) Standards of Excellence
The authors strongly recommend that a mechanism be devised to assure that all aspects of the graduate education programs be maintained at the highest standards of excellence. The establishment of a graduate council composed of highly qualified, active participants in the graduate programs should be considered.
If such a council is established it must include appropriate representation from faculties providing basic, supporting and agricultural science offerings.

(5) Implementation

The authors recommend that a committee of consultants be obtained to advise on the organization of the graduate school before it is established. This committee should be composed of individuals with extensive experience in graduate education, and should be chosen so that it adequately represents the broad areas that the graduate program will eventually cover, including plant, animal, and social science. It also should include a representative with a strong non-agricultural basic science orientation.

2. Undergraduate Education

The authors recommend that immediate steps be taken to make highly qualified members of ICA's staff available to the Faculties of Agronomy and Veterinary Medicine at the National University. At the same time qualified research personnel in these Faculties should be invited to participate in the research program of ICA. One of the purposes of this exchange would be to improve the quality of instruction by providing the opportunity for creative scholarship to outstanding agricultural scientists on the faculties of the National University. It also should influence the whole nature of the teaching program by providing a dynamic curriculum based on current and developing concepts.

The sharing of personnel to improve the teaching program in the various faculties could be accomplished as follows. A faculty member
wishing to participate in the ICA research program would submit a research project proposal through his dean as outlined elsewhere in this report. The proposal could be accepted or rejected by ICA. If it is accepted, the details of the arrangement would be worked out by the dean of that faculty and the Director of Research in ICA. At the same time, ICA and university authorities should mutually encourage informal collaboration and joint research effort by staff members found in each entity.

If a research worker on the ICA staff wishes to become a member of a teaching faculty, he would make his request through his department chairman to the Director of Education of ICA. The Director of Education would clear the request with the Director of Research and transmit it to the dean of the appropriate faculty through the Director General. The dean and Director of Education would then work out the appropriate arrangement.

The procedure also might be initiated by the various deans. The request would be communicated to ICA through the Director of Education. The Director of Education through the Department Chairman would communicate the request to the research worker. If all parties recommended that this step be taken, the Director of Education would clear with the Director of Research and recommend to the Director General that the request be approved. The Director General would approve or disapprove the request and in cases of approval the details of the arrangement would be worked out between the dean and the Director of Education of ICA.
Such a program should be implemented through the device of a contract between ICA and the university in question. The contract would provide for repayment of services rendered to each entity. It is possible that the exchange would be so equal that there might be little if any necessity to exchange funds.

3. **Vocational and Technical Schools**

The authors recommend that ICA assume an active role in cooperating with the vocational and agricultural normal schools. We firmly believe that no aspect of agricultural education in Colombia is more important than vocational education. It is hoped that eventually the entire vocational agricultural education program of Colombia will be closely related to ICA and the other agricultural schools.

Relationships should be developed with agricultural normal schools such as the one at Buga in order that the research program at the Palmira station could serve as a center for improving the competency of these schools. This might be done by planning seminars, discussion periods, field demonstrations and similar activities specifically for these teachers. Perhaps refresher courses held mainly at night could be established in cooperation with the Faculty of Agronomy. ICA facilities might be made available for limited use by the vocational agricultural students.

In addition, there is a substantial need for re-evaluation of the concept that vocational education is necessarily inferior education. The authors strongly recommend that ICA cooperate with the Ministry
of Education in establishing a model technical agriculture school at a location where there is a major agricultural experiment station and a faculty of agronomy or of veterinary medicine. This school, staffed by highly motivated teachers, should attempt to establish an appropriate balance between academic and practical instruction based upon modern agricultural practices. It should be directed toward the production of an elite corps of active agriculturists who will go into the field to implement the inevitable and necessary technological revolution in agricultural practices which must precede any meaningful development in agriculture.*

C. Extension Program

The Director of Extension of ICA, working with the Director General and other staff members, will be responsible for developing ICA's extension program. It is recommended that ICA work with existing extension organizations and personnel in Colombia rather than establishing a large staff of its own. Specifically it is suggested that ICA's extension program include:

1. In-Service Training for Existing Extension Education

In-service training should be conducted at Tibaitatá and at the various regional centers, including short courses and workshops in defined subject matter areas. Representatives of the potential participants in these training programs should be called together in order that they may perform a major role in helping to plan the programs. The Director of Extension should organize these schools, and select the teachers and subject matter areas while drawing heavily upon the competence of the ICA staff. ICA should have a budget.

* See Miller, Paul A., et al., Higher Agricultural Education in Colombia, Bogotá, April, 1961.
to cover the costs (transportation and subsistence) of those who participate in the in-service planning and training sessions. It is suggested also that these training programs should draw upon the staff and research of the Faculty of Sociology at the National University.

