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**A
NEW
DYNAMIC
ORGANIZATION
OF
AGRICULTURAL
RESEARCH**

Fostering Economic Development
in Central America





Fundacion Hondurena de Investigacion Agricola (FHIA)
(Honduran Foundation for Agricultural Research)

A Prospectus
Office of Development

VIP QUOTES

"The Honduran Foundation for Agricultural Research exists today because of a brilliant agreement between our two nations. (Honduras and the United States.) Its teams of Honduran and international experts seek to provide the most effective agricultural technology, to serve Honduras and Central America—indeed FHIA's raison d'etre. This Foundation is a noteworthy example of co-operative endeavor for developing our country."

Jose Azcono Hoyo, President of Honduras

"I am confident that as the Fundacion Hondurena de Investigacion Agricola (FHIA) grows and consolidates its agricultural research efforts, it will continue to serve as a valuable organization which can greatly contribute to agricultural prosperity. FHIA can help provide a better quality of life for the many people living in peace and democracy in Honduras and in the Central American region. The United States government is pleased to be able to provide support towards its continuing development in collaboration with the private sector and the Honduran government and with participation of other countries and organizations."

Everett Briggs, United States Ambassador

"One of the most pressing needs in tropical agriculture is research that is objective and scientifically well carried out. Honduras and Middle America are not an exception to this situation.

Consequently, through research and experimentation, we in Honduras and Middle America must move to increase our agricultural productivity and diversify into new promising agricultural commodities. This is essential if we are to succeed in improving our social and economic problems within a reasonable length of time. FHIA has one of the best—if not the best—research and technical capacities in the region committed to stimulate agriculture and agri-business. As chairman of the voluntary fund raising committee for the Foundation, I feel I am able to assist my country and the region through the search for funds needed to help support it."

Jorge Bueso Arias, President Banco de Occidente

"AID has supported FHIA from the time it was founded in 1984 with the conviction that, through FHIA, AID could directly contribute to the improvement of the Honduran economy and the benefit of its people and the region as a whole. Increased agricultural production and productivity are crucial to the development of Honduras and the region in general. FHIA is playing a dynamic role in the expansion of the agricultural research system and is an excellent model of how a private sector institution can promote agricultural development. As such, FHIA will continue to be a lead institution for stimulating the development of the Central American region through science and technology. AID believes the outputs of FHIA's research programs will have a significant impact not only in Honduras, but on other Central American economies."

John Sanbrallo, USAID Mission Director/Honduras



The administration and soil analysis buildings, along with other facilities and experimental land at La Lima near San Pedro Sula in northern Honduras, were donated to the new Foundation.

A NEW DYNAMIC ORGANIZATION OF AGRICULTURAL RESEARCH

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WHY FHIA?

After intensive and careful planning by teams from public and private sectors, a new and exceptionally unique institution—the Honduran Agricultural Research Foundation (FHIA)—has been created to help improve a lagging economy and generally low standard of living in a democracy in the heart of Central America. Based on available information, FHIA is the only private, non-political, non-profit research organization dedicated to the expansion and improvement of technology generation and transfer systems in Honduras and the region responsive to the production needs of small, medium, and large farmers. Exports need to be increased, as well as domestic food supplies and this can be accomplished through science and technology.

Until the advent of FHIA, no effective private, autonomous research organization concerned with the farming sector had existed in Honduras or in the other countries of middle America to help the country modernize its agricultural base. The creation and the early development of this Foundation were the result of a convergence of initiatives and special circumstances supported by the government, all taking place in Honduras during two years prior to May 15, 1984, when FHIA's charter was signed at San Pedro Sula.



The Foundation's staff is made up of carefully chosen scientists and support personnel dedicated to the advancement of agricultural development.

Rationale for a Different Research Entity

Honduras typifies the situation of agriculture in the countries of Central America. A major impediment to expanded farm output, increased rural sector employment and income, and alleviation of poverty in Honduras is the low level of agricultural productivity. Also, the development and transfer of technology—a key stimulus to agricultural progress—is weak. These constraints affect not only production of the nation's food staples and traditional export crops but also efforts to diversify its export base which has been dominated for a long time by bananas and coffee. In particular, the Government of Honduras, a party to the founding of FHIA, was not in a position to provide the technological base needed for an expanded agricultural diversification program; also research/dissemination programs being undertaken by the private sector were dispersed.

In light of these conditions and a review of various options, the establishment of a new model, an independent private research foundation, was considered to be the best choice.

Realistic Objectives

The "personality" of FHIA is exciting, dramatic, and yet sophisticated in knowing that its principal objectives are realistic:

- Develop agricultural technology that supports and advances the productivity of traditional and nontraditional products for exportation.
- Provide specialized agricultural technical services to producers and private and public organizations.
- Assist governmental and private programs that increase the production of staple foods.
- Share with farmers and other users technical information that contributes to the planning and development of agriculture.

Beneficiaries

Primary beneficiaries of FHIA's efforts will be the farmers, especially the small ones of Honduras and the region, who persevere in the hard task of producing food for their families. Their fellow Hondurans in both rural and urban areas, the poor in particular, will benefit from

greater availability of inexpensive food staples. Because one of the final aims is to augment and diversify the export food commodities, all sectors of the population of countries of the region will become the beneficiaries resulting from increased employment, production, trade, and investment of revenues of foreign exchange that will foster development and improve their standard of living. Finally, the inhabitants of importing countries will enjoy the availability of high quality, nutritive, and healthy tropical foods.

Why an Emphasis on Export Food Commodities?

One of FHIA's principal objectives as prescribed in its mandate is to provide agricultural technology that will enhance and increase the export of traditional and nontraditional crops.

