

HONDURAS
AGRICULTURAL SECTOR

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Honduras Agricultural Sector

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I. DIAGNOSIS

1. General Information about the Country

The area of Honduras is 112.088 square kilometers or 11.2 million hectares. The country is divided into three well defined zones:

- 1.1 Atlantic Zone - It is 46% of the total area, or almost 5.2 million hectares. The country's largest and most productive valleys are in this region. The soil in the valleys as well as on the coastal plains and low hills is fertile and suitable for intensive agriculture, livestock raising and the banana industry. This region is well equipped with infrastructure and has marketing facilities; nevertheless, much of the extreme east of the zone is almost uninhabited, so in the long term the area can be developed more.
- 1.2 The Central Zone - This zone is 41% of the total area - 4.6 million hectares. It is the most mountainous and rugged part of the country. On the whole, the valleys are small and enclosed, so that communications between them are even more difficult. Most of the soil is unfertile and a large part of the area cultivated with the system of crop rotation and fallow periods.
- 1.3 The Pacific Zone - It is 13% of the country - 1.4 million hectares. Most of the zone is arable and moderately fertile.

2. The Importance of the Agricultural Sector

If we look at the three basic indicators listed below it is obvious that the agricultural sector is very important within the Honduran economy.

- a. The sector's share of the Gross National Product in percentage terms.
- b. The portion of the total volume of exports coming from the sector.
- c. The number of economically active population working in the sector.

Table No. 1 illustrates the importance of each of these indicators.

Table No. 1

1976

Agricultural Sector	%
Share of the G.N.P.	29.2
Share of Exports (1)	55.9
Economically Active Population in the Sector	65.0

(1) Only refers to the exports of goods.

3. Resources in the Agricultural Sector

3.1 Land

3.1.1 Current use of the Land

According to the 1974 national agricultural census, there are 196.585 farms with a total area of 2,659.940 hectares. Table No. 2 gives a classification of the land depending on the use.

Table No. 2

1974

Land Use	AREA-in Has.	% of Total
Annual Crops	365.947	13.8
Perennial Crops	225.510	8.5
Natural Pasture (1)	485.671	18.2
Cultivated Pasture	866.323	32.5
Mountains and Forests (2)	542.303	20.4
Others	33.694	1.3
Fallow Land	140.487	5.3
TOTAL	2.659.940	100.0

(1) Includes native and improved natural pastures.

(2) Includes Guamiles, Pines, Oak, Ceder and others.

3.1.2 Potential Land Use

Table No. 3 gives an evaluation of the potential use of the land in the country.

Table No. 3

1974

Potential Land Use	Area - Has.	% of Total
Land area suitable for intensive use	2,744.610	24.5
Land area suitable for extensive use	889.570	7.9
SUB-TOTAL	<u>3,634.180</u>	<u>32.4</u>
Land area not suitable for agriculture	6,973.790	62.2
Others	600.830	5.4
TOTAL	<u>11,208.800</u>	<u>100.0</u>

So, 62.2% of the country is mountainous and only 32.4% is suitable for agriculture. For this reason the forestry sector is so important for the country's development.

If we compare the area being used for agriculture - 2,083,938 hectares - with the country's agricultural potential - 3,634,190 hectares - we can see that 1,550,242 hectares of land are not being used.

Consequently, Honduras could increase its productivity and production by bringing more arable land into production, and by improving the agricultural methods, and techniques.

3.1.3 Types of Land Ownership

Table No. 4 shows that in 1965-1966, 46.2 % of the land being agriculturally exploited was privately owned, 25.5% was government land or municipal land (ejidal), 5.1% was leased, 1.2% was occupied by squatters and 22% of mixed ownership. This data refers to the legal form of ownership.

Table No. 4The Total Number of Farms According to Type of Ownership inPercentages

1965-1966

Type of Ownership	% Number of Farms	% of Total Farm Area
Privately owned	22.4	46.2
Government owned	11.3	9.9
Municipal land (Ejidal)	24.7	15.7
Leased	22.5	5.1
Used by the Occupant (squatters)	2.4	1.2
Mixed types	16.7	21.9
TOTAL	100.0	100.0

Although we do not have more complete up to date information, it is possible to make the following comments on trends in the evolution of the land ownership patterns described in the above Table from the preliminary figures of the third national agricultural census taken in 1974.

- a. The number of privately owned farms has increased. This has occurred because these holdings have been broken up especially the smallest ones.
- b. The municipal ownership has been declining. The cause here is that many users of the common land have been able to become outright owners of their parcels as a result of the land reform, or, this land has passed into government hands.
- c. The last factor in the previous point would explain why government land has increased.
- d. The number of leased farms has grown considerably but the average size of each is smaller.
- e. Less land is now used by the occupier (squatters with no legal title), which reflects the fact that this land

is under different forms of ownership, most notably it has become government land.

- f. The farms of mixed ownership have also changed as the land reform was active here as far as recuperating common and government land that was not legally owned, is concerned.

3.1.4 Land Distribution

The way land is distributed, influences – as we will see further on – the agricultural production and economic development in the country. Table No. 5 shows how concentrated land ownership in the country is.

The very small scale farmers have 67.5% of the farms but cultivate parcels of less than 7 hectares each, so their farms are only 12.3% of the total farm area. It must be pointed out that 47% of these farms are less than 3 hectares and cover 5.3% of the land.

At the other end of the scale, the large farms – 0.2% of the total farms – cover 19.6% of the area.