(1) **Establishment of an Information Center at Tibaitata.**

This center should prepare, publish, and disseminate educational publications as well as releases for the press and radio. This center could become the information arm for ICA’s total operation. In addition to releases it should develop teaching aids and visual materials for use by extension educators. The information specialist should be a key person in this operation.

(2) **Identification and Employment of Needed Subject Matter Specialists**

One of the major gaps in the information diffusion process seems to be the function performed by the subject matter specialist. The specialist integrates the relevant knowledge in important subject matter areas and serves as a link between the research workers and the people who use the research results. Initially the persons so employed would be few in number. In fact, Extension might be responsible for part of the salary of a researcher, thus channeling some of his time into information dissemination. Such specialists would be members of the appropriate departmental staff.

The Extension Division should take principal responsibility for working out the details of contract and program with
one of the departmental universities to develop a jointly sponsored area pilot extension project. In addition, it may consider the possibility of locating an information specialist at major research stations as well as supporting and further implementing expanded research programs in extension methodology.
III. Organization and Administration

The overall purpose of the Colombian Agricultural and Livestock Institute (ICA) is that of achieving an improved program in agricultural research and instruction in Colombia by means of a country-wide coordination of activities in the field of agriculture. Although it will carry on certain programs of its own, as outlined previously, ICA will achieve success only as it may assist other agencies and programs to plan and to act in concert.

The chief temptation for ICA will be to over-extend its autonomous characteristics and to become another organization isolated with its own program. Accordingly, ICA must be developed from the very beginning as an organization with many ties to other entities in Colombia. This cannot occur unless ICA takes pride in remaining flexible, responsive to the interests of others, and cooperative rather than competitive. To conduct itself in this manner, ICA must avoid rigid rules and regulations of its own, and be prepared to demonstrate a dynamic capacity to achieve rapid results.

As an important example, a fundamental decision of ICA is whether to become a completely autonomous rural university in its own right or a true institute which gives cooperative leadership to many entities which carry on similar programs. Although ICA should move quickly into action and should take on those responsibilities which other entities, due to legal restrictions and traditional conservatism, cannot now provide, the authors believe that the way should remain open for later agreements which may not now be possible. Of fundamental importance at this point is the relationship of ICA to the National University. Although ICA may have to establish many academic procedures in order to fulfill its official obligations, including degree-granting authorities, continuous efforts should be made to foster, by the
contract or other methods, the closest possible ties with the National University. The students of ICA will require a total university environment and it is doubtful that ICA will ever be able to foster it fully. In short, all the entities related to agricultural research and education in Colombia should be strengthened by ICA's existence rather than weakened through needless competition and duplication. (Note Appendix III)

The authors point out that the far-flung installations and programs of ICA will present a problem of coordination to ICA in its own right. We urge a minimum of bureaucratic procedure. In addition, delegation of administrative authority and duties to the points of actual operation should be practiced. ICA cannot help others to embark on coordinated ventures without exhibiting a competence of its own in these same processes.

The authors believe that there are six principal points of organization which must be carefully developed by ICA as its program and mode of operation unfold: the Board of Directors, the Director General, the Director of Research, the Director of Undergraduate and Graduate Instruction, the Director of Extension, and the Chairman of a specified subject matter area.

A. The Board of Directors

The Board of Directors of ICA has ultimate responsibility for securing the objectives of ICA as set forth in the Decree of 1962. Accordingly, the Board of Directors is responsible to the people and the Government of Colombia for seeing to it that the mission of ICA is faithfully and successfully discharged. The Board must look forward to establishing the broad policies under which ICA will function and to giving general supervision to administrative officials as they proceed to implement the policies. In addition, the Board should:
1. Be responsible for employing the major administrative personnel of ICA.

2. Establish and approve the operation of personnel procedures.

3. Authorize and stimulate the preparation of annual plans of work and conduct periodic evaluations to determine if the plans are being followed and achieved.

4. Be responsible for developing the general policies of fiscal management and call for periodic audits of the effectiveness of these policies.

5. Devote time and attention to developing a country-wide program of public relations for ICA, in order that an increasing number of Colombian citizens will have an accurate understanding of the organization.

6. Be ultimately responsible for securing and maintaining the necessary financial support of ICA's programs.

7. Conduct regular and frequent meetings with carefully planned agenda, in order that decision-making by the administrative officers and policy-making may be always moving forward. It is strongly urged that Board meetings be conducted at the central headquarters of ICA, and occasionally at other of its centers, in order that the members of the Board will have an intimate familiarity with its operations.

B. The Director General

The Director General is the principal administrative officer of the Institute. He is the chief agent of the Board of Directors in achieving the purposes for which ICA was created. His function is largely executive,
although he sits with the Board of Directors in order that policy-making by
the Board may be properly implemented by the organization. In addition, the
Director General may:

1. Be responsible for communicating to the organization the nature
   of policies adopted by the Board and communicating to the Board
   the nature of the opportunities and problems as are suggested
   by members of ICA.

