

**Report to  
Agency for International Development  
Honduras**

**Office of Agriculture and Rural  
Development**

**Evaluation of FHIA  
(Fundacion Hondurena de  
Investigacion Agricola)**

**November 1987**



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EVALUATION OF FHIA  
(FUNDACION HONDURENA DE INVESTIGACION AGRICOLA)

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Agency for International Development  
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Office of Agriculture and Rural Development

By  
Winrock International Institute for Agricultural Development

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PRINCIPAL SOURCES OF INFORMATION

## ABBREVIATIONS

AED	Academy for Educational Development, Inc. (Washington, D.C.)
AID	Agency for International Development (U.S.)
ANACH	Asociación Nacional de Campesinos de Honduras
ANACIHO	Asociación Nacional de Citricultores de Honduras
ANEXHON	Asociación Nacional de Exportadores de Honduras
APROCACAHO	Asociación de Productores de Cacao de Honduras
BANADESA	Banco de Desarrollo Agrícola
BID	Inter-American Development Bank
CARCOMAL	Cooperativa Agropecuaria Regional Comayagua
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza
CDI	Centro de Desarrollo Industrial
CEDEC	Centro Experimental y Demostrativo de Platano
CEDEP	Centro Experimental y Demostrativo de Platano
CIAT	Centro Internacional de Agricultura Tropical (Colombia)
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo (Mexico)
COACAL	Cooperativa de Agricultores y Productores de Cacao Limitada
CTTA	Communication for Technology Transfer in Agriculture Project
CURLA	Centro Universitario Regional del Litoral Atlántico (La Ceiba)
EAP	Enseñanza Agrícola Panamericana (at Zamorano)
EEC	European Economic Community
FAO	Food and Agriculture Organization of the United Nations
FECORAH	Federación Hondureña de Cooperativas de Reforma Agraria
FENAGH	Federación Nacional de Agricultores y Ganaderos de Honduras
FEPROEXAAH	Federación de Asociaciones de Productos y Exportadores Agropecuarios y Agroindustriales de Honduras
FHIA	Fundación Hondureña de Investigación Agrícola
Fruta del Sol	Cooperativa Regional Servicios Agropecuarios "Fruta del Sol" Ltda.
GDP	Gross Domestic Product
GOH	Government of Honduras
IDRC	International Development Research Center (Canada)
IHCAFE	Instituto Hondureño del Café
INA	Instituto Nacional Agrario
INFOP	Instituto de Formación Profesional
LPS or L.	Lempiras (2 Lps = US\$1.00)
MRN	Ministerio de Recursos Naturales
mz	manzana = 0.7 ha
PL-480	Public Law 480
PSA	Purchasing Services Agency
PTR	Proyecto de Tecnologías Rurales

PVOs	Private Voluntary Organizations
ROCAP	Regional Office for Central America and Panama (USAID)
SRN	Secretaría de Recursos Naturales
UBC	United Brands Company
UNC	Unión Nacional de Campesinos
UNDP	United Nations Development Programme
UPEB	Union de Paises Exportadores de Banano
USAID	United States Agency for International Development
USPS	Universidad de San Pedro Sula
VITA	Volunteers for International Technical Assistance

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Members of the this evaluation team were K. O. Rachie (team leader), J. Moncado (agricultural research administration), B. Henrie (financial analysis), J. Leslie (financial development/fund-raising), and C. Crisostomo (institutional linkages).

**EXECUTIVE SUMMARY  
OF THE FIRST FORMATIVE EVALUATION OF FHIA**

**I. AN OVERVIEW**

The Fundacion Hondureña de Investigación Agrícola is a center of excellence and the best of its kind in the region. The evaluation team found the center to have a highly capable and dedicated staff of professionals working together as an integrated team. The leadership is experienced, dynamic and visionary as evidenced by having so quickly established and implemented all the elements of an efficient and effective organization. Supporting facilities have been carefully and tastefully developed, mainly by restoring and refurbishing existing buildings provided by United Brands. Field experiment stations have been established in locations appropriate to FHIA's research activities. In all cases, the overriding concern has been for utility and function.

**II. THE OBJECTIVES OF FHIA**

The ultimate goals of FHIA are to help increase the level of agricultural productivity in Honduras and contribute to the generation of employment in the country. To accomplish these goals the following specific objectives are given in its statutes:

- Conduct research on traditional and nontraditional crops for both export and internal consumption. This includes aspects of production, processing, and marketing at national and international levels.
- Operate the Center of Tropical Research of Honduras at La Lima and its dependencies, including analytical and other research-related services.
- Provide communication services in support of the agricultural extension services and the producer.
- Stimulate the agricultural development of the country through science and technology.
- Operate international programs, especially in developing the genetic resources of bananas, plantains, and related species, and in obtaining funding for that purpose.

As evolved over the first three years, and under subsequent agreement with the Ministry of Natural Resources, FHIA's research has focused primarily on specified nontraditional export crops. Further, FHIA does not do any research on the basic grains, except in a limited way on soybeans.

### III. PURPOSE OF THE EVALUATION

The first interim evaluation of the project was to determine the progress made by FHIA in developing its operations, initiation and progress of its research programs, linkages established, initiation of fund-raising activities and outlook for financial viability of the foundation.

### IV. EVALUATION METHODOLOGY

The evaluation process carried out in-country during August 3 to October 3, 1987, began with a schedule of briefings by USAID and FHIA staff followed by field trips to experiment stations, laboratories, farmers' fields, and institutions in the area. Most of the team's activities (from September 3 to 25, 1987) were centered around FHIA's headquarters at La Lima and San Pedro Sula on the northern coast. The final write-up was carried out by the team leader in consultation with other team members at Winrock International headquarters in Arkansas on October 12 to 16 and 26 to 30, 1987.

### V. FINDINGS AND CONCLUSIONS

The team examined virtually all aspects of FHIA development, operations, and future plans. In the main, the center should be highly commended for establishing itself and addressing the institutional mandate within the relatively short period of three years. However, there are some concerns about initial growth and its effect on institutional commitments as well as on the funding base needed for long-term sustainability. It follows that the major recommendations of this evaluation impinge directly and(or) indirectly on the immediate shortfall of resources and long-term sustainability of the institution.

Specific findings and conclusions occur under the following headings:

- Scope and Mandate
- Governance
- Research Program
- Communications and Institutional Linkages
- Administration and Financial Management
- Institutional Sustainability

The team found that FHIA has made an heroic effort to address its mandate, but the original project resources are totally inadequate for the scope of effort required. In fact, some programs, scientific disciplines, and supporting services are already or will become substantially understaffed within 2 or 3 years.

The team would like to stress that despite the exceptional potential for FHIA, at least 10 years will be required to lay the necessary groundwork for sustaining an impact on the national agricultural economy.

Therefore, the effective institutional life of the center should be considered in terms of at least 25 years.

### Specific Conclusions

The present research program has both international (banana and plantain improvement) and national responsibilities (cacao, citrus, and vegetables). FHIA also conducts exploratory studies and potential new export commodities like mango, black pepper, pineapple, and palm hearts under the diversification program. While the center's initial program development has been well planned, funding is inadequate to mount a reasonable effort on all these commodities. For those and other reasons the evaluation team arrived at the following major conclusions.

- **Mandate.** The original mandate is too broad and does not accurately reflect FHIA's evolving role, potential clientele and comparative advantages both nationally and internationally.
- **Governance.** The system of governance is both cumbersome and expensive. Moreover, there does not appear to be a clear exercise of responsibility on major institutional issues like program expansion and institutional sustainability.
- **Constituency.** FHIA permanency and long-term viability depends on developing domestic support through an organized constituency of producers and other interested parties. Development of this constituency is needed to enlist its input on FHIA research program needs and to provide political leverage within the Honduran public and private sectors and with external agencies.
- **Staffing.** The complement of staff is of high caliber but inadequate in number for FHIA's programs. Most urgently needed are plant pathologists, physiologists, economists, and agronomists in research departments; geneticists in banana breeding; horticulturists in cacao, plantain agronomy and cacao; and accountants in administration.
- **Banana/plantain research.** This program is poised for major breakthroughs in controlling Black Sigatoka disease and yield increases. However, it urgently needs to begin reaching out to future cooperators and beneficiaries who can exploit the new technology.
- **Cacao.** This program is making an excellent start at La Masica and will soon begin having an impact on national production. Cacao appears to be a good prospect for export.
- **Citrus and vegetables.** Citrus is particularly well organized, and an energetic start has been made on pilot-scale vegetable production for export. There is heavy competition for export of both commodities and Honduras does not appear to have a competitive advantage over other sources like Mexico, Guatemala, and the Caribbean region.

- Communications. This well-developed division will soon be fully operational, but needs to turn its attention to training. However, further expansion should be geared to the realistic needs of FHIA research.
- Administration and management. FHIA's administration and support services function well and are on track, albeit shorthanded in some areas like accounting. Management is excellent, ambitious, experienced, well organized, and highly dedicated.
- Financial development. This aspect is underdeveloped owing to preoccupation with institutional development and the daunting nature of the task. This may require some initial assistance by an expert consultant for several months.

## VI. RECOMMENDATIONS

The following are the major recommendations which the evaluation team believes should be implemented in order for FHIA to meet its objectives.

- Redefine FHIA's mandate with input from USAID, giving due consideration to other affected institutions. The team urges that major emphasis be given to research on export crops and that FHIA refrain from direct involvement in production development. FHIA must retain its inherent flexibility to explore new commodities.
- Prioritize research activities and add(or) reassign positions to give needed depth in more critical programs and disciplinary departments that are presently understaffed.
- Develop a critical mass of research effort to be funded on a continuing long-term basis. Consider other research activities only when funding is obtained on a special project basis or added core funding is obtained.
- Request USAID to front-load funds currently programmed for 1992 and 1993 for use in 1988 and 1989.
- Request establishment of an endowment from the Government of Honduras and USAID, the proceeds from which would go to support the long-term core research fund.
- Place immediate emphasis on establishment of an aggressive fund-raising program from all sources -- public and private, national and international. Use short-term experts in this area when necessary to achieve best possible results.
- Continue to establish and further develop national and international linkages to enhance dissemination of research findings.

- Launch a campaign to alert the public of the role of FHIA, FEPROEXAAH, and other interested organizations that play a role in the development of Honduras' agricultural export capacity.

## VII. LESSONS LEARNED

Among several lessons learned from the FHIA experience, perhaps the most important can be summarized under the following headings:

### Program Planning

Good fiscal planning and careful definition of the institutional mandate is essential when developing new projects like FHIA. During the initial development stages growth must carefully match the realistic availability of resources. This will require close monitoring by the founders, FHIA governance, and management.

### Institutional Linkages

An institution such as FHIA needs to establish good relations with several related entities and to nurture these linkages carefully to build an enduring identity, both nationally and internationally.

### The Comayagua Experience

Prospects for exporting temperate vegetables in the off season are very shaky, despite their many advantages for national development. These highly perishable crops have rigid quality requirements, transport costs are exorbitant, and market competition from better situated countries is very high.

Production technology for vegetables is highly sophisticated and requires close management to produce an acceptable product. Moreover, many parts of the valley are contaminated by previous indiscriminate use of agrochemicals; ground water may be of poor quality; and expert, close management is necessary to coordinate carefully timed production. FHIA has no comparative advantages in this role.

## VIII. FUTURE IMPACT

Prospects for the outputs of FHIA's research programs to make a significant impact on Honduras' economy are excellent. As an example, FHIA's future contributions in terms of banana/plantain improved varieties resistant to Black Sigatoka will have a great economic and social impact in the developing world. At present \$100 million is spent annually on Black Sigatoka control in the western hemisphere alone. Based on present progress, FHIA is likely to develop and release improved resistant varieties within the next five years that will save that expenditure.

FHIA's projections, after evaluating the production and export potential of nine commodities after the years or by 1997, estimate the additional

income generated mainly from improved technology will be Lps 1454 million of which Lps 1056.6 million (\$528 million) will come from exports; and the increased value of generated employment would be Lps 237.5 million. Of the total increase, an estimated 77% would occur from increases in cultivated area and 23% would result from applying new improved technology. Profit will have a value in excess of \$500 million.

## I. EVALUATION OF FHIA

### 1.1 BACKGROUND

The Agricultural Research Foundation Project (522-0249), which began in September 1984, was designed to establish the Honduran Agricultural Research Foundation (FHIA). As an independent, private research organization, FHIA will contribute to the expansion and improvement of the Honduran agricultural research system enabling it to better respond to the technological needs of farmers, especially those producing nontraditional export crops. The project includes two major activities: a commodity-oriented research program, and a supporting communications and development component. The institutional strengthening of FHIA is seen as instrumental to the long-term success of the project. A long-range strategy for reaching potential sources of funding to support FHIA development and programs will be developed and implemented.

### 1.2 PROJECT MONITORING

USAID, as an essential condition of its contributions to FHIA, has prescribed three external evaluations of institutional development and progress. There will be two formative and one final evaluations. In addition, data from existing surveys and those under preparation will be utilized to establish a base from which to measure project impact. Variables to be measured will include agricultural practices, acquaintance with and use of modern technology, agricultural yields, and postharvest practices.

#### 1.2.1 First Evaluation

The purpose of this evaluation is to determine progress made to date with respect to the organization of FHIA operations, the initiation of its research, dissemination and fund-raising programs, and to determine the future financial viability of FHIA.

The first and present formative evaluation will concentrate on progress made with respect to the organization of the foundation's operations and the initiation of its fund-raising activities. A specific plan of work was prepared by AID under the title "Evaluation of the Agricultural Research Foundation Project" (522-0249) included herewith as Appendix 1. This project was contracted to Winrock International, which organized the evaluation, mobilized experts, arranged travel and logistics, and prepared the report. The evaluation team travelled to Honduras on August 30 and remained until October 3, 1987, and the team leader spent an additional week at Winrock headquarters in Arkansas finalizing the report for delivery to USAID by November 7, 1987. The biodata for the evaluation team members is included in Appendix 3.

#### 1.2.2 Evaluation Process

The in-country evaluation process carried out during August 30 to October 3, 1987, began with a schedule of field trips and briefings by USAID officials, FHIA staff, GOH officials, university officers and

several representatives of the private sector (e.g., agrarian banks, transnational fruit companies, small producer cooperatives, exporters, shippers, and commodity boards). The field trips included a day's visit to the Comayagua Valley to view the emerging vegetable production and processing industries and the FHIA experiment station-cum-demonstration farm. However, most of the team's activities (from September 3 to 25, 1987) were centered around the institute's headquarters at La Lima and San Pedro Sula on the north coast.

At the center headquarters each program and department presented formal briefings and(or) participated in discussions, some of which were conducted in their laboratories or experimental fields. Field trips included visits to FHIA experiment stations and demonstration farms at Comayagua (vegetables), Calan (plantains), La Masica (cacao), Guaruma (citrus), and other experimental sites or farmers' fields. During these trips, interviews were held with officials of producer cooperatives, with private farmers, and other knowledgeable persons.

The last phase of evaluation included interviews with external agencies like agrarian banks, universities, exporting agencies, transnational fruit companies, commodity groups, production cooperatives and others. Usually, these activities were interspersed with follow-up meetings with FHIA personnel, perusing the extensive documentation list, and composing the report. The team followed the practice of meeting during the evening's dinner hour and at breakfast to compare notes, share impressions, and exchange thoughts. Following the preliminary write-up and early formation of impressions, the team presented a brief overview seminar at FHIA on September 24. On September 29, preliminary draft of the team's recommendations were presented to USAID (and FHIA management) in Tegucigalpa. Discussions during those sessions allowed further clarification of issues and were incorporated into the final report. A more detailed itinerary of the team's movements and activities and a listing of contacts is outlined in Appendix 3.

### 1.2.3 Evaluation Methodology

The evaluation team's activities and deliberations were greatly enhanced by the excellent program and facilities provided by FHIA administration and staff. Every door was open to probing in depth. Well prepared briefings were followed by extensive discussion and visits to experiment stations, farmers' fields, and researchers' laboratories were carefully timed to coincide with the subject being studied. These and other elements essential to a successful evaluation include the following:

- (i) a small team of knowledgeable persons representing a broad range of training, experience, and interests critical to the review
- (ii) ready availability of the documents and literature bearing on the subject

- (iii) well organized and planned briefings on the major activities/programs of the review subject allowing ample time for discussion and clarification
- (iv) frequent field trips (to both field and laboratory) to see firsthand the work under way and obtain a measure of operational efficiency and progress being made
- (v) ready access to closely related institutions and knowledgeable community leaders to allow sampling of other (outside) opinions and perspectives
- (vi) repeat contacts with key staff members on an informal and one-on-one basis to allow clarification of specific points and sifting of divergent views
- (vii) sufficient time for intra-team meetings (preferably on a daily basis) to share experiences, impressions, thoughts, ideas, and to organize and compose the collective experience, conclusions, and recommendations
- (viii) final opportunity to test observations and impressions against the background of local interests, development aims, and extensive experience with defined clientele

The evaluation team enjoyed all these elemental advantages in addition to many other facilities and services that allowed completing the assignment within the time period allowed. In retrospect, however, the team may have benefitted from 1 or 2 extra days at Tegucigalpa to allow more time to study background documents. In order to make efficient use of this indoctrination period the best available sources of information could be identified in advance.

## II. FHIA AND HONDURAN AGRICULTURE

### 2.1 THE AGRICULTURE

Agriculture in Honduras is an anomaly. Some of the most advanced production practices can be found on large operations like the banana production estates. Meanwhile, traditional practices are being used on small subsistence farms in the same region. Recent imbalances in economic conditions, rapid increases in population growth (3.3% per year), and decline in export markets have contributed to slowed economic growth in agriculture of only 2.1% during 1980 to 1985. As a consequence of these and other factors, including lack of petroleum deposits, Honduras is the second poorest nation in the Western Hemisphere (after Haiti) with per capita GDP of only about \$550 per annum.

About 61% of the economically active population was engaged in agriculture in 1970 but was reduced to 46.4% by 1985. Unfortunately, the underemployment rate increased from 11.3% in 1974 to 25% in 1984. Alternate sources of employment like manufacturing increased only slightly from 12% to 15% between 1970 and 1985 while the services sector went from 27% to 38% during this same period. Owing to a high illiteracy rate (40.5%) and school absenteeism Honduran labor has declined both in productivity and output quality.

One promising approach to increase employment, improve living standards, and enhance national economic development is through increasing exports of agricultural commodities. Traditional crops like bananas and coffee representing 27% and 20% of total exports are considered to have reached the saturation level, but several other commodities could be developed to greatly increase economic development and employment. However, new technologies must be worked out, production networks formed, and markets developed.

### 2.2 ESTABLISHING FHIA

Increasing concern for developing an effective technology generating capacity in Honduras resulted in the establishment of FHIA on May 15, 1984. Prime movers in this event were the Honduran Ministry of Natural Resources, USAID, and United Brands Company. Each of these organizations made long-range commitments in terms of resources, land, and facilities. In particular United Brands contributed virtually its entire research facility (offices, laboratories, greenhouses, and grounds, and the banana breeding germplasm) at La Lima on the north coast while AID made an initial grant of \$20 million to provide core funding for the start-up and MRN committed additional funding and helped in the implementation of a national charter.

The primary goal of FHIA is to contribute to increased income for farmers and to generate additional employment in Honduras. This will be done by increasing the productivity of the Honduran agricultural sector, particularly the small- and medium-size farmers, by improving their access to quality research services. The primary focus of the center will be on nontraditional crops for export. An initial agreement was

made with the MRN and other Honduran research agencies to include six commodities (banana/plantain breeding, plantain agronomy, cacao, citrus, vegetables, and diversification crops) supported by a strong communications activity. Of these, the banana/plantain breeding is the most advanced program by virtue of being a continuation of the prior, long-term United Brands involvement.

A more detailed description of events leading up to establishing FHIA, its purpose and objectives, the institutional structure, staffing, function and activities, mandate, and projected output are discussed in a recent draft of "FHIA's Mandate, Financial Projection and Sustainability: A Funding Strategy Draft Document." Relevant portions contained in Sections I through III of this document are included in Appendix 4.

### 2.3 THE MANDATE OF FHIA

The mandata of FHIA is to generate and transfer technology to support production of export oriented agricultural commodities -- traditional and nontraditional -- including the generation and transfer of technology to support basic staple food grain crops.

Regarding FHIA's mandate content, it encompasses the generation and transfer of technology to support the continuum that includes planning, production, postharvest and marketing.

### 2.4 RESEARCH PROGRAMS

As of 1985, the research programs prescribed by the administrative council and sanctioned by the General Assembly of the FHIA are:

- banana and plantain breeding
- plantain agronomy (crop management and protection)
- cacao
- citrus
- vegetables
- crop diversification

In addition there are five disciplinary departments -- agronomy, plant pathology, entomology, agricultural engineering, and biometrics -- that function across the commodity programs on a variable time share basis. These departments also manage the technical services laboratories (soils and residue analysis, disease and pest identification) that provide specialized agricultural services to Honduran producers and to public and private organizations.

### 2.5 FHIA'S CONSTITUENCY AND BENEFICIARIES

The constituency of FHIA are the producers of commodities in FHIA's mandate. FHIA will also give attention to extension personnel of the public and private sector who in turn provide technical assistance to producers. Additional members of FHIA's constituency are professionals, merchants, businessmen, industrialists, public officials, and students.

The beneficiaries of FHIA's research results are Honduras producers, regardless of size, with special emphasis on the small- and medium-size farmers (cacao and plantains).

Other beneficiaries are those involved in the processing and marketing activities related to the commodities in FHIA's mandate.

The resulting increased production through both expansion of area and augmented productivity will generate additional employment. Consumers from both importing countries and in Honduras will benefit from better availability, improved quality, and lower prices.

FHIA's banana and plantain breeding program will generate new pest and disease resistant varieties that will benefit the producers, consumers and the economies of export banana producing countries. In the case of plantains the number of countries and the number of people benefiting will increase enormously. The plantain is a basic staple food commodity among the poorer classes of many developing countries.

## 2.6 FHIA'S ORGANIZATIONAL STRUCTURE

The foundation's maximum authority is its General Assembly presently composed of 30 members selected from the public and private organizations of the agricultural sector, who meet once a year.

A Board of Directors or Administrative Council composed of eight members meets every two months, counsels management, and sets operational policy.

An Oversight Committee (Comité de Vigilancia) periodically audits FHIA to ensure that finances and operations are properly regulated and conducted according to ethics and normal procedures.

FHIA's management is a responsibility of an executive director general, assisted by three division directors: research, communications and development (fund-raising). An executive administrator, directly under the director general, is in charge of accounting, personnel, and other administrative support services.

Each of the six commodity research programs is headed up by a "leader," who provides the scientific, technical and logistic leadership required to coordinate program staff work. Individual teams consist of a small group of two or three commodity specialists, plus the support provided by the scientific disciplinary departments that work in concert with the commodity program staff.

The six existing disciplinary departments; agricultural economics, agronomy, entomology, pathology, agricultural engineering, and biometrics include three to five professionals in each department. According to FHIA management, this arrangement in programs and departments allows the most efficient utilization of limited personnel and resources.

## **2.7 SPECIALIZED TECHNICAL SERVICES**

FHIA provides a significant contribution to the Honduran agricultural sector offering specialized services to producers as well as to institutions. In this way, FHIA is providing high quality specialized services not only to Honduras but also to organizations involved in agricultural development in the Central American region. Since its inception, FHIA has been providing specialized laboratory services at reasonable cost including:

- chemical analysis of soils and plants
- identification and diagnosis of diseases and pests
- testing pesticides and residues

### III. THE RESEARCH PROGRAM

#### 3.1 BACKGROUND

Agricultural research in Honduras began at the turn of the century to support the technological needs of the banana production and trade. The late United Fruit Company pioneered this effort. Meanwhile, other agricultural production enterprises were established as privately owned, profit oriented organizations, but United Fruit (later United Brands Company) was the only one which included a research division to support the technological base for production.

In the mid-1980s the Government of Honduras, through its Ministry of Agriculture, initiated a research effort to augment the production of staple food grains and livestock. Since its inception, this program has concentrated on basic food grains, but to date no research has been conducted by MRN on export oriented commodities.

#### 3.2. FHIA'S ESSENTIAL CHARACTER

FHIA's original funds provided by USAID (US\$20 million) were allocated to support mandated research and dissemination of results for a period of grace -- no longer than 10 years -- while continuation funds to be obtained from other sources aimed to replace the initial funding.

Intrinsic to the foundation title is the necessity for FHIA to identify and develop a constituency willing to provide political and financial support to its programs, through the emergence of organized producers and other interested groups. Therefore, FHIA was established with external support but its permanency depends largely but not exclusively on gaining domestic support and in diversifying its funding sources.