These figures prove that the problem of concentrated ownership is very serious and the consequences of this fact are: subsistence agriculture, technical deficient cultivation practices, badly located crops, low incomes and farmers that are marginated from the market. Table No. 6 gives the number of families according to the type of land ownership.

Table No. 5

Number and Area of Farms by Size in Percentages

1965–1966

	Farms	Area
Land Parcels	67.5	12.3
Small Scale Farms	30.0	39.7
Medium Scale Farms	2.3	28.3
Large Farms	0.2	19.6

Table No. 6

Classification	Number of Families
Landless laborers	92.400
Microfarms 0.7 hectares	30.200
Sub-family small farms 0.7 to 4 Has.	70.900
Sub-family medium farms 4 to 7 Has.	34.900
Family farms 7 to 35 Has.	53.200
Multifamily medium farms 35 to 350 Has.	11.500
Multifamily large farms 350 Has.	800
Administrators	2.600
TOTAL	296.400

3.1.5 Land Reform

18.411 families had benefitted from the land reform up to 1975. If we compare this figure with the number of landless families, reported in 1970 (previous Table), it becomes obvious that not much effort has been made in this area. Although the figures on land ownership and distribution appearing in the previous tables are not up to date, the land reform process has not in fact greatly changed the panorama the tables present.

3.2 Human Resources

3.2.1 Rural and Urban Population

As the Honduran economy is principally agricultural, the majority of the population lives in the rural areas. Thus, in 1976, 63.6% of the country's population was rural. Nevertheless, the urban population is growing at a faster rate than the rural as there is considerable migration towards the cities. A consequence of this migration is that the rural labor force has declined; so productivity in the agricultural sector has to increase not only so that it can supply its own needs, but those of the whole population as well.

3.2.2 Economically Active Population

The labor force in the country is only about 30% of the total population, this demonstrates that the majority of the population is dependent on a small labor force.

Table No. 7 gives a breakdown of the labor force or the economically active population in each economic sector in percentages.

Table No. 7

Distribution of the Economically Active Population in Percentages

1976

Areas of Economic Activity	%
PRODUCTIVE SECTORS	76.4
Agriculture, forestry, hunting, fishing	65.0
Exploiting mines and quarries	0.3
Manufacturing industries	8.7
Construction	2.4
BASIC SERVICES SECTOR	2.4
Electricity, gas, water and sanitation services	0.6
Transport, warehouses and communications	1.8
OTHER SERVICES	21.1
Wholesale and retail commerce	5.5
Services, banks, insurance and real estate	12.2
Other activities (public administration and defense)	3.5
TOTAL ECONOMICALLY ACTIVE POPULATION	100.0

From the above Table we can infer that almost two thirds of the labor force is economically dependent on agricultural activities.

Unemployment and underemployment are severe and the unemployment rate in the country as a whole is estimated to be 8%. Unemployment and under-employment are magnified because the productivity level of much of the population employed in fundamentally agricultural jobs is very low and there is seasonal unemployment which can last as long as 6 months in agricultural activities.

4. Structure of Agricultural Production

4.1 Structure of the Gross National Product

In 1976 the Gross National Product at 1966 cost factors and prices was US\$716 million, or equivalent to US\$800.5 million at market prices. The agricultural sector which encompasses the sub-sectors cultivation, livestock, forestry, hunting and fishing, is still the principal activity as far as total production is concerned. As can be seen in Table No. 8, the sub-sector manufacturing industry, whole sale and retail commerce, different services and house ownership follow in that order of importance.

Table No. 8

Percentage Breakdown of the GNP

1976

Sectors	%
Agriculture, forestry, hunting and fishing	29.2
Exploitation of mines and quarries	2.7
Manufacturing industry	17.3
Construction	5.9
Electricity, gas, water and sanitary services	1.9
Transport, warehouses and communications	7.2
Retail and wholesale commerce	12.8
Banks, insurance and real estate	3.6
House ownership	6.8
Public administration and defense	3.6
Other services	9.0
TOTAL	100.0

4.2 Aggregate Value of Agricultural Production

Table No. 9 gives the structure of the aggregate value of the agricultural sector in 1974.

Table No. 9

1974

		Percentages
<u>Crops</u>	<u>65.5</u>	
Banana		25.4
Coffee		12.8
Maize		9.3
Beans		2.9
Others (1)		15.1
<u>Livestock</u>	<u>18.3</u>	
Beef Cattle (2)		12.0
Swine		2.9
Poultry		3.4
<u>Forestry</u>	<u>15.4</u>	
<u>Hunting and Fishing</u>	<u>0.8</u>	
TOTAL AGRICULTURAL SECTOR		100.0

(1) Includes other cereals, tobacco, unbaled cotton, African Palm, plantain, sugar cane, coco nuts and others.

(2) Includes beef and milk.

Although the percentages of each item in the aggregate value of the agricultural sector may have changed in the last few years, the order of importance of the items has remained the same.

4.3 Production Systems

There is a dichotomy in the agricultural production in the country; on the one hand there is efficient agricultural production for export, and on the other hand, inefficient production of basic food-stuff by a number of small farmers who lack land, technical assistance, credits and access to markets.

4.4 Production and the Area down to the Principal Crops

Table No. 10 shows the area planted with each crop and the production of the principal agricultural products.

Table No. 10

1974-1975

CROPS	Area Planted - Has.	Production Metric Tones
Maize	301.372	341.882
Beans	64.457	35.225
Sorghum	47.492	63.313
Rice	14.122	17.246
Yucca (cassava)	5.877	10.697
Potato	379	4.543
Tomato	5.523	14.786
Cabbage	686	5.461
Bananas	36.882	1,428.476
Plantain	6.991	585.656
Sugar Cane	27.507	891.430
Sesame	1.392	614
Coffee	109.455	45.452
Cotton	8.243	5.141

It should be noted that the basic cereal in the diet of the Honduran people is maize, in some zones it is complemented by small quantities of rice and wheat products. Beans are the other food in the country's diet pattern.