2. Be generally responsible for staffing, assigning, supervising,
   and evaluating members of the organization. However, these
   specific administrative duties must be delegated to the various
   subordinate officials.

3. In cooperation with other officials, take the leadership in
   over-all program planning and devise the steps necessary to
   achieve the programs.

4. Be responsible for carrying out the over-all rules of effective
   fiscal management.

5. Following the guidelines set forth in Board policies, be respon-
   sible for conducting a constant program of public relations and
   interpreting the program to the public.

6. Following principles adopted by the Board of Directors, give
   leadership to devising an over-all program of financial support
   for the organization and its programs.

7. Assume the leadership for establishing the rules of procedure by
   which ICA will function, as well as the means to secure effective
   internal communications and coordination.

8. Serve as ICA's major voice of interpreting agricultural problems,
   goals, and progress in Colombia, and serve to inspire high ideals
   and morale among the members of the total organization.
C. Research Director

The Research Director will be seen as a subordinate line official to the Director General. As such he should be expected, in addition to discharging those duties delegated specifically to him, to work closely with the Director General and the other administrative officials in devising the programs of ICA and coordinating them. Although it must be recognized that the Board of Directors and the Director General have ultimate responsibility for fiscal management, it is to be expected that the Research Director will have broad latitude in the handling of research budgets and personnel. In addition, the Research Director should:

1. Be responsible for the operation of Tiahuitz station.
2. Be responsible for the operation of outlying stations either directly or indirectly (via contract, for example).
3. Work with Director General in establishing contractual arrangements for integrating research and education at regional centers.
4. Chair a research planning committee in order to determine the allocation of research resources.
5. Develop cooperatively with other directors and institutions arrangements for sharing manpower: i.e., release of people for part-time teaching and/or extension; acquisition of part-time researchers from staff of other institutions and divisions; participate in selection of graduate research assistants and provide remuneration for them.

D. Director of Undergraduate and Graduate Instruction

In some respects, this Director is a coordinator. His principal duties are to help strengthen vocational, intermediate, and undergraduate instruction
programs and to develop (in cooperation with the National Universities and other institutions) a graduate program.

With respect to the vocational, intermediate, and undergraduate programs this Director should:

1. Organize, sponsor, and conduct seminars, workshops, and in-service training programs for teachers in various subject matter areas. Involved here would be studies of such matters as curricula, course content, teaching materials, standards, teaching methods, and related areas. Findings of such seminars should be reproduced and made available to others.

2. Identify persons who might teach in particular subject matter areas and help arrange for released time for this purpose. This may involve joint appointments with research and/or extension. Or it may mean direct transfer of funds to a cooperating institution in support of desired instruction.

3. Encourage able students to enroll in programs of agricultural instruction. This may be a public information service which tells young people the future they may expect if they complete high school and college work in the field of agriculture. Appropriate institutions may be identified. The objective of this program would be to get a larger number of able students qualified for and enrolled in agricultural studies. Scholarship programs might be devised and conducted.

4. Establish a program of employment opportunities for college students in agriculture. The objective of this program is two-fold: (1) to give farm practice experience to young men who lack practical farming
skills and understanding and (2) to give the students a learning opportunity which complements their formal studies.

5. Follow up on the initial start made in Home Economics instruction. Here the task would be one of helping to identify funds and assisting the program to prosper.

The task of organizing the graduate program is a major one since it involves the integration of resources available in several entities. With the assistance of appropriate committees and groups, the Director of Education would:

1. Plan the graduate offerings, the method of operation and establish the initial duties of faculty members. This includes identification of staff, facilities, and arranging for them to be available. He should negotiate necessary contracts and arrangements.

2. Plan the program of financial assistance for graduate students. It is anticipated that part-time assistantships in undergraduate teaching, extension, and research be offered.

3. Establish standards for admitting students to the program.

4. Prepare appropriate brochures, application forms and related promotional materials and distribute them widely among teachers of undergraduates and among students. The director should visit potential student groups and promote the program.

5. Be responsible for developing unity, understanding, and purpose in the graduate groups. This may take such forms as a special non-credit seminar program for students, the organization and sponsorship of an ICA Graduate Student Club, and special student facilities at Tibaitata.
E. Extension Director

The Extension Director joins with the directors of research and instruction to assist the Director General in executing the over-all programs and policies of the organization. In a manner similar to that of the Director of Undergraduate and Graduate Instruction, he should be expected to serve in a variety of coordinating tasks. In addition, he should:

1. Create, organize, staff, and operate the Information Center at Tibaitata.

2. Organize, staff, finance, and conduct an integrated program of in-service training for extension specialists. (The work of the Extension arm of ICA may be judged more on the quality and usefulness of the training sessions it conducts for others than on any other one criterion.) The continuing support of INCORA and the opportunity for earned cooperation with other extension groups will depend upon effective performance.