The need for Honduras and other countries of the region to increase exports and to be able to compete in international markets is vital for the long-term economic health and growth of the countries and the well being of the people, especially those in the low



Some of the food products which receive research attention by FHIA scientists.

income bracket. For some time now, emphasis has been given in developing countries and by international agencies to the production of food for local consumption, and considerable progress has already been achieved. But that alone does not resolve poverty. In some countries the supply of basic foods continues to be of prime concern while in others attention is being drawn to the need for increasing the purchasing power of local consumers who can then buy locally produced food and purchase materials and equipment, most of which have to be imported. The generation of hard currencies through exports can help provide employment opportunities and a better life for those now suffering in poverty.

Guiding Principles

FHIA holds fast to several guiding principles illustrative of its operational strategy to accomplish its objectives:

- Maintain political and administrative independence.
- Put "up front" as primary concerns the needs of farmers of whatever size and the national development requirements of Honduras and the region.
- Develop agricultural technologies within a context and setting which analyzes constraints faced by its users.
- Undertake research projects that will have direct impact on the well-being of small and medium size farmers through field testing of new and adapted technology.

- Promote the involvement of the private sector in agricultural development.
- Establish sound linkages between private, public, national, and international research programs.

Although Honduras is the Foundation's primary focus, research findings are available to all Central American countries and other interested nations, as well as regional and international research centers.

Strong Linkages

FHIA has no intention of "going it alone" or duplicating the research efforts of others. One of the Foundation's unique characteristics is its desire and ability to establish and maintain strong linkages with pertinent research, training, and communication efforts both within and outside Honduras. Inside the country, collaborative relationships have been established with government agencies, crop production and marketing institutes and cooperatives, agribusiness firms and exporters, private voluntary organizations, banks, and educational institutions.

Among those on the regional and international scene are the Tropical Agricultural Center for Research and Training (CATIE) in Costa Rica and the International Institute of Tropical Agriculture in Nigeria. The latter has indicated interest in FHIA's collaboration to strengthen its research on plantains and to provide Western Africa with disease resistant material. FHIA is the only institution in the world with present-day capability to assist Africa with plantain improvement for resistance to diseases that may severely reduce this basic food supply in that continent.

Over time, FHIA can serve as a mechanism to tap into the substantive research efforts and investments being made worldwide and provide a clearinghouse for the adaptation of this research from Honduras. Research, to be effective, is a long-term invest-

ment, but it has high rates of return—typically 30% to 100%. Twenty-three studies of agricultural research programs in developing countries showed rates of return as high or higher than those reported for research in developed countries.

Starting with Significant Support

A special circumstance affecting the proposed new venture happened the year before FHIA's charter was signed: United Brands Company decided to close its Tropical Research Center at La Lima (near San Pedro Sula) and donate all its facilities there to private interests. Over almost half a century, this company and its corporate predecessors had established a tradition of excellence, mainly in banana research, that gained worldwide recognition.

The president of the company at that time agreed, in principle, that all the facilities of this historic establishment, valued at two million dollars, would be donated to form a new agricultural research entity on the condition that funds be found to support it. The research facilities donated to FHIA included 130 acres of land, laboratories, a specialized library, insect collection, and an invaluable germplasm "bank" on which the equivalent of fifteen million dollars has already been

spent. It has the world's most complete collection of banana and plantain cultivars and advanced hybrids created by plant breeders. Now the company's tradition of excellence in research with these two crops is being carried forward independently by FHIA but with a much broader scope than in the past and with the addition of research programs on other crops.

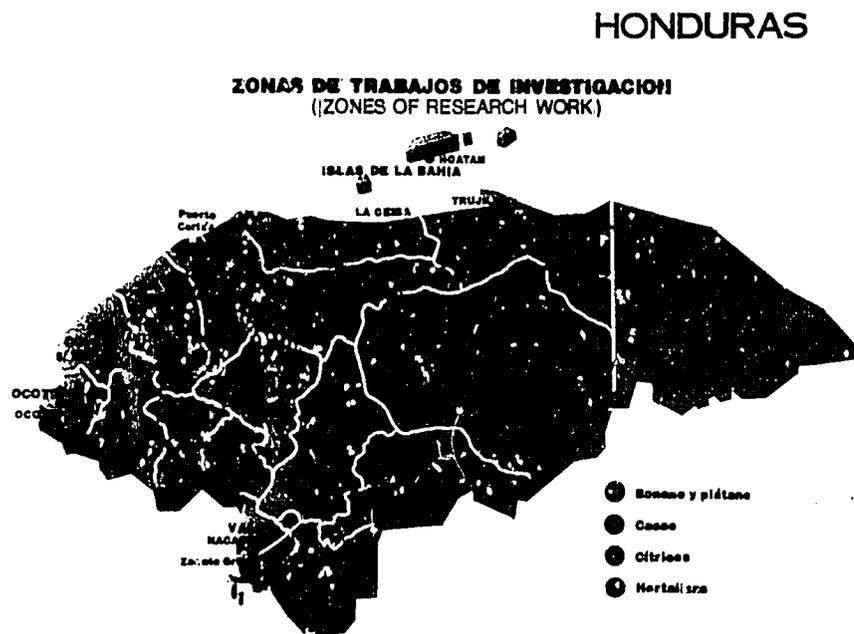
Following detailed studies in concert with the Government of Honduras, the U. S. Agency for International Development provided a grant of US\$20,000,000 to FHIA to be used over a period of 10 years. Thus, with this and other support and the facilities donated by United Brands Company, the Foundation's research got underway after a few months transition and a new era began in January 1985 when FHIA started active operation.

Figure 1. Production areas in Honduras where FHIA conducts research on various crops.

COMMODITY-ORIENTED RESEARCH PROGRAMS

FHIA has active domestic research efforts in vegetables, plantain, cacao, and crop diversification (palm hearts, pineapples, mangoes, and spices, for example), plus the international program in banana and plantain breeding. Additionally, funding is being sought for support of research on citrus. Research on other commodities may be undertaken when the Foundation reaches a financial and/or administrative position to embark upon a program expansion.