4.5 Basic Grain Production and Technology

There has been little agricultural development in products for domestic consumption while the opposite has been the case with the products for export.

If we analyze Table No. 11 we can see that, at a national level, the small and medium scale farmers, who are classified with a technological level of grade 1 and 2 produce 80% of the maize, 87% of the beans, 49% of the rice and 87% of the sorghum.

Table No. 11

Percentage of the Area Sown with Basic Grains and the Production According to the Level of Technology used in the Cultivation

Basic Grains	% of Area	% of Production
<u>Maize</u>		
<u>Technological Level</u>		
G1* less than 4 Has.	28.3	16.3
G2** 4 to 35 Has.	61.6	66.1
G3*** over 36 Has.	10.1	17.6
TOTAL	100.0	100.0
<u>Beans</u>		
G1 less than 4 Has.	27.0	25.1
G2 4 to 35 Has.	62.0	62.5
G3 over 35 Has.	11.0	12.4
TOTAL	100.0	100.0
<u>Rice</u>		
G1 less than 4 Has.	18.2	9.2
G2 4 to 35 Has.	41.8	40.0
G3 over 35 Has.	40.0	50.8
TOTAL	100.0	100.0
<u>Sorghum</u>		
G1 less than 4 Has.	30.1	18.8
G2 4 to 35 Has.	60.8	68.7
G3 over 35 Has.	9.1	12.5
TOTAL	100.0	100.0

* Technological level where the least physical inputs are used.

** Technological level where a moderate quantity of physical inputs are used, animal energy and intensive labor.

*** High rate of physical inputs used, mechanical energy and mechanization.

4.6 Basic Grain Consumption

Basic grain production has been increasing recently but not as fast as the needs of the economy. There are two principal factors which can be said to have influenced this situation.

- a. The low level of technology used in production, and
- b. the weak purchasing power.

In the previous paragraph we discussed the reasons for factor (a) so here we will concentrate on the second factor (b).

Undoubtedly, the weak purchasing power is one of the main barriers to consumption and consequently it affects basic grain production in the country. This weak purchasing power is determined by the income levels and the income structure. Table No. 12 is a description of income distribution.

Table No. 12

Income Distribution 1970-1972

	Families %	Income %
I. Bottom Stratum (less than US\$1.000 per year)	<u>79.7</u>	<u>31.8</u>
a. -Lower bottom - less than US\$250	44.7	8.8
b. -Upper bottom - between US\$250 and US\$1.000	35.0	23.0
II. Middle Stratum -between US\$1.000 and US\$3.500 a year	<u>17.2</u>	<u>41.0</u>
III. Top Stratum -more than US\$3.500 a year	<u>3.1</u>	<u>27.2</u>
TOTAL	100.0	100.0

In the agricultural sector more than 40% of the sector's income is earned by five percent of the active agricultural population. Therefore, we can conclude from this analysis that production and productivity must be increased and incomes more fairly distributed before the consumption of basic grains will expand in Honduras.

4.7 Livestock Production

In 1974 livestock represented 18.3% of the aggregate value of agricultural production. It is estimated that in 1976 and 1977 it will be 21% to 24%.

Bovine cattle is used principally for beef and dairy production. It is calculated that more than 36,000 tons of beef are produced annually. The country exports approximately 21,000 metric tons of this and the rest is consumed locally.

Annual milk consumption is estimated to be nearly 221 million litres. The country must import nearly 24.9 million litres of powdered milk so as to meet this demand.

The cattle industry in the country is extensive and inadequately organized, the latter is mainly so as little technical assistance is offered.

On the contrary, the poultry industry is not only well organized but uses modern technology too. However, it has to depend on imported products to maintain efficient production.

The national herd has almost 2 million head of cattle, and 80% of them are on farms of less than 35 hectares.

A survey done in 1975 calculated that 28% to 31% of the farms total earnings came from livestock and the by-products such as meat, milk, butter, cream, cheese and eggs. 66% of this total comes from beef cattle and only 6.6% to 7.3% from swine.

5. The Structure of Foreign Trade of Agricultural Products

5.1 Exports

The Honduran economy is characterized by being highly dependent on the external sector, and exports are a decisive factor in the country's growth.

In 1976, agricultural products represented 55.9% of the total goods exports refrigerated meat and wood 16.6% and mining and other products 27.5%.

Bananas and coffee exports together, were 52.6% of the exports in 1976, with 27.5% and 26.2% respectively. These two products add up to 94.3% of the total exports of agricultural products. Other agricultural products which are exported are, in order of importance: tobacco, cotton and sugar.

As the exports are so undiversified, and dependent on so few products, the Honduran foreign trade is extremely vulnerable, and it is even worse as only two agricultural products account for more than half the trade.

5.2 Imports

Wheat purchases constitute practically all the imports of agricultural products, 93.5% of the total.

5.3 Crop Priorities Resulting from the Structure of Agricultural Foreign Trade

On account of the characteristics of the imports and exports of agricultural products, which we analyzed above, the technical report of the project to develop and diversify agricultural production in the country selected certain crops that should have priority and grouped them as follows:

5.3.1 Crops that could reduce imports:

- potato
- rice
- products to substitute wheat
- raw materials for the agro-industries such as vegetable oil and fats.