3. Identify, employ, and develop extension specialists where need for their services exists and where such services are unavailable from other sources.

4. Develop and help place into operation pilot projects at the regional level.

5. Continuously study agricultural information development and dissemination programs in Colombia in order that deficiencies may be identified and removed.

F. The Department Chairman

In order that the research and instruction programs of ICA may be developed, it is likely that department groups will be formed which represent
certain broad areas of agricultural competence, i.e., the plant sciences, the animal sciences, the social sciences. As this aspect of ICA's structure is formed, it will be necessary that the Director General, in collaboration with the Directors of Research, Instruction, and Extension, and with the members of the respective interest groups, appoint a chairman of each group. The chairman of a department or interest group should:

1. Work closely with the Director General and the Directors of Research, Instruction, and Extension, as well as with such other officials as research station managers, in coordinating the competences and interests of members of the department with the over-all policies, decisions, and programs of ICA.

2. Be responsible for recruiting, subject to the approval of the Director General and/or his aides, qualified members of the department.

3. Be responsible for the subject matter competence of the department as a whole, and stimulate such activities on the part of departmental members as may continually improve their capacity for distinguished research and education.

4. Participate in the planning of over-all programs of research and education and assume responsibility for arranging the resources of the department in order that such programs as may concern the department may be achieved.

5. Be responsible for such budgets and personnel as may be assigned uniquely to the department.
6. Stimulate department activities in order that a high level of scholarly attainment may be continually achieved, and in order that good morale and enthusiasm may characterize the department's mission.

7. Consider the chairmanship an important vantage point to offer intellectual leadership for the entire department.
IV. Implementation of the Colombian Agricultural and Livestock Institute

The authors believe that great steps have been taken already to implement ICA. The contract with the Ministry of Agriculture assigns responsibility for major research efforts to ICA, a Director General has been appointed, a Director of Research is at work, preliminary papers, estimates, and alternative administrative procedures are being developed, a growing involvement and discussion with many officials is occurring, and the basic relationships of ICA with such major entities as the National University, the Ministry of Agriculture, and the Ministry of Education are being reviewed.

Accordingly, ICA is no longer an idea on paper. Established by Decree No. 1562 of 1962, it is a formally organized institution devoted to the welfare of Colombia generally and to agriculture and rural life specifically. ICA sponsors one of the most distinguished agricultural research units to be found anywhere, possesses an operating budget, substantial assets in the way of research facilities, land, equipment, and a competent research staff. Therefore, the following suggestions for implementation are aimed to assist ICA in moving off aggressively and soundly toward a day when such promising objectives and programs as described above will be routinely developed and carried out.

It should be said that new institutions which are destined to live and serve well are never organized quickly or perfectly. Each new step of progress depends on how well an earlier step was achieved, and sometimes the nature of the new step is not clear until the previous one has been taken. Accordingly, the Board of Directors and the officers of ICA should begin immediately to sponsor programs of action which are in the service of Colombia, rather
than attempting to anticipate all of the many possibilities, the many opportunities, and the many problems which every new institution must face as its life unfolds. The following suggestions are to this point.

A. Formal Establishment of ICA's Headquarters at Tibaitata

1. The Commission recommends that appropriate space at Tibaitata be provided immediately for the purpose of establishing the national headquarters of ICA. Even with some hardships from insufficient high quality office space, it is of extreme importance that the people of Colombia, and the leaders of agriculture, know without doubt that ICA is moving confidently into action. This cannot happen unless people are able to visit its premises.

2. It is recommended that such a move be planned for completion not later than February 1, 1964.

B. The possibility of one or more university contracts with ICA through AID ICA officials should discuss with appropriate representatives the desirability of this step. We urge great flexibility in the contracts in order that the varied aims of ICA may be properly assisted by a university as a whole, in the event that such contracts come to be considered desirable.

C. Employment of the Director of Undergraduate and Graduate Instruction and the Director of the Extension Division.

1. While the above two steps are being carried out in the next three months, it is urged that the Board of Directors and the Director General give substantial time and effort to recruiting and employing
the Director of Undergraduate and Graduate Instruction. Since many of
the important coordinating relationships will involve this division,
and since graduate studies are planned, an individual of the highest
possible qualifications as an academic leader should be secured.
First and foremost, he should be an outstanding educator. He should
have a Ph.D. or equivalent education or experience. It would be de-
sirable, but not essential, that he have acquired the Ph.D. degree in
a field which is important to the agricultural efforts of Colombia.
He should have experience in research as well as teaching and adminis-
tration. It is strongly urged that this person be a native Colombian.

2. Attention should be given next to the employment of the Director of
Extension. It appears doubtful to the authors that a qualified per-
son of the necessary experience in this complex field may be available
in Colombia. Therefore, it is suggested that the Board of Directors
and administrative officers of ICA give consideration to alternative
proposals, including the employment of an outstanding leader in
extension from the United States, who, while initiating ICA's ex-
tension program, would be responsible for developing qualified
Colombian successors.