In regular meetings of technical advisory committees



formed for each crop program, representatives from the producers, industrial associations, and the public and private institutions discuss with the Foundation's scientists plans and activities involving the production and technology of their respective crops. This process contributes to maintaining open channels of communication between FHIA and these associations and provides the means to become familiar with their needs and determine ways to meet them.

The research is conducted at FHIA's headquarters at La Lima and four experimental and demonstration farms in other parts of the country (Figure 1). In addition, numerous experiments and validation trials are carried on with farmers in their fields. Multidisciplinary teams of scientists and technicians view each crop or crop group as needing specific

analysis and implementation. Each commodity system is composed of numerous factors, from adequate soil and water conditions, and pest and fungus control, to market requirements. The system's line operation is the grower-processor-shipper-marketer chain which moves the product from production to consumption. Naturally, a key element of this chain is the production and post-harvest function where adequate research and development play a critical role. A lesson learned through past experience is that profitability is not associated only with higher yields and good quality but with domestic and export marketing ability.

Because research is seldom entirely basic or applied in nature, FHIA depends on a combination of both. However, applied research, geared to quick results, is given priority.

Vegetable Research

Progress is being made to open a domestic and export "market window" for small and medium-sized farmers to sell vegetables. More farm income is not the only reason: FHIA is also concerned with making a nutritional impact on what is basically a carbohydrate diet among most Hondurans.

A three-cycle planting scheme is being tested to maximize

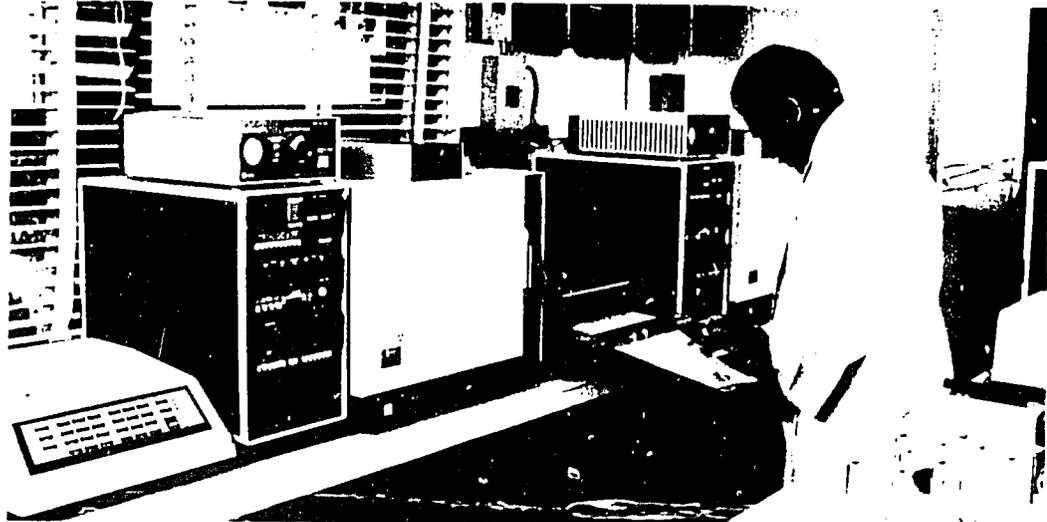
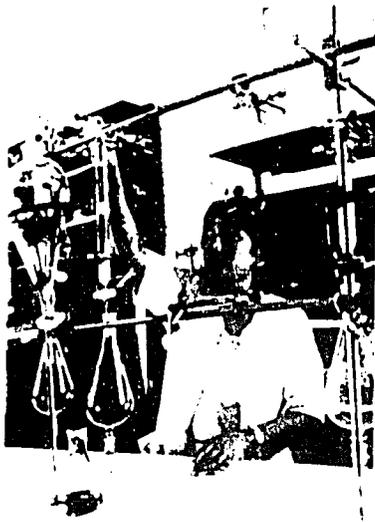
production and help increase incomes by generating year-round employment. Three harvests annually provide opportunities in areas currently suffering from high unemployment. For example, in one year in a high unemployment zone (Comayagua) a cooperative exported 106,000 boxes of cucumbers which generated 70,200 man-days of labor equal to 423,000 lempiras (US\$211,500) in wages. A similar experience was reported in the Choluteca zone.

FHIA has already established its credibility with a farmers' association which was having problems with cucumber production. The Foundation's scientists identified the virus causing low quality, non-exportable cucumbers. By replacing the old variety with a stronger, disease-resistant plant, the cucumber farmers were able to get back in business. This crop is planted



Top photo: A three-cycle vegetable planting scheme is being tested at FHIA's experimental and demonstration farm at Comayagua. It is one means of helping to increase rural incomes by generating year-round employment in areas suffering from high unemployment.

Left, domestic and export vegetable "market windows" are being opened for small and medium-size farmers, and attention is being paid to post-harvest techniques, including packing and transportation.



FHIA has an intense interest in the protection of human health and the environment. Evidence of this can be found in the work underway in a recently completed laboratory where pesticide residues are analyzed and the biological effects of new pesticides tested. Left, a technician extracts pesticides from a vegetable crop through florasil columns; right, a scientist reviews a computer readout of the concentrated extractions run through an electron detector.

during the slack period of a farmer's agricultural cycle and the harvest comes when the production may be marketed at good prices in the U.S.

The cultivation of vegetables is in the hands of both small and medium-sized farmers and land reform beneficiaries. Crops such as cucumbers and melons, which may be planted over the same areas where basic grains were grown, may provide substantial income to producers and generate employment both for family members and hired labor. The net profits that can be made by cultivating one hectare of cucumbers, for example, are equivalent to almost twice as much as the established poverty line income for a family of six. Profits of that sort

may indeed bring people out of poverty.