5.3.2 Crops that could affect the country's present exports:

- fruit
- maize
- beans

5.3.3 Crops that can increase and diversify the country's exports:

- cacao
- citrus fruits
- yucca
- African palm oil

II. RESEARCH ACTIVITIES

1. Agricultural Research Policies in Honduras

The agricultural research policy is formally administrated by the National Agricultural Research Program of the Section of Natural Resources. This research program has two general basic objectives:

- a. Increase the productivity and production of foodstuffs and raw materials and consequently benefit the national economy.
- b. Give priority to the solution of problems which hinder agricultural development, and which have been identified through the extension programs.

National agricultural production must be increased urgently so as to satisfy the demands of the Honduran population and to do this, agriculture needs to be modernized based on research. This situation has forced the state to designate more funds and provide more organization so as to overcome the technological problems which exist in the national agricultural sector. In the area of organizing research, the Section of Natural Resources has signed an agreement with the World Bank, through the Central Bank and the IICA, to structure a research program in cultivation and livestock raising. Work will be done on organization, planning and analysis, so that a work program can be designed which will contribute towards strengthening the country's research capacity when it is implemented. IICA will contract 5 highly trained experts in the following fields:

- agricultural research organization
- livestock research organization and administration
- economic analysis of research and production
- transferring technology
- production, certification and multiplication of improved seeds.

Each of these international experts will have two national counterparts. There is a general description of the project in the appendix to the agreement with the World Bank. See Appendix 1.

The agricultural research policy is in line with the objectives and goals the government stipulated for the agricultural sector in its operative development plan. The Plan's primary objective is to "achieve a substantial and sustained increase in and a more equitable distribution of the rural per capita income, especially among the peasants, by means of agrarian reform". The strategy for achieving this objective is to increase production principally by providing a greater access to technology, a more adequate supply of resources and better use of the land under cultivation. It is hoped that in this way complementary

objectives can be achieved, like "improving the diet of the Honduran people both quantitatively and qualitatively, help the balance of payments by increasing and diversifying exports and by substituting the majority of the agricultural imports, and supply the agricultural raw materials needed by the country's industries". All this proves why agricultural research, for fulfilling the government's strategy for the agricultural sector, is so important.

2. Organization of the Agricultural Research

In the agricultural sector there are different types of entities pursuing different activities. We have chosen those which are connected with agricultural research in some way: Secretary for Natural Resources, the Honduran Forestry Development Corporation, the Honduran Coffee Institute, the Higher Economic Planning Council, the National School of Forestry Sciences, the Regional Center of the Atlantic Coast and the Zamorano Panamerican Agricultural School.

2.1 Section of Natural Resources

This entity is responsible for directing and coordinating the implementation of the agricultural development policy. Its functions are to provide extension, research, mechanization services, improved seeds and vegetable material, promote livestock, animal and plant health, irrigation and drainage, agricultural training and education.

The National Agricultural Research Program is responsible for and directs all the research undertaken by the Section of Natural Resources. At the same time this program coordinates its efforts with other public and private entities who are carrying out research and it also coordinates its work with the different support programs the Section has.

2.1.1 The Priorities the Section of Natural Resources has Established for Agricultural Research

The criteria used for selecting the priorities for agricultural research are the priorities established by the Central American Common Market. The priorities are:

1st. Priority: Basic Grains: maize, beans, rice and sorghum.

2nd. Priority: Products for export: bananas and coffee.

3rd. Priority: Crops to diversify the traditional structure of exports.

Within the priorities beans and maize are prominent as they are so important in the domestic consumption patterns in Honduras. The priorities laid down depend on the weight and importance of the crops as far as cultivated area and production are concerned. Appendix 2 shows that 72% of the area sown with commercial crops is planted with the high priority crops.

The table in Appendix 3 of the activities programmed for the Section of Natural Resources' experimental stations reveals the importance given to the research on each crop.

2.1.2 Research Policy

Instead of working with the individual small scale farmers, the Ministry of National Resources is developing its work and activities with the peasant settlements which are a collective type of organization. This means that the farms must be taken as a whole, or in other words, the farms and the settlements are considered as productive units.

2.1.3 Infrastructure

Seven agricultural regions have been established in the country. The agricultural programs of the Section of Natural Resources are being carried out in these regions. These regions cover the whole country and are:

- Region No. 1 - South: headquarters Choluteca
- Region No. 2 - West Center: headquarters Comayagua
- Region No. 3 - North: headquarters San Pedro Sula
- Region No. 4 - North Coast: headquarters La Ceiba
- Region No. 5 - East: headquarters Juticalpa
- Region No. 6 - East Center: headquarters Danli
- Region No. 7 - West: headquarters Sta Rosa de Copan

The location of the different crops and the priority given to each in every region has been detailed in Appendix 4. These seven regions which the country has been divided into are served by 6 experimental stations:

- Guaymas experimental station. It is in the north region. Projects on maize, rice, soybeans, ground nuts and production systems are being done.
- Gomayagua experimental station. It is in the Center west region. Projects on maize, sorghum, rice, beans, soybeans, ground nuts, vegetables, potatoes and sesame are being carried out.
- La Esperanza experimental station. It is located in the Center west region. Maize and Potato projects are being carried out.
- La Lujosa experimental station. It is located in the south region. Projects with maize, sorghum, rice, soybeans, ground nuts, sesame and Ricinus comunis are being carried out.
- Danli experimental station. It is located in the Central east region. Projects with maize, sorghum, rice, beans, soybeans, ground nuts and potatoes are being carried out.
- Catacamas experimental station. It is located in the east region.. Projects on maize, sorghum, rice, beans, soybeans, ground nuts and vegetables are being carried out.