D. Establishment of Active Planning Committees

Several committees should be established as soon as possible in order
that detailed projects may be carefully developed and well-documented pro-
posals prepared for the purpose of gaining support for them. The major
programs of ICA, which deal with instruction, research, and extension will
require detailed planning. The following committees are suggested in order
that such planning may begin quickly. The authors suggest that these com-
mittees include, when possible, members of the staff of ICA, members of the
Board of Directors, and selected representatives from the public and private
sectors of Colombia, which have an interest in agricultural development. Special consideration should be given to representatives of the chief supporting agencies, the National University, the Ministry of Agriculture, and the Ministry of Education.

1. **A Committee on the School of Graduate Studies**

   This committee should: (1) review the qualifications of the staff of ICA as they relate to the particular specialties in which the Master's level of graduate degree is to be offered; (2) develop the procedures for obtaining students and qualifying them for admission as well as the extent of aid to be offered the graduate student in terms of fellowships, scholarships, or assistantships; (3) discuss and recommend the nature of the course work and the research work for the student as well as the balance between the basic sciences and agricultural science; (4) outline academic services required for the graduate program not now possessed by ICA, where they are to come from, who may provide them, and how they are to be paid for; (5) consider and recommend alternative approaches to the detailed nature of the academic structure of the graduate school and its relationships with the National University and other educational institutions; (6) catalog the projected needs for new physical structures, laboratories, equipment, libraries, and such necessary questions as the housing and feeding meals for students.

   The authors urge that officials of ICA request the services of two or more eminently qualified individuals to assist the committee in working out a detailed plan of answers to the above points and to many others which will emerge as the discussions and plans unfold.
2. A Committee on Extension

Since the objectives of ICA in the extension field are far from clear, and since this function is unusually complex, it is urged that a carefully selected committee be formed which may (1) outline in detail a plan of work for ICA in the extension field for the year 1964; (2) sponsor a number of short-run projects for 1964 in order to give the committee and ICA some valuable experience in the extension short course fields; (3) plan such short-term and long-term projects in extension with reference to where they are to be conducted, what entities and persons are to conduct them, how much each project will cost, by what means they will be financed, and what types of contracts with cooperating agencies are required.

The detailed plans of work in the extension field should be carefully prepared and reviewed with a Visiting Committee of Consultants during its visit in the June-July period of 1964.

3. A Committee on Intermediate Technical Education

Although it is recognized that ICA may not operate direct programs for the training of agricultural technicians in Colombia, it is quite clear that the extension needs of the country, especially in connection with such programs as those of INCODA, will not be met without a much greater production of such personnel. Accordingly, the authors believe that ICA should establish a committee which should: (1) sponsor, in cooperation with the Ministry of Education and perhaps others, a carefully conceived technical institute for the preparation of such personnel. It is suggested that attention be given to some one of the agricultural normal schools according to recommendations set forth in the Kellogg Commission Report*;

*Miller, et al. op. cit.
(2) consider the possible assistance of an U. S. University under contract with ICA and AID; (3) outline a program of in-service training for agricultural technicians already at work in Colombian agencies; (4) encourage and conduct research on the ways and means to coordinate personnel of varying levels of training in single programs of Colombian extension work.

The authors point out that the early and active work of these three important committees should aim for the completion of tentative reports by June 1, 1964, in order that a Visiting Committee of Consultants might review them thoroughly in the June-July, 1964 period.

E. Physical Planning of Tibaitatá and other Properties

1. The authors recommend strongly that officials of ICA request the service of two or more persons qualified to assist ICA in the detailed development of a working model of the Tibaitatá station, space requirements for the projected program, general architectural features, needed land acquisitions, and specific inventories of equipment.

2. Attention is also directed to the early need of a combined administration-continuing education center at Tibaitatá, expanded laboratories and research equipment, dormitory housing, staff housing, food preparation and dining facilities.

3. Similar reviews of the various research centers about Colombia should also be made in order that the over-all research establishment of ICA may make rapid and balanced progress.
F. Implementation of Contracts with Cooperating Entities

As pointed out earlier, ICA proposes to assist and facilitate the agricultural improvement of Colombia by emphasizing the coordination of agricultural teaching, research, and extension services among all the many agencies involved with these duties in Colombia. Accordingly, it is necessary that ICA be closely coordinated with such important entities as the National University, with such area-wide programs as may become possible in the areas of Palmira and Medellín, and with the private and departmental universities. Accordingly, it is recommended that immediate attention be given to completing three contracts, as briefly outlined below, in order that ICA may gain immediate experience with the contract method of coordinating two or more entities, and may demonstrate to all interested parties that it intends to sponsor as many coordinated projects as possible.