FHIA has established a 60-hectare experimental and demonstration (training) sub-station near Comayagua (Figure 1) to test vegetable varieties and cultural methods mainly for cucumbers, tomatoes, squash, and cantaloupe. Also, close attention is paid to post-harvest techniques, including packing and transport to help guarantee undamaged produce upon arrival.

Several serious problems found in some of the vegetable growing areas need to be corrected, including excessive use of pesticides by growers and inappropriate fertilization. Two examples: (1) a tomato crop in Comayagua had 16 applications of 12 different pesti-

cides in one season, and (2) a survey in the Choluteca area revealed that farmers who applied phosphorus and potassium in full strength on land for melon production were getting reduced yields and higher costs of production. They did not need to apply either one. Instead, the application of only 100 kilograms of nitrogen per hectare increased the profits from export melons by 50%. If farmers used only the fertilizer needed on their land, as shown by a FHIA soil analysis, their cost of production could be reduced by 500 lempiras (US\$250) per hectare.



Generally low yields and poor quality of cacao can be improved through research now underway to develop promising hybrid varieties and better cultural methods.

Cacao Research Program

Although Honduras has appropriate conditions for producing high quality cacao—a crop grown in the country since Mayan times—yields and quality are low. But this can be changed.

At FHIA's new cacao experimental and demonstration farm "La Masica" near Tela (Figure 1) and within the major cacao producing region, extensive plantings have been established to test promising hybrids, different types of shade, better planting and manage-

ment methods, and improved propagation. Research is expected to pave the way for more effective and economical control of Black Pod Rot—a serious and universal cacao disease. Also, experiments are underway to improve post-harvest processing techniques to help ensure better fermentation and drying of the final product.



A small farm family packs a portion of its plantain harvest in export boxes to be collected by a local cooperative. The export product brings the farmer a higher price than the rest of the crop sold for domestic consumption. FHIA is making progress on the development of a dwarf variety to reduce wind damage and on cultural methods for increased production of this basic food, especially for the poor in the tropics worldwide.

Plantain Research Program

Plantain—a starchy cousin of the banana—is a basic food, especially of the poor in the tropics worldwide. Differing from bananas, plantains are palatable only when cooked. Small farmers produce most of this crop in Honduras primarily for domestic consumption, but an expanding export market beckons. Farmers were recently receiving about 50% more for plantain packed in export boxes than for the product they sent to local markets.

Only about 14% of the plantain harvest is exported. However, plantains are becoming a major cash crop. Advanced packing and shipping methods make it possible to move them beyond

the areas where they grow.

FHIA scientists are working intensely to overcome the Number One problem which threatens plantain production: the devastating Black Sigatoka disease which can cut yield in half. The scientists believe that they are well on the way to develop a hybrid resistant to this fungus disease. This is the principal solution. Chemical control is considered too expensive, and, if practiced widely, would price this traditional staple food crop out of reach of many domestic consumers. Black Sigatoka is continuing to

spread in East and West Africa and was reported in Nigeria for the first time in 1986. It has reached the vast plantain growing area in the interior of Colombia and it showed up in Ecuador in early 1987.

Now plantain lines are being tested at FHIA's experimental and demonstration farm at Calan (Figure 1) and progress is being made on the selection of a dwarf variety to reduce wind damage. The variety selected must produce high yields with fruit of acceptable flavor and texture.

Rapid multiplication by meristem culture in test tubes in the Tissue Culture Laboratory makes it possible to produce large quantities of plants for investigation and to exchange plant material with other countries without transporting viruses and other diseases and pests.

Plant nutrition is another focus with identification of the best fertilizer and the most effective application schedules. Accurate soil and leaf analyses for plantain and other crops in one of FHIA's laboratories have helped farmers increase production and save money. For example, recommendations presented to plantain cooperatives on fertilization and control of nematodes had the potential to increase yields and lower costs of production by approximately 400,000 lempiras (US\$200,000) in one year; producers in another area were able to stop applying potassium because the analyses showed the level of this element was very high. They were wasting their money.



Tissue culture greatly speeds up plant breeding research at FHIA. Many plantlets, originating from one meristem tissue, can be grown in special solutions in test tubes. Because they are disease-free, they can also be exchanged with other countries without transporting viruses, other diseases, and pests.



Soil samples are analyzed at FHIA in the most modern and complete laboratory of its type in Central America. This laboratory is part of a worldwide network which provides yardsticks and crosschecks for quality.

International Banana and Plantain Improvement Program

Hundreds of thousands of people in Central and South American countries make their living directly from bananas and plantains. Millions more depend on them directly and indirectly as food and as a source of employment. The banana industry is now, and likely will continue to be, a pillar of the economy of countries in Latin America, Africa, and Asia. It is also a major foreign exchange earner. In Honduras alone, about 20,000 persons are employed in the production of bananas which generates approximately US\$220 million per year in hard currency earnings. These figures are multiplied greatly when applied to the rest of the tropical world. Although exports have a major impact on the economy of each country, the importance of these crops as a source of food for domestic consumers should not be underestimated.

The role of the various participants in the banana industry of Honduras has changed significantly during the past two decades. Production is being gradually transferred to national producers, and, over time, foreign companies are becoming more interested in marketing. From 1964 to 1983, the percentage of land cultivated for bananas by local farmers in Honduras increased from 11% to 44% and their share of production from 12% to 40%.

The history of banana production in this part of the world



Dr. Phillip Rowe, a senior plant breeding scientist, points his machete at damage caused by Black Sigatoka, a serious fungus disease of bananas and plantains. It has spread from Honduras to the rest of Central America, costing the industry \$100 million a year. The best answer—development of resistant hybrids—has a Number One priority in FHIA's International Banana and Plantain Breeding Program. Based on progress made so far, Dr. Rowe is optimistic that one or more of these hybrids will be ready for field testing in five to seven years. The results of this research will be made available worldwide.

illustrated the dangers inherent in a monoculture. From the late 1800s until the mid-1900s, only the Gros Michel variety was widely grown commercially for the export trade. By 1955, Panama disease (or *Fusarium* wilt) had rendered continued cultivation of this variety unprofitable. (Approximately 40,000 hectares were destroyed or abandoned in Central and South America because of this disease.) Fortunately, the resistant Cavendish clones could be substituted.