#### 3.3 THE COMMODITY PROGRAMS

##### 3.3.1 Research Personnel

The six commodity programs (including diversification) are the activity channels for the 38 professional and 50 permanent support staff assigned to FHIA's research. Of these, 20 professionals and 20 support personnel are assigned directly to one of the commodity programs while 13 professionals and 14 support personnel are assigned to the disciplinary departments and participate across commodities. The remaining 5 professionals and 16 support staff are assigned to horticultural development (3 and 5, respectively) and to analytical services (2 and 11, respectively). The personnel of the six commodity programs comprise 79% and 60%, respectively, of the total professional and support personnel of the center.

### 3.3.2 Current Activities and Future Prospects

Each of the six commodity programs has made considerable progress in identifying and prioritizing constraints, formulating improvement strategies, and organizing activities. Although it is much too early (only 1 to 2 years) to assess progress, some programs like banana/plantain breeding, which continues earlier work started by the United Brands Company, have several promising improvements in advanced stages of development. These include genetic sources of resistance to Black Sigatoka disease and Panama Disease Race 4, dwarf plantains, and exceptionally large fruit bunches. Exploitation of these important characters, both singly and in combination, will have far-reaching consequences for the production and consumption of bananas and plantains throughout the world.

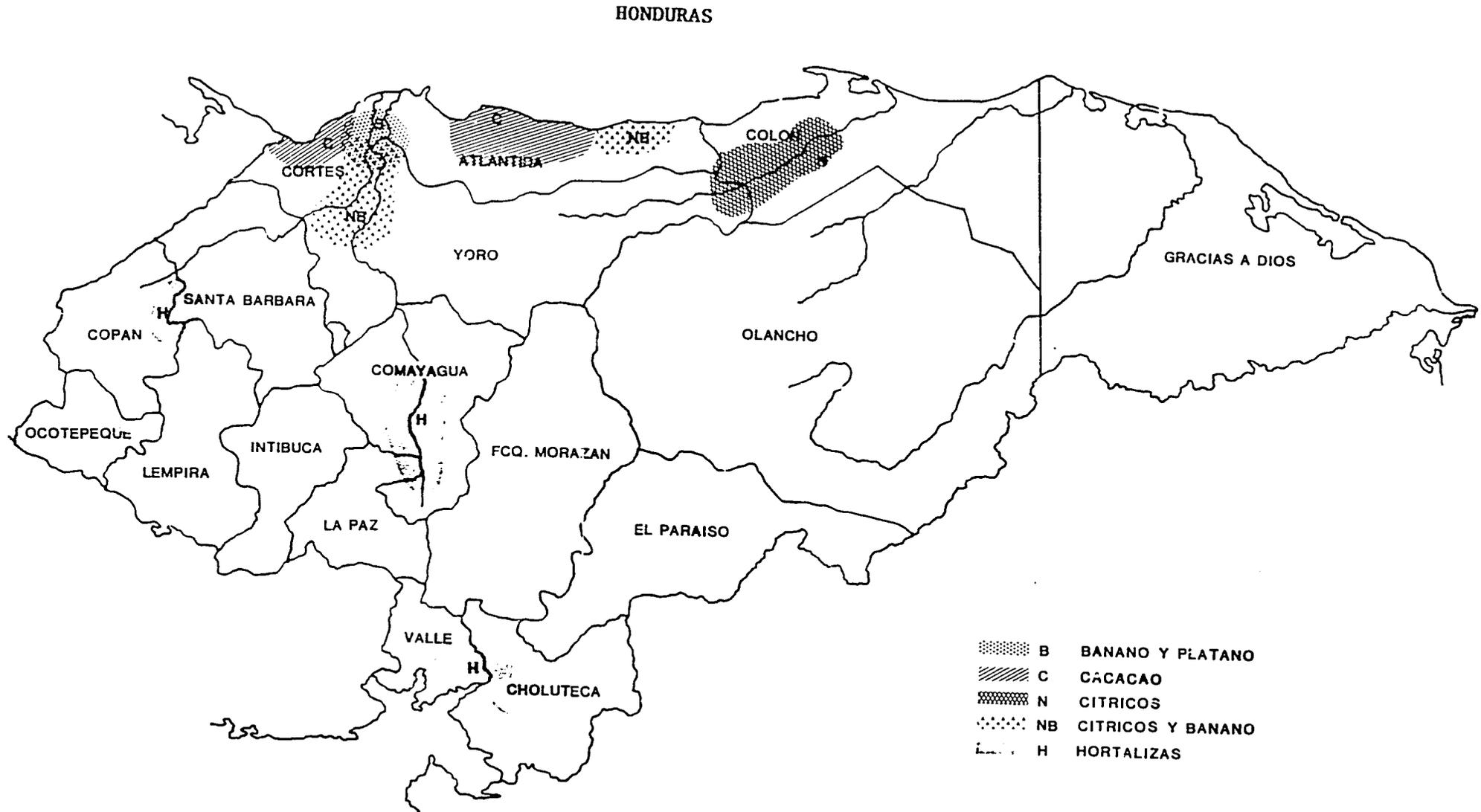
The other programs like plantain agronomy, cacao, citrus, and vegetables have made an excellent start in organizing their activities and facilities -- including experiment stations at Camayagua (vegetables and mango), Calan (plantains), Guaruma (bananas and citrus), and La Masica (cacao). The citrus program is planning two more work stations -- a lowland site for grapefruit and a highland site for oranges. Additional sites have been established on farmers' fields at different locations in the country: Aguase Valley on the north coast, La Entrada in the west, and Choluteca in the south. The principal areas where FHIA is working at present are shown in figure 1.

The diversification program (DP) is an interesting new model, in some respects epitomizing the very nature and purpose of FHIA. The primary objectives of the DP is to contribute to diversifying Honduras' agricultural export potential. It functions by analyzing the potential for new commodities and processes and in carrying out the initial exploratory research necessary to develop a technological base which is appropriate, feasible, and cost-effective to support the production, postharvest handling and marketing of new and potentially promising export commodities. A source of preliminary exploration on new crops and of planting stocks is the readily accessible Lancetilla Botany Garden near La Ceiba. In the future the DP will become invaluable to the national economy in identifying and helping develop new export commodities ahead of the competition.

### 3.4 FHIA ACCOMPLISHMENTS AND CONTRIBUTIONS

Although it must be recognized that it is too early to make an evaluation of FHIA's first three years of work, some significant accomplishments have been made and are briefly described in the following sections.

Figure 1. Areas where FHIA is conducting research



### **3.4.1 FHIA as a New Model of Research Organization**

#### **3.4.1.1 Identity**

The FHIA was established under the auspices of the Government of Honduras, United Fruit Company, and the Agency for International Development (USAID). Therefore, FHIA must establish a national identity in response to Honduran interests.

It is our impression that FHIA is making good progress in this respect. However, a campaign is needed to alert the public and to clarify the mandate and role of FHIA, FEPROEXAAH and other organizations with key roles in the development of Honduras' agricultural export capacity.

#### **3.4.1.2 Developing a Constituency**

FHIA has made rapid progress identifying and building a constituency. The FHIA permanency and long-term viability depends on developing domestic support through organized groups of producers and other interested parties in order to enlist their input on FHIA research program needs and to provide political leverage within the Honduran public and private sectors and with external agencies.

#### **3.4.1.3 Credibility**

In its first three years, FHIA has successfully established an institutional image of professionalism, responsibility, good management, and efficient operation.

### **3.4.2. Developing an Institutional Capacity**

#### **3.4.2.1 Physical Plant**

FHIA is to be commended for its well-planned and cost-effective strategy exercise in repairing, remodeling, and efficiently arranging the buildings and properties donated and purchased from United Brands Company.

The FHIA management and agricultural engineering departments are commended for their diligence and efficiency in designing and constructing the physical plants at the La Masica and Calan research and demonstration centers.

#### **4.3.2.2 Human Resources**

It is the team's opinion that FHIA has given the most careful attention to identifying and selecting the best qualified individuals for its professional staff. This combination of Honduran professionals and international specialists from different countries includes several former staff members from international centers (CIAT, ICRISAT, others). However, FHIA urgently needs to strengthen the disciplinary research departments capabilities since effective research depends on a critical mass of human resources organized as an interdisciplinary team effort.

### **3.4.3 FHIA's Significant Research Contributions**

#### **3.4.3.1 Biological Contributions**

Several important preliminary advances designed to expedite main stream activities have been made during the past 1 or 2 years.

(i) **Banana.** Although Race-4 of Panama Disease is not yet present in Latin America, it represents a potential threat to the banana industry. FHIA's banana/plantain breeding program, with the generous cooperation of Australian scientists, made an extraordinary discovery that the banana strain SH-3362 carries resistance to the Race-4 pathogen. As the genetic investigations develop at FHIA, these genes will become more important, specially when the disease begins to spread to new areas.

(ii) **Dwarf plantains.** Two new dwarf plantains from 1.2 to 2.0 meters shorter in height than the traditional variety (first identified by the MRN) are under intensive study of FHIA. These two dwarfs combine comparable quality of fruit and bunch size with resistance to toppling, higher yields, and better disease/insect control. Higher yields are obtained because the dwarfs can be planted at higher densities and disease control is more effective because hand spraying can reach the more vulnerable upper leaves (2.5 m to 3.2 m versus 4.5 m).

(iii) **Disease screening techniques.** FHIA's Plant Pathology Department has discovered and extracted a phytotoxin produced by *Mycosphaerella fijiensis* var. *difformis*. Several inoculation tests indicate this toxin can be used to screen or differentiate between various levels of resistance to Black Sigatoka disease. Future plans are to use the toxin to screen Dr. Rowe's breeding materials for resistance to isolates of the pathogen obtained from around the world without introducing the fungal isolates into Honduras.

(iv) **Citrus pests.** The FHIA Entomology Department has made a significant contribution by identifying a fruit piercing moth as the primary culprit of extensive damage done to oranges. Another accomplishment is the identification of weeds that host the pest along with the characterization of the biological cycle.

(v) **Regulating mango maturity.** FHIA's diversification program has successfully induced early blooming in mango in order to ripen fruit for export from February to April when minimum competition occurs from other exporting countries.

#### **3.4.3.2 Commodity Feasibility Analysis**

It is our opinion that FHIA has already made important contributions in gathering and analyzing basic information not only on commodities, but also in characterizing the agroecological and socioeconomic conditions for each important commodity. Detailed field studies and extensive interactions with producers and other interested parties have been carried out.

Another important contribution has been the development of a methodology for commodity analysis, which includes agroecological aspects and a bank of information for the areas of concentration of crops of interest to FHIA.

#### **3.4.4. Contributions in Planning and Agriculture Policy Guidance**

FHIA has contributed valuable agricultural development policy guidance to the Government of Honduras. In one instance its technical analysis showed that it would be inappropriate and undesirable to plant sweet oranges in the low areas of the Aguan Valley Development Project (2,300 ha) thus avoiding significant long-range economic and financial losses to Honduran producers.

#### **3.4.5. Commodity Export Potential Evaluation**

The FHIA diversification program has developed a methodology to select agricultural commodities with export potential. One significant finding is that 12 crops headed by mangoes, palm hearts, and green peas were found more profitable than bananas, and 17 crops are more profitable than coffee under Honduran conditions. In this study about 1000 species were screened.

#### **3.4.6. Specialized Services Contributions**

FHIA has developed the capacity to play a significant role in the national efforts to protect the Honduran ecology. FHIA analytical laboratories have the means for monitoring and identifying contaminants like pesticides, heavy metals, and other dangerous substances and alerting GOH of the presence of potentially dangerous new pests and diseases.

## IV. COMMUNICATIONS AND LINKAGES

### 4.1 COMMUNICATIONS

The founders of FHIA determined that the foundation would establish a small but effective communication and development directorate. The purpose was to establish links to national and international agricultural research and education institutions; producer, processing, trade and other private sector organizations; the national extension service, and to a limited extent, directly to farmers, and potential sources of research grants, contracts, endowments, and other support. Also, modern communications technology would be used to produce materials in various media targeted for different audiences, improve the quality of training provided for extension workers, and maintain a computer based research data and information service readily accessible to all members of the network. The directorate would collaborate closely with the Office of Agricultural Communication and Public Relations in the MRN in the development of a national agricultural communications network.

Communications and development were eventually established as separate divisions, each headed by a director. Then the initial establishment of the Communication Division was contracted to a consortium led by the Academy for Educational Development, Inc. (AED) including Cornell and other universities under a project entitled "Communication for Technology Transfer in Agriculture" (CTTA).

#### 4.1.1 Current Status

Excellent progress has been made in developing an effective, functional Communication Division and its programs. At present the communication and library units are functioning except for on-site printing, which should be operational by the last quarter of 1987. Twelve qualified staff members (including four professionals), headed by a highly motivated and able director of international standing, have been recruited. However, additional staff will be recruited to bring the division up to its projected strength.

Offices and laboratories have been established (at present in limited space) and equipment has been procured. Recently, a new facility has been purchased (formerly the United Brands Company recreational Club Sula) and will be refurbished to provide adequate space for the communications operations, including training. This facility, which cost Lps 600,000 to purchase and Lps.900,000 for refurbishment, costs only one-third of a ground-up new facility.

There remains one largely undeveloped area, that of training, which is expected to increase in importance as the center becomes better established and research programs develop. Expanded facilities eventually including dormitory and food services, will be required to cater for structured courses with larger numbers of trainees.

#### 4.1.2 Overview of Communications

The Communications Division is a highly professional and well managed operation. It appears to be on track and perhaps even ahead of schedule in development. However, there is not yet any measure of FHIA's training function although indications appear generally favorable depending on the development of both communications and the research programs and on future demand.

An overall impression of communications is that of professional excellence with the potential capacity for serving the needs of a somewhat larger institution than FHIA. Perhaps the division can serve a larger role within the national and international milieu in terms of training in communications, assisting and advising the MRN, and exploring new approaches to technology transfer.

#### 4.2 COMMUNICATIONS FOR TECHNOLOGY TRANSFER IN AGRICULTURE (CTTA)

##### 4.2.1 The Academy for Educational Development (AED)

The Academy for Educational Development (AED) has a five year contract co-sponsored by AID/Washington and USAID/Honduras to provide a communication support component for technology transfer in agriculture. This project (CTTA) is being implemented by two groups, the Ministry of Natural Resources' communication unit and FHIA's Communication Division. This involvement has a major impact since a significant portion of FHIA's annual operating budget goes toward supporting the CTTA project.

Funding for FHIA's portion of the CTTA project comes from the \$20.0 million allocated by USAID to FHIA for the 10 year life of the project. For each of the five years, \$250,000 of FHIA's annual allocation from USAID is ear-marked to pay AED for the CTTA function.

FHIA management does not receive sufficient information concerning the overall activities, responsibilities, budgets, financial status and other project data concerning the CTTA project even though FHIA contributes considerably of its resources. FHIA does not have a copy of the agreement between AID and AED, only the letter of understanding between MNR, FHIA, and USAID is available.

At the present time, FHIA must set aside the \$250,000 per year from its annual operation's budget and consider that amount as committed, yet does not receive reports of its actual expenditures for the CTTA. This could result in FHIA not utilizing funds that might be available and badly needed for other FHIA activities.

In order to better manage its Communication Division's activities, FHIA must have better information on the overall CTTA activities, especially as FHIA funds are being utilized. FHIA now has sufficient expertise to manage its own communications functions and is seriously considering

terminating the project with AED. Moreover, the team believes that procurement could have been done at lower cost and more efficiently by FHIA directly.

### 4.3 INSTITUTIONAL LINKAGES

#### 4.3.1 Importance

In order to justify the existence of FHIA and ensure its longevity it is imperative that FHIA become an integral part of the Honduran socio-economic development system. To accomplish this, the coordinated and complementary participation of other institutions is essential to help achieve FHIA's mandate thereby guaranteeing a continuing stable flow of cost-effective technology.

#### 4.3.2 Current Situation

##### 4.3.2.1 National Level

The most consistent and formal mechanism used by FHIA to maintain its interinstitutional linkages has been the integration of technical advisory committees for plantain, cacao, citrus and soybean crops; these committees coordinated by FHIA have included participation of FEPROEXAAH, the Ministry of Natural Resources, Farmers' Associations, and other public institutions related in some way with the respective crops. These meetings have served as a forum for discussion of the broad issues, involving product marketing, producer's services, political framework, and technical aspects of each individual commodity.

Other interinstitutional linkages have been established by FHIA through ad-hoc activities with specific objectives, which have been formally documented in some cases but usually only verbal agreements have been reached. This type of agreement has been reached with the National Plantain and the National Soybean Programs of the Ministry of Natural Resources in order to divide up the research workload on these commodities in a mutually satisfactory manner. There are agreements with APROCACAHO for joint management of demonstration plots and with CURLA and USPS to assist students with graduate thesis programs. Among the formally documented activities there are the Horticulture Demonstration Farm in Comayagua with FEPROEXAAH, the Integrated Pest Management Project with the EAP, and others.

FHIA has also carried out training activities such as courses, seminars, and field days where there have been interinstitutional relations including participation of credit institutions.

Furthermore, with the objective of working in close proximity with target groups FHIA has established small experimental stations in the center of the most important production areas for each crop.

#### 4.3.2.2 International Level

At this level FHIA has maintained relations with some U.S. and other external institutions, such as the University of Florida in citrus; Louisiana State University on Black Sigatoka of banana; Cornell University on communications; New York Botanical Garden on taxonomy, and CATIE as a supplier of cacao germplasm. However, these contacts have been isolated and do not follow a defined policy.

#### 4.3.3 Observations

As noted above, FHIA has succeeded in establishing linkages with some institutions which can help carry out its mandate. However, it is necessary to continuously strengthen these linkages until a genuine spirit of cooperation exists (practical, effective, functional) and coordination of the interinstitutional relationship develops so that FHIA can become an integral part of the Honduran socioeconomic development system.

##### 4.3.3.1 Interinstitutional Teams

At the field production level FHIA should establish on-farm research teams responsible for carrying out research and adaptation and validation of production technologies. These teams should consist of FHIA on-farm researchers, extension agents from appropriate organizations, and representative farmers in order that the interactive participation of these interinstitutional teams become the key to ensuring a continuous flow of technologies for the dynamic production process. Concurrently, these teams will facilitate the process of feedback from the farmer to FHIA so that the technology generated will be appropriate to the socioeconomic conditions of the farmers, and will also fulfill market requirements for the commodities produced. Since the teams will consist of existing FHIA and other institution's staff members, costs should be minimal except possibly for some modest implementation funds -- mainly for transport.

##### 4.3.3.2 Technical Advisory Committees

FHIA also needs a forum for coordination at the management level of the various institutions with which it interacts. The existing technical advisory committees could assume this role. However, FHIA should review and revise the present make-up of these committees to include all those institutions not presently represented, such as credit institutions. When this is done, the first task will be to define the role and responsibilities of each with respect to the others to ensure effective coordination. In this forum the implementation plans of each institution should be discussed and coordinated. Once these plans are finalized, each institution should agree to provide support to the others according to their capacity and mandate. As an example, in control of Black Sigatoka, FHIA would carry out the research, MRN would provide a plantation of dwarf plantains for this research, ANAPLA would provide the inputs and FEPROEXAAH would test the export quality of the resulting product. The committee should jointly followup on the

implementation of their plans and analyze and discuss the results so that a new plan can be developed.

#### 4.3.3.3 Involvement in National Planning

At an even higher national level, FHIA should participate in the definition of Honduran macro policy relevant to the crops in its mandate by providing pertinent information to the national planning system. For example, FHIA would give INA information on the area of the country where export quality orange concentrate could be produced so that INA could organize the agricultural reform sector to ensure production in an appropriate climatic zone. FHIA also needs feedback from this macro level so that its programs will be in line with national priorities.

#### 4.3.3.4 Linkages with the Scientific Community

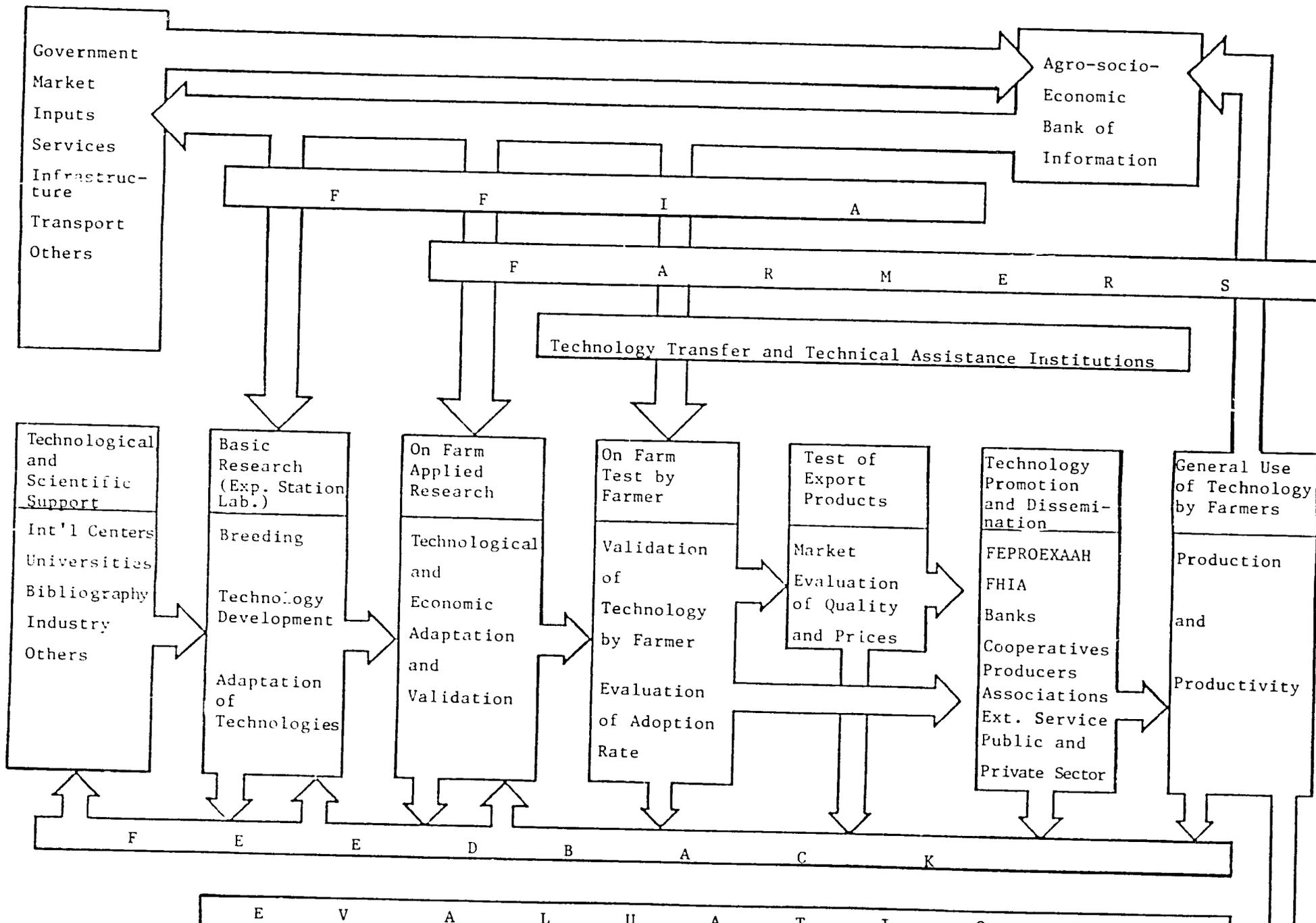
At the scientific community level, FHIA should continuously explore possible linkages with those organizations, both national and international, which could provide scientific and(or) technological support and make formal agreements for mutual cooperation with appropriate institutions ensuring that the agreements are fully in line with the mandates of each organization. The international centers do not have much to offer FHIA at this time because they do not work with the same commodities. On other hand, there are many universities which do have a great deal to offer, such as the University of Miami with assistance in pesticide residue analysis. FHIA has a great deal to offer at this time to the scientific community in Musa spp. technology and information.

#### 4.3.3.5 FHIA's Role Definition

Figure 2 is a diagram which can serve as the basis to define FHIA's role and relationships with all the above mentioned institutions. This has been discussed thoroughly with Mario Contreras and Jairo Cano, directors of research and communication of FHIA, respectively.

In order to consolidate linkages, we believe that FHIA should include in its training program courses in technical and methodological aspects of technology generation, validation and transfer for its own personnel as well as for personnel of other institutions with which FHIA coordinates to carry out its mandate.

Figure 2. FHIA's technology generation and transfer system



## V. GOVERNANCE AND ADMINISTRATION

The evaluation team was impressed with the progress that FHIA has made in a relatively short period of time. Continuing from the able stewardship that was provided by Mr. Millensted, Dr. Fernandez arrived and began developing the project staff that has already made several major accomplishments although much remains to be done. In setting up a new organization, it must be recognized that there are multitudes of details to be managed and that some of the methods and procedures that are originally developed will later need to be altered. FHIA has instituted basic procedures that allow the organization to become established and handle resources in an effective manner. Reviews of original procedures are being made to fine tune them to meet FHIA's operating needs and determine needs for additional procedures and guidelines.