2.1.4 Human Resources

The Section of Natural Resources has 32 professionals and 5 technicians working, mainly, on research, although some also perform additional administrative work.

In Appendix 5 there is a detailed list of the technical personnel belonging to the program.

Where the researchers are located and their academic training has been set out in the following table:

	Ph.D	M.S.	Agr. Ing.	B.S.	Agr.	Total
Coordination	4	1		1		6
Guaymas experimental station		1	8			9
La Esperanza experimental station			2		1	3
Comayagua experimental station		1	4			5
La Lujosa experimental station			5		1	6
Danli experimental station			4			4
Catacamas experimental station			1		3	4
	4	3	24	1	5	37

2.1.5 Financial Resources

All the Ministry of Natural Resources' funds come from departmental funds.

It has been planned to spend 5.9%, about US\$1.500.000 of the Section of Natural Resources' budget for 1978 on research.

A relevant indicator of how much money is being given to research is that the total sum is equivalent to 0.5% of the agricultural sector's gross domestic product.

The financing for crops is given in Appendix 6-A, the data has been taken from the operative plan for 1976, the costs of inputs (not including salaries and day wages) for each station and crop are detailed. Appendix 6-B is an account of the expenses for agricultural research services programmed in the 1977 operative plan.

2.1.6 Research Programs

2.1.6.1 Agricultural Research

Appendix 7 gives a detailed description of the specific objectives of the research the Section of Natural Resources is doing on each of the crops.

2.1.6.2 Livestock Research

Little importance has been given to livestock research. Programs on the adaptation and production of pedigree animals which are imported to be sold to farmers, is all that has been done. There is no research whatsoever on pasture or forage.

As there has never been a research policy for the livestock sector, the study on how to organize the research being done by the Section of Natural Resources together with the International Agricultural Development Service will first of all determine how important the sector is for the economy.

It should be emphasized that more than 90% of the 83,000 cattle farms are small or medium sized.

2.1.6.3 Existing Problems

The principal problems agricultural research has to face can be divided into four groups:

2.1.6.3.1 Inadequate financing.

2.1.6.3.2 Lack of experimental programs.

2.1.6.3.3 Lack of qualified technical personnel.

2.1.6.3.4 Limited opportunities for specialized training.

These problems are even more pronounced in the livestock sector.

2.1.7 Extension Activities

Although technical assistance for the small and medium scale farmer has increased considerably in recent years it is still insufficient. The majority of the extension services have concentrated on the easily accessible areas, and as a result a large number of small farmers are excluded.

The Section of Natural Resources has been increasing the technical assistance services by working through organized peasant groups, the cooperatives, the associated enterprises of producers and the large federations. In fact, the Section of Natural Resources' policy is to make technical assistance cover a larger area. In the table below there is a description of where the extension agencies are located, and the number of agents in each.

Periodic meetings and conferences with the regional extension agents are being organized so as to achieve a better understanding and a better flow of information from the experimental camps to the extensionist camps. The objective is to achieve a flow of knowledge in both directions.

Established Agricultural Regions	Extension Agents	Number of Agents
Region No. 1 South	13	17
Region No. 2 West Center	8	10
Region No. 3 North	23	31
Region No. 4 North Coast	6	11
Region No. 5 East	9	10
Region No. 6 East Center	11	16
	70	95

2.2 Honduran Forestry Development Corporation - COHDEFOR

This is a semi-autonomous entity, with legal status and its own patrimony. It is responsible for implementing the state's forestry policy, for achieving optimum utilization of the country's forestry resources, assuring that they are protected, improved, conserved and increased, and for providing funds to finance the state programs.

The state delegated the job of controlling forests on private and public land, conserving them, reforestation, exploitation and utilization as well as industrialization and marketing of the products derived from the forests to the Corporation.

It must be emphasized that the forests in Honduras are the country's most important renewable natural resource; they could become one of the principal pillars of the nation's economic development, as 66% of the potential use the land could have is as forests.

2.2.1 Characteristics of the Research Undertaken

COHDEFOR is doing some applied research. At present they are collecting basic information on forest growth. This research covers the whole country and it is being done jointly with the FAO.

However, COHDEFOR's principal activity is not research but marketing and industrial activities. The National School of Forestry Sciences which is one of its dependencies and which we will discuss in more detail further on, works on the research.

2.2.2 Infrastructure

COHDEFOR has 42 special yield plots all over the country. These plots are used to determine the best spacing needed to obtain the best yields of wood. The plot program is using PINES. In addition it has a demonstration forest.

2.2.3 Human Resources

There is 1 Ph.D, 1 Master and 8 professionals working on research programs.

2.2.4 Financial Resources

The Institute's financial resources are revenues from its activities as a commercial company. In 1975 COHDEFOR earned profits of US\$6.3 million from its various operations.

2.3 Honduras Coffee Institute - IHCAFE

This is a decentralized, semi-autonomous entity. Its functions are to study, channel, stimulate and orientate the coffee activities in accordance with the state's economic, social and fiscal policy and the international coffee agreements.

2.3.1 Research Activities

IHCAFE only does research related to coffee growing. It is mainly interested in cultivation practices. The philosophy behind this research is to provide the grower with technological packets.

There is a project to create a research department that would depend on the Institute's agricultural division.

The agreement with IICA for the whole of Central America to carry out a project to "modernize coffee growing in Central America" will come into force in 1978. Honduras will contribute US\$40,000 through the Institute.

2.3.2 Infrastructure

The Institute has four experimental stations for its research work in Santa Barbara, Cortes, La Paz and Olancho.