But once again, commercial plantings become a monoculture, and another serious fungus disease—Black Sigatoka—threatens the Cavendish. Within a decade, it has spread from Honduras to the rest of Central America and is costing the banana industry \$100 million a year. At present, no other known cultivars derived from natural evolution exist as possible alternatives.

The best answer is to develop a Black Sigatoka resistant hybrid that looks, tastes, and ships like the Cavendish. That is far from easy because of the complicated genetics of the banana and the problems of sterility. For example, in breeding some traits, 10,000 bunches of bananas are grown to get enough seeds to breed for the next phase, and the generation time from seed to seed is three years.

One of FHIA's senior scientists, Dr. Phillip Rowe, is taking the tiny embryo out of each seed and germinating it in a test tube with a special solution.

To speed up the banana breeding research at FHIA, a tiny embryo out of each seed is germinated in a test tube with a special solution. (left); the resulting plantlet is grown in sterile soil in a greenhouse and within three to four months (right) can be planted in the field.



Development of banana hybrids with acceptable eating quality and resistance to diseases is a long process because of the complicated genetics of the banana and the problems of sterility. For example, out of 10,000 bunches pollinated, scientists may get only one hybrid plant worth keeping for further research.

This relatively new method, which was developed in Jamaica, helps to speed up research because it results in a 50% germination rate compared with only about 10% when seeds are planted directly in the soil. This scientist, who has been involved in banana breeding for the past 18 years, is optimistic that one or more Black Sigatoka resistant hybrids will be ready

for field testing in five to seven years.

Furthermore, he has had a breakthrough in developing a banana hybrid resistant to a new strain of Panama disease.

This was verified in 1986 by cooperating scientists in Australia where the disease is present.

The Foundation has the most advanced banana and plantain breeding program in the world. One component includes an extensive and irreplaceable germplasm collection from several countries—a "safety deposit" to be used if a new disease comes on the scene. It provides scientists with genetically diverse material to screen for resistance.

No one retains exclusive rights to new research results developed by FHIA scientists. The new hybrids and other research results will be offered to all producers throughout the world.

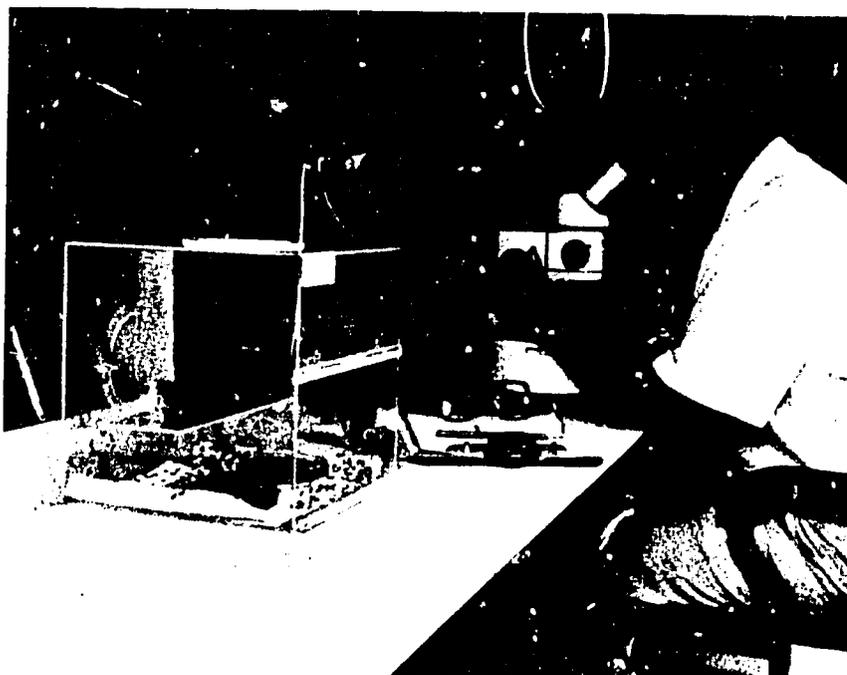
From the beginning of FHIA, a decision was made that the International Banana and Plantain Breeding Program would be financed primarily outside the "core" budget by donations from private and public sources. Some financial contributions have already been provided: Ecuador has pledged \$60,000 a year and the Union of Banana Exporting Countries \$150,000 a year. Beginning in 1988, the Government of Honduras started to share part of a tax on banana exports with the Foundation which is expected to amount to about US\$200,000 per year. The government of Canada through IDRC donated US\$150,000 for two years in 1985-87. But more is needed to cover the present costs and to accelerate the program toward an urgently needed breakthrough in the near future.

Diversification Program

Similar to the needs of all tropical Central American countries, the diversification of Honduran agriculture is essential, especially for the country to derive currencies for trade to fuel its agro-industrial development. The Diversification Program looks for new production export alternatives such as mangoes, spices, palm hearts, speciality citrus, pineapple, and others.

A breakthrough has already been made by inducing early flowering of mangoes for harvest to occur during the winter months of high market demand. Other innovative approaches are planned for research on pepper and palm hearts.

Research by Dr. Pablo Soto and his associates in the entomology department on the life cycle and behavior of various species of fruit flies and their effect on mangoes and other tropical fruits provides data for determining control recommendations and for the development of reliable methods of treatment of fruit before it can be exported.