### 5.1 GOVERNANCE

The policy setting and overall operational guidance of FHIA appears cumbersome, expensive (mainly of management and staff time), and sometimes, capricious by international standards. The Assembly (30 members), the center's highest authority, meets once a year, but has the power to make quick decisions sometimes based on spur-of-the-moment, emotional pleas. These kinds of acts can have a profound impact on the center's directions and functions.

The Administrative Council, consisting of eight members elected by the Assembly, meets every two months to counsel management and set operational policy. An Oversight Committee (Comité de Vigilancia) of three or four members elected from the Assembly requests audits and assures that finances and operations are properly conducted and regulated.

The basic problems of governance activities is that the Assembly, with least knowledge and contact with FHIA, has the greatest power and influence on the center's directions and operations. Moreover, governance activities are not yet linked to fund raising activities.

### 5.2 ADMINISTRATION AND MANAGEMENT

#### 5.2.1 Facilities

FHIA has made wise and efficient use of the United Brands facilities that were donated. The buildings had been vacant for about 2 years, during which time there had been little, if any, maintenance. FHIA, therefore, had to perform a significant amount of maintenance and refurbishment to make the buildings usable.

The former warehouse building used by United Brands was converted into the main research building. It was originally thought that a new research building would have to be built at a cost of about \$1,500,000,

but instead, the original building shell was used and a very adequate facility emerged that cost under \$100,000. Rather than building new structures, other existing buildings were remodelled as necessary and are serving FHIA's current needs though certain departments require more space. This has saved tremendous amounts of fiscal resources to meet other pressing needs. The evaluation team felt that the remodelling and refurbishing work has not been excessive and expenditures have been reasonable.

FHIA has recently bought adjacent land and the building which formerly housed the United Brands employees' club with the intention of converting it into a communications building to include seminar rooms, library, printing shop, and visitors' center. It was a strategic acquisition since it is located directly to the side of the facilities originally donated by United Brands and is a natural site for the Communication Division. It will complete the set of buildings in the main FHIA complex.

The laboratory building is currently being used for several unrelated activities such as accounting and communications. When the former employees' club mentioned above has been remodelled, the Communication Division will move into it. The library will also be moved from the administration building to the new communication building thus making space available for accounting to move to the administration building and close to the executive administrator. The accounting office currently has six persons housed in a room only 15' x 15'.

#### 5.2.2 Procedures/Internal Controls and Accounting

FHIA's staff quickly developed written procedures for managing and conserving resources. Procedures/operating manuals for travel, vehicle use, personnel, accounting, purchasing, and inventory/supplies were developed and put into use to assure that staff had proper guidance and knowledge for operations.

Discussions with the external audit firm that performed FHIA's audit for each of the first two years, Mendieta y Asociados, as well as review of the financial statements and management letters revealed no material findings. In order to protect its legal right, FHIA will need to follow up on finalizing the ownership documents for land that was purchased for experiment station use.

Financial management appears to be in hand. Though short of accounting staff, they are attempting to accommodate the needs of internal FHIA staff as well as meeting reporting requirements to the Administrative Council, management staff, individual commodity leaders, and sponsors. The development of a simplified fiscal report for the Council utilizing only highlights will make the report more understandable and meaningful. Additional staff is needed in the accounting office, to ensure proper and accurate accounting, especially with new sources of special project funds coming on line in the future.

A detailed and thorough indirect cost study conducted as soon as possible will substantiate a rate to include in special project budgets.

This would help ensure that project sponsors share equitably in indirect costs and that FHIA's core resources are not used to support such activities. Advice may be obtained from other similar nonprofit organizations that have long experience in indirect cost calculations and applications. Many external audit firms do not have an in-depth knowledge of this subject so appropriate expertise must be sought.

Increased use of microcomputers would result in greater efficiency and adequate control of assets in several areas like inventory, purchasing, fixed assets, maintenance scheduling, cash flow management, and personnel.

### 5.2.3 Personnel

The overall qualifications and dedication of the FHIA staff are impressive. An excellent job of recruiting and selecting highly qualified persons and forming them into an efficient team has been done. Wide-reaching recruitment efforts have been used to obtain the best possible individuals.

A concern of the evaluation team was the fact that no salary increases have been made since 1986, either cost-of-living or merit. It is recognized that management realizes that fiscal resources are very limited, but not providing moderate salary increases might turn out to be to the overall detriment of FHIA. Well qualified persons hired are also likely to be recruited by other organizations. FHIA is thereby vulnerable to losing staff members if it does not keep salary levels that are at least equitable for the area.

### 5.2.4 Staff Benefits

FHIA's compensation package for employees is quite conservative. Employees must pay 50% of the premiums for medical and life insurance. Those who are at the higher end of the salary scale, over \$650 per month, are offered a long-term disability policy, but the employee must pay the entire premium if he or she desires the coverage.

A retirement plan is also optional. If the employee elects to participate, he or she must contribute 5% or 10% of salary (5% for employees up to 35 years of age and 10% for those 36 and over). This contribution is matched by FHIA. Currently, the retirement plan is managed by a U.S. insurance company. All contributions are invested in U.S. dollars. The benefit an employee will receive as an annuity is based solely on the amount in each individual's account when he or she retires and it is actuarially computed.

FHIA has a plan for assisting local staff members with educational costs for their children. All eligible staff with children in school are using this plan.

International staff receive certain additional benefits. Assistance for initial costs of moving to Honduras is in line with similar groups. A rental assistance plan of up to 20% of a member's salary is paid.

Educational costs up to 100% of the rates for the local international school are reimburseable.

Comparing salaries and benefits paid to staff with those of somewhat similar institutions in other locations, the feeling of the evaluation team was that FHIA's perquisites are adequate but not out of line.

#### 5.2.5 Special Projects Management

An important source of support for FHIA in the immediate future will likely be from special projects funded by various sponsors. This will require considerable effort in terms of possible projects with potential sponsors; proposal preparation; negotiation, contracting and subcontracting; technical, administrative, and fiscal reporting, and other related tasks.

This activity will be of major importance to FHIA but involves new and different management responsibilities. Adequate support for special projects will be necessary if they are to be carried out successfully and meet the goals of FHIA and project sponsors. This will require added inputs of resources. It is extremely important that projects are only undertaken with complete funding of both direct and indirect costs, so that other FHIA resources are not diminished to support special projects.

#### 5.2.6 Purchasing

FHIA has been required by USAID to purchase imported equipment and supplies using the purchasing services agent (PSA). This has proven to be costly and extremely time-consuming for FHIA and delayed the arrival of needed items. For the first year or so of FHIA's existence, this arrangement probably was useful and needed. FHIA has now developed purchasing procedures that include quotations, contacts with international suppliers, and shipping arrangements so that purchasing and importation can be managed efficiently. Purchasing will be greatly expedited if FHIA is allowed to purchase directly without having to use PSA.

#### 5.2.7 Maintenance

Up to this point a major portion of the maintenance effort has been in remodelling and refurbishing buildings donated by United Brands. Much of the equipment and vehicles were new so maintenance needs have been minimal. As the vehicles and equipment age, an increasing amount of maintenance will be required. Moreover, the FHIA Maintenance Section will require augmentation to ensure that equipment and facilities do not deteriorate. A preventive maintenance program utilizing a microcomputer would be a valuable "tool" for this purpose.

#### 5.2.8 Internal Audit

FHIA currently has no internal audit function or a similar means of assuring adherence to procedures and operating standards. However, FHIA could, with minimal effort, create a function within the organization to

assist staff by establishing and following workable, efficient operating procedures.

#### 5.2.9 External Audit

The external audit firm has been submitting and discussing its annual audit with FHIA management, not the governing board. The Oversight Committee's responsibilities include selecting the external audit firm.

The usual procedure in most organizations is for an external audit firm to submit its report to the Board of Directors/Trustees or some subcommittee thereof. In FHIA's case the report might be submitted to the Oversight Committee since that committee selects the audit firm. Of course, during the actual auditing, nearly all contact would be between the audit firm and FHIA's internal management staff.

#### 5.2.10 Annual Report

It was noted that the FHIA Annual Report for 1986 had not yet been printed and distributed, nine months after the close of the year. However, FHIA will soon establish its own print shop allowing publication and distribution of the annual report to donors, project sponsors, clientele, and the interested public as soon as possible after the end of a year.

#### 5.2.11 Food and Housing

FHIA is considering establishing food and housing facilities due to the lack of such accommodations in La Lima. Facilities for short-term consultants, trainees and persons on sabbatical leave are urgently required since San Pedro Sula does not have much to offer and is too far away. FHIA will apply for USAID PL-480 funds for this purpose.

## VI. FINANCIAL EVALUATION

### 6.1 PROJECT FINANCIAL ANALYSIS

The evaluation team made a thorough financial analysis of FHIA's first three years of operation. A comparison of the original financial plan, requirements for the increased scope of work, and actual expenditures for the three years raises a major question as to the adequacy of the financial resources currently planned.

#### 6.1.1 Long-term Assumption

The financial analysis contained in the early project planning obviously had to make a number of long term assumptions. As would be expected, experience of FHIA during its first three years of operation has shown some significant variances from the original plan.

##### 6.1.1.1 Increased Staffing

The original project plan envisioned an organization of 134 total staff, distributed among nine (9) commodities. The actual project implementation plan reduced the number of commodities but called for greater emphasis on the selected commodities. The evaluation team feels that a larger and more intense level of effort is needed for FHIA to meet its original mandate. The FHIA organization currently has approximately 230 staff members, thus requiring far greater fiscal resources than the original project plan.

##### 6.1.1.2 Inflation

The original project financial plan and project cash flow estimation seems to have overlooked or underestimated the effect that inflation would have on the value of the funds that were to be provided by USAID over the ten year life of the project. The plan called for nearly level allocations from USAID for the 10-years with income from the Government of Honduras (GOH), other donors, and sales/services increasing throughout the 10 years. Most certainly the actual inflation that has been experienced to date and that which can be expected for the next seven years will reduce considerably the actual value of the USAID funds available to FHIA, thus making the meeting of the goals with current funding highly unlikely.

##### 6.1.1.3 Rate of Expenditure

The actual expenditure rates experienced in 1984, 1985 and 1986 were below the levels projected in the original project financial analysis. This would be expected with the time required to recruit staff; purchase and ship equipment, vehicles, and commodities, and get research projects under way. The savings that resulted in the build-up phase have been used primarily in 1987 to support a research program of increased scope that was developed by the FHIA management, as minimal to meet its

mandate, and approved by its Administrative Council, Assembly, and USAID.

As a consequence of a slower-than-expected expenditure rate in 1985 and 1986 and higher-than-planned rate in 1987, FHIA's expenditures at the end of 1987 should be approximately on the schedule contained in the project plan.

#### 6.1.1.4 Future Needs

The serious problem that FHIA faces in 1988 and subsequent years is how to finance the increased scope of operations that has been undertaken. FHIA's recently-developed budget for 1988 to 1983 is reflected in table 1. Known funds are those that appear to be firm at this time. The lower portion of the table assumes that USAID will authorize front-loading to 1988 and 1989 and income from GOH/USAID endowment would provide \$3.5 million per year starting in 1990. The line entitled "grants/special projects" shows what would have to be derived from those sources in order for FHIA to break-even if spending is to be at the level projected.

Table 1. Current status of FHIA expenditures and funding sources.

	U.S. dollars, 000						
	1987	1988	1989	1990	1991	1992 <sup>4</sup>	1993 <sup>3</sup>
Total funds committed to FHIA	4,600	3,638	3,650	2,825	2,820	725	750
FHIA's planned expenditures	4,200	5,200	5,970	6,815	7,998	8,825	9,709
Balance <sup>1</sup>	400	(1,562)	(2,320)	(3,990)	(5,148)	(8,100)	(8,959)
Carryover	--	400	779 <sup>2</sup>	459	--	--	--
Front-loading	--	1,941 <sup>3</sup>	2,000 <sup>4</sup>	--	--	--	--
Endowment	--	--	--	3,500	3,500	3,500	3,500
Grants/special projects	--	--	--	31	1,648	4,600	5,459
Balance	400	779	459	--	--	--	--

<sup>1</sup>Projected balance before front-loading, endowment, grants, or special projects.

<sup>2</sup>Balance from GOH, services, banana tax.

<sup>3</sup>Front-loading USAID funds from 1993 to 1988.

<sup>4</sup>Front-loading USAID funds from 1992 to 1989; balance from GOH, services, banana tax.

### **6.1.2 Alternative Approaches to Meeting the Funding Deficit**

It appears that FHIA has several alternatives to resolve the situation, not necessarily in the following order.

#### 6.1.2.1 Reduce Commodities and Activities

The scope of activities and numbers of commodities to be attended could be reduced to a level that can be accommodated within the funding that is currently assured. New activities/commodities would only be initiated if added sources of funding became available.

#### 6.1.2.2 Front-loading

USAID could permit accelerated use of the \$20.0 million originally committed to FHIA for the ten year period through "front-loading". Funds budgeted for 1992 and 1993 could be made available to cover 1988 and 1989 shortfalls. This would allow FHIA to continue operation at the current level during which time funding generated from other outside resources as a result of fund-raising activities will be received.

#### 6.1.2.3 Supplemental Support

USAID could consider increasing funding to FHIA by adding to the current annual allocations for the remainder of the planned 10-year project and through annual allocations in following years. If the accelerated or front-loading alternative mentioned above is used, USAID could provide added funding to replace the funds that were made available for earlier use.

#### 6.1.2.4 Endowment

A fourth alternative and one which would provide FHIA with a greater likelihood of sustainability over the long term would be for the GOH and USAID to make an endowment available to FHIA. An endowment would have to be of a magnitude that the yields, in conjunction with funds from other sources, would be adequate to carry out the FHIA mandate. Ideally, an endowment would be in some mix of dollars and local currency since FHIA needs sufficient dollar revenue from either the endowment or other sources to meet dollar requirements for needed importations, travel expenses, and international staff salaries and benefits. Obviously, any endowment would have to have strict limitations and guidelines on use of the endowment to protect the GOH and USAID and to ensure that FHIA's mandate is carried out. A matching requirement calling for FHIA to generate funds from other sources in some proportion to the endowment could serve as an incentive for FHIA to seriously pursue other sources of funding.

## **6.2 LIKELIHOOD OF SELF-SUFFICIENCY**

Given the fact that FHIA's mandate currently involves agricultural development in Honduras only, the possibilities for major support sources are limited. The original project financial analysis was

optimistic. In terms of timing, it assumed receipt of donations early in the life of FHIA and did not adequately consider the need for time for such income to be realized. The FHIA management initiated fund-raising efforts soon after it was organized, but not unexpectedly, it will take some time and well planned campaigns to realize significant income.

In terms of sources, contributions to FHIA are more likely to be from the public rather than the private sector. A major limitation in either case is the fact that FHIA's mandate is to assist only Honduran agriculture. If the beneficiaries covered a much broader sector such as other countries in the region, likelihood of large donations from a number of sources would be enhanced.

The original project financial analysis estimated income from sales of technical and laboratory services would be \$3,655,000 over the ten year plan, ranging from \$200,000 the first full year to \$570,000 in the tenth. The \$3,655,000 envisioned would be over 10% of the total resources of funding for the project. Actual experience for the first years and an estimate halfway through the third year shows the following results.

	Original Estimation Project Financial Analysis	Actual Year Receipts
1985	\$200,000	\$150,000
1986	320,000	194,000
1987	330,000	200,000 (est.)
1988	350,000	235,000 (est.)

In order to achieve a level of income somewhat close to that which was originally planned, FHIA will have to accelerate its activities in providing technical and laboratory services. If this is not possible and accomplished, there will be an even greater gap between available financial resources and budget needs.

Income from the GOH during the first three years has been slower than planned in the initial project financial analysis and part of the donations have been in the form of goods and not funds which causes a cashflow problem for FHIA. This factor, as in the case of income from sales of technical and laboratory services, will result in FHIA falling further behind in meeting its goals of self-sufficiency if the income from the GOH is not kept on schedule.

Bearing these facts in mind, along with experience up to this time, FHIA will be hard-pressed to attain self-sufficiency by 1994 unless a long-term funding mechanism is provided.

## 6.3 FINANCIAL DEVELOPMENT

### 6.3.1 Ingredients Necessary for Successful Fund-raising

There are three ingredients necessary for successful fund-raising, regardless of the institution or organization: a compelling case for support, sources of support sufficient to meet the needs, and leadership (both internal and external) willing and able to achieve the stated goals.

The following is a brief summary of the strengths and weaknesses of FHIA in these three ingredients.

#### 6.3.1.1 Case for Support

##### Strengths:

- obvious needs for the organization
- recognition of banana/plantain breeding program
- independence from governments and governmental agencies
- quality of research and departmental staffs
- quality of administrative staff
- AID support
- location in agricultural areas
- national and regional need for agricultural research
- historical legacy of research program under UBC

##### Weaknesses:

- newness of organization and programs (except banana breeding)
- thinness of administrative and research staffs
- national, rather than regional, nature of research (except banana breeding)
- inability of Honduran government to provide significant support
- inexperience (collectively among the professional staff) in preparing and presenting a case for support
- political instability in Central America
- underdeveloped nature of Honduras

#### 6.3.1.2 Sources of Support

##### Strengths:

- interest of United States in Honduras and Central America
- established infrastructure of international multi-government funding agencies
- involvement of Honduran government in project

**Weaknesses:**

- poor fiscal condition of Honduras
- lack of philanthropic base in Honduras or Central America
- pressures on governments and quasi-governmental agencies from all sources for funding
- minimal number of U.S. private foundations which make international grants
- corporate contribution policies of the handful of U.S. corporations which do significant business in Honduras
- perception that FHIA has become essentially a U.S. entity because of amount of AID funding
- no institutional performance base for private support

**6.3.1.3 Leadership**

**Strengths:**

- FHIA director general
- FHIA management and research staffs
- AID involvement

**Weaknesses:**

- structure and composition of assembly
- administrative council for same reasons
- lack of volunteers with experience in or understanding of fund-raising
- inexperience of FHIA management and researchers in fund raising

**6.3.2 Fund-raising Activities: Observations**

**6.3.2.1 Present Capabilities for Fund-raising**

FHIA has the ingredients for both fund raising and a successful comprehensive development program; however for a number of reasons it must first establish a conceptual framework and then a strategy designed specifically for its unique circumstances.

FHIA cannot undertake fund raising in a conventional manner. It must broaden its approach to cover its total funding needs from all sources, not just those from the private sector. When it plans its development program strategy, it must look to foreign governments, international multi-governmental agencies, and the production of income from businesses, as well as from the more conventional philanthropic sources of corporations, private foundations, and individuals. Likewise, it must go counter to the principal of seeking funds first from the best and most likely prospects. Initially, it must build a creditable base, albeit small, among Honduran individuals and corporations; at the same time it must begin the process of fund raising with organizations outside of the country.

At the present time, FHIA's fund-raising capabilities are in the embryonic state. The development office was opened formally in the spring of 1987 and the director is still groping his way through the maze of professional literature, consultative services, and the pressures of carry-over responsibilities from the past three-plus years. Until such time as a comprehensive development strategy for FHIA is formulated, this groping is likely to continue.

#### 6.3.2.2 FHIA's Potential for Fund-raising

FHIA's ability to formulate an effective long-term development strategy compatible with all parties concerned will determine the organization's funding potential and its ultimate financial viability. Neither the director-general nor the development director will be able to work effectively and efficiently until such a plan is ready for their guidance.

Cash flow is an important consideration in any long-term development strategy. And one of the factors affecting cash flow is the delay, which varies, from presentation of requests to realization of income (if ever) from governments, international multi-government agencies, foundations and corporations.

#### 6.3.2.3 Short- and Long-term Development

FHIA and USAID must understand that funding potential from sources external to Honduras is limited until research efforts become recognized and the development program has had time to produce results.

Probably one of the better funding sources, assuming details can be worked out, is income from business operations. Unquestionably there are many points to consider and policies to determine, but a well run business venture division would pay handsome returns. FHIA must, however, be conscious at all times to maintain good relationships with farmers and producers.

Establishing profitable businesses requires time -- a minimum of 2 to 5 years. In the interim, FHIA must initiate an effective fund-raising program within Honduras and concurrently with all of the sources previously mentioned.

Lic. Jorge Bueso Arias, a prominent banker in Honduras and member of the FHIA Assembly, would appear to be a key figure to Honduran fund raising. He is in the process of enlisting a committee of business and civic leaders to seek contributions from Honduran corporations and individuals. His committee should be a formal entity within the overall organizational structure and committee members should be invited to join the General Assembly.

## VII. CONCLUSIONS AND LESSONS LEARNED

The FHIA can be described as a national "center of excellence" for defined areas of agricultural research (e.g., nontraditional export crops) with international responsibilities for banana/plantain breeding and genetics. Current commodity improvement targets cacao, citrus, vegetables, and plantains (cultural practices). In addition, a diversification program provides a rational and analytical approach to evaluating the economic potential for new or overlooked and frequently exotic species like mango, pineapple, black pepper, palm hearts and shrimp. A major institutional advantage, particularly in the latter program, is the flexibility to explore new areas and to discontinue projects as continuing study shows them lacking in potential. A key indicator of success is whether producers and entrepreneurs enter the field unsubsidized.

### 7.1 SPECIFIC CONCLUSIONS

#### 7.1.1 The Mandate

A new mandate is needed to more accurately reflect FHIA's evolving role, the agreement with MNR on basic grains, potential clientele, and comparative advantage nationally and internationally. It should also be noted that possible future expansion in FHIA's regional role (aside from its international responsibility for bananas and plantains) could benefit the Central America/Caribbean region and greatly expand its funding base. Some guidelines for developing a new mandate are briefly described under "VIII. RECOMMENDATIONS".

The mandate as presently defined does not accurately reflect institutional directions, goals and activities. Moreover, it is too broad to protect FHIA from poorly-reasoned or analyzed institutional roles and assignments.

A new mandate must be defined based on FHIA's evolving role, potential clientele, and comparative advantage nationally and internationally. The mandate should include the possibility of an expanding regional role to both help broaden the funding base and increase FHIA's overall impact.

#### 7.1.2. Governance

The system of governance is both cumbersome and expensive by international standards. Moreover, there does not appear to be a clear exercise of responsibility for the policy-making process. Governance must concentrate on policy matters, leaving management with full autonomy for day-to-day operations. However, greater responsibility is needed in

- limiting institutional growth to the facilities and resources available
- lending support in raising funds for FHIA's operations
- helping define and protect FHIA's mandate

The evaluation team concluded that the present system of governance could be improved by vesting greater responsibility in the Administrative Council to study and make recommendations to the Assembly; increase membership (individuals not ex-officio) on the council by three or four members; add program and development committees; and reduce council meetings to two or three times a year, since the program and development committees would perform part of the council functions and report to that body.

The development committee (fund raising) would formalize and strengthen the current activities of Lic. Jorge Bueso. The program committee would consist of knowledgeable experts consulting closely with management and staff on overall program development. They would

- review ongoing programs (research, communications, training, and development)
- review ongoing strategic plans (5- and 10-year projections) with management and staff
- monitor ongoing (strategic) plans

The program committee would also look at outreach and linkages.

### 7.1.3 The Institutional Setting

FHIA headquarters in La Lima are conveniently located on the Honduras north coast in a region typical of the low-lying, alluvial soil, humid tropics. This type of environment is favorable to growing a very broad range of crops from rice and maize to perennial estate crops and spices, many of which are highly suited for export.

### 7.1.4 Institutional Development

The center enjoyed a head start in that the headquarters site, buildings, some experimental lands, and the nearly intact banana breeding program with its scientific staff were taken over as a contribution from the United Brands Company. Of course, it was necessary to modify, expand, and refurbish some of the facilities. This has been done skillfully and at minimal cost in such a way as to be compatible with the surroundings. Day-to-day operational management of the facilities appears highly efficient in the manner of a "taut ship".

### 7.1.5 Staff and Personnel

Recruitment of staff has been carefully done and has resulted in a highly qualified cadre of professionals who will give a good account of their efforts even at the international level. Several have served for extended periods at IARC's like CIAT (Colombia), ICRISAT (India) and

IITA (Nigeria). Technical and support staff are likewise very capable, well trained and, sometimes, have been retained from the preceding United Brands Company support staff complement. The leadership is excellent -- perhaps the best in the region and has succeeded in imparting a sense of dedication and enthusiasm seldom encountered in institutions of this type.

A dilemma faced by FHIA is the minimum level of professionals allocated to each commodity program. Unless the institutional budget can be increased substantially, there are few possibilities to improve this situation. One approach would be to reassign staff on the basis of priority constraints or problem areas (rather than on a commodity basis). Another measure would be to enter cooperative agreements with both internal and external agencies (like Title XII universities) to provide a continuing flow of visiting scientists and graduate students on a short-term basis (e.g., 1 to 12 months) to augment and supplement locally available institutional talent. However, special funding (mainly AID) would be required to carry out the travel and in-country costs of this approach.