2.3.3 Human Resources

Each of the four experimental stations has an Agronomist. They have little experience in research. There is an Agronomist who does have experience in research on coffee and he coordinates the personnel at the experimental stations. The Agricultural Division of the Institute has one graduate with a Masters degree.

The Extension Department of the Agricultural Division has one agronomist and one agricultural technician as an assistant.

The Diffusion and Training Department has one experienced agronomist.

The Agricultural Division has eight regional offices in the country. The regional offices have five agronomists, and three agricultural technicians. There are 100 agents, who are trained as technicians to carry out the extension activities.

The Institute's personnel mostly comes from CURLA. The Centre and the Institute have an agreement whereby the students do their social service in IHCAFE.

2.3.4 Financial Resources

The Institute's most important source of financing is US\$1.00 tax the producers must pay on each sack of coffee they export.

Additional revenue comes from the Institute's own income from bonds, interests and sales of seed.

It receives some transfers from the governments too. This year the government contributed US\$1.8 million.

IHCAFE's general budget is US\$5 million. The Agricultural Division is allocated the largest share of the Institute's funds - US\$1.5 million. The plan is to assign about 3.6% of the Agricultural Division's budget to research when the Research Department is created.

2.4 Higher Council for Economic Planning - CONSUPLANE

This body advises the Presidency of the Republic. Its functions are to plan, coordinate, supervise and evaluate the execution of the economic plans, programs and projects as a whole.

At present, the Regional Planning Division is about to develop a project covering the frontier region. This region includes 46 municipalities and 228,000 people. This border development project includes research.

2.5 National School of Forestry Sciences - ESNACIFOR

The School is attached to the Honduran Forestry Development Corporation. The School's function is to train the intermediate level personnel the Honduran forestry system needs. It also carried out research which helps to train and educate the students in the school and offers solutions to the problems of the forestry sector in the country.

2.5.1 Infrastructure

The school has:

- A 4,200 hectares forest of conifers which acts as a laboratory.

- A 600 hectares forest of Broad Leaf trees - a tropical forest.
- The Laucetilla experimental station near La Ceiba. This is a botanical garden that was founded more than 45 years ago and has just been handed over to the school. It consists of 40 hectares of trees from all over the world and 700 hectares of Broad Leaf trees.

2.5.2 Training Resources

The academic training given by the school is intermediate level.

The school will be turned into a Research Institute.

2.5.3 Human Resources

The following table gives a list of the human resources, the school has, their academic training and research activities.

	Total	Ph.D	
		Doing research and teaching	Doing re-search only
Personnel hired by the School	5	3	2
Personnel from international organizations	2		2
TOTAL	7		
		M.S.	
Personnel hired by the School	3	3	
Personnel from international organizations	1		1
TOTAL	4		

	Total	ENGINEERS	
		Doing research and teaching	Doing re-search only
Personnel hired by the School	11	11	
Personnel from international organizations	3	2	1
TOTAL	14		

It should be mentioned that the school receives foreign technical assistance from the FAO, the British Mission, the Peace Corps and the French Government.

2.5.4 Financial Resources

The School's general budget is US\$1.372.000. This budget includes:

- the income generated by the school itself, which amounts to 5% of the general budget.
- a counterpart investment with the IDB - Aid Agreement
 - worth US\$75.000. The IDB is contributing US\$400.000.
- COHDEFOR contributes the rest of the budget.

Approximately 3.7% of the general budget is allocated to research. This research spending finances operational costs and equipment, as salaries are counted as administrative costs.

2.5.5 Research Projects

Appendix 8 gives a description of the research projects the School is involved in at present.

2.6 Regional University Center of the Atlantic Coast - CURLA

This is the Agricultural Sciences Department of the Autonomous University of Honduras - UNAH. This unit was founded to carry out teaching, research and extension work in agricultural sciences and forestry sciences. The academic and administrative structure is closely linked to the global structure of the University.

CURLA was created 10 years ago and it has achieved very little in that decade. The Superior Council of the University has just approved a plan to restructure and develop the institute. The idea is that this new academic-administrative structure should replace the present one as it is one of the main barriers hindering the Center's development.

2.6.1 Physical Resources

2.6.1.1 CURLA owns 286 hectares of land and approximately 210 of these are used for agriculture.

2.6.1.2 Area Cultivated:

Fruit trees: 24.1 hectares are planted with fruit trees. These trees are only just beginning to bear fruit so, consequently, there is, as yet, no concrete data on production.

Intensive Crops: Maize and Sorghum. 13 hectares of maize were sown during the winter season. During the dry season sorghum is planted on these 13 hectares instead of maize.

Pasture Collection: The Center has 89 plots each with a different variety of pasture.

Excluding the area down to pasture, there are a total of 38.5 hectares being used for crops.

2.6.1.3 Area for Livestock

The cattle herd has 91 head including Brahman, Zebu, Hereford, Sta. Getrudis and Fresian Holstein.

Pasture area: 95.2 hectares are sown with Guinea Grass, it is divided into 26 fields, including a breeding unit. This has a building with 4 divisions and 4 fields. Only 30 hectares of the pasture area are actually used for grazing.

Swine Program: At present the swine program has a total of 123 animals belonging to different breeds: Lanchace, Yorkshire, Duroc and Hampshire.

There is a 216 M² pig sty with 4 breeding area, 12 rearing areas, 1 storeroom and the office. There are also 3 hectares of land divided into five fields for the pigs to graze in.

Poultry Program: This program has a henhouse for layers, a breeding house and a fattening house.