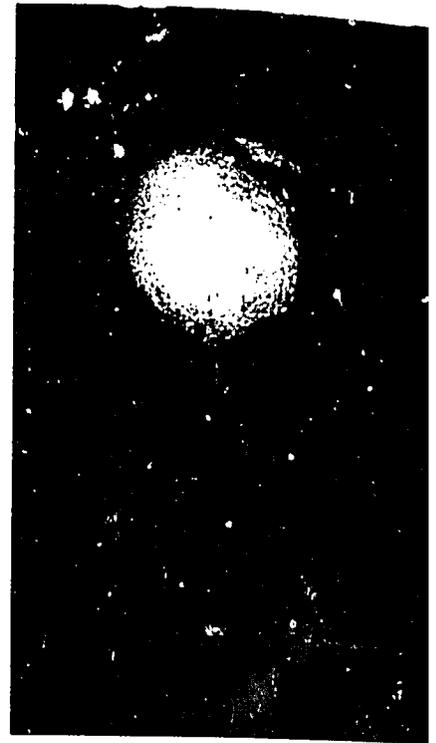
Citrus Research Project

This project is categorized as "non core" and will consequently have to be financed through special project funding needed by mid-1988. FHIA's citrus project is of particular value to the region and has been selected as the center of the region's certified budwood and root stick program.

Using Honduras as an example, citrus production is important both socially and economically. Substantial employment is created which in turn provides income for small farmer families. Although a small but active local market exists, the great potential lies in the export market, regionally and internationally.

The citrus industry in Honduras is in its infancy. The country is blessed with a combination of lowlands that

produce delicious tropical grapefruits and highlands capable of producing quality oranges and other speciality citrus fruits. But these resources are not being fully utilized. Only about 5,000 hectares of citrus are now grown in Honduras, but the potential is 20,000 to 25,000 hectares. Before that potential can be reached and a viable industry developed to serve both domestic and export markets, several technical problems confronting producers need to be solved: inappropriate varieties,



Above, fruit-piercing moths have been identified as the cause of extensive damage to oranges and FHIA scientists have chronicled their biological cycle as the first step toward finding effective means of control.

Left, research by FHIA is conducted on some farmers' fields as well as on its experimental farms. Here a farmer and Dr. Manuel Zantúa check the effectiveness of a legume for biological weed control in a citrus orchard instead of using chemicals.

use of non-certified planting materials, inadequate control of weeds, insects, and diseases, and the wrong fertilizers. FHIA is working to find solutions to each of them.

Progress is already being made. For example, a genetic "bank" facility for citrus budwood has been prepared and a program started for indexing and certifying plant material for renovation of old orchards and the establishment of new ones.

So far, low quality juice extracted from Honduran oranges must be mixed with high quality juice from elsewhere to compete in the North American market. A FHIA study made in five production zones showed that, except for one zone, the locally cultivated orange variety (70% of total production) was comparatively low in the minimum level of solids required for processing in other countries. By introducing new varieties, export quality standards can be met.

The Foundation scientists have already made significant advances in the field of entomology, pathology, and agronomy that have provided considerable benefits to the producer in controlling pests and diseases and improving basic husbandry. It is vital that this work continue to provide more urgently needed advances.

TECHNOLOGY TRANSFER

For research to have the desired impact, an effective communication and outreach program must be in place. FHIA's Communication Division produces and shares information with other national and international research institutions working on problems relevant to the region. Development of a viable communications network that facilitates the rapid flow of information to and from national institutions working

in agricultural extension and, ultimately, the farmers, and to and from other national and international research institutions has a high priority.

Numerous agencies in Honduras have active dissemination programs, including the Ministry of Natural Resources (MNR) and the National Agrarian Reform Institute (INA). FHIA is now working with them in disseminating research information through demonstrations, on-farm trials, technical publications, newspapers, and other media. Because training is an

Interviewing farmers gives FHIA useful information about their problems that need research and also "feedback" on the effectiveness of improved crop varieties and cultural practices.



integral part of the research dissemination process, FHIA also holds short courses for extension personnel and others.

The Communication Division administers a scientific library with 4,500 books, 4,400 bound journals, and 10,000 pamphlets, some of which are published in five languages. Its services are being expanded with acquisitions in different agricultural research disciplines and with improved documentation services.



Professional staff and visitors use FHIA's scientific library with its several thousand books, journals, and other publications.

Agricultural advances generated by FHIA scientists are transmitted to diverse audiences through field days (left), personal contact (right), radio, newspapers, and other means in cooperation with the Extension Service of the Ministry of Natural Resources and others.



ORGANIZATIONAL STRUCTURE AND PERSONNEL

Because of its organizational structure, the Foundation has flexibility of action and is free of political pressures. The Government of Honduras does not enter directly into its operations, leaving policies to be set by a Board of Directors that acts in concert with the government policy. The Director General is the chief executive officer and exerts control through vertical lines of authority extending downward through the Foundation staff (Figure 2). Through the Board of Directors, the Honduran private sector, small farmers' groups, and other technology users play a leading role in determining Foundation programs. To enhance coordination of research efforts, the government (through the Minister of Natural Resources) is also represented on the Board, although the private sector retains a dominant role.