#### 7.1.6 Facilities and Equipment

Facilities for fully controlled field research have been greatly expanded with the acquisition of FHIA-run stations at Comayagua, Calan, La Masica, and Guarumas. Development of the stations themselves is largely completed although further expansion of farm buildings, offices, and other structures is currently under way or planned. These directly managed field stations should be adequate for the present mandate and commodities. Moreover, the increasing use of farmers' fields to validate improved technology should be encouraged as the center develops its programs.

Equipment for field laboratory and office needs is largely in place although some routine replacement and upgrading for increased efficiency is inevitable. However, new projects and commodities will often require specialized laboratory instrumentation and field equipment.

In order to expedite the visiting scientist program FHIA will need to provide short-term housing and dormitory facilities to increase the attractiveness of temporary assignments and minimize concerns for unfamiliar, local living facilities. Present guest house facilities are totally inadequate for the needs of FHIA's programs.

#### 7.1.7 Institutional Expansion

The strategy in establishment has been aimed at bringing FHIA up to speed as rapidly as possible. This has largely been an orderly process, but the institute has substantially exceeded projected growth with implied commitments leading to a future funding crisis. In the near term this will necessitate front loading of the principal grant.

Although the current strength of FHIA is reasonable given its mandate, FHIA must curtail further growth (except in already committed capital

expenditure or separately funded projects) until future funding prospects become clear.

Both the Assembly and Administrative Council (and through its committees) must recognize their responsibilities to institutional governance. A good source of information on international board's responsibilities are papers by Hardin and Dillon. Appropriate portions of these papers should be excerpted and translated for the benefit of FHIA's Board. Winrock International will assist in accessing the original papers for FHIA management.

#### 7.1.8 Institutional Programs

Further increases in staff and program development should be deferred until the funding prospects are determined. In the meantime FHIA must decide how best to assign its now limited staff and resources. In general, the evaluation team felt it is better to develop fewer programs and do them well rather than attempt a full mandate by providing only minimal support to each of several programs. This principle applies to both research and communications.

##### 7.1.8.1 Research Program

The evaluation team was impressed by the good progress made in attempting to address the full mandate. However, careful analysis of priorities should identify the most important problem areas. In this respect the team made the following observations:

- (i) **Banana/plantain breeding.** This program has greatest potential of all FHIA's activities in having a significant impact on both national and global agriculture in the tropics. It is also the furthest advanced and is poised for major breakthroughs in disease control (especially Black Sigatoka disease), and in otherwise contributing significantly to increased yields and other desirable traits.
- (ii) **Plantain agronomy.** This program also has excellent potential for contributing to both subsistence needs around the world and as an export crop.
- (iii) **Cacao.** This program has made a good start at the new experiment station (La Masica). The several interesting experiments under way, and the large number of genetic stocks being evaluated will provide an increasing flow of improved technology to both serve and expand the national industry.
- (iv) **Citrus.** This program is exceptionally well organized and has clearly identified the major constraints in Honduras. However, the team is skeptical about prospects for oranges except for national consumption. The possibilities for exporting grapefruit may be somewhat better, but competition from other countries will be considerable and Honduras will not have a comparative advantage.
- (v) **Vegetables.** Prospects for exporting temperate vegetables in the off season are very shaky in the opinion of the evaluation team, despite

their many advantages for national development. These highly perishable crops have rigid quality requirements and are the most "market-driven" of FHIA's commodities.

The measure of success for FHIA in its diversification activities will be acceptance of a target commodity by other agencies, national research, producers, and entrepreneurs. If further development of a commodity or process is required, FHIA, either through diversification or other programs and departments, may find the means to expand needed investigations on the subject.

#### 7.1.8.2 Communications and Training

The communications program is well advanced in development and should be fully operational by the end of the year. The evaluation team, however, queried whether the multisectional Communication Division will develop beyond the realistic needs of the Research Division. Of course, the rising needs for training, which comes under communications will require some additional resources and special staffing. Nevertheless, the pending budget crisis suggests the need to curtail further growth of the division until the funding picture becomes clearer. Moreover, training projects are often highly "saleable" to prospective donors so that a good portion of their requirements can be funded externally.

#### 7.1.9 Financial Sustainability

FHIA has progressed rapidly in developing an efficient organization for managing its financial affairs. The main concern however, is that the goal of self-sufficiency by 1994 as planned in the original project design cannot be obtained following the original plan. It will be necessary to alter quite drastically the original financial plan and utilize additional means for ensuring the sustainability of FHIA for the long term. A source of continuing support will be needed to permit FHIA to play its role in improving the economy of Honduras.

#### 7.1.10 Financial Development

Establishment of a long-term financial development program is of urgent importance to FHIA. Even if USAID approves front-loading of currently programmed funds, it will only provide FHIA with a "breathing period" in which to implement and start to receive funds from an active fund-raising program. Fund-raising must be considered in the broad context of total financial development which will also include support from Honduran groups, foreign countries, and multigovernmental international agencies, private foundations, international corporations, for-profit operations, and indirect cost recovery from special projects.

### 7.2 LESSONS LEARNED

#### 7.2.1 Program Planning

- New projects and programs must be thoroughly analyzed and evaluated before adding them to the institutional program. Any new projects

must also have forward funding with adequate overhead to support infrastructural requirements. Weak projects and those not contributing to FHIA's mandate are to be avoided.

- In the development stage of a project, careful planning is necessary to avoid taking on too many activities within a short time and with limited resources. Better matching of available resources needs with the scope of activities planned would have helped avoid imminent financial crisis for FHIA.
- Careful and continuous monitoring of project growth is imperative in order to avoid undertaking commitments for which known resources are not available.

### 7.2.2 Institutional Linkages

FHIA has established good relations with a number of institutions that will be very important in carrying out its mandate. However, to develop effective and permanent linkages, FHIA must be conscious of the responsibilities of each of the institutions in order that they can work together to fulfill the common mandate. These linkages are even more important to FHIA than to the other groups.

### 7.2.3 The Comayagua Experience

The Comayagua Valley is an example of the indiscriminate use of agrochemicals and highly sophisticated technology. The impact of technology components on environmental quality and agriculture sustainability should be critically analyzed.

#### 7.2.3.1 Guidance from Past Experience

It is our impression that in the Comayagua project, little consideration was given to previous experiences in the area. Although some of the Comayagua "old-timers" were consulted and the limited data was reviewed from the vegetable project carried out in 1977-78 in which the Standard Fruit Company provided the technical assistance and AID the financing, the project was committed to testing California and Florida technology introduced by Louis Berger. The earlier experience showed that tomatoes had great potential in the area if postharvest handling and shipping problems were solved.

Ten years later another attempt in vegetable production was made with AID providing the financing. Technical assistance and production technology were contracted by FEPROEXAAH/AID to the Louis Berger Company. FHIA, financed by AID, was responsible for the implementation and project operation, but local vegetable growers did not participate in this development.

#### 7.2.3.2 Lessons from the Comayagua Project

The production of vegetable crops for exportation would seem to offer a good opportunity for Honduras, in terms of providing gainful occupation and wages in Comayagua which is an area of high unemployment.

Nevertheless, vegetables are highly perishable and compete in a volatile market of fluctuating prices and high transport costs. Competition with other countries closer to the market and endowed with a better infrastructure has been a major deterrent for Honduras in the past. Moreover, there are numerous biological and technical constraints. The solution to such a diversified portfolio of problems makes for a costly and risky undertaking.

The Comayagua Vegetable Production Project provided FHIA and other interested parties with the following lessons:

- A minimum technological base of previous biological research was required, i.e., planting dates, appropriate varieties, irrigation practices and postharvest handling.
- Production technology was highly sophisticated and capital intensive. Therefore, in order for Honduras agricultural products to be competitive in the international market mass scale production is necessary. The technological base provided by FHIA must have attributes like minimum sophistication, stable-accepted quality, and appropriate and cost-effective production practices. Profitability should be the major concern.
- FHIA's research guiding principle must be the participation of an economist in an interdisciplinary research group who critically evaluates proposed technology in terms of its sophistication, capital requirements, cost effectiveness, and potential profitability.
- FHIA must critically evaluate the impact of its technology on job demands, potential negative effect on the ecosystem and agricultural sustainability.

### 7.3 AN INSTITUTIONAL STRATEGY

The FHIA has made an excellent start in developing facilities, recruiting qualified staff, and establishing its programs. The center is most fortunate in inheriting a globally unique and well advanced program on banana and plantain breeding. These accomplishments are designed to have a major impact on banana and plantain production throughout the tropics and on consumption throughout the world within the next 5 to 10 years.

The other programs and activities have made remarkable progress in establishing their research facilities and developing efficient operations within hardly 1 or 2 years. This has occurred as a consequence of long, hard hours of dedicated effort by a relatively small cadre of highly capable and experienced professionals. For this reason, overall institutional development has been rapid and impressive.

The present dilemma is that both the research programs and departments are understaffed and lack resources for much needed further development. Therefore, continuing progress is bound to decelerate from limitations

imposed by the shortage of skilled manpower, facilities, and budgetary resources. A second showing of progress within specific projects will occur somewhat later as FHIA comes to grips with more intractable biological problems, such as serious diseases, pest control, quality deficiencies, yield/adaptation problems, and others. Resolution of these more difficult constraints will require bringing in highly specialized expertise on a short-term basis and having resource flexibility to increase efforts when and where needed. It may also require permanent staff in specific fields and on a long-term or permanent basis.

Given the present budgetary and growth limitations and high caliber of research leadership, the evaluation team feels that current operations are not yet as cost-effective as they might be. Two approaches to this problem are obvious

- increase funding
- prioritize programs and problem areas to apply more manpower and resources to primary constraints

Unless additional funding is forthcoming promptly, this could mean dropping one or two programs (or at least minimizing activities on them) until the situation improves.

Given this situation and the urgent need for increasing resources as well as some restructuring of programs, the evaluation team viewed with alarm the implied intentions of FHIA to move into areas clearly on other turfs, for example, vegetable production development (FEPROEXAAH) and the eventual possibility of expanding to basic grains research. While such expansion may ultimately work to the advantage of Honduras, the team believes it is much too premature and considerable groundwork needs to be done beforehand. Also, such expansion will inevitably change the very nature, flexibility, and many other desirable features of the present organization.

In brief, the evaluation team believes FHIA needs a brief period of a few years to

- work out financial development and broaden the funding base
- consolidate programs and activities within the realistic limits of available resources
- carefully direct and nurture its priority developing programs

Given the long lead time for FHIA's type of research, the team also feels it is better to build a solid reputation on doing fewer projects well, than attempting partial efforts on a large number of commodities/activities. That is, maximizing the time available for both demonstrating accomplishments and in working out the financial development problems is more important than simply increasing structure size and responsibilities to the overall success and survival of FHIA.

## VIII. RECOMMENDATIONS.

The team examined virtually all aspects of FHIA development, operations and future plans. In the main, the center should be highly commended for establishing itself and addressing the institutional mandate within the relatively short period of three years. However, there are some concerns about initial growth and its effect on institutional commitments as well as on the funding base needed for long-term sustainability. It follows that the major recommendations of this evaluation impinge directly and indirectly on the immediate short fall of resources and long-term sustainability of the institution. These are briefly described under the following headings:

### 8.1 SCOPE AND MANDATE

#### 8.1.1 Long-term Outlook

Institutions such as FHIA, particularly those working on perennial crops, are unlikely to make a major, continuing impact on national production for at least 10 years. Therefore, the founders and management must find ways to project institutional life for a minimum of at least 25 years for the organization to be reasonably cost effective.

#### 8.1.2 New Mandate

The present mandate is much too broad considering that FHIA's role in the national and international setting has evolved. Therefore, careful study and redefinition of the institutional goals, objectives, and responsibilities as stated in the 1984 project paper are urgently needed. The new mandate will greatly help in protecting the center from having "projects dumped" on it and in defusing both national and regional concerns about FHIA encroaching on their "turf".

The team would like to see the new mandate give major emphasis to research on export crops, avoid direct involvement in commodity development, and ensure that FHIA retains its inherent flexibility to explore new potentialities and commodities. The guidelines for preparing this mandate are as follows:

The primary focus of FHIA is on selected export crops in concert with GOH and other concerned agencies in Honduras. The distinction between traditional and nontraditional export crops should be removed.

FHIA's responsibilities encompass all aspects of research on mandated commodities including the development of practical cost-effective, grower acceptable technology delivered to the center's clientele by optimal media. This responsibility includes postharvesting studies and rigorous market research, but limited production development activities (and only when adequately funded).

- FHIA has an international mandate for bananas and plantain breeding. Include plantain agronomy in this broader mandate.
- Basic grains should not be included in FHIA's activities unless the MNR specifically requests the center to do so and these efforts are fully funded; moreover, a full-fledged research program on basic grains could easily double the present size of FHIA.
- Strengthen linkages at all levels both within country and internationally particularly those involving close working relationships with other research institutions, extension agencies, production development organizations, seed/planting materials suppliers, and farmers.
- Prepare a proposal to provide additional support for travel and in-country costs of Title XII, university linkages on priority constraints like Black Sigatoka disease and crossing problems in Musa spp. (best prospect: USAID).

## 8.2 GOVERNANCE

### 8.2.1 The Governance Structure

The present system of governance appears cumbersome and inefficient. Moreover, major decisions affecting the center can be made without sufficient time to study their full impact. The team, therefore, recommends that FHIA management, with help from its institutional founders, work toward evolving the following changes:

- The Assembly vests primary policy-making with the Administrative Council: that is, major issues must be referred to the Council for study and recommendation before the Assembly acts.
- Increase the Council membership from 9 to 12, reserving at least two slots for individual members (not representatives) from international organizations and donors.
- Add a program committee comprised of three to four members with special expertise in programmatical policy matters to assist management and report to the Council.
- Appoint new members to the Council and the committees on an individual (not ex-officio) basis. However, USAID must retain membership on the council since FHIA's finances and programs are closely tied to AID.
- Formalize the development committee (presently headed by Lic. Jorge Bueso Arias) under the aegis of the Council to broaden FHIA's political and financial base in Honduras.

## 8.2.2 Streamlining the Process

Frequent meetings (every two months) of the Administrative Council are both time consuming and expensive for FHIA management and staff. Since the center is now well advanced and functioning smoothly, and with the establishment of the program committee which will meet four times a year and report to the Council, it should be possible to reduce Council meetings to two or three times a year.

## 8.3 RESEARCH PROGRAM

### 8.3.1 The Programs

Having made an excellent start and progressing well, FHIA's commodity program and disciplinary departments are understaffed. Only one or two professional staff are assigned to each program. Therefore, the team recommends prioritizing activities and reassigning positions to give needed depth (see Institutional Sustainability).

### 8.3.2 Future Program Planning

The consensus of the evaluation team is that the original project plan was grossly underfunded for the intended mandate. While FHIA has managed to address its perceived responsibilities in a relatively short span of time, research programs and supporting activities are seriously lacking in depth and manpower.

The primary concern of this review is long-term sustainability of FHIA to ensure it can contribute to the Honduran economy.

Unfortunately, FHIA has no "core base" of support unlike other agricultural research institutions. This critical gap in the support base will certainly affect institutional integrity and its ability to attract and hold capable, professional staff.

Projections of current trends show substantial funding shortfalls. Therefore, alternate approaches must be considered. The evaluation team therefore recommends that FHIA prioritize and classify activities as 1) core programs or 2) special programs and projects. Core projects are those conferring FHIA's "essential character" and which will require at least 10 or more years of concerted, in-depth investigation. Special programs/projects are those commodities and activities which are likely to command shorter-term attention and will require additional (non-core) funding via special grants and contracts.

Given the above criteria FHIA's program commitments would be as follows:

RESEARCH PROGRAM	CORE PROGRAM	SPECIAL* PROGRAMS/PROJECT	PHASE* DOWN
1. Banana/Plantain Breeding	x		
2. Plantain Agronomy	x		
3. Diversification	x		
4. Cacao	x	- - - - - >	
5. Vegetables	<-	- - - - - x	- - - - - ->
6. Citrus	<-	- - - - - x	- - - - - ->
7. Mango	<-	- - - - - x	- - - - - ->
8. Black Pepper	<-	- - - - - x	- - - - - ->
9. Oil Palm	<-	- - - - - x	- - - - - ->
10. Shrimp	<-	- - - - - x	- - - - - ->
11. Others	<-	- - - - - x	- - - - - ->

\*Dotted lines signify movement in either direction toward long term (core) commitment or phase down.

Est. Costs in 1987: core = \$3.2 to 3.5 million  
non core = \$0.7 to 1.2 million  
total = \$4.2 to 4.7 million

### 8.3.3 The Commodities

Some specific recommendations applicable to individual programs are summarized below.

#### 8.3.3.1 Banana/Plantain Breeding

- Focus major attention on developing economic controls for major diseases, especially Black Sigatoka and Panama Disease Race 4.
- Seek the input of a competent genetic engineer to improve crossing techniques, and more efficient propagation.
- Formalize a project for preservation and evaluation of Musa spp. germplasm.
- Expand FHIA's cooperation on international banana/ plantain improvement through visits to world production centers and cooperative projects with other national and international programs.

#### 8.3.3.2 Plantain Agronomy

Bring this program up to speed as rapidly as possible. Also, establish a special task force to study prospects for finding a practical (nongenetic) solution to Black Sigatoka.

#### 8.3.3.3 Cacao

- Increase staffing to double the present complement by 1992.

- Increase cooperation and collaboration both within Honduras (esp. APROCACAO, MRN and INA) and internationally (esp. CATIE and the Trinidad Cacao Breeding program).
- Support FHIA's clientele through increases of superior planting materials (this may also become an important revenue raising activity).

#### 8.3.3.4 Citrus

- Make a rigorous prioritization of citrus products with realistic export potential through a more precise definition of researchable major constraints.
- Phase out activities on oranges except for certification. Continue some further studies on grapefruit and possibly on limes until the export potential is established.

#### 8.3.3.5 Vegetables

Continue some exploratory studies on vegetables -- perhaps under the diversification program, but transfer development activities to FEPROEXAAH and national institutions as soon as possible.

#### 8.3.3.6 Diversification

- Add a vigorous market research function (or unit) to the program; this may also be more efficiently accomplished through short-term consultancies.
- This program needs more human resources, facilities, and equipment. Reallocate from lower priority activities.
- Further develop and refine commodity screening methodology to accommodate other important factors like potential international competition.
- Collaborate closely with the FHIA Development Division to facilitate preparation of new proposals and projects.

### **8.3.4 Research Principles and Methodologies**

- FHIA should be careful not to commit itself to projects and responsibilities beyond its available financial and human resources.
- FHIA should concentrate its efforts on researchable major constraints (i.e., Black Sigatoka) rather than on technological refinements.
- FHIA should critically review its staffing situation. In particular, the disciplinary departments may not have enough

specialists (i.e., plant pathologists, economists, physiologists) to cope with the commodity programs' demands.

FHIA should stress the development and(or) validation of appropriate and cost-effective intermediate technology, i.e., small scale and medium-size spraying equipment, dwarf bananas and plantains, and other minimal purchased input systems.

- FHIA needs to develop a greater capability in exploring market potential before embarking on a costly biologically oriented research program.

### **8.3.5 Specialized Technical Services**

FHIA must continue to expand the important specialized services to the institutional and producer level via diagnostic, analytical, and testing services. These cost effective, income generating services can provide one of the quickest and most economic approaches to increasing national crop yields.

## **8.4 COMMUNICATIONS AND INSTITUTIONAL LINKAGES**

### **8.4.1 Training**

Training of Honduran and other scientists will become an increasingly important contribution of FHIA. Although most FHIA programs are not yet ready to mount structured training courses, this aspect should become an integral constituent of the institutional programs as soon as possible. They can be started on a modest scale beginning with communication methodologies and the more advanced programs like banana/plantain improvement during the next year.

### **8.4.2 Division Growth**

At present communications is nearly fully functional and utilizes about 15% of the total budget. Some future expansion is anticipated especially for training, but if overall institutional growth is slowed pending clarification of the budgetary situation, expansion of communications should remain within the same order of magnitude.

### **8.4.3 The AED/CTTA**

Now that the Communication Division is developing rapidly and headed by a highly experienced professional, there appears to be little need for the CTTA contract. The team recommends an early termination of the AED contract.

### **8.4.4 Institutional Linkages**

Since several Honduran institutions have a mandate and a role in supporting a national concerted effort to increase Honduran agricultural export capacity we recommend that FHIA:

- Coordinate its activities with the commodity system approach being implemented under the export development and services project, FEPROEXAAH, and other interested parties. Above mentioned institutions must clarify their respective mandates, roles and responsibilities in order to implement a concerted, effective effort.
- Assess the role, functions, and effectiveness of the technical advisory committees. Also, there is a need to clarify the role and responsibility of each member. A list of objectives and goals along with a work plan must be jointly defined and evaluated.
- Define policies and strategies to assume a significant presence in the existing bananas/plantains research networks. An attitude of cooperation and development of a strong linkage with the world scientific community dealing with Musa spp. is essential for FHIA.
- Develop close collaboration with MRN on soybeans and work out a mutually acceptable division of labor on research, technology transfer and training.
- Carry linkages to the field level. Insofar as possible, experimentation, adaptation, and validation trials are to be carried out on farmers' fields. This approach necessitates the nurturing of an attitude of concern for producers' problems and objectives, and stressing the on-farm research approach in all of FHIA's institutional training programs.

## **8.5 FINANCIAL MANAGEMENT**

### **8.5.1 Administration and Management**

The evaluation team looked closely at FHIA's organizational development, administration, and operating features and feels that excellent progress has been made in three years. There are, however, steps to be taken which if implemented will enhance FHIA's administrative operations. The team recommends that FHIA:

- Review and update the original procedures and guidelines to be sure they meet current needs.
- Develop additional operating procedures and guidelines where needed to assist the staff in management of the FHIA resources.
- Add staff to enable the accounting office to ensure proper and accurate accounting for funds, including special projects.
- Develop a fiscal report for the Administrative Council that capsulizes the highlights and important information.
- Obtain the ownership documents for land purchased for experiment station use.

- Perform a comprehensive indirect cost study to develop a valid rate for equitably charging indirect costs.
- Update the staff manual and personnel guidelines.
- Develop a unit to manage special projects to include proposals, negotiations, and technical and fiscal reporting.
- Utilize its own purchasing office to acquire and import merchandise from outside Honduras, and discontinue use of the purchasing service agent except in cases where the service would be useful.
- Augment the Maintenance Section as facilities and equipment are becoming older. Use a microcomputer to implement a preventive maintenance program.
- Create an internal audit function whose responsibility would include administrative systems development and overview.
- Have the external audit firm submit its annual audit to the Oversight Committee (Comité de Vigilancia).
- Increase the use of microcomputers in financial and administrative functions to provide greater efficiency and control.
- Make every attempt to complete and distribute its annual report as soon as possible after the close of the year.
- Move ahead with planning for development of a food and housing facility near its La Lima offices.

### 8.5.2 Institutional Sustainability

The evaluation team concluded that the original estimate of financial resources needed to support the scope of work was not adequate. If FHIA is to be sustained over a long period in order to contribute to the economy of Honduras, long-term resources are needed. In addition to FHIA implementing the financial development activities noted immediately below, the team recommends that:

- USAID make available projects funds now programmed for 1992 and 1993 in 1988 and 1989 to meet the needs for the new scope of research work.
- Further, to provide continuing long-term support for a base level research program, USAID and the GOH should make funds available to create an endowment fund beginning as soon as possible so that by no later than 1991 income from the endowment will be available to finance a critical mass of research. The level of the base program should be at least \$3.5 million per year which would require an endowment of approximately \$50.0 million to yield the needed income. The endowment should have a stipulation that FHIA will strive to

obtain funds from other sources, preferably in hard currencies, to create a fund of at least of \$2.0 to \$4.0 million by 1991.

- FHIA should finance any added research efforts through special projects and income from other donors.
- If an endowment proves to be impossible, a less desirable means of providing long-term support would be for USAID to supplement core activities to the level of \$3.5 million per year from 1988 to 1993 and to commit at least \$3.5 million per year (in constant dollars) to FHIA for years subsequent to 1993. This commitment should be for at least 10 years after 1993.

### 8.5.3 Financial Development

The following recommendations in the financial development section are made with the assumption that USAID will advance 1992 and 1993 grant payments and that budget growth will be held to no more than 7% from a base expenditure of approximately \$4.2 million in 1987.