2.6.1.4 Experimental Area:

There are 10 hectares used for experiments, tests to adapt different varieties of beans soybeans, maize, rice and ground nuts have been done here.

2.6.2 Human Resources

Today CURELA has 37 professors, and almost half of them are foreign visiting professors. This means that it is difficult for the Institute's programs to be stable and they have little continuity.

The following table details the academic training of the personnel at the school.

Academic Training	Number
M.S.	11
Licenciados	23
Instructors*	3
TOTAL	37

* Personnel who have three years of study after secondary education.

2.6.3 Financial Resources

The CURLA budget is part of the University's budget. No sum is especially allocated to research.

2.6.4 The State of Research and the Prospects

At present little research is being done, and the little there is, is limited to experimentation. Basically, the work has been to improve varieties of maize, rice and legumes and to discover the best dates for sowing these crops. So far it has been the individual members of the staff and not the institute who are interested in research, so what research there is has been done by teachers in their own time, as the institute has not assigned personnel for the work.

In the already approved restructuring process, research has been given an important role. There are plans to create a research council, which will be the maximum organ of the Center and will be in charge of determining the research policy to be followed by the department during each agricultural cycle. This organ will be responsible for preparing the research work plan each year. All the department heads and the careers coordinators will sit on this research council.

This new structure with its emphasis on research, will make a special contribution towards providing better training for the human resources the country needs so desperately. Nevertheless, more human and financial resources will be needed if these new activities are to have the hoped for success.

In Appendix 9 there is a list of the research activities planned for each department in the school.

2.7 Zamorano Panamerican Agricultural School

The School is a private and autonomous institution founded in 1941 with the cooperation of the Honduran Government and under the laws of Delaware. The School is a technical agricultural center where students from 13 Latin American countries are taught classes and laboratory courses in agricultural sciences and they are trained in practical field work.

The study program takes three years and it is open to high school graduates. The U.S. Sugar Corporation established a fund in the University of Florida to finance a number of selected graduates from the school who are registered for a B.S. in agriculture. In addition to their academic studies they will receive practical training during summer courses at the agricultural extension agencies and at various research and education centers in Florida.

2.7.1 Research Activities

Although the School's main function is to teach, it has done some research with maize and sorghum. Furthermore, there is a potato research project with Canada. Experiments are being done on dairy and beef cattle in the area of livestock.

2.7.2 Human Resources

The school has 25 faculty professors and visiting professors collaborate.

2.7.3 Financial Resources

The Institute's principal source of financing is the income from its endowment fund started by the United Fruit Company in 1941 and donations from private individuals, corporations and foundations. In 1976 a campaign to collect funds for the School was started. Some donors who made contributions deserve special mention: Rockefeller Foundation, Tinker Foundation, the Government of Honduras, the Government of Venezuela, Grace Foundation, World IBM Corporation, Kimberly-Clark Foundation, United Brands Foundation, the United States Sugar Corporation, Standard Fruit, Texaco Caribbean Inc., Standard Oil, S.A., the Embassy of the German Federal Republic, etc.

APPENDIX No. 1

A Basic Description of the Agricultural Research Projects:

Transferring Technology; Seed Production, Certification and

Multiplication

INSTITUTIONAL STRENGTHENING OF THE AGRICULTURAL

RESEARCH SERVICES

1. The Project

It aims to strengthen the research services for crops, livestock and the economic analysis of the research and agricultural production. In order to do this, organizational, planning and analysis work must be done so that a work plan can be designed which, when implemented, will increase the capacity to do agricultural research and obtain trustworthy and relevant information.

2. Identify the Problems

There are certain limitations and deficiencies in the agricultural research services the Ministry of Natural Resources supplies for producers. They include the following:

- 2.1 The structure of the research program is inadequate, so it cannot fulfill its objectives properly.
- 2.2 There is no definite philosophy which guides the development of the research.
- 2.3 The medium and long term research activities, their objectives, goals and work strategies are not planned.
- 2.4 The research must be strengthened urgently, so as to improve its operative capacity and ability to absorb foreign technical and financial assistance.
- 2.5 An efficient system of evaluating the research as a whole and its impact on production and productivity must be established.
- 2.6 The coordination between the research program and other related programs is deficient.
- 2.7 There is not enough trained technical personnel, or material, equipment and installations to carry out the work efficiently.

- 2.8 There is very little documentation, information and communication with national and/or foreign organizations which develop research activities.
- 2.9 The material and moral incentives for the technical personnel working on the program must be improved so they will remain with the programs.

3. Objectives

- 3.1 Help the Section of Natural Resources to restructure the agricultural research program so it will fulfill its principal objective of contributing towards increasing agricultural production and productivity more efficiently.
- 3.2 See that the crop and livestock research program has been strengthened by the end of the period of technical assistance so that it has the necessary technical and operative capacity to provide an adequate service for the needs of the Honduran farmer.
- 3.3 Assist in training the national technical research personnel, so as to consolidate the new organization and give continuity to the research projects chosen for the program.
- 3.4 Assist the head of the research program in establishing a long and medium term system of planning and programming in accordance with the National Development Plan.
- 3.5 Assist the Ministry to organize and administer a research program that can be applied to livestock.
- 3.6 Design and update a system of economic analysis for agricultural research and production.
- 3.7 Collaborate in designing and establishing a system of transferring technology that will orientate research to the producer to justify its operation.
- 3.8 Establish an efficient mechanism to coordinate the research program, the related programs and the producers.