1. A Contract with the National University involving the coordination of an experiment station with a Faculty of Agronomy

Since ICA is administratively responsible for the programs of the agricultural research centers, it is in a position to take a pioneering step forward in Colombia by initiating the decision to place the center, at one or more locations, under the coordinating responsibility of the Dean of the Faculty of Agronomy. Such a contract between ICA and the National University should clearly set forth terms as follows:

(1) The use of the station research facilities by the teaching staff.

(2) The use of the teaching laboratories by the research staff.

(3) The opportunities of the research staff with reference to the teaching faculty.
(4) The possibility of joint appointments, salary and other perquisites for parties involved, the services rendered by the dean to ICA, the services rendered by the research staff to the faculty.

(5) The principles and procedures employed between the faculty and the station, between the dean and ICA, and between the National University and ICA.

The authors suggest consideration of the station and Faculty at Medellín, although it is hoped that both Palmira and Medellín would be coordinated as suggested above.

2. A contract with the National University involving the exchange of services between its Faculty of Sociology and ICA

Since ICA should emphasize the training of extension workers in the next year, and since the Faculty of Sociology will be helpful in this instance, a contract between the Faculty and ICA would enable each entity to improve its services to the other. Such a contract should:

(1) Emphasize the contributions of ICA to the Faculty in helping the latter in its new Sociology graduate program.

(2) Outline the possibility of ICA assistance for graduate fellowships and/or part-time instructional costs for the Faculty of Sociology and the services of the Faculty to ICA in the way of planning and instructional assistance for extension and short courses.

(3) Encourage research projects by the Faculty on projects deemed important in the extension and community fields by ICA.
3. A contract with one of the department universities involving a jointly sponsored program of extension pilot projects

Since ICA hopes to improve the coordination of teaching, research and extension services in areas other than those which sponsor national centers of teaching and research, it is important that initial experience be gained with coordinating devices at the departmental level. Accordingly, immediate consideration should be given to:

(1) Completing a contract with one of the department universities, such as the Universidad del Tolima, which sponsors a Faculty of Agronomy and which is in a position to cooperate with various extension efforts in the department.

(2) Such a contract might emphasize the sponsorship of an extension professor and demonstrator in the Faculty by ICA, the supporting services of the Faculty to a department-wide extension program involving both public and private entities. The contract should specify the administrative duties of the Faculty and ICA in planning and supporting the program with an exchange of goods and services between them.

It is recommended that these contracts be designed and executed as quickly as possible. Careful records should be maintained by ICA with reference to negotiating these contracts. Such records should be later reviewed with the consulting Committee.
Initiation of discussions and plans by tentative departmental or interest groups made up of the staff of ICA

1. Since the staff of ICA will be organized into broad subject matter groups, the early participation of the staff should begin immediately, so that the ideas of the staff with reference to organization and program may be gained in the early stages of ICA's development. Such groups should be asked to contribute ideas to the over-all organization of ICA prior to considering specific programs for each group. Regular meetings of administrative officials with such departmental groups should begin at an early date.

2. Careful attention should be given to the identification of potential staff leaders. The appointment of department chairmen should be delayed until after the employment of the Directors of Instruction and Extension and should also await the study of departmental organization. Informal chairmen should be employed to a time of final decision. It is suggested that within the next six months, the administrative leaders of ICA should have a firm plan of departmental organization in mind, specific ideas of departmental procedures including budgeting and program development, and relatively clear conclusions about desirable appointments for departmental chairmen. To meet such a deadline, such departmental planning should begin at once.

3. The authors suggest that the most careful attention be given to those administrative procedures and values which will provide maximum freedom of expression by departmental groups in the planning and carrying out of programs in their respective fields, while, at the same time, insuring over-all goals and interdisciplinary efforts by ICA as a whole.
H. Attention to Public Information Procedures

1. During the next several months, ICA will be moving through its most critical stage—the initiation of its first programs and the setting up of a working organization. It is natural and desirable that the people of Colombia have a great interest in these events. Accordingly, the Commission recommends that ICA employ, borrow temporarily from another agency, or contract in some manner, a qualified person for the purpose of stimulating a constant flow of information about ICA's progress.

2. Every new organization must take the responsibility for determining the impression it desires to make; this determination does not happen automatically. It is suggested that a public information program be organized immediately and that each event of progress in the next several months be fully and accurately described and interpreted.

I. Short Course and/or Extension Seminar Planning

The previous steps have dealt with placing ICA into full and permanent operation. However, it must be recognized that practical programs, in the service of others, must be conducted as quickly as possible. Since the people and leaders of Colombia will observe closely how ICA actually desires to serve the development needs of the people, it is important that feasible projects be initiated soon.

In view of the fact that INCORA has contributed to the budget of ICA, it is suggested that immediate consideration be given to experimental projects in the training of extension workers from such entities as INCORA.
Examples follow:

1. ICA may wish to sponsor a seminar of several days' duration, to which would be invited the top extension leaders of the country. The purpose of the seminar would be to obtain the advice of these leaders as to Colombia's needs in extension training, extension program planning, evaluation, coordination, as well as the types of assistance which they may require from ICA. Occasional seminars of extension leaders should serve to establish and sustain a growing discussion between ICA and the extension effort in Colombia.