We recommend the following:

#### 8.5.3.1 Fund Raising Plan

FHIA initiate immediately an aggressive fund-raising program that would have as its target \$2 million annually from all sources -- public and private, national and international -- by 1990. FHIA must use the balance of 1987 to formulate the financing plan which must dovetail with its funding efforts from USAID. The plan should include, among other things:

- identification of target groups such as foreign governments, international multi-government agencies, private foundations, corporations, and Honduran sources
- a detailed list of prospects within each target group
- a priority evaluation of sources and selected prospects for initial focus
- prospect research which will enable the setting of preliminary request figures along with an indication of interest areas which coincide with those of FHIA
- a fund-raising strategy for each prospect
- staff utilization requirements and assignments
- volunteer or third-party requirements
- budget support needs

- a plan of implementation which includes a preliminary calendar of target dates

#### 8.5.3.2 Special Support Group

The appointment of a special Honduran development committee (by this or some other name) under the leadership of Lic. Jorge Bueso Arias whose mandate would be to establish a broad base of annual support from leading businesses and influential individuals should be made. The committee, initially seven to eight in number, would:

- organize a program, with the assistance of FHIA staff, to inform and involve a selected group of Honduran prospects
- implement a formal solicitation process for annual gifts to FHIA. FHIA must make a substantial commitment of time over the next 18 months toward developing broad Honduran support since its effect on potential international donors will far outweigh the money raised

#### 8.5.3.3 For-profit Activities

Explore in detail the potential of for-profit business operations through which FHIA would within 3 to 5 years begin receiving a steady flow of unrestricted income.

#### 8.5.3.4 GOH Commitments

USAID must use its good offices to persuade the Honduran government of the importance of fulfilling its money commitments from 1985 to the present.

#### 8.5.3.5 Fund-raising Abroad

FHIA should conduct its fund-raising activities in the United States under its own auspices rather than through the Friends of Central American Agriculture.

#### 8.5.3.6 Fund-raising Consultant

Considering the urgency of broadening its funding base, FHIA, with USAID support, should recruit a short-term (up to 6 months) fund-raising expert with connections in the international community. The terms of reference would be to develop a comprehensive fund-raising program and provide guidance on project development for external funding.

### **8.6 PROJECT DESIGN SUMMARY**

As a consequence of the several project design changes implicated in these recommendations, a revised project design summary logical framework has been prepared (Appendix 7A). The original log frame is included for comparison (Appendix 7B).

## APPENDIX 1

### STATEMENT OF WORK

#### ARTICLE I - TITLE

Evaluation of the Agricultural Research Foundation Project (522-0249)

#### ARTICLE II - OBJECTIVE

##### I. Background

The Agricultural Research Foundation Project (522-0249), which began in September 1984, was designed to establish the Honduran Agricultural Research Foundation (FHIA). As an independent, private research organization, FHIA will contribute to the expansion and improvement of the Honduran agricultural research system enabling it to better respond to the technological needs of farmers, especially those producing nontraditional export crops. The project includes two major activities: a commodity-oriented research program, and a strengthening of FHIA is seen as instrumental to the long-term success of the project. A long range strategy for reaching potential sources of funding to support FHIA development and programs will be developed and implemented.

The purpose of this evaluation is to determine progress made to date with respect to the organization of FHIA's operations, the initiation of its research, dissemination and fund raising programs, and to determine the future financial viability of FHIA.

#### ARTICLE III - STATEMENT OF WORK

The contractor, in close coordination with the USAID will:

1. Review and analyze the effectiveness of FHIA's research program. This effort will include a description of research programs being implemented to date (number, level of effort, basic/adaptive research, methodologies, etc.), including an analysis of criteria established to evaluate these efforts. While it is recognized that it is too early to evaluate their impact, the contractor's report should identify principal objectives of these programs and analyze the likelihood of meeting objectives under current research methodology. In this light, the contractor will review FHIA's organizational and institutional structure, research budgets, technical capabilities (including technical assistance), and other factors that may impact on the effectiveness of research operations. What contributions to strengthening the agricultural research system in Honduras can be attributed to FHIA? What are the likely contributions over the short- to mid-term (next five years)? The contractor should determine whether duplication might exist between research being carried out by FHIA and other Honduran private and/or public sector institutions. A case study might be "lessons learned" by FHIA in the Comayagua experimental farm. What research findings

have been made? To what extent was this information made available to producers? Was it useful and is likely to be applied? The Contractor should estimate what have been or are likely to be the economic payoffs of FHIA research in terms of GDP as well as at the farm level. Have these payoffs been or likely to be cost effective?

Along the lines indicated above, separate analysis should be undertaken on the banana/plantain breeding program. What is FHIA's contribution to banana/plantain research and breeding in Honduras as well as in other production regions of the world? How is this contribution recognized? How does the FHIA program compare to that being undertaken by other commercial (private) research programs as well as that of other international centers?

2. Provide a detailed analysis of the effectiveness of FHIA's linkages to national research and extension efforts. This analysis should include discussion of linkages to the Ministry of Natural Resources (MRN) research and extension programs and, discussed separately, private producer, processing, and trade organizations. The Contractor should also analyze the effectiveness of FHIA's linkages to the international research center network. How is FHIA establishing these linkages? How effective are they? To what extent will FHIA's programs translate into increased production over the short- and medium-term, given the effectiveness of these linkages? The contractor should describe and analyze measures being undertaken by FHIA to disseminate research findings. How effective are these means? How can they be strengthened? In the case of the international research centers, the contractor should describe what mechanisms are being implemented and contemplated by FHIA to take full advantage of the research being undertaken by these institutions. How is FHIA disseminating its research findings to the international research community?
3. Review and evaluate the overall progress made to date by FHIA in the initial implementation of its fund raising activities, with special attention paid to FHIA's efforts in obtaining initial financial assistance from possible donors. How sound is the overall FHIA fund raising strategy? What is its relationship to current and future activities and programs at FHIA? Is the organization and management of the FHIA fund-raising unit adequate for the task at hand? What progress has been made to date in obtaining funding from possible donors and what is the outlook during the next few years? The contractor should assess the short- and long-term fund raising plans developed to date and make recommendations for any needed changes in either the management or organization of the fund raising program or the overall fund-raising strategy.
4. Carry out a financial analysis to determine the potential for financial self-sufficiency of FHIA each year between 1988 and 1994. As a point of departure, the contractor should review and report on the validity of the assumption contained in the original project financial analysis; i.e., that FHIA would reach financial self-

sufficiency by 1994. The financial analysis to be carried out should be based on FHIA's long-term development plan and fund-raising strategy. It should include a realistic appraisal of what, in terms of future financial resources, will be required for FHIA to attain financial self-sufficiency by 1994. Finally, the contractor should review the current financial self-sufficiency plan and make appropriate recommendations.

#### **ARTICLE IV - REPORTS**

The contractor will present a draft report (in English) for discussion with USAID before departure from Honduras. This draft report shall include an executive summary. The executive summary will have the following sections: purpose of the evaluation, methodology used, major findings, lessons learned, conclusions and recommendations. The summary must be a self-contained document. The main draft report must include, but not be limited to, sections on methodology utilized; the project's development impact; lessons learned with references to factors that proved critical to project success or failure to date; and evaluation recommendations. The draft evaluation report also will include a listing of the evaluation team, including host country personnel, their field of expertise, and the role played in the team.

The final version of the report will incorporate proposed revisions resulting from this discussion, and will be submitted in five copies to the Office of Agriculture and Rural development within four weeks of departure from Honduras. The final report should encompass all findings, analysis, conclusions and recommendations contained in Article II - Statement of Work, above, and should also include an executive summary.

#### **ARTICLE V - RELATIONSHIPS AND RESPONSIBILITIES**

The contractor will report directly to the Director of the Office of Agriculture and Rural Development and will work on a daily basis with the project officer and project liaison officer for the Honduran Agricultural Research Foundation Project.

#### **ARTICLE VI - TERMS OF PERFORMANCE**

The effective date of the work order is August 30, 1987, and the estimated completion date is, including submission of deliveries, November 7, 1987.

**APPENDIX 2**

**BACKGROUND ON CONTRACTOR'S REVIEW TEAM**

Kenneth O. Rachie  
Senior Research Advisor and Team Leader

Jesus Moncada de la Fuente  
Agricultural Research Advisor

Bernard Glenn Henrie  
Financial Analyst

John W. Leslie  
Rund Raising Specialist

Carlos E. Crisóstomo V.  
Agricultural Research and Dissemination Specialist

**NAME:** Kenneth O. Rachie

**KEY QUALIFICATIONS:**

Dr. Rachie is a distinguished agricultural research administrator, plant breeder, and agronomist. He served the Rockefeller Foundation for nearly 30 years on assignments to Mexico, Colombia, India, Ethiopia, Uganda, and Nigeria. His major research contributions include developing and releasing of the first hybrid sorghums and millets and establishing world collections of these crops in India; collecting and breeding tropical food legumes in West Africa; and developing elite strains of cowpeas and pigeon peas at the International Institute for Tropical Agriculture (IITA), Nigeria. He also has been an agricultural research administrator at IITA and the Centro Internacional de Agricultura Tropical (CIAT). As IADS Supervisor for the USAID-funded Sumatra Agricultural Research Project (1982-1984), he led the development of a network of 12 experiment stations on food crop research. In 1973 he received the Sorghum Producers Award for contributions to sorghum germplasm; in 1983, he was awarded the International Service in Agronomy Award presented by the American Society of Agronomy in recognition of his contributions to food crop research and training in developing countries. Currently a private consultant and Senior Associate for Winrock International, Dr. Rachie is frequently involved in the evaluation of agricultural research and extension programs.

**EDUCATION:** Ph.D., Plant Breeding/Agronomy, University of Minnesota, 1954  
M.S., Agronomy, University of Minnesota, 1952  
B.S., Agronomy, University of Minnesota, 1949

**EXPERIENCE:**

1984-Present Private Consultant and Senior Associate, International Agricultural Development Service (IADS)/Winrock International.

1955-1984 Rockefeller Foundation.

Project Supervisor, Sumatra Agricultural Research Project, IADS, USAID-funded, 1982-1984. Supervised technical assistance team to develop a network of 12 agricultural experiment stations on food crops research. Responsible for project administration, including constructing facilities, equipping research stations, training staff, and developing research programs.

Associate Director, Agricultural Sciences Division, New York, 1979-1982. Provided technical support in plant sciences in Latin America and developed research projects in basic food-crops improvement.

Associate Director General, Research, CIAT, Colombia, 1975-1978. Responsible for research administration for the center's commodities and for research support.

Plant Breeder/Program Leader/Assistant Director, Grain Legume Improvement Program, IITA, Nigeria, 1971-1975. Major efforts of program focused on cowpeas with secondary concentration on soybeans. Research activities included breeding; collecting, assembling, maintaining, evaluating, and distributing germplasm of secondary tropical grain legumes; and developing management practices for growing pulses in difference environments.

Professor of Plant Breeding, Makerere University, Uganda, 1968-1971. Taught plant breeding; established improvement program on pigeon peas; developed genetic studies in maize, interspecific hybridization in elephant grass, and rice agronomy; developed station swamps for rice experiments; and served as chairman of research committee.

Visiting Scientist, Universities of California, Davis, and Nebraska, 1967-1968. Joined interim cereals-collecting project in Ethiopia and assembled inclusive collections of world literature on millets.

Sorghum/Millet Breeder and Coordinator, Rockefeller Foundation Indian Agriculture Program, 1957-1967. Was All-India Coordinator for Sorghum and Millet Improvement. Assembled world collections of genetic stocks.

Malze/Sorghum Breeder, Mexico, 1955-1957.

1954-1955 Assistant Professor and Forage Agronomist, Abu Gbraib College of Agriculture, Iraq

**LANGUAGES:** English (FSI 5)  
Spanish (FSI 3)

**PERSONAL DATA:**

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**NAME:** Jesús Moncada de la Fuente

**KEY QUALIFICATIONS:**

As Chief Executive Officer of the National Institute for Forestry, Agriculture and Livestock Research (INIFAP), Dr. Moncada was responsible for national programs on research, validation, and transfer of technology, and development of scientific staff. He negotiated the process by which three national institutions merged to form INIFAP, one of the largest and most complex national agricultural research institutes in Latin America. He has broad professional experience in designing, managing, coordinating, and implementing numerous research plans and programs aimed at supporting and improving agriculture at regional, national, and international levels. His work with CGIAR, CIMMYT, and ICRISAT has familiarized him with the capabilities, objectives, and procedures of the international centers, and impressed on him the importance of close interactions among the international centers and national research institutes. As Director General of the National Institute for Agricultural Research (INIA), Dr. Moncada was responsible for formulating and implementing a national research program to support Mexican agriculture. His more than 20 years of experience in agricultural research and institutional development/administration have given him a unique and valuable perspective.

**EDUCATION:** Ph.D., Soils and Experimental Statistics; Plant Physiology, North Carolina State University, 1965  
M.Sc., Soils, Graduate College, Chapingo, Mexico, 1961

**EXPERIENCE:**

- 1986-Present Senior Consultant/Advisor to the National Institute for Forestry, Agriculture and Livestock Research (INIFAP). Commissioned to prepare detailed study of professionals in agronomy in Mexico.
- 1985-1986 Chief Executive Officer, National Institute for Forestry, Agriculture and Livestock Research (INIFAP). Responsible for coordinating an inter-subsectorial task force, which negotiated the merging process of the National Institute of Agricultural Research (INIA), the National Institute of Livestock Research (INIP), and the National Institute of Forestry Research into an integrated research institute (INIFAP).
- 1983-1985 Executive Secretary, Council for Agriculture, Livestock and Forestry Research. Coordinated the design of a master research plan, integrating agriculture, livestock, and forestry, using a production-system approach. Coordinated a master plan for human resources development. Designed and implemented a national program to provide support to agriculture, livestock, and forestry institutes; was instrumental in the design and implementation of a training scheme on integrated production systems, and

modified INIA's trust fund contract to incorporate into it the livestock and forestry institutes.

1981-1983

Director General, National Institute for Agricultural Research (INIA). Responsibilities included direction, coordination, and administration of a federal agricultural research institute and the formulation and implementation of a national research program to support Mexican agriculture.

1977-1981

Deputy Director General for Research Programs Operation, National Institute for Agricultural Research (INIA). Was responsible at the national level for INIA network of 11 regional research centers and research backup units, biometrics, information and library, genetic resources, and service laboratories. Also was responsible to the director general for the consolidation and presentation of INIA annual budget, including research infrastructure and development plan.

1965-1977

Director, CIANE, INIA's Regional Research Center for Northeastern Mexico, Torrsón, Coahuila. Coordinated, administered, and developed new research programs and experimental stations. Promoted a research strategy of an interdisciplinary team organized by crop or resource management, an on-farm research strategy with the active participation of farmers, and two special committees composed by farmers and entities of the private and public sector to provide moral and material support to research programs. Participated as a research coordinator in an inter-agency team effort for the rehabilitation of La Laguna irrigation district and was an advisor on agricultural studies.

**LANGUAGE:** Fluent: Spanish, English

**PERSONAL DATA:**

Date of Birth:

Citizenship:

Address:

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**PUBLICATIONS:**

Influence of Leguminous Plants on the Growth and Nitrogen Nutrition of Associated Grasses. (Ph.D. Dissertation).

Physical and Chemical Study of Soils of Volcanic Origin with High Aluminum Content in the State of Michoacan. (M.Sc. Dissertation).

Author and co-author of a number of papers on water-fertilizer interaction, crop management, and productivity in irrigated and nonirrigated cultivation, and a number of papers on agricultural research policy and organization.

RESUME

June 1, 1987

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Cali, Colombia, S.A. (Until July 10, 1987)

PERMANENT ADDRESS: [REDACTED]

TELEPHONE: (57)(3) 67-50-50 (Office)  
[REDACTED]

EDUCATION AND TRAINING

1965 - 1967 M.S., Business Administration (Finance), minor in Industrial Psychology, Colorado State University.

1957 - 1960 B.S., Finance, "with distinction", Colorado State University. AFROTC Distinguished Military Graduate. President of Campus Veterans' organization and CSU Flying Club.

1948 - 1952 Center High School, Center, Colorado. Salutatorian of high school class.

EXPERIENCE

1985-Present Colorado State University with assignment as Director of Finance and Administration at the Centro Internacional de Agricultura Tropical (CIAT), Cali, Colombia. Manage all financial and administrative operations for CIAT, one of the thirteen international agricultural research centers of the Consultative Group for International Agricultural Research (CGIAR). Responsible for negotiations and management of contracts and grants with AID, World Bank, UNDP, Inter-American Development Bank, and approximately twenty governments and foundations; sub-contracting; core and special project funding; support of CIAT projects in numerous sites throughout the world; budgets; accounting; investments; physical plant; maintenance; security;

information systems; personnel; purchasing; and internal audit.

1979-85

Colorado State University with duty as Associate Executive Director, Consortium for International Development (CID), Tucson, AZ. Worked closely with the Executive Director in management of the Consortium. Served as contracting officer. Activities involved contract negotiations, sub-contracts, recruitment of staff for projects, liaison with universities, site visits, project implementation, support of field project teams in various countries, management and administration of numerous major international projects. Involved interaction with member universities, overseas staff, sponsoring agencies, and host governments.

1973-79

Treasurer, Colorado State University. Responsible for banking, investments, cash flow, risk management and insurance, transfers and payments, revenue bonds, and international financial support of overseas projects.

1970-73

Administrative Officer, International Maize and Wheat Improvement Center (CIMMYT), Mexico City. Responsible for the overall financial management of the Center. Included budget, contract and grant management, negotiations of special projects, support of CIMMYT staff outside Mexico, accounting systems, cash flow, international banking, investments, purchasing, personnel, physical plant, systems development, and insurance. Worked closely with staff in Mexico and representatives from the World Bank, United Nations, AID, Ford and Rockefeller Foundations, and a number of governments.

1967-70

Director, Office of Sponsored Research, Colorado State University. Responsible for the administration of the University's research and development program. Included proposals, budgeting, contract negotiations, sub-contracting, patents, property, and all related aspects of administration of university research. Included management of a number of international projects. Travelled to overseas sites in support of projects.

Served as Business Manager for the CSU Research Foundation, a corporate body within the University. Responsible for business affairs of the Foundation which carried out real estate purchases, sales, and leases; issuance of revenue bonds for capital purchases and buildings; patent administration;

and operation of a 12,000 acre cattle ranch owned by the Foundation.

- 1964-66 Assistant Director of Personnel, Colorado State University. Responsible to the Director (who had dual responsibility as an Academic Dean) for all functions of personnel administration for 2,000 employees.
- 1960-64 Budget Officer and Comptroller, U.S. Air Force Research and Development Command, Space Systems Division, Los Angeles, CA., and Turkey.
- 1953-57 NCO, U.S. Air Force. Officer personnel technician, U. S. and Spain.

#### PROFESSIONAL AND HONORARY SOCIETIES

Phi Kappa Phi  
Society of Research Administrators

#### LANGUAGES

Spanish

#### OTHER:

Colonel, U. S. Air Force Reserve  
Commercial Pilot; multi-engine, instrument rated

#### AGRICULTURAL EXPERIENCE

- Until 1952 Raised and worked on a farm/ranch in San Luis Valley of Colorado, an area irrigated by sub-irrigation, flooding, and sprinklers. Primary crops are potatoes, barley, alfalfa, and wheat. Took four years of vocational agriculture in high school. Participated in crop and livestock judging.
- 1964-Present Own an irrigated farm at Ft. Collins, CO. Raise corn, small grains, and alfalfa. Am a partner in a cattle ranch in southern Colorado.
- 1985-87 On staff of the International Tropical Agricultural Center (CIAT), in Cali, Colombia.
- 1970-73 On staff of the International Maize and Wheat Improvement Center (CIMMYT), in Mexico.

**NAME:** John W. Leslie

**KEY QUALIFICATIONS:**

John W. Leslie, President of John W. Leslie, Inc., brings more than thirty years of experience to the fund raising and communications fields. His professional career includes ten years as a fund-raising consultant with two of the country's senior firms; eleven years as chief executive officer of ACPRA, an association of 1,300 colleges and universities and a forerunner of CASE, and eight years as vice president for development for a public university and a private college. Mr. Leslie is the author of two books and numerous articles on the management and evaluation of development and public relations programs in higher education. Much of his work in cost-benefit and resource analysis has been sponsored by the Exxon and the U.S. Steel Foundations. He is listed in Who's Who in America.

**EDUCATION:** M.A., Mass Communications, American University, 1968  
A.B., History and Government, College of William and Mary, 1952

**EXPERIENCE:**

1985-Present President of John W. Leslie, Inc. Serves as counsel to educational and cultural institutions in planning, implementing, and evaluating development programs and major fund-raising campaigns. As a consultant presently and from 1974-1980, Mr. Leslie has served such clients as the American Association of Community and Junior Colleges, Catholic University of America, Coastal Carolina College (University of South Carolina), Fuller Theological Seminary, MacMurray College, McDowell Cancer Center of the University of Kentucky, Michigan State University, National 4-H Council, Norfolk State College, Oakland University, Ouachita Baptist University, Pennsylvania State University, Purdue University, Southwestern Adventist College, Wittenberg University, Vanderbilt University, University of Alabama at Birmingham, and the Universities of Houston, Maryland, and Minnesota.

1981-1985 Vice President, University of Houston, Texas. Served as vice president for development of the University of Houston system and was in charge of programs on four campuses enrolling more than 45,000 students. Built a professional development program and staff, which resulted in a five-fold increase in gift income to more than \$23 million.

- 1974-1980 Senior Vice President, Brakeley, John Price Jones. Served as supervisor of development campaigns, new business and accounts. The company's portfolio consisted of 95 percent fund raising, public relations work and counseling.
- 1963-1974 President of American Colleges Public Relations Association (ACPRA).

**LANGUAGES:**

Fluent: English  
Other: None

**PERSONAL DATA:**

Date of Birth: [REDACTED]  
Citizenship: United States  
Address: [REDACTED]  
Telephone: [REDACTED]

**NAME:** Carlos E. Crisóstomo V.

**KEY QUALIFICATIONS:**

Mr. Crisóstomo is a senior-level expert in applied agricultural research, extension, and technology transfer, with 15 years of experience in Latin America including assignments in Chile, Mexico, Guatemala, and Honduras. He has planning, implementation, and administrative capability in the technical areas of technology generation, validation, and transfer. This has involved new approaches to research and to working with farmers and involved training local agricultural officers and farmers to carry out research and technology transfer. Mr. Crisóstomo was an integral part of a team of scientists that developed the farming systems approach to research and extension in ICTA in Guatemala. As Regional Coordinator for the southern coastal region, he had the responsibility of coordination and direction of the new approaches and strategies at both the Experiment Station and in farmers' fields. Following a successful 2.5 years as Regional Coordinator, he was promoted to Technical Director with national responsibility for the technical unit of ICTA. In addition to planning and developing the strategies and operational plans for the national program, his duties also included the administration of more than 150 professional and technical personnel responsible for implementation of the applied research program to generate, adapt, test, and promote the use of improved technology by the farmers. Since leaving ICTA in 1979, he has assisted the Ministry of Agriculture of Chile in the elaboration of a plan for restructuring the National Extension Service and in the definition of strategies for restructuring the National Agricultural Research System to include the participation of the private sector. More recently he has served as Technical Advisor to the National Agricultural Research and Rural Technologies Programs of Honduras. In these positions he has assisted in the definition of strategies and elaboration of operational plans for the generation and extension of appropriate agricultural technology for small farmers at both the regional and national levels. He has extensive successful experience as a researcher, regional coordinator, administrator, and advisor in the planning, reporting, implementation, and integration of research and extension of tropical agriculture and farming systems.

**EDUCATION:** B.S. (Ing. Agr.), Agronomy, Universidad Austral de Chile, Valdivia, 1968

**EXPERIENCE:**

- 1986-Present Private Farmer, Chile. Supervises the production of vegetables and other crops on local farm.
- 1983-1986 Technical Advisor, Rural Technologies Program of Honduras, Servicios Técnicos del Caribe, USAID. Provided professional advice to the director and zonal coordinators on

all technical aspects of rural technology for the small farmer and participated in the definition of strategies and development of operational plans and programs. Duties also included assistance in the development of a center for the demonstration of rural technologies and techniques, where all aspects of a rural development program for the small farmer were taken into consideration. These centers tested and demonstrated modular farming systems, which included crops and livestock production and the use of natural energy sources, animal traction, and improved family living conditions. Small farmers who were representative of the region were selected for training at these centers and were provided technical assistance and financing to aid them in the use of appropriate technology for increasing their productivity and income. Personnel from both public and private institutions responsible for rural development programs also received training at these centers.

1983

Technical Advisor, Program for Rural Technology of Honduras, USAID, Honduras. Planned and implemented programs of technology transfer to the small farmer. Through field days, field visits, and on-farm demonstration, promoted the use of appropriate irrigation systems for small farmers and assisted metal workers in the manufacture of appropriate irrigation equipment suited for small farmers.