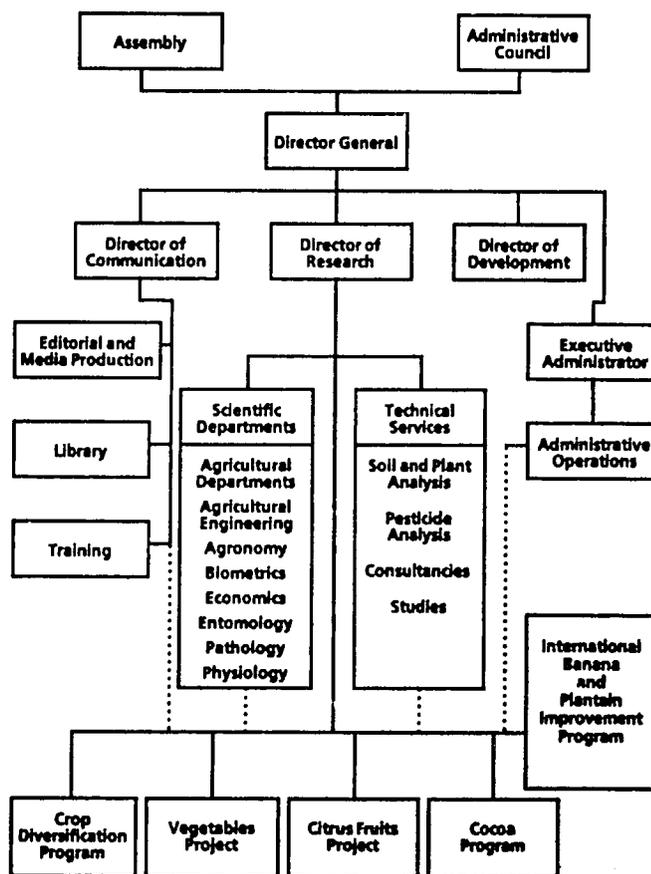
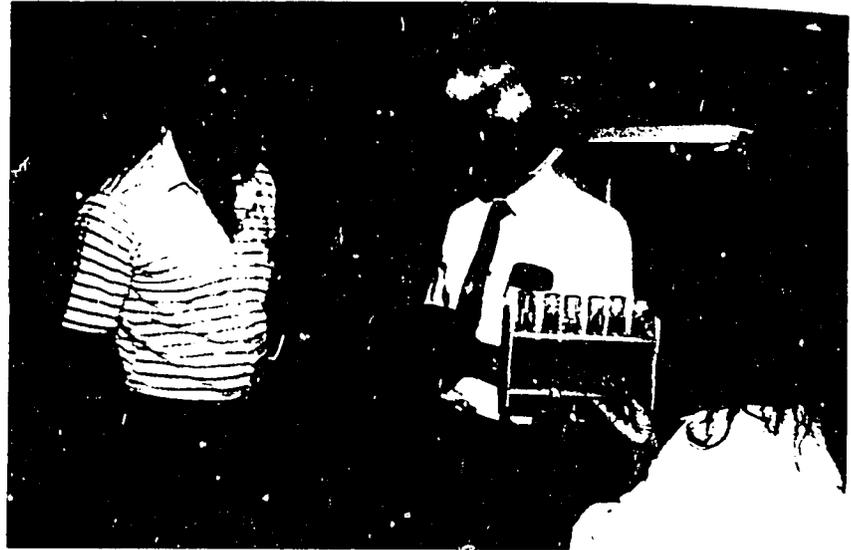


Figure 2. The Foundation's organizational structure with a Director General as chief executive officer.

FHIA's Director General

After a worldwide search, Dr. Fernando Fernández was selected as Director General and assumed this position in September 1985. He met the high standards set by the Administrative Council of the Board of Directors: scientist of international prestige, significant contributor to agricultural research and training, Ph.D. degree in a field of agricultural science, demonstrated knowledge of tropical agricultural conditions and opportunities in Latin America, proven leadership, management and administrative abilities, and fluency in Spanish and English.

For 10 years prior to his appointment at FHIA, Dr. Fernández was Coordinator of Scientific Training for the International Center for Tropical Agriculture (CIAT) with headquarters in Cali, Colombia. There he managed a dynamic program that trained approximately 2,000 research scientists, extension and agribusiness leaders, and educators from most of the countries in the Americas, plus several countries in Asia and Africa. His duties also included the development of strategies for research and for institutional transfer of technologies between CIAT and national programs and among countries.



Dr. Fernando Fernández, a scientist of international prestige, was chosen by the Board of Directors to be the Foundation's first Director General. He assumed this office in September 1985.

Right after receiving the Ph.D. degree from the University of Wisconsin with a major in soil science and a minor in economics, Dr. Fernández, a native Ecuadorian, became Dean of the Pan American Agricultural School in Honduras and two years later joined CIAT as production agronomist where he conducted applied research and validation trials with food crops.

Dr. Fernández manages and directs the Foundation in close collaboration with Division directors and senior staff members—an approach that has contributed to significant progress in a short time.

Scientific Staff

Carefully selected scientific staff members, including exceptionally capable Hondurans and nationals from twelve countries, work with devotion to advance FHIA's cause, focusing on practical solutions to production constraints. They work under the inspirational leadership of a Director of Research as a world class team and are single-minded in the pursuit of excellence. A Director of Communication also provides leadership to ensure that research results get to producers who will use them and benefit from them.

OPPORTUNITIES TO SHARE IN A SUCCESSFUL VENTURE

This charge was given to the Foundation in the beginning: establish an independent financial base within the shortest possible time frame and a small Office of Development with fund raising duties in cooperation with the Director General and the Board of Directors.

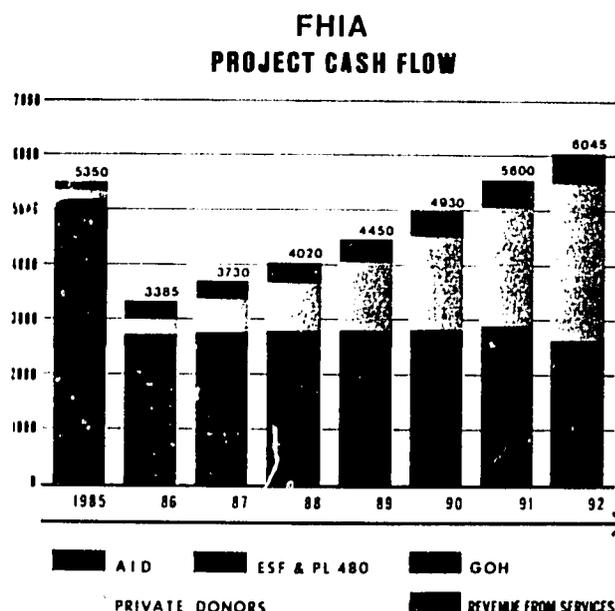
Substantial funding was provided for the first few years, mainly from the U. S. Agency for International Development.