2. Experimental training courses for INCORA workers should be timely for INCORA and helpful to ICA in learning how to plan and conduct short course projects. Consideration should be given to locating such efforts not only at Tibaitatá but at local centers, and emphasizing the bringing together of different extension entities with the staff members of the research stations and the faculties.

J. The Board of Directors and Other Supporting Entities

1. The authors desire to stress the importance of regular meetings of the Board of Directors with all members present. It is suggested that the place of meetings be at the headquarters of ICA. Such meetings should be carefully planned, with detailed discussions of recommendations by the Director General on such topics as are recommended above for committee study.

2. It is suggested that the Director General and his administrative colleagues give considerable thought, in occasional review with the Board of Directors, to systems of policy-making and decision-making in which both the Board of Directors and the administrative
officers form a dynamic team. Encouragement should be given to flexibility, a swift pace of decision-making, and the appropriate delegation of authority. The Board and the Administrative officers should arrange ample time for long-range planning and the imaginative development of new approaches to agricultural teaching, research, and extension.

3. The authors recommend also that the Director General sponsor occasional meetings with official leaders of the many agencies and organizations in Colombia which deal with ICA's objectives. From the work of the respective committees many questions will arise which concern the responsibility of other organizations. No better public relations can be practiced by ICA than that of seeking honest advice and criticism from other agencies and institutions. The Commission especially urges the Director General to visit frequently with the Rector of the National University and with the Minister of Agriculture, the Minister of Education, representatives of AID, etc.

K. **Over-all Suggestions to ICA's Board of Directors and Officials**

In addition to the foregoing suggestions, the directors and officers of ICA will have many more such items for action. Undoubtedly they will differ with some of the steps set forth above. Nevertheless, if the foregoing proposals stimulate ICA to move aggressively into an active program, then they will have been successful. Regardless of their merit, these proposals should contribute to meet two objectives:

1. To undertake some immediate steps which will help ICA move rapidly into action along feasible directions.
2. To initiate and complete an intensive period of planning in order that well-documented projects and proposals for financial support may be developed within the next six months.

Finally, the authors suggest that the officials of ICA may wish to consider the following possibilities:

1. Asking for support of a Visiting Committee of Consultants, consisting of relatively stable membership, which would work closely with the development of ICA throughout its formative period in the next three to five years. Such a possibility would expect an annual visit of the Visiting Committee and continuous correspondence about specific points.

2. Sharing with the Foundations represented by the current authors such working documents as may be developed in response to the above proposals, in order that the authors, together with other foundation representatives, may have the opportunity of being aware of the immediate progress which ICA seems destined to make.
APPENDIX I

In view of the fact that the social sciences require intensive development in Colombia and by ICA, the following detailed comments are offered:

Agricultural Economics and Sociology

ICA should draw upon and support developing work in the social sciences; also it should, in our opinion, add agricultural economists to the ICA staff. If these talents could be obtained in part at the onset through a US/AID University contract, stationing the economists at ICA, this we would strongly support.

Needs include, among others:

1. Strengthened undergraduate instruction in farm management, marketing, agricultural prices, economic development, and rural sociology. Support by direct and indirect means to courses in these areas:

   (a) broadens the agronomist's, animal husbandry man's and veterinarian's subject matter base and competence.

   (b) identifies these areas to the students as ones for possible specialization at the graduate level.

2. Support of strong work in general economics. Sound training in principles of economics should have support just as the basic sciences are supported.

3. Increased research output, especially in farm management. Needs here range from economic analysis of controlled experiments to feasibility studies on potential new areas, enterprise combinations and production practices.

Once a research staff is on the job, it should inventory the work that has been done or is in progress, urge some coordination in data collection and
reporting among public agencies, evaluate the accuracy of available data services, then plan and launch an integrated research program. Simultaneously it will probably be necessary to prepare, from available data and knowledge on the part of experienced agriculturists, sets of estimates for use in farm planning and budgeting.

The needs for such data on a regional basis are urgent; extension and action programs are going forward. In this situation meaningful estimates are superior to no data at all.

4. Future establishment of an M.S. graduate level program in agricultural economics after more Colombians have been trained to the M.S. and Ph.D. levels outside the country. The need to identify, select, and support promising young men in graduate study in Agricultural Economics in the U.S. or Europe is real and urgent—if Colombia is to develop in this discipline. We estimate that at least five years of staff development will be required before a Colombian graduate program can be launched in this area.

5. The support and working closely with the program in Sociology at the National University, Bogotá. Also work closely with the Wisconsin/AID Land Tenure research program located with the above Sociology faculty.