1980-1982

Programa Nacional de Investigaciones Agropecuarias de Honduras (PNIA). Assisted the regional and national research and extension personnel of PNIA in the development of a research program to improve the agricultural productivity of the small farmers in the Olancho and Danlí Districts of Honduras. The program included: a characterization of the agricultural problems; identification, generation, and adaptation of alternate technologies; testing and reconfirmation of the technologies with the direct participation of producers and extension agents; and transfer of proven technology to the farmer.

1980

Instituto Interamericano de Cooperación para la Agricultura (IICA). On assignment from IICA, assisted the Office of Planning of the Ministry of Agriculture of Chile in the elaboration of a plan for restructuring the National Agricultural Extension Service. The new organizational plan included the active participation of private firms in technical assistance to farmers. Was also responsible for development of a new strategy for restructuring agricultural research with the objective of greater participation of the private sector.

1974-1979

Instituto de Ciencia y Tecnología Agrícolas (ICTA).  
1974-1976 Regional Coordinator. Assigned to the southern coastal region of Guatemala. As leader of a technical team responsible for the development

of farming systems research and technology transfer within the region, duties included coordination and direction of: preparation of operational plans and budgets; definition of research priorities; implementation of experiments on research stations and farmers' fields, and field testing of results on farmers' fields and adaptation of results by farmers; organization of field days, seminars and short courses for technicians and producers; and the preparation of technical reports and bulletins. Also responsible for the coordination of the participation of other institutions in the program.

1977-1978 Technical Director. Directed, coordinated, and administered a group of 150 agricultural professionals and technicians who were responsible for carrying out applied research to generate, adapt, test, and promote the use of improved technology at the farmers' level. Commodities in the program included corn, beans, rice, wheat, vegetables, fruits, sesame, soya, and swine. Had the responsibility of elaboration, development and supervision of the operational plans for research, farm testing, and technology transfer. Duties also included establishment of agricultural priorities and documentation and extension of the proven results and strategies to the Guatemalan farmer.

1978-1979 Technical Advisor. Responsible for the gradual transfer of functions of the Technical Director to the newly appointed National Technical Director. Also assisted the new Director in the consolidation of institutional strategies for the generation, validation, and transfer of technology.

1971-1973 Research Scientist, Centro de Investigaciones Agrícolas del Noroeste (CIANO), Obregón, Mexico. Responsible for the planning and execution of research on pasture and forage crops, including alfalfa, corn, sorghum, oats, triticales, grasses, and legumes for the northeastern region of Mexico. Also worked with the University of Washington in the establishment of an animal production program in CIANO. This program emphasized cattle grazing studies on hybrid sorghum and cattle feedlot studies to make use of local agricultural by-products.

1969-1971 La Hacienda, Collipulli, Chile. Provided technical assistance and administration for a 3,000-ha mixed (crops and livestock) farm in Chile. Annual crops on the farm included wheat, rape, oats, and rye which were produced in rotation with grass and clover pastures for a herd of 500

Carlos E. Crisóstomo V.  
Page 4

cattle and 3,000 sheep. Duties also included the administration of a large section of natural forest.

**LANGUAGE:** Fluent: Spanish, English

**PERSONAL DATA:**

Date of Birth: [REDACTED]

Citizenship: Chile

Address: [REDACTED] [REDACTED] [REDACTED]

Telephone: [REDACTED] [REDACTED]

**APPENDIX 3  
EVALUATION TEAM ACTIVITIES AND CONTACTS**

**ACTIVITIES**

Travel, visits, and report preparation were carried out from August 30 to November 7, 1987. The full team participated in travel and visits from August 30 to October 4, 1987 and Dr. Rachie completed the report at Winrock International headquarters during October 13 through 16 and 26 through 30, 1987. One member of the team, Mr. J. Leslie, had prior commitments in the United States during the week of September 14 through 19 and after September 30, but he completed his assignment within the allotted period. The completed report was delivered to USAID/Honduras before November 1, 1987.

The evaluation team's daily activities are briefly outlined below.

Date	Activities
August 30-31	Travel to Tegucigalpa and briefing on assignment by USAID; mainly by B. Cooper and E. Kvitashvili.
September 1	Visit the Comayagua Vegetable Project, including the cooperativa the Fruta del Sol and CARCOMAL; Agro-International (Seaboard Marine) packers and shippers, Mejores Alimentos (CONADI state holding co.) processing/canning co., and the FHIA Demonstration/Research Farm.
September 2	Continue briefing by USAID and meeting with the Mission Director (J. Sanbrailo), Deputy Mission Director (C. Leonard), Head of Rural Development (R. Peters), and others.
September 3	Travel to La Lima and FHIA headquarters, and tour of facilities and briefing by the Director General (Fernandez), Director of Research (Contreras), Director of Communications (Cano), and Director of Development (Millensted).
September 4-5	Presentation of banana/plantain breeding (Rowe and Rosales) and the plantain agronomy (Medina and Ugarte) programs; and visit to the Calan Banana Breeding Station.

September 7 Visit to La Masica Cacao Center and presentation of FHIA's program and activities in cacao improvement (Sanchez and colleagues).

September 8 Presentation of FHIA Citrus Program and visit to Guaruma Center (Holcomb and colleagues).

September 9 Review of the vegetables research and pilot-scale production activities at Comayagua (Aleckovic, Ramirez, Alfonso, and Miselen).

September 10 Presentation of diversification program (Tabor and associates); and visits to the laboratory services: soil and tissue analysis (Zantua) and pesticide residue analysis (Salgado).

September 11-12 Discussions with members of the disciplinary support departments (economics, engineering, and biometrics) and FHIA library; and with members of the Vigilance Committee of FHIA's Assembly. Also, team review and discussions (on Saturday).

September 14-15 Visit to the Ministry of Natural Resources (MRN) experiment station at Omonita; and national banks: Atlantida, Sogerin, Banadesa, and Bancahsa; and team discussions and review.

September 16 Visits to the MRN regional officer in San Pedro Sula (Hernandez); APROCACAHO (Alvarez), University of San Pedro Sula (de Martel), FEPROEXAAH (Zelaya and Zeron), and ANACIHO (Zelaya); and team review.

September 17-19 Follow-up meetings with FHIA directors and staff on an ad hoc basis; team discussions and review.

September 21-24 Team discussions, review, and preparation of report. Meeting with FHIA's Administrative Council on 9/24/87.

September 25 Preparation of report and presentation of preliminary observations to the FHIA principal staff by the evaluation team.

September 26 Team discussions, study, and review; returned to Tegucigalpa.

September 28-29 Preparation of report and seminar presented to USAID on September 29 (see list of participants under "Contacts").

September 30	Preparation of report, team discussions, and review at Winrock International and International Executive Secretarial Services (IESS) offices in Tegucigalpa.
October 1	Visit to Zamorano -- Pan American School of Agriculture (Malo, Ramon, and MIPH staff), and preparation of the report.
October 2-3	Preparation of report at Winrock International offices in Tegucigalpa. Also, breakfast meeting with Dr. Leopoldo Alvarado of MRN.
October 4	Departed Honduras.
October 12-16, 26-30	Completion of FHIA evaluation report at Winrock International headquarters in Arkansas (Maner and Rachie).

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## CONTACTS

### August 31-September 2: Tegucigalpa, Honduras

Mr. J. A. Sanbrailo	Mission Director, USAID
Mr. C. Leonard	Deputy Mission Director, USAID
Mr. R. Peters	Rural Development, USAID
Mr. B. Cooper	Project Officer, USAID
Mr. E. Kvitashvili	Program Planning Office, USAID
Ms. C. Zembrano	Evaluation Specialist, USAID
Mr. A. Herrera	Assistant Comptroller, USAID
Mr. C. Overbeck	Program Officer-RD, USAID
Dr. M. Contreras	Director of Research, FHIA
Mr. S. Aleckovic	Vegetable Project Leader, FHIA
Mr. M. Molino	Gerente, Agro-International
Mr. R. Duron	Gerente, Mejores Alimentos

### September 3-10: FHIA Programs and Field Stations

Dr. F. Fernandez	Director General
Dr. M. Contreras	Director of Research
Dr. J. Cano	Director of Communications
Mr. C. Millensted	Director of Development
Mr. C. Young	Executive Administrator
Mr. J. Sanchez	Leader, Cacao Program
Mr. E. Holcomb	Leader, Citrus Program
Dr. P. Rowe	Leader, Banana/Plantain Breeding
Mr. F. Rosales	Banana/Plantain Breeder
Mr. C. Medina	Leader, Plantain Agronomy
Dr. D. Ramirez	Leader, Horticulture Program
Mr. S. Aleckovic	Leader, Vegetable Project
Dr. P. Tabora	Leader, Diversification Program
Mr. J. Romero	Diversification-Soybean-Research

Dr. M. Zantua	Head, Agronomy Department
Mr. C. Zacarias	Head, Agricultural Economics Department
Dr. R. Ahmad	Head, Biometrics and Computer Services
Dr. P. Soto	Head, Entomology Department
Dr. J. Krausz	Head, Plant Pathology
Dr. G. Molina	Plant Pathologist
Mr. R. Vaquero	Agricultural Engineer
Mr. R. Amaya	Chemical Analysis Laboratory
Mr. T. Salgado	Residual Analysis Laboratory
Mr. J. Repich	Office of Finance
Mr. J. Moran	Communications - Library
Ms. S. de Mejia	Personnel Office
Mr. R. Arriaga	Institutional Services
Ms. I. de Rivera	Purchasing
Mr. M. Chirinos	Maintenance Section

Note: The evaluation team is most grateful to all the above and many other staff members who contributed generously of their time and information.

Mr. J. Wainwright            FHIA Auditor, Mendieta y Asociados

**September 11-26: External Contacts (North Coast)**

Dr. Francisco Sierra	UBC Soils Scientist (retired)
Dr. Clyde Stephens	UBC Technical Services (entomologist)
Mr. Henry Franser	Fabrica Industrial de Alimentos de Honduras (Mgr.); and SPS Chamber of Commerce (Pres.)
Mr. David H. Tas	Honduran-Exotics (Mgr.)
Dr. Jorge W. Gonzales	Standard Fruit Co.-LaCeiba (Supt. of Research)
Lic. Jorge Bueso A.	Comité de Desarrollo de FHIA (Chmn.)
Ing. Omar Hernandez	Regional SRN Office (Director)
Ing. Fernando Alvarez	APROCAHAHO (Executive Secretary)
Lic. Jane de Martell	University of San Pedro Sula (President)
Sr. Boris Goldstein	Fundacion USPS (President)
Ing. Jorge Jaar	Fundacion USPS (Member)
Ing. Napoleon Canahuati	Fundacion USPS (Member)
Ing. Joaquin Fernandez	Facultad Agricultura USPS (Director)
Sra. Vilma de Colindres	ANACIHO (Secretary)
Lic. Ilsa Diaz Zelaya	FEPROEXAAH (President)
Lic. Carlos Ceron	FEPROEXAAH (Executive Director)
Ing. Joaquin Fernandez	Banco Atlantida, SPS (Assistant Manager)
Lic. Mario Carranza	BANCAHSA (Assistant Administrative Manager)
Ing. Luis Alonso Lopez	Programa Nacional de Platanos, SRN (Head)
Ing. Miguel A. Bonilla	Secretario de Recursos Naturales (Ex-Minister)
Dr. Robert K. Waugh	Member, Comité de Vigilancia (FHIA)

**September 24: Meeting with FHIA Administrative Council**

Ing. Luis A. Quezada	MRN-FHIA Admin. Council (President Supl.)
Mr. Richard Peters	USAID-FHIA Admin. Council (V.President Supl.)
Lic. Jane L. de Martel	USPS-FHIA Admin. Council (Member)
Dr. Leopoldo Alvarado	MRN-FHIA Admin. Council (Member)

Dr. Jorge Roman PAS-Zamorano; FHIA Admin. Council (Member)  
Dr. Rodrigo Tarte CATIE; FHIA Admin. Council  
Sr. Encencio Peralta Farmer; FHIA Admin. Council  
Also: FHIA Management Group (FF-ME-EM-JE-CY)

**September 28-29: USAID Meeting**

Dr. C. Leonard Acting Mission Director, USAID  
Mr. J. Miller Acting Deputy Mission Director, USAID  
Mr. D. Flood Rural Development, USAID  
Mr. J. Warren Rural Development, USAID  
Mr. D. Cruz Development and Finance  
Ms. E. Kvitashvili Development and Finance  
Mr. B. Cooper Project Officer, USAID  
Dr. F. Fernandez Director General, FHIA  
Dr. M. Contreras Director of Research, FHIA  
Mr. J. Cano Director of Communications, FHIA  
Mr. C. Millensted Director of Development, FHIA  
Mr. C. Crisostomo FHIA Evaluation Team (Chile)  
Mr. B. Henrie FHIA Evaluation Team (U.S.A.)  
Dr. J. Moncada FHIA Evaluation Team (Mexico)  
Dr. K. Rachie FHIA Evaluation Team (U.S.A.)

**September 30-October 3: Tegucigalpa and Zamorano**

Dr. Simon E. Malo Director, EAP-Zamorano  
Dr. Jorge Roman Dean, EAP-Zamorano  
Dr. Keith Andrews Dept. of Plant Protection, EAP (Head)  
Dr. Jairo Castaño Dept. of Plant Protection, EAP (Plant Path.)  
Mr. Oscar Paniagua Dept. of Plant Protection, EAP (Weed Sc.)

## APPENDIX 4

### DESCRIPTION OF FHIA'S PURPOSE AND MANDATE EXTRACTED FROM PAGES 1-16 OF: FHIA'S MANDATE, FINANCIAL PROJECTION AND SUSTAINABILITY- A FUNDING STRATEGY DRAFT DOCUMENT

August 1987

This new agricultural research organization was established in early 1984 in response to a felt-need to innovate agricultural technology as to allow Honduras to increase the production, the quality and the diversity of commodities for export. The combined interest of the government of Honduras and of the USAID coincided with the willingness of the United Brands Company to donate its research facility in La Lima, including its program of banana genetic improvement.

#### I. PURPOSE, OBJECTIVES AND ORGANIZATION

The founders of FHIA decided, from its inception, to adopt a new model of organization and modus operandi, forming a private enterprise, nonprofit, closely related to the government agricultural strategy, but independent in its operations and management. The original funds, provided largely by the USAID (US\$20 million), were intended to support basic core research and dissemination of results for ten years while other funds were to be obtained through active fund-raising to progressively supplement, and ultimately, replace this initial funding. Thus, evolved the character of a "foundation" as its title indicates. Obviously, for a new enterprise, the first two years were largely devoted to organizing, recruiting personnel, building essential research and communication infrastructure, defining research strategy and priorities, characterizing the situation of the chosen commodities and initiating research and communication activities compatible with FHIA's objectives. These objectives as established by its Assembly of Members are as follows:

#### Objectives

The ultimate goals of FHIA are to help increase the level of productivity of the Honduran farmer and the generation of employment in the country. To accomplish the above, the following specific objectives have been given in its statutes:

1. To conduct research in traditional and nontraditional crops for internal consumption as well as for export, including aspects of production, processing and marketing at national and international levels.
2. To operate the Center of Tropical Research of Honduras at La Lima and its dependencies, including analytical services and other research-related services.

3. To provide communication services in support of the agricultural extension services and of the producer.
4. To stimulate the agricultural development of the country through science and technology.
5. To operate international programs, especially in relation to genetic resources of bananas, plantains and related species and in regard to obtaining funding for that purpose.

### **Organizational Structure**

The foundation's maximum authority is its General Assembly presently of 30 members chosen from the public and private organizations of the agricultural sector, who meets once a year. A Board of Directors (Administrative Council) of eight members meets every two months, counsels management and sets operational policy. A committee of overseers (Comité de Vigilancia) periodically requests audits and makes sure that finances and operations are properly regulated and conducted according to ethics and standard procedures.

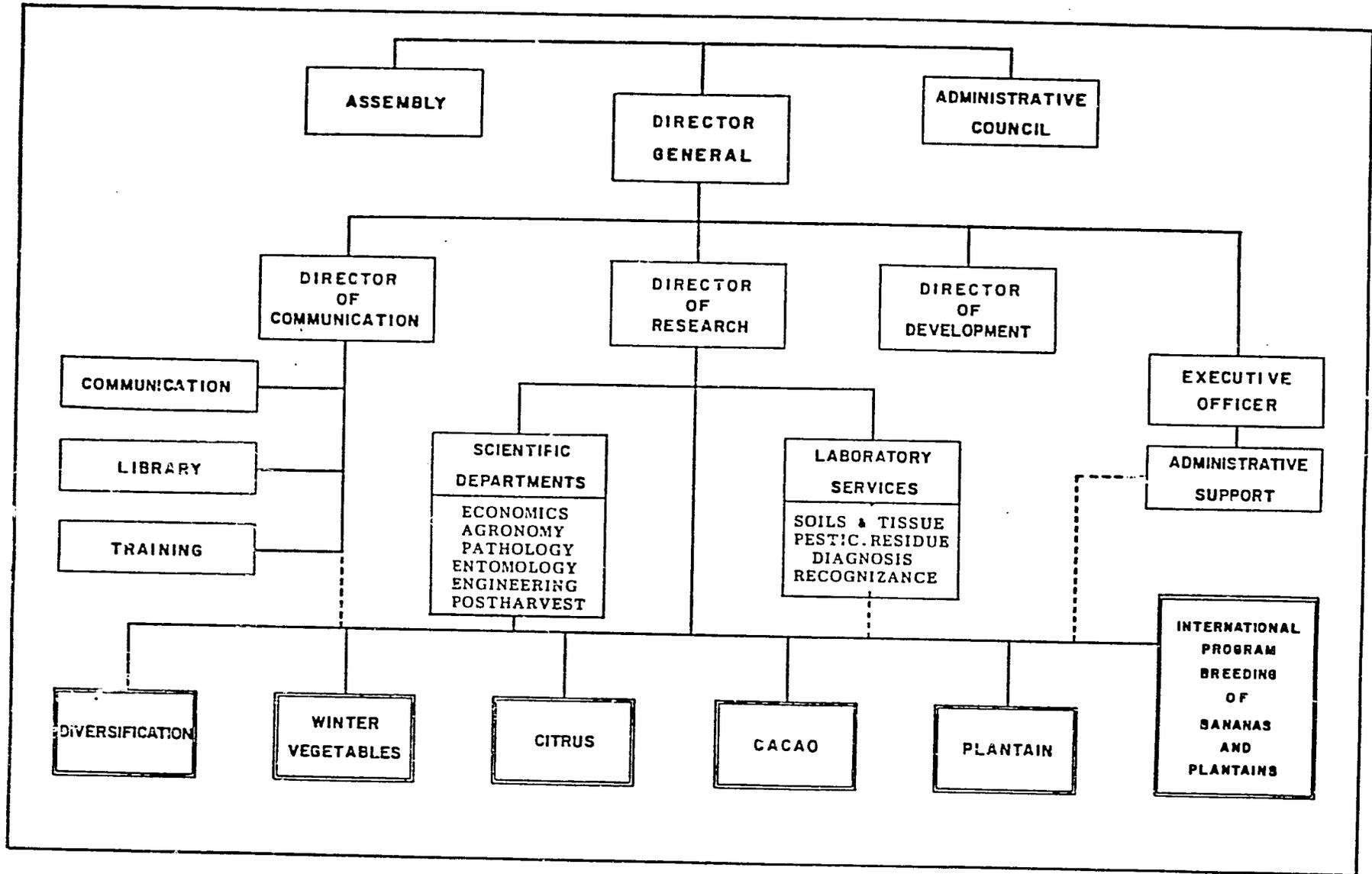
The management and leadership are in the hands of an executive director general, assisted by three other directors, for the three divisions of research, communication and development (fund raising). An executive administrator, directly under the director general, is in charge of accounting, personnel and other administrative services. All of these functions are based on a "philosophy of lending support to the research and communication activities." The organigram in the next page shows the foundation's structure (figure 1).

In concert with its focus on export commodities, FHIA's Assembly has adopted a mandate concentrating from the beginning on six programs. The previously existing banana improvement program expanded by FHIA to cover breeding of plantains as well, plus five other programs of domestic coverage: cacao, citrus, plantains (cropping practices), vegetables, and a diversification program; this latter with the purpose of exploring new nontraditional options of export products. These six programs form the main thrust of FHIA's research and communication efforts.

Each of the above programs is headed by a "leader" who provides the necessary technical and logistic leadership required to coordinate the work of the program staff, (a very small group of two or three commodity specialists) plus the inputs of the disciplinary scientific departments that, together with the program staff, conduct all the research and most of the complementary communication activities on each commodity.

The present five disciplinary departments: agricultural economics, agronomy, pathology, entomology, and engineering; consist of three to five professionals in their departmental fields. This combination of "programs" and "departments" allows for the most efficient utilization of limited personnel and resources.

Figure 1. Organization of the FHIA structure



The Communication Division included the "units" of communication (production of publications, visual aids, radio, video, etc.), training and conferences, and the library. These units assist the staff of the programs and departments to produce, package and deliver appropriate messages in different forms in order to carry to extensionists, to farmer's decision makers and to other audiences the technologies generated, adapted or channeled by FHIA.

The administration, under the executive Administrator, lends support to the research and communication staff through the four "offices" of personnel, supplies, maintenance, and Services. The staffing of all these components of FHIA's structure are given in the attached tables. Total permanent employees in 1987 are 230 of whom 48 are professionals, 84 support staff and 96 laborers. Of the professional staff, 13 are Ph.D.'s, 20 masters and 23 holders of baccalaureate degrees.

### **Infrastructure**

Headquarters for the foundation are at La Lima, on a two-acre facility donated by the United Brands Company where their former Research Department was based. These facilities include laboratories, greenhouses, offices, and warehouses and have expanded recently to four acres to include two additional buildings for the communications center's conference rooms, offices, shops, library, and visitor's reception.

Research is conducted in four small experiment stations located purposely in the center of the regions of production of program's commodities at Guaruma (bananas, citrus), Calan (plantains), La Masico (cacao), and Comayagua (vegetables, mango). Additionally, a number of experiment sites have been established on farmers' fields at different locations in the country as far as the Aguan Valley on the north coast, La Entrada in the west and Choluteca in the south.

### **Technical and Laboratory Services**

Besides conducting research and communicating the results, FHIA offers to producers various technical services such as soil and tissue analysis and fertilizer recommendations, diagnostic tests on diseases and pests, land recognizance and drainage-irrigation design. FHIA's soil analysis laboratory is internationally known and draws samples from several countries in Central America. A moderate amount of income on the order of US\$200,000 is expected from these services.

Additional details of the present research and communication strategies and plans are given in FHIA's five-year plan document available at the foundation.

### **Development (Fund-raising)**

Seeking and obtaining funds is essential for the growth and sustainability of FHIA. Early plans, recognizing this requirement, included the establishment of a development office, later elevated to the level of division, headed by a director of development. This person

was hired at the beginning of 1987. The new director of development, Mr. Chris Millensted, together with the director general, rapidly expanded the fund raising efforts initiated the previous year for the international program of improvement of bananas and plantains. The results of those earlier efforts by the director general amounted to grants totalling US\$475,000 and donated by the UPEB, the Government of Ecuador, the IDRC of Canada and the Government of Honduras.

## II. BENEFICIARIES AND CLIENTELE

The objectives of FHIA are focused primarily in the Honduran producer to help increase his productivity in selected crops and to help generate additional employment in the agricultural sector. The same objectives apply to the producers of bananas and plantains in other countries of the tropics where these commodities are important as local foods as well as export commodities.

The beneficiaries of FHIA's research results are, therefore, firstly the Honduran producers, regardless of size, with special attention to the small and medium farmers. These constitute the majority of plantain and cacao producers both in terms of number and acreage. If we take into account the associated enterprises and cooperatives, small producers are also the majority of those producing vegetables, citrus and bananas (except in acreage for the latter crop).

Another category of beneficiaries are those that enter into processing and marketing activities related to the crops in FHIA's mandate. Export diversification crops are expected to provide a strong stimulus in this area.

It is anticipated that increased production will, through area expansion and higher productivity, generate a significant number of jobs in the rural sector. For instance, in plantains, employment is expected to increase from 1270 man-days in 1987 to 1518 or 20% in 5 years and to 1815 or 43% in 10 years. Table 1 shows the projected increases in value of generated employment for the present FHIA's commodities.

Finally, consumers will benefit from increased availability of food crops at lesser prices. These consumers will not only include those importing countries, but also and perhaps to a greater extent, Honduran consumers since only a portion of the production will meet export requirements; however, the unexported portion will be channeled through local markets allowing even the poorest segment of society access to fruits and vegetables that otherwise may not be available to him.

### Other Benefits to Honduras

In addition to the above mentioned beneficiaries of FHIA's efforts, other indirect advantages will accrue to the national economy thereby benefiting the general population and helping the economic development of the country. The following increases in gross value of production are estimated for the next ten years for selected export crops are shown in Table 2.

Table 1. Increases in value of generated employment predicted in the production of export crops in Honduras during the period 1988-1997.