But the long-term stability of FHIA and its ability to meet the demands and needs for research assistance in agriculture depends on additional support from private and public donors in Honduras and other countries and from regional and international organizations. Several Hondurans have demonstrated their interest and confidence in the Foundation by donating funds and a leading banker in the capital (Tegucigalpa) has accepted the chairmanship of a national volunteer fund-raising team. As stated earlier, funds have also been provided by donors both inside and outside Honduras for the International Banana and Plantain Breeding Program.

The Foundation seeks several types of funding, including:

- Medium-term basal operation funds for "core" programs such as those that allowed FHIA to be founded and to initiate activities. These grants are committed for a fixed period of time (USAID yearly for 10 years) and used for operations during the early and medium-term evolution of the organization. (FHIA needs to count on a financial "core" base of approximately US\$4 million per year during its first 10 years.)
- Funds for capital investment to help improve lands, buildings, and equipment. Donors provided the equivalent of US\$2.5 million for this purpose during the first three years; almost US\$1.5 million were on hand at the start of 1987 for capital investments already planned, mainly the development of experimental and demonstration stations and the establishment of the Communication Division.

Figure 3. The long term stability of FHIA and its ability to meet increasing needs for agricultural research depends on growing support from private and public donors.



- Unrestricted funds for existing programs and for new long-range programs that may be added in the future. A modality of these funds may be restricted to a given program or long-term activity.
- Endowed investment funds or properties that will yield income for the Foundation to use for long-term self support. Currently it has no funds of this kind.
- Project funds or specific grants of short duration (1–5 years) to carry on clearly defined research, training, or communication activities. These projects must be closely related to FHIA's mandate and reinforce or supplement the "core" programs.

Donors may provide funds to FHIA in several forms to match their interests. Donations made in the United States for FHIA can be directed to the Friends of Central America Agriculture Foundation and receive tax exemption.

To maintain and strengthen its position as a leader in agricultural research, FHIA will accept continuing and growing challenges with confidence in its ability to meet them. This ability depends on two things: first, scientists who understand the problems, analyze their components, and find their solutions and, secondly, the financial support that provides the wherewithal to endure and move in new directions.

For further information, please contact the Director of Development, Honduran Foundation for Agricultural Research.

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PROFESSIONAL STAFF

(As of January 1988)

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Carlos Young Reyes, M.B.A.	Executive Administrator
Susana de Mejia	Head Office of Personnel
Juan Repich	Head Office of Finance
Eduardo Salinas	Chief Accountant
Rolando Arriaga	Head Office of Administrative Services, Purchasing & Maintenance
Isabel de Rivera	Assistant Administrative Services & Purchasing

Office of Development

Christopher Millensted	Director of Development
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Research Division

Mario Contreras, Ph.D.	Director of Research
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Agronomy Department

Manuel Zantúa, Ph.D.	Head of the Department
Héctor Aguilar, M.S.	Associate Researcher II (Weed Control)
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Alejandro Hausermann, Agm.	Assistant Researcher I

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Roque Vaquero, M.S.	Head of the Department
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Napoleón Rodríguez, Agm.	Assistant Researcher II (Irrigation/Drainage)
Oscar Suazo, C.I.	Assistant Researcher II
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Jose J. Rosales, M.S.	Associate Researcher III
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Biometrics and Computer Services

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Plant Pathology Department

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José Mauricio Rivera, M.S.	Associate Researcher I
Gloria Molina, Ph.D.	Associate Researcher III
Julio Guillén, Agm.	Assistant Researcher I

Cacao Program

Jesús Alfonso Sánchez, M.S.	Head of the Program
Aroldo Dubón, I.A.	Assistant Researcher I
Alvaro Martínez, I.A.	Assistant Researcher I

Crop Diversification Program

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José David Portillo, Agm.	Field Technician

Plantain Program

Carlos M. Medina, I.A.	Head of the Program
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Vegetable Project

Salko Aleckovic, M.S.	Head of the Project
Denis Ramírez, Ph.D.	Associate Researcher I
José Angel Alfonso, I.A.	Associate Researcher I
Rafael Ponce, Agm.	Assistant Researcher II

Citrus Fruit Project

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Laboratory for Residual Analysis

Tomás Salgado, M.S.	Head of the Laboratory
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Laboratory for Chemical Analysis

Miriam Wood Euceda, M.S.	Associate Researcher I
Rebeca de Amaya, I.A.	Assistant Researcher III

Communication Division

Jairo Cano, Ph.D.	Director of Communication
Analia Güell, B.S.	Assistant Researcher (Training and Networks)
Nadina Alvarenga, B.S.	Assistant Researcher (Production)
John Moran, M.S.	Head of the Library

ABOUT HONDURAS

This Central American republic with its largely rural population (2.6 million out of 4.1 million) borders Guatemala on the southeast. It also has a northern frontage of 400 miles on the Caribbean Sea and a southern shore of less than 100 miles on the Gulf of Fonseca, an arm of the Pacific Ocean. The country's landscape varies from rugged mountains to valley and hillside farms to sea coasts.

The agricultural sector plays a crucial role in the national economy, providing more than 90% of all foodstuffs consumed in the country, approximately 30% of the Gross Domestic Product (GDP), and nearly 70% of all export earnings. It also provides some employment to over 60% of the economically active population.

Climatic conditions permit production of a wide range of warm and cool climate crops. Most staple food crops and virtually all types of fruit and vegetables can be grown. Major export crops have traditionally included bananas, coffee, sugar, tobacco, cotton, beef, and lumber.



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