6. Working liaison with teaching and research programs in agricultural economics throughout Colombia. Some research currently being produced may not be known; research should be incorporated into teaching programs. Entities identified as having some interest and competence in this area, in addition to the above, include:

University of Los Andes, Bogotá
National University, Faculty of Agronomy, Medellín
University of Valle
U.N. Special Fund Program, Cali
IIIMA, Bogotá
Food Science and Technology

One of the most important problems facing developing countries is better utilization of the food produced in these countries. Unless adequate food processing and storage mechanisms are available, much of the food produced in a country never is consumed. Furthermore, many crops which might serve as excellent food crops cannot be grown because there is no way to utilize them. An agricultural economy based largely on the utilization of fresh and unprocessed foods is doomed to inefficiency. There is no doubt that modern food science and technology has as much to offer to the alleviation of hunger as has production research in developing countries.

Simply stated, food science is the key to the conversion of raw agricultural materials into an untold variety of properly processed and preserved foods. Food scientists must be masters of many disciplines. They must apply all the physical and biological sciences to the development of new products and new processing methods. They must apply mathematics, chemistry, biochemistry, physics, microbiology, botany, zoology, economics and engineering to food processing and marketing. They must be experts by training and research on food constituents -- proteins, fats, carbohydrates, fiber, vitamins, and minerals. Advances in food science will not result from the effort of an individual, but from the organized and collaborative effort of many scientists, well-trained in their disciplines, working toward a common objective.

Needs:

1. The most important first step is the establishment of a food science research program in ICA. This should be a program built initially around one or two competent individuals with disciplinary specialty training who will address their research competence to the solution of one or more
important Colombian food science problems. As the program becomes productive it can be expanded. It will be necessary that an outstanding specialist in food science be brought to ICA to advise on the development of this program. It probably will be necessary to maintain close liaison with a strong food science department at an American university.

2. When trained food scientists become available, an undergraduate course in food science and technology should be taught at one or more of the faculties of agronomy.

3. Many years will be required before sufficient competence is present to provide graduate offerings in food science in Colombia. In the meantime, students should be trained at American universities with strong food science programs, or in other South American countries such as Brazil and Peru.

4. It must be clearly recognized that outstanding food science programs like all other quality agricultural programs are based upon strong backgrounds in the basic sciences. Every effort must be made to strengthen the basic science education of Colombians who enter the research program in food science.
APPENDIX III

Principles of cooperation as expressed by the Minister of Agriculture, the Minister of Education, the Rector of the National University.

Los Ministros de Agricultura y de Educación, y el Rector de la Universidad Nacional de Colombia reconocen:

1o. - Que para obtener una tasa adecuada de desarrollo económico y mejoramiento social, es esencial dar impulso a la producción agropecuaria del país;

2o. - Que para alcanzar tal fin es imprescindible aumentar la productividad de ese sector;

3o. - Que esto requiere no sólo el desarrollo y difusión de semillas mejoradas y de métodos de cultivo y formación de un número suficiente de técnicos de alta calidad profesional, sino también llevar los conocimientos y la tecnología hasta el agricultor y el campesino;

4o. - Que se considera insoslayable la coordinación e integración paulatina de las labores de investigación científica, la docencia y los servicios de extensión agrícola.

Por tanto, han decidido consignar las bases para aunar esfuerzos y aprovechar en forma óptima los recursos humanos y materiales que disponen los Ministerios de Agricultura y de Educación, la Universidad Nacional y el Instituto Colombiano Agropecuario (ICA), en los siguientes puntos;
1. - Celebrar contratos específicos entre las entidades mencionadas, en los cuales se acuerde el funcionamiento integrado de las Estaciones Experimentales del ICA y las Facultades de Agronomía y Medicina Veterinaria de la Universidad Nacional, en lo relativo al intercambio de servicios; entre el Ministerio de Educación y el ICA en lo que se refiere a actividades de la educación técnica media e intermedia; y entre entidades públicas y privadas por una parte y el ICA por la otra, en conexión con servicios de extensión en los niveles nacional y regional.

2o. - Organizar una Escuela para Graduados en Agronomía, Veterinaria y Zootecnia, bajo la dirección administrativa del ICA, sujeta a:

a) - La participación del Rector de la Universidad Nacional en la Junta Directiva del ICA y de un representante suyo en el Consejo de la Escuela para Graduados;

b) - La asistencia académica y la prestación de servicios por parte de la Universidad Nacional a dicha Escuela.

3o. - Adoptar un criterio dinámico en busca de métodos para la integración de la investigación, la enseñanza y la extensión agrícolas, en tal forma que la Escuela para Graduados pueda llegar a ser una parte de la estructura académica de la Universidad Nacional y que se puedan establecer relaciones con otras Universidades por conducto de la Asociación Colombiana de Universidades.

Virgilio Barco
Pedro Gómez Valderrama
Hernando Morales

Bogotá, Nov. 23/63