<u>Value of generated employment - millions of Lps.</u>			
	Due to increase in area cultivated	Due to increase in productivity	Total increase
Cacao	7.2	3.6	10.8
Citrus	9.3	4.7	14.0
Vegetables	48.2	36.1	84.3
Plantain	19.0	9.6	28.6
Bananas	73.8		73.8
Soybeans	3.3	3.3	6.6
Mango	2.3	2.4	4.7
Black Pepper	3.0		3.0
Pineapple	4.7	7.0	11.7
	<u>170.8</u>	<u>66.7</u>	<u>237.5</u>

Table 2. Projected increases in gross value of production for the period 1988-1997 for selected export crops in Honduras

<u>Gross value of production - Millions of Lps</u>		
	Value of production	Value of exports
Cacao	71.1	57.4
Citrus	212.9	69.0
Vegetables	186.3	186.3
Soybeans	10.8	
Mango	48.8	9.0
Black Pepper	7.6	5.0
Palm Hearts	0.5	0.5
Pineapple	155.2	142.3
Plantain	152.6	44.7
Bananas	607.4	542.5
TOTAL	<u>1454.0</u>	<u>1056.6</u>

The other benefits to the future economic industrial development of Honduras will be made possible by the foreign exchange accruing from agricultural exports. These dollar resources can be used for imports of industrial equipment and expertise to help develop other sectors of the economy. By the year 1997 it is estimated that a total accumulated increase of 1,056 million of Lempiras in foreign exchange equivalent will accrue from additional exports of nine commodities. This is a significant injection of capital derived from export-generated financial resources.

### **Benefits to Other Countries of the World**

The new pest and disease resistant varieties coming out of the international banana/plantain breeding programs will also benefit the producers, consumers and economies of at least eight banana producing/exporting countries in Latin America and at least six others in Asia and Africa. However, when plantains are included the number of benefiting countries and people will increase enormously since at least 26 additional plantain producing countries and some 250 million people are potential beneficiaries in variable magnitudes difficult to assess.

### **Clientele**

The ultimate clientele of FHIA are the producers of commodities in the Foundation's mandate. To reach them FHIA will be able to contact them directly in numerous ways. Moreover, FHIA will also give attention to extension personnel of the public sector and of farmer's associations, which in turn, will carry technology information to producers. Additional audiences are professionals, businessmen, industrialists, public officials and students, all of whom will be reached by FHIA through its communication strategies.

### **III. CROPS IN FHIA'S MANDATE, PRESENT AND POTENTIAL**

The present crops (programs) in FHIA's mandate (banana and plantain breeding, plantain's agronomy, cacao, citrus, vegetables and diversification) were prescribed by the original planners and founders of the center and sanctioned by its General Assembly.

Not presently included in its research programs are coffee and basic grains, for two reasons 1) both are already handled by other agencies and 2) funds currently available to FHIA are not sufficient to adequately support the six existing programs. On the contrary, reducing the number of commodities, in order to maintain adequate depth of research, may become necessary unless substantial additional funds are obtained.

### **Analysis of Crop Priorities**

An attempt is made to comparatively analyze the likely possibilities of each of the six crops in the core programs plus the four commodities in the diversification program. It must be noted that the research in the diversification program is of exploratory nature to test the feasibility of profitably producing and exporting nontraditional crops. A recently

completed analysis confirms the justification for the choice of commodities in FHIA's mandate, in terms of potential increases in production (area expansion and productivity) increase in value of exports (at least 1987 prices) and increase in value of employment generated. Ranked in order of increase in gross value of production are 1) bananas, 2) citrus, 3) vegetables, 4) pineapple-plantain, 5) cacao, 6) mango, 7) soybeans, 8) black pepper, and 9) palm hearts. The ranking by value of potential export changes somewhat from the previous ranking to 1) bananas, 2) vegetables, 3) pineapple, 4) citrus, 5) cacao, 6) plantain, 7) mango, 8) black pepper, and 9) palm hearts. The combined increase in gross value of production over the ten-year period from 1987 is Lps.1,454 million and the total value of exports is Lps.1,056 million.

The ranking order as generator of additional employment over the same period is 1) bananas, 2) vegetables, 3) plantains, 4) citrus, 5) pineapple, 6) cacao, 7) soybeans, 8) mango, and 9) black pepper.

Coffee and basic grains have not been included in this analysis for the reasons stated before. Pineapple was not adopted into FHIA's mandate at the start as it was assumed that its research was handled by the Standard Fruit Company, but since then, local production in the Yojoa area has created a need for research to cover that and other potential pineapple areas of Honduras.

The above economic projection is based on assumed, constant rates of growth. However, these may be affected by special circumstances of market demand that remain to be included in the analysis.

Also, the desirability must be taken into account to diversify export agriculture with alternatives that may pay off in the long term future and beyond the ten-year span.

Finally, the potential of other economic crops must be considered in the very near future, especially in regard to African oil palm, cut flowers, foliage ornamentals, macadamia nuts and perhaps shrimp production, an industry that is growing rapidly in Honduras.

APPENDIX 5  
SOME OBSERVATIONS ON FHIA'S COMMODITY PROGRAMS

**BANANA AND PLANTAIN BREEDING PROGRAM**

Objectives and specific goals. With the donation by the United Brands Company of its division of tropical research, the FHIA inherited the banana and plantain breeding program developed over the past 25 years.

Along with the physical plant and valuable germplasm collection, FHIA assumed the responsibilities for developing commercial varieties genetically resistant to:

- (i) Panama Disease Race 4
- (ii) Black Sigatoka
- (iii) Nematodes

In plantains the first priority is to develop a commercial variety resistant to Black Sigatoka.

The banana/plantain breeding program has the unique distinction of being international in scope.

Staff and facilities. The program has a highly qualified and motivated leader and support staff. Regarding capacity, however, the breeding program has to cope with the fact that triploids, tetraploids and most of the diploids produce very few seeds when pollinated. Therefore, the program would benefit by a two fold increase in field labor at least.

Methodologies. Due to the intricacies of Musa breeding, basic research is required to understand and overcome the complexities of the cytology and physiology of the reproduction process and its implications on breeding methodology. However, FHIA does not have the staff nor the facilities to undertake these studies. One solution would be to establish linkages with mentor institutions from abroad. Basic knowledge developed through thesis work is indispensable to support and speed up FHIA's breeding activities on Musa spp.

The major constraint in the genetic improvement of Musa spp. is crossing. Biotechnology research is therefore urgently needed to accelerate the recombination process. Adding a young scientist trained in genetic engineering to interact with mentor institutions and adapt new techniques to field operations is among FHIA's highest priorities.

Linkages. Since the banana/plantain breeding program has an international clientele, FHIA must define national policies and strategies of action to have a significant impact on the existing banana/plantain existing research networks. The principal staff would benefit greatly through visitations to important producing countries and programs in order to reaffirm mutual interests and cooperation. A

spirit and attitude of openness and linkage with world scientific community dealing with Musa spp. is essential for FHIA.

Current activities and progress. The program has developed improved genetic material. Hence, a significant breakthrough or contribution is expected in the next five years with the continued adequate support and funding.

Future prospects. FHIA has a large collection of Musa spp. germplasm. Therefore, FHIA could function as one of the world's repositories of basic germplasm. Mankind cannot afford the genetic erosion in this valuable export crop also of vital importance for human nutrition in many countries of the developing world.

The characterization, preservation, and expansion of the Musa collection is an urgent task. Therefore, FHIA could present a special germplasm project to the world community of donors. These linkages would include IBPGR, FAO and other interested agencies.

FHIA's future contributions on banana/plantain improved varieties resistant to Black Sigatoka will have a great economic and social impact on a global scale. For example, at present US\$100 million are spent annually for Black Sigatoka control in the Western Hemisphere alone.

#### Plantain Agronomy

Present situation. Plantains represent a major food and are extremely important in the daily diet of people not only in Honduras, but also in many other countries of the region and in the tropical developing world. In Honduras the area under cultivation with plantains is 10,470 hectares farmed by approximately 6,200 producers, who represent a large proportion of the FHIA constituency. The average yield is only 13.75 tons per hectare. Production is concentrated in the Sula Valley and most of the producers are organized in associations and cooperatives.

Approximately 86% of the production is consumed locally and 14% is exported. At present the world price is considerable better than that of the national market, but in order to take advantage of increasing demand, several problems have to be solved. Increasing plantain production for both export and internal consumption will contribute significantly to national employment and income.

Prioritizing problems and research activities. The major production constraints of plantains in Honduras include

- (i) High incidence of Black Sigatoka disease. Only 34% of Sula Valley production is protected using planes or motorized sprayers, at intervals longer than 15 days.
- (ii) Inadequate population densities and fertilization practices.

- (iii) Drainage problems and possible drought during the "canicula" period.
- (iv) Losses from spread of virus diseases.
- (v) Postharvest problems including packing systems and transportation.

Specific goals and objectives. FHIA should concentrate its major activities in the following areas:

- (i) Crop management and cultural practices.
- (ii) Control of Black Sigatoka through an integrated strategy of cost effective cultural practices and intermediate technology (e.g., more effective hand sprayers).
- (iv) Postharvest quality control.

Staff and facilities. The plantain program is understaffed. Therefore, adding a young scientist trained in the design of intermediate technology would be of great benefit.

FHIA recently completed the Calan Research and Demonstration Center, which is strategically located in the plantain production area.

Current activities and progress. After its inception the plantain program began field studies to characterize the agroecological and socioeconomic conditions associated with plantain production practices. It is our opinion that FHIA has made a conscientious and serious effort to gather basic information on plantains through extensive interactions with producers and other interested parties.

FHIA has also been actively involved in providing technical assistance to producers and other related institutions through chemical analysis of soils and foliage. It was recently determined that nitrogen but not potassium is required under most growing conditions.

Dwarf plantains. Two new dwarf plantains from 1.2 to 2.0 meters shorter than the traditional variety have been identified. These two dwarfs combine comparable quality of fruit and bunch size with resistance to toppling, higher yields, and more convenient disease and insect control. Higher yields would be obtained by planting at higher densities and disease control is more effective because hand spraying can reach the more vulnerable upper leaves (2.5-3.2 M vs. 4.5 M).

Plantain program overview. Based on plantain export potential and its socioeconomic benefits including the generation of employment and income, it is the team's opinion that plantains should be part of FHIA's core program. The research should focus on appropriate, practical, and cost effective technology acceptable to the majority of plantain producers.

## Cacao Program

Objectives and specific goals. After its establishment in September, 1985, the program began field studies to characterize the agro-ecological and socioeconomic conditions along with cacao production practices in the zones under cultivation -- Cuyamel and Guaymas. Characterization of the La Masica zone is in progress.

It is our opinion that FHIA has done a conscientious and serious job in gathering basic information on cacao through extensive interactions with cacao producers and other interested parties.

Derived from collected field data, the most limiting problems are:

- lack of good genetic material and planting stock
- high incidence of Pro-rot (Phytophthora spp), at present cacao's most important disease
- drainage problems
- inadequate knowledge of cacao production technology by farmers, e.g., low planting density, inadequate shading, absence of fertilizer practices, and unsuitable postharvest handling

The objectives and specific goals of FHIA's Cacao Program are:

- improvement of varieties
- characterize crop phenology
- improve crop management
- better plant protection
- improve postharvest drying and processing
- socioeconomic constraints

Other equally important objectives and goals are the production of hybrid seeds, the establishment of validation and demonstration plots, and the training of technicians and producers.

It is FHIA's responsibility to keep a close liaison with its clientele through the technical advisory committee of the cacao program.

Staff and facilities. FHIA is to be commended for its diligence and efficiency in developing the physical plant of the Cacao Research and Demonstration Center at La Masica in only 15 months. This center is strategically located within the cacao producing area and is already frequently visited by producers and other interested parties.

The cacao program at present is adequately staffed. However, within the next 5 years, a two-fold increase will be required to cope with the increasing demand for services.

Linkages and possible duplications. At present, FHIA has constituted a technical advisory committee for the program, with the participation of the Cacao Producers Association (APROCACAHO), the Ministry of Natural Resources (MRN), the National Agrarian Institute (INA), the National

Institute for Professional Formation (INFOP), the Center for Industrial Development (CDI), Program for Rural Technology (PTR), and the Honduran Coffee Institute (IHCAFE).

Since lack of credit is a major constraint for cacao expansion, the technical advisory committee would benefit from inviting representatives from banking institutions.

To avoid duplication FHIA's cacao program would benefit from close cooperation with CATIE and the Trinidad cacao breeding program.

Current activities and progress. Simultaneously with the construction of the cacao center infrastructure, FHIA's cacao program has been actively involved in developing:

- (i) A nursery to supply the material required for the research and demonstration plots and eventually to supply growers with improved material. In this respect, there are frequent visitors to the program requesting material, and demand will grow rapidly in the immediate future. Propagating cacao planting material is an activity in which FHIA can make significant contributions in a short period of time. In a separate section a suggestion is made about a separate propagation scheme which implies the active participation of cacao growers and simultaneously offers the potential to generate additional funds for FHIA.
- (ii) A germplasm bank has been established to maintain introduced and locally selected cacao materials. This program offers the unique opportunity to select and preserve local materials that are in danger of disappearing due to genetic erosion through uncontrolled deforestation.
- (iii) Demonstration plots have been established with different planting densities and will show the benefits of applying the integral technological production package.

Future prospects. FHIA's cacao program has the responsibility for developing and(or) validating an appropriate and cost effective technological basis for transforming cacao as a subsistence activity into a commercially oriented industry with quality to compete in the international market. Cacao export in Honduras has considerable potential. The ecology is favorable and, according to experts, Honduras has around 35,000 hectares of land suitable for cacao. Also, cacao productivity will have a tremendous positive economic and social repercussions among FHIA's beneficiaries, including future cacao growers and others in the production-marketing chain. Therefore, FHIA's cacao program is a well justified mainstream activity.

## **Diversification Program**

Present situation and needs. One of the most important responsibilities assigned to FHIA under its mandate is to contribute to diversifying the agricultural export potential through the utilization of nontraditional commodities.

The Honduran government recognizes the country's dangerous dependency on a small number of traditional export crops and is committed to diversifying its economic base. Therefore, FHIA has the opportunity to investigate nontraditional agricultural commodities with export potential.

Specific goals and objectives. FHIA is concentrating on developing a technological base which is appropriate, feasible and cost effective to support the production, postharvest handling, and marketing of new and potentially promising export commodities.

Staff and facilities. At present the program is adequately staffed. However, on a short-term basis, the diversification program will require the participation of disciplines, especially entomology, agronomy, pathology, physiology, economics.

The acquisition of an experimental site of 50 ha is being considered for 1987. However, at present and in the future the program should conduct experiments on producers' farms. The purchase of seed processing and storage equipment is also planned. However, the diversification program has unsatisfied needs: human resources, infrastructure and equipment. Therefore, FHIA has to re-examine this situation in order to study the reallocation of human resources and facilities.

Current activities and progress. Since its inception the diversification program of FHIA concentrated its efforts on making a comparative analysis for the selection of promising crops with export potential and which merit further studies.

The screening methodology begins with the definition of the philosophy, objectives and goals for the diversification of commodities in Honduras. A list of 250 potential export crop has been prepared which was later reduced to 25 commodities. The methodology for evaluating these selected crops, includes the gathering of information on 1) size of markets, 2) marketing problems, 3) price situation, 4) producer/supplies, 5) competitors, 6) supply/production timing, 7) comparative advantages of FHIA, 8) strategies for development, 9) financial requirements, 10) potential to generate employment, and others.

In order to make valid comparisons, the diversification program developed a model screening process. After passing the crops through the model, the results obtained gave a reasonable estimate of their potential in respect to generation of employment, cost of production, rate of return, investment requirements, pay back periods, interest-to-cost ratios and others.

The developed methodology along with results were included in a FHIA' publication entitled "Comparative Evaluation of 25 Crops for the Diversification Program of FHIA."

A basic conclusion of this study is that there are a number of other crops which may be even more attractive than coffee and bananas and should be included in future evaluations. Moreover, FHIA's diversification program has developed a methodology to aid in the selection of crops with export potential. Some examples are

- (i) Mango. A significant accomplishment of the diversification program was to induce early flowering in mango cv. Haden during the final months of 1986. This allows the production and export of mangos when competition in the international market is minimal.
- (ii) Storing palm hearts. Trials were conducted in storing palm hearts of coconut and African oil palm under various temperatures to study product storage. The results showed that when properly prepared and cooled quality remained acceptable in terms of texture, taste and color even after seven weeks of storage. The information obtained will provide better commercial opportunities for the producers and exporters of both crops.
- (iii) Soybeans. Considerable progress has been made in screening and selecting improved strains of soybeans for Honduran growing conditions. Extensive trials have been conducted and studies are currently under way to identify lines with satisfactory seed viability, promiscuous modulation, and other desirable agronomic traits, and to develop efficient cultural practices for Honduran growing conditions, particularly in controlling weeds. In addition, demonstration plots and field days have been conducted and an excellent rapport has developed between the FHIA soybean specialists and farmers and other interested groups.

Critical issues for the DP. A major dilemma for the diversification program is to determine how much effort and resources can be devoted to exploring the potential for new commodities and how to transfer the longer term applied research activities to other departments, agencies, and organizations. A case in point is the soybean project which has already gone much beyond the initial exploratory role intended for the DP.

Despite the excellent work being done at FHIA, it must be recognized that soybeans are highly unlikely to become an export crop, current production levels are very low (500 ha), large-scale production is highly mechanized, specialized equipment is required for processing, small-scale production methodologies have never been satisfactorily developed, and soybeans are not a preferred subsistence crop in the western hemisphere.

The problem is that the soybean program under the able leadership of Dr. Julio Romero has reached a stage where considerable expansion is needed both in research and extension/demonstration to continue the highly promising studies on varietal improvement and cultural practices (especially chemical weed control) and conduct on-farm trials on a much wider scale. Since the current production and future projections (2000 ha by 1997) will be used in-country, the GOH and other potential donors must be convinced to participate in soybean production/utilization and support both the research/development and processing/marketing aspects.

Since soybeans are a basic grain crop with very low export potential, FHIA and MRN need to define the role of FHIA in soybean breeding and in developing appropriate and cost effective cultural practices. The MRN presumably, would be responsible for technology transfer, but both FHIA and MRN also have significant roles in training. Therefore, to avoid possible duplication and political friction, a cooperative agreement on soybeans is urgently needed between MRN and FHIA. If such an agreement is reached and additional support is obtained, the center should consider raising soybean research to the status of a special program.

Future prospects. The diversification program is an essential component of FHIA in fulfilling its mandate in developing a technological base to support nontraditional agricultural commodities with export potential. Hence, the DP must be considered as part of the FHIA core program.

The DP urgently needs to conduct market research and exploration including the likelihood of external competition that will provide basic information on commodity market potentials before FHIA embarks on costly biological research.

#### **Citrus Program**

Present situation. Citrus is produced throughout the country. However, the North Atlantic Region is the area of highest concentration. Oranges account for the greatest volume, 70% of its production is commercialized as fresh fruit in the domestic and Central America markets; the other 30% is locally processed into concentrated juices and other forms. However, the volume exported is insignificant and of modest quality in comparison with the volume and quality demanded by the U.S. market.

Grapefruit and citrus products can be exported to Europe to take advantage of a window in the market from July to October.

A rigorous analysis of production and commercialization prospects for exporting citrus indicates that this activity is at present and will for the future remain highly competitive.

The outlook for Honduras exporting citrus to Europe is apparently better for grapefruit. However, production of commercial scale grapefruit is limited to only about five growers and 1000 ha. In oranges, poor quality is a limiting factor.

Entrepreneurial export-oriented growers can take advantage of the ecology of the areas close to sea level which are excellent for high quality grapefruit production.

Specific goals and objectives. FHIA is responsible for developing and(or) validating a base of appropriate and cost effective technology, to support the production and marketing of quality citrus and to assure the competitiveness of an export oriented citrus industry.

Limiting factors and research priorities. The characterization studies conducted by FHIA have identified the following technical constraints as critical for the citrus industry in Honduras.

- location of citrus orchards in nonoptimal ecological environments
- inappropriate varieties and use of noncertified planting material
- low content of soluble solids in the juice in certain areas
- poor drainage, low density plantings and lack of pruning
- lack of and(or) ignorance of appropriate and cost effective technology on fertilization, control of weeds, insects, and diseases

The consequences of these major technical constraints are fruit of low quality not only for processing juices but also for exporting fresh fruit. Therefore, the quality of Honduras citrus fruits must be improved in a cost-effective way, in order to develop a competitive export oriented industry.

Staff and facilities. Whether FHIA's citrus program concentrates its primary research efforts on major technical constraints or on technology refinements, the program remains understaffed.

Due to variation in conditions for orange production in Honduras, costly "on-farm" trials will be required to validate appropriate and cost-effective production practices for the different production systems.

The FHIA citrus program has a plot of 5.5 hectares of adequately fenced land for the germplasm bank although additional investments in facilities are needed to complete this unit.

At present, citrus trials are conducted in growers' orchards, but the citrus program is planning to acquire and operate at least two experimental farms: one for the highlands and the other for the low lands. In these two sites the focus will be on grapefruit at the lowland center, while mandarins and their hybrids will be studied at the highland center. The development and operation of these two centers will require additional staff.

Current activities and progress. In 1985, FHIA concluded initial studies which characterize the agroecological conditions of citrus production in the area of highest concentration, the North Atlantic Region. Preliminary socioeconomic data was also collected. This information has proven very useful and has also led to establishing links with grower associations and farmers.

These initial studies confirmed the working hypothesis about the poor quality of the oranges currently produced for the concentrated juice industry. Oranges produced in the Yojoa zone are the exception.

Significant contributions. One important accomplishment has been the identification of a fruit-piercing moth as the culprits of the extensive damage done to oranges. The magnitude of damage, although devastating, has not yet been fully assessed. A related study made by the entomologist is the identification of weeds that host this moth and the characterization of its biological cycle. It is hoped that effective and practical control methods would be developed as soon as possible.

Future prospects. Due to the center's financial constraints, a strict and rigorous analysis of the potential of oranges for export needs to be made. One alternative is to concentrate FHIA's resources on grapefruit and citrus products. Another option is for FHIA to concentrate on alleviating the major biological constraints rather than do technology refinements. A new and creative research strategy may be studies of new leguminous cover crops for weed control.

### **Vegetables Program**

Present situation. The exportation of vegetables from Honduras to the U.S. winter market is of recent origin since no accurate statistics are available. Production is concentrated in Comayagua, Choluteca and Siguatepeque. The most important crops are tomatoes, cucumbers, and melons. From 1986 to 1987 cantaloupes were planted on 3000 ha (90% in Choluteca and 10% in Comayagua).

The majority of the producers are organized in cooperatives, such as the Regional Cooperative of Horticulturalists of the South Limited (CREHSUL), Frutas del Sol, and the Horticultural Cooperative of Siguatepeque Limited (COHORSIL).

CREHSUL of Choluteca exported 4500 boxes of cucumbers generating 57750 man-days of labor in 1985. Choluteca is noted for its high level of unemployment.

There is a consensus that exportation of vegetables would seem to offer a good opportunity for Honduras. Nevertheless, the fluctuating prices of the market and competition with other countries closer to the market and endowed with a better infrastructure make these highly perishable commodities a very risky venture.

In 1984 the growers and cooperatives lost approximately three million Lempiras. The reason for this loss has not been clearly determined.

Limiting factors and research priorities. Major technical constraints identified by FHIA are:

- use of inappropriate varieties
- inappropriate and excessive fertilization
- diseases and pests
- lack of infrastructure for irrigation and drainage
- postharvest losses caused by lack of cooling facilities
- indiscriminate and excessive use of insecticides

Specific goals and objectives. FHIA has assumed responsibility for developing and(or) validating a base of appropriate feasible and cost effective technology of selected species to support the production and marketing of vegetables in highly volatile and competitive markets.

In addition to the technical constraints, other Honduran institutions responsible for supporting agricultural commodities exportation are responsible for finding and implementing a similar strategy: to reduce the cost of production, increase productivity, improve postharvest management, and lower transportation costs. The latter is the primary limiting factor and will only be alleviated when there is a sufficient and continuing volume of production. Another possibility is to find alternate, less volatile markets.

Staff and facilities. The vegetable program is understaffed at present. FHIA has developed a vegetable commercial production unit with an adjoining site for research at Comayagua.

Current activities and progress. The vegetable program began operations in July 1984 with field visits to characterize the agroecological and socioeconomic conditions in the major zones of production (Choluteca, Comayagua, Copan, and others.) At present the Comayagua Valley receives FHIA's major attention under the vegetable commercial production project funded by AID.

Vegetables program overview. Vegetables production for export in the Comayagua Valley has very serious technical constraints. In addition, it has to compete in a highly volatile market as several other countries have a greater competitive advantage being closer to market, have lower labor costs, and are endowed with a better infrastructure. Therefore, a rigorous analysis of vegetable products with real export potential, along with a more precise definition of researchable major constraints, is urgently needed.

## APPENDIX 6

### SOME OBSERVATIONS ON FHIA'S INSTITUTIONAL RELATIONSHIPS

#### HONDURAN FOUNDATION FOR AGRICULTURAL RESEARCH (FHIA)

The Honduran Foundation for Agricultural Research (FHIA) has placed special emphasis during its first three years on the establishment of a technological base for production of those export crops within its mandate.

To establish the technological base, FHIA has been adopting and generating production technologies to respond to the main limiting factors that affect the development and productivity of the crops. These factors have been identified through a characterization process done by FHIA.

The research activities are being performed in FHIA's laboratories and experimental centers developed for each crop and also on farmers' fields. The acquired experimental centers have been strategically located within the geographical areas where most of the production occurs or with the highest production potential for each crop.

FHIA is to be commended for the development of these centers because in less than two years it has established most all of the necessary physical facilities for the crops. However, it should be noted that these crop experimental centers are in contrast with the farmers' fields and different results may occur due to the high inputs that will go into the demonstration farms.

In performing its technology generation and transference tasks, FHIA has not yet extensively involved farmers and institutions who might have complemented its efforts. There was some involvement, however, such as the organization of technical advisory committees for each one of the following crops: plantain, cacao, citrus, and soybeans. There were also isolated actions to promote the participation with some national and international organizations.

It is necessary for FHIA to systematize its actions in the inter-institutional relations field in order to assure its continuity and effectiveness. Likewise, the active participation of farmers is essential.

#### THE SECRETARIAT OF NATURAL RESOURCES (SRN)

The evaluation team held a meeting with Ing. Omar Hernandez, regional director in San Pedro Sula, and another with Ing. Luis Alonso Lopez

Santos, who serves as head of the national plantain program and executive secretary of the national plantain committee.

The SRN considers that the relationship with FHIA has been adequate but mainly because their objectives are not the same. The secretariat's priority is on the development of crops related to food security for the country while FHIA's is on the export crops. In those areas where an overlap may occur, and therefore create a duplicity of efforts, there have been good relations between the two groups. The national plantain program had conducted some research before FHIA came into existence, but has now yielded this function to the foundation and is concentrating its efforts and resources on extension and technical assistance to farmers. In soybean research and production there have been strong linkages at the working level, benefiting from FHIA's technical capacity for genetic improvement.

The participation of the Secretariat of Natural Resources in the technical advisory committees organized by FHIA is considered of great value.

The secretariat feels that the relationship between SRN and FHIA should be formalized in order to avoid any problems that might appear in the future. In the areas of personnel training, a cacao production course was offered to extension specialists. Other courses are being considered for those crops attended by the extensionists and that are within the scope of FHIA. Communications is another field where support is needed from fhia for the training of the secretariat's staff.

#### **FEDERACION DE PRODUCTORES Y EXPORTADORES AGRICOLAS Y AGROINDUSTRIALES DE HONDURAS (FEPROEXAAH)**

The evaluation team held a meeting with Lic. Ilsa Diaz Zelaya and Lic. Carlos Zeron, president and executive director, respectively, of FEPROEXAAH.

Export promotion of nontraditional products is the principal objective of the federation. Thus far, twenty-six producers' associations have been organized that render the following services:

- information on market prices
- assistance in national export logistics
- assistance in negotiating with brokers
- market studies
- feasibility studies
- recommends farmers for participation in export projects and guarantees 60% of the bank loans made by the Central Bank of Honduras
- technical production assistance (this service has been free, but a fee will be charged in the future)

The federation and FHIA have maintained a relationship through the following: monthly participation in the technical advisory committees created by FHIA, and sharing responsibilities in the vegetable project in Comayagua. (FEPROEXAAH carries out the packaging, transport, and marketing activities.) This project is considered a highly sophisticated one, having expensive machinery and unlikely to be extended to the farmers.

FHIA has provided soil analysis services and helped in determining the feasibility of projects. FEPROEXAAH feels that FHIA's role is essential in the development of production and postharvest technology but should be more communicative about the results obtained.

### **HONDURAS CACAO PRODUCERS ASSOCIATION (APROCACAHO)**

The team interviewed Eng. Fernando Alvarez, executive secretary of APROCACAHO. APROCACAHO was created in September 1986 with the objective of increasing production and improving the marketing of cacao. At the beginning, a goal was set to develop 1500 new hectares for production and the rehabilitation of 1000 hectares already planted. This goal has now changed and all efforts are aimed toward farm rehabilitation.

Up to now, 520 out of 1300 existing producers are registered, with a Lps 10.00 registration fee plus Lps 5.00 monthly fee. The association provides technical assistance service with seven extensionists and two coordinators distributed among the zones of Jutiapa, La Masica, Guamas, and Cuyamel. They also sell chemicals and tools to the producers.

Beginning in January 1988 a technical assistance service will be provided to producers with funding from the Banco de Occidente.

Two small processing and drying plants will be installed in order to test the internal marketing system with the possibility of expanding to the export market. This will be done to avoid the intermediaries who exploit the producers with loans-in-kind and money payable as harvest season proceeds.

The use of mini driers will be promoted with capacities from 150 to 350 pounds at a cost of Lps 300.00 and Lps 500.00 respectively. These sizes are considered appropriate for small producers (with an average of 2 hectares).

The APROCACAHO cooperation with FHIA is through its participation in the technical advisory committees created by FHIA. Last year an agreement was signed under which APROCACAHO would pay FHIA Lps 50,000.00 to provide an eight-month training program for APROCACAHO technicians and to support farmers' training activities. The agreement was not continued; however, as in April 1987, an advisor provided by VITA was assigned to APROCACAHO. APROCACAHO paid FHIA Lps 18,000.00 for the

training and soil analysis that had been carried out up to the time of the agreement's termination.

During the current month, September 1987, APROCACAO delivered to FHIA a proposal for a study to be done by FHIA. This proposal, to be funded by APROCACAO, is for FHIA to determine solutions to the problems detected by the extensionists and also to provide them with training and technical assistance.

Demonstration plots have also been established in farmers' fields with the cooperation of both institutions.

One problem that FHIA will help to solve within two or more years is to serve as the source of certified seed planting stock. The clonal garden from Instituto Nacional Agrario (INA) is not reliable due to a lack of adequate management at the moment. Actually, the "seed" is obtained from the Centro Agronomico Tropical de Investigacion y Enseñanza (CATIE), located in Turrialba, Costa Rica, but it is an expensive item. It is expected that FHIA's seed would not be as expensive, despite all the investments already made in the Centro Experimental y Demonstrativo de CACAO (CEDEC), located in La Masica.

#### **HONDURAS CITRUS PRODUCERS NATIONAL ASSOCIATION (ANACIHO)**

A meeting was held with Lic. Ilsa Diaz Zelaya and Mrs. Vilma de Colindres, president and secretary of ANACIHO, respectively.

ANACIHO's main objective is the development of a modern citrus culture in the country. The association has achieved the unification of the citrus growers. The association currently has 350 associates paying a monthly fee of Lps 10.00. Supported by these contributions, free field trips are organized to demonstrate growing practices unknown to many producers like pruning, fertilization, and soil drainage.

A good relationship has been maintained with FHIA through participation of ANACIHO in the monthly meeting of the technical advisory committee and attendance at the field trips organized by FHIA. The cooperative work done by FHIA and FEPROEXAAH on standard and design was presented to the European economic community and opened the door for the Honduran green orange to be exported to Europe.

ANACIHO feels that FHIA may be valuable in the establishment of a seed bank and also in tree nursery certification since at this moment no registration is required for the large number of nurseries. Also, FHIA is already working on weed and pest control problems that represent severe constraints faced by the producers. ANACIHO also believes that FHIA should print leaflets, including photographs, as an effective means of technology transfer to illiterate farmers. It is expected that FHIA will also train foremen and farm daily laborers.

## **AGRICULTURAL AND INDUSTRIAL BANKS**

Meetings were held with Lic. Mario Carranza, assistant to the administrative manager for the North-West zone of BANACAHSA and with Ing. Joaquin Fernandez, deputy-manager for the San Pedro Sula branch of Banco Atlantida S.A.

In general, banks are very interested in financing exports. Since the foreign exchange is important to them, exports bring about diversification of bank investments and results in overall benefit to the Honduran economy.

The banks feel that a technology base is lacking and that FHIA can solve this problem with the human resources that it has.

Banks do not have an agricultural department since they consider it very expensive. Therefore, they would like for FHIA to provide the training for farmers since there are not enough consultant firms to perform this task.

They believe FHIA should get more involved in the economic aspects of the country and become well known so it may influence and attract investors. Another opinion is that FHIA must concentrate on those crops with the highest economic potential that are adapted to the climatic conditions in Honduras.

The relationships between FHIA and banks, besides the normal one of a customer and a banker have been through the participation in two or three seminars organized by FHIA and visits by various bank managers. They believe they can assist FHIA in getting economic and political support.

## **NATIONAL UNIVERSITIES**

A meeting was held with Lic. Jane de Martel, president of the University of San Pedro Sula, and later joined by Mr. Boris Goldstein, president of the foundation, Mr. Napoleon Canahuati and Mr. Jorge Jaar, members of the university's foundation, and Ing. Joaquin Fernandez, director of the agronomy faculty. The university was started ten years ago by the initiative of the private sector in San Pedro Sula. It has over 1,000 students and offers 10 professional careers, including agriculture.

The University believes that FHIA has a meaningful role in the Honduran economic development, and its highly qualified personnel could be useful for the university. It is assumed that through an association with a Title XII university, FHIA and the university could expand the capability to graduate professionals, including up to the master degree level.

FHIA is currently working with the university on thesis work for the university students as part of its research and technical transfer.

APPENDIX 7A  
REVISED PROJECT DESIGN SUMMARY LOGICAL FRAMEWORK

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Program or sector goal: The broader objective to which this project contributes:	Measures of goal achievement:		Assumptions for achieving goal targets:
To increase incomes for farmers and generate additional employment.	Increase in GDP of 5% to 7% Average increase in participating farmer incomes: 25% Ten thousand jobs created by 1994	Central Bank statistics CONSUPLANE estimates Mission calculations	Stable political environment
<u>PROJECT PURPOSE</u>			
To establish a private, nonprofit Agricultural Research Foundation which will expand and improve research in Honduras	A nationally, regionally, and world renowned Agriculture Research Center.  Three well-functioning departments in research, communication-outreach and analytical services: fully staffed departments.	Survey of originating request points. Review of foundation records.  Review of Foundation records.	Top-notch researchers and managers continue their willingness to work in Honduras.
<u>OUTPUTS</u>			
1. Foundation Organization - Legally constituted foundation, established and operating effectively	General Assembly, expanded Board of Directors (to 12), Oversight and Program Committees; Director General, Permanent Staff in Research and Communication Divisions, staffed administrative unit  - Working capability established  - Drawing research requests, grants, and endowments to provide long-term existence for the foundation.	Survey of Foundation Records; site visits	Foundation achieves long-term sustainability.

## 2. Research Program

- Expanded production of nontraditional crops exports.
- Increased productivity of traditional export crops.

Increase of \$65 million in sales by 1997 for 6 or 7 commodities.

- Cacao production increased 50% by improved planting stocks and cultural practices.
- Citrus production doubled by improved varieties (e.g., Henderson & Rohde Red) and cultural practices.
- Tomato, cucumber, melon exports from Comayagua doubled: due to improved varieties, more efficient production practices -- especially irrigation.
- Dramatic increases achieved in: mango = 3x, soybeans = 4x, pineapple = 2x.
- Three new but unidentified commodities (e.g., black pepper, shrimp) shown by FHIA to have highly promising export potential and have attracted entrepreneurs with capital.
- Foreign exchange earnings of \$400 million by 1997.
- One black sigatoka resistant variety developed for a savings of \$15 million over LOP.
- One dwarf plantain variety with higher, more stable yields released for Honduras: estimated increase after 10 years - \$30 million/year.

Government records, mission records, and evaluations

Commodity prices do not decrease below production costs in a sustained basis.

Farmers continue to participate in the program.

Production costs become internationally competitive

Marketing/shipping constraints are resolved.

## OUTPUTS

### 3. Communications, Outreach and Institutional Development

- Improved dissemination of technologies to farmers and producers
- Stronger linkages between national, regional, and international research center:

Systematic flow of information from the Research Foundation, through intermediary extension agents to the farmer with field results flowing back to the foundation (20 short training courses, 30 pamphlets, 20 videotapes, 100 half-hour radio programs, 200 radio spots, 1 technical journal, 70 on-farm demonstrations).

Continuous exchange of information expertise and materials between these institutions.

Project evaluations  
Spot site checks  
Interviews

Project evaluations  
Interviews  
Foundation records

Improved human resource base through training

Twenty person-years training for mid- and upper-level foundation staff.

Project evaluations  
Spot checks  
Interviews  
Performance reports

Improved agricultural information services

Up-to-date library containing reference information on all crops systems dealt with.

Project evaluations  
Spot checks

OUTPUTS

4. Services: Analytical

Approximately 280,000 separate tests conducted generating over \$2.3 million.

Foundation records

INPUTS (in thousands of constant dollars)

	<u>AID</u>		<u>GOH</u>	<u>OTHER</u>	
	<u>Core</u>	<u>Special project</u>		<u>Core</u>	<u>Special project</u>
Administrative operating costs	6,835		1,175	1,180	
Capital investments	1,060	±4,000*	1,385	675	250
Experimental substations	220		150		
Research programs	5,820	4,500	2,390	3,175	3,000
Communications and training	2,790		900	1,500	
Technical analytical services	2,700				
Evaluation	200				
Project liaison officer	375				
<b>Current projection</b>	<b>20,000</b>		<b>6,000</b>	<b>7,000</b>	
<b>Special projects (1989-1993):</b>					
Capital		4,000			250
Operations		4,500			3,000

USAID/Controllers  
Office records  
Foundation records  
Surveys

Private sector contributes as expected

\* From PL 480 or ESP funds.

Projections

1. Total projected income including receipts from analytical services (less special projects) = \$35.2 million
2. Anticipated shortfall in non-AID receipts = 7.5 million: net = \$27.5 million
3. Projected 10-year expenditure based on 5% real growth after 1988 = \$35 million (FHIA currently estimates \$54.1 million using 7% inflation).
4. Requirement for special project support for vegetables research, vegetables production, and citrus (or cacao), estimated at \$900,000 per year for 1989-93 (USAID) = \$4.5 million
5. Special project support to be obtained from other donors/private sector for research on citrus, mango, black pepper, shrimp, and others: 1989-1993 = \$3 million

2

APPENDIX 7B  
ORIGINAL PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Project Title: Agricultural Research Foundation  
Project Number: 522-0249

Life of Project: From FY 84 to FY 94  
Total U.S. Funding: \$20,000,000  
Date Prepared: May 23, 1984

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p>Program or sector goal: The broader objective to which this project contributes:</p>	<p>Measures of goal achievement:</p>		<p>Assumptions for achieving goal targets:</p>
<p>To increase incomes for farmers and generate additional employment.</p>	<ul style="list-style-type: none"> <li>- % increase in GDP</li> <li>- 25% average increase in farmer incomes</li> <li>- 10,000 jobs created by 1990</li> </ul>	<p>Central Bank statistics CONSUPLANE estimates Mission calculations</p>	<p>Stable political environment</p>
<u>PROJECT PURPOSE</u>			
<p>To establish a private, nonprofit Agricultural Research Foundation which will expand and improve research in Honduras</p>	<p>A nationally, regionally, and world renowned Agriculture Research Center.</p> <p>Three well-functioning departments in research, communication-outreach and analytical services: fully staffed departments.</p>	<p>Survey of originating request points. Review of foundation records.</p> <p>Review of Foundation records.</p>	<p>Top-notch researchers and managers continue their willingness to work in Honduras.</p>
<u>OUTPUTS</u>			
<p>1. Foundation Organization - Legally constituted foundation, established and operating effectively</p>	<p>General Assembly, Board of Directors, Oversight and Program Committees; Director General, Permanent Staff in Research and Communication Divisions, staffed administrative unit</p> <ul style="list-style-type: none"> <li>- Working capability established</li> <li>- Drawing research requests, grants, and endowments to provide long-term existence for the foundation.</li> </ul>	<p>Survey of Foundation Records; site visits</p>	

2. Research Program

- Expanded production of nontraditional crops exports.
- Increased productivity of traditional export crops.
- Increased production of basic food grains.

\$65.0 million in sales by 1990 for 12 commodities.

- \$400 million in foreign exchange earnings.
- 1 Black Sigatoka resistant variety developed for a savings of 15 million over LDP.
- 6 new varieties of basic grains developed.
- self-sufficiency in corn, beans, sorghum, rice
- 30% increase in yields

Government records, mission records, and evaluations

Commodity prices do not decrease below production costs in a sustained basis.

Farmers continue to participate in the program.

OUTPUTS

3. Communications, Outreach and Institutional Development

- Improved dissemination of technologies to farmers and producers
- Stronger linkages between national, regional, and international research centers
- Improved human resource base through training
- Improved agricultural information services
- Analytical

Systematic flow of information from the Research Foundation, through intermediary extension agents to the farmer with field results flowing back to the foundation (20 short training courses, 30 pamphlets, 20 videotapes, 100 half-hour radio programs, 200 radio spots, 1 technical journal, 70 on-farm demonstrations).

Continuous exchange of information expertise and materials between these institutions.

20 person-years training for mid- and upper-level foundation staff.

200 local extensionists trained to improve performance.

Up-to-date library containing reference information on all crops systems dealt with.

500,000 separate tests conducted generating over \$4 million.

Project evaluations  
Spot site checks  
Interviews

Project evaluations  
Interviews  
Foundation records

Project evaluations  
Spot checks  
Interviews  
Performance reports

Project evaluations  
Spot checks

Foundation records

INPUTS

	<u>AID</u>	<u>GOH</u>	<u>OTHER DONORS/ PRIVATE SECTOR</u>		
Administrative operating costs	6,835	1,175	1,180		
Capital investments	1,060	1,385	675	USAID/Controllers	Private sector contributes
Experimental substations	220	150		Office records	as expected
Research programs	5,820	2,390	5,145	Foundation records	
Communications and training	2,790	900		Surveys	
Technical analytical services	2,700				
Evaluation	200				
Project liaison officer	<u>375</u>	<u>          </u>	<u>          </u>		
	20,000	6,000	7,000		

## PRINCIPAL SOURCES OF INFORMATION

### A. FHIA In-house Documents Provided for the Evaluation Team

<u>Número de documento</u>		<u>Mas util</u>
	I. MARCO LEGAL	
1	A. Documento del Proyecto	*
2	B. Acta de Constitución	*
3	C. Personería Jurídica	*
4	D. Decreto Ley	*
5	E. Estatutos (ver nota -a- al final)	*
	F. Recursos de Constitución	
6	1. Documento de Traspaso de Bienes UB	*
7	2. Documento de Traspaso de Bienes INA	*
8	3. Carta de Ejecución AID	*
	II. MARCO ORGANIZACIONAL	
	A. Guías de Estructura y Funcionamiento	
	1. Funciones y Estructuras	
	2. Organigramas	
	3. Descripción de Puestos	*
9	B. Manual de Personal y Beneficios	*
	C. Manual de Procedimientos Administrativos	
10	1. Política de Gastos de Viajes	*
11	2. Reglamento de Uso, Conservación y Mantenimiento de Vehículos	*
12	3. Sistema de Procedimientos Administrativos y Contables	*
13	4. Manual de Procedimientos Sección de Suministros	*
	III. MARCO OPERACIONAL	
	A. Documentos de Estrategias	
14	1. Plan Estratégico Quinquenal	*
15	2. Estrategia de Comunicación	*
	3. Estrategia de Desarrollo	
16	4. Diseño de Proyectos	
17	a. Propuesta de Proyecto de Hortalizas, 1986	
18	b. Propuesta de Proyecto de Hortalizas, 1987	
19	c. Proyecto de Piña	
20	5. Manual de Investigación	*
21	6. Project Formulation System in the FHIA	
	B. Planes de Trabajo y Presupuestos	
22	1. Plan de Trabajo 1985-1986	*
23	2. Plan de Trabajo, Proyectos de Investigación 1987	*
24	3. Plan de Trabajo y Presupuesto 1987	*

## C. Informes

### 1. Mensuales

	a. Investigación, 1985, 1986, 1987	
25	- Agronomía, 1985, 1986	
26	- Agronomía, 1987	*
27	- Cacao, 1986	
28	- Cacao, 1987	*
29	- Cítricos, 1985, 1986	
30	- Cítricos, 1987	*
31	- Diversificación, 1986	
32	- Diversificación, 1987	*
33	- Economía Agrícola, 1985, 1986	
34	- Economía Agrícola, 1987	*
35	- Entomología, 1985, 1986	*
36	- Hortalizas, 1985, 1986	
37	- Hortalizas, 1987	*
38	- Ingeniería Agrícola, 1986	
39	- Ingeniería Agrícola, 1987	
40	- Lab. de Residuos, 1985, 1986	
41	- Laboratorio de Residuos de Pesticidas, 1987	
42	- Laboratorio Químico Agrícola, 1985, 1986	
43	- Laboratorio Químico Agrícola, 1987	
44	- Patología, 1985, 1986	
45	- Plátano, 1985, 1986	*
46	- Plátano, 1987	*
47, 48	b. Comunicación, 1986, 1987	*
49	c. Financieros, 1987	*
	2. Anuales	
50, 51-56	a. Técnicos, 1985	
	b. Administrativos, 1985, 1986	
	c. Institucionales:	
57	- Informe Anual 1985, versión en Español	*
58	- Informe Anual 1985, versión de Inglés	*
59	- Informe Anual 1986-1987, bilingüe	*
	3. Estudios Especiales	
60	a. Frijol soya	*
61	b. Cítricos: Naranja Dulce	
62	c. Cítricos: Toronja	*
63	d. Plátano	*
64	e. Cacao	*
65	f. Costos y Rendimientos de los Cultivos de Tomate y Pepino Europeo	
66	g. Informe del Progreso sobre Costos de los Cultivos en el Proyecto Hortícola Demostrativo FHIA/ FEPROEXAAH	
67	h. Análisis de Registros Económicos del Frijol Soya	*
68	i. El Cultivo de Soya	
69	j. Cacao: Estudio de Caracterización	

70	k. Evaluación Comparativa de 25 cultivos para el Programa de Diversificación	*
	4. Servicios Técnicos	
71	a. Laboratorio Químico Agrícola	
	b. Diagnóstico Plagas y Enfermedades	
72	- Control de Muestras: Patología, 1985	
73	- Control de Muestras: Patología, 1985	
74	- Control de Muestras: Patología, 1986	
75	- Control de Muestras: Patología, 1987	
76	c. Ingeniería Agrícola	
	D. Revisión y Evaluación	
77	1. Informes Comité de Vigilancia	*
78	2. Informes Auditorias Externas	*
	3. Informes Técnicos Anuales y Proyectos de Trabajo 1986 (ver nota -a- al final)	
	E. Promoción	
79	1. Folletos que describen la FHIA	
	2. Notas de Prensa	
	IV. LOGROS INSTITUCIONALES	
	A. Tecnología	
	1. Listado de Logros y Avances	
80	2. Capacitación	
	3. Publicaciones (completas y en proceso)	
81	- Registro Manual de los Costos e Ingresos de la Producción en la Finca	
82	- Insecto de Cítricos: Polilla Perforadora de la Fruta	
83	- Situación y Perspectivas de la Citricultura en Honduras, Vol. II	*
84	- Guía sobre costos de Producción de Cacao en Honduras	*
85	- Control Pre-emergente de Caminadora en el Cultivo de Cítricos	
86	- Evaluación de Herbicidas en el Cultivo de Cítricos	*
	4. Material de propagación (germoplasma)	
	B. Enlaces	
	1. Convenios	
	2. Proyectos Colaborativos	
	3. Cartas de Entendimiento	
	4. Comités Asesores	
87	a. Cacao	*
88	b. Cítricos	*
89	c. Frijol Soya	*
90	d. Plátanos	*
91	5. Centros Educativos	*

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## **B. Other Sources of Information on FHIA and Honduras**

- Garcia, V. Magdalena et al. 1987. Agricultural Development Policies in Honduras: A Consumption Perspective. Tegucigalpa, Honduras
- Halcrow, W. et al. 1972. Comayagua Valley Development Project Feasibility Study Report. Vol. 4, Agriculture. ODA, United Kingdom.
- Ministerio de Recursos Naturales (MRN). 1978. Recopilación de los Estudios Basicos del Diagnostico del Sector Agricola. Tegucigalpa, Honduras.
- U.S. Agency for International Development (USAID). 1978. Agriculture Sector Assessment for Honduras. Tegucigalpa, Honduras.
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- Winrock International. 1987. Assessment of Development Strategy and Programs for the Comayagua Valley. Report to USAID. 115 pp. Morrilton, Arkansas.