4. Goals

- Contract a specialist in organizing and administrating applied agricultural research; a specialist in organizing applied livestock research projects; a specialist in economic analysis of the research.
- Cooperate with the Ministry in formulating a medium term General Plan, short term plans and research projects, all the priorities, objectives, goals and strategies to be followed should be defined.
- Prepare a training program for the national counterpart personnel and technicians chosen from them. This program should be taught by means of short courses, seminars, talks, camp days and training abroad.
- Organize an information and documentation system so as to complement what exists and so that the Program can achieve its aims efficiently.
- Design a mechanism for evaluating the results of the agricultural research in general.
- Establish an efficient system of coordinating this Program and, above all, the seed extension, production, certification and multiplication programs.

INSTITUTIONAL STRENGTHENING OF THE AGRICULTURAL TECHNOLOGY TRANSFER SERVICES

1. The Project

Its aim is to strengthen the agricultural technology transfer service by organizing it efficiently. This organization will include, basically, administration, planning, supervision, evaluation and support services.

2. Identify the Problems

- The need to increase the quality and quantity of the technical personnel in the Program.
- The head of the program needs technical support in various specialized areas.
- The advisability of the Agricultural Extension Program having a medium and long term planning system.
- It is advisable to strengthen the program, principally at the leadership level, so that in the immediate future it can execute new projects and absorb national and foreign, technical and financial assistance.
- The coordination and communication of the Extension with other Ministerial plans, principally with research and other bodies of the sector, must be improved urgently.
- The leadership of the program needs to be strengthened with an efficient organization in administration, planning, supervision, evaluation and support services.
- There is a lack of technical personnel with enough training to transfer the technologies, techniques and advances obtained from agricultural research to the producers.
- There is no efficient mechanism to coordinate the agricultural research programs, the agricultural and seed services with the extension program, or to coordinate the latter with the producers.

- There is no program or plan which really attends the producers' demands (mechanization, inputs, vegetable and animal health, credits and marketing) so that these demands can be met opportunely.
- There is no program to train technical personnel for the extension service, so that technology transfer can achieve the desired results.

3. Objectives

- Assist the head of the Extension Program in administration, programming and execution, and make the necessary adjustments so the Program functions as well as possible.
- Assist the Extension Program to execute specific projects.
- Provide assessment at a regional level so as to establish an efficient supervision system.
- Establish a system to coordinate and communicate the extension with the research and with the other related Ministerial programs and/or those belonging to other bodies in the sector.
- Train the extension technical personnel.

4. Goals

- Evaluate the Agricultural Extension Program (technology transfer) with the intention of improving its operation.
- Restructure the Program by strengthening its leadership with an efficient organizational system in administration, planning, supervision, evaluation and support services.
- Design a medium term General Plan, and annual plans, programs and projects to transfer research technology and new techniques to the farmer and determine the priorities, objectives, goals and strategies to be followed.
- Prepare a training program for the counterpart technical personnel and the other technical personnel and promoters who are involved in the project.

INSTITUTIONAL STRENGTHENING OF THE SEED

PRODUCTION, CERTIFICATION AND MULTIPLICATION

SERVICES

1. The Project

It hopes to strengthen the seed production, certification and multiplication service by reorganizing it and designing an efficient system of planning, supervising and evaluating the activities performed and their related aspects.

2. Identify the Problem

There are several limitations which hinder the Seed Production, Certification and Multiplication Program from functioning properly.

- Insufficient technical personnel are assigned to the Program.
- The capacity of the plants processing seeds is limited and the machinery is obsolete.
- There is no legislation to regulate the different aspects of seed production, certification and multiplication.
- There is no adequate infrastructure for storing seeds at a regional level.
- Seeds are not distributed at the right moments because there is no program to determine the users' needs.
- This Program is not properly coordinated with, principally, the Research and Extension Programs.

3. Objectives

- Cooperate with the Ministry in establishing the Seed Law and its regulations.
- Support the head of the seed program in organizational and administrative aspects.

- Cooperate with the Ministry in establishing an efficient system of producing, certifying and multiplying seeds.
- Collaborate in evaluating how well the seed plants capacity is being used and make and implement recommendations on this point.
- Train the technical personnel of the Ministry's Seed Program and the producers who are collaborating.
- Revise the country's legislation on seed certification and production with the help of the national counterpart personnel and propose the necessary modifications and prepare the regulations needed to apply the legislation better.
- Train the counterpart personnel in seed production and certification services.
- Train the extensionists and seed producers in seed production and seed utilization techniques.
- Improve the seed storage and conservation services by designing and implementing a program at a national and regional level.

4. Goals

- Prepare a seed production, certification and multiplication general plan and annual programs and projects.
- Organize training courses for the counterpart personnel in seed production and certification, and in seed use and conservation techniques for the extensionists and seed producers.
- Design and implement a project for storing, conserving and distributing seed at a regional and national level.
- Establish a system to coordinate this project and the research, extension and agricultural services.
- Collaborate in preparing legislation in the areas of seed production, certification and multiplication that will meet the country's needs.

- Design and implement an effective mechanism for supplying these services to the farmers promptly and efficiently. It must be born in mind too, that there is a demand for other agricultural services (mechanization, credit, marketing etc.).
- Establish a system of coordinating the service with seed research, production, certification and multiplication, as well as with the other programs belonging to the Ministry of Natural Resources.

APPENDIX No. 2

The Importance of Each Crop According to the
Area Cultivated and the Production

1973/1974

CROPS	AREA (Has.)	% of the Area of all the Commercial Crops	PRODUCTION MT
Maize	320.220	50.6	343.040
Beans	67.229	10.6	31.604
Sorghum	55.010	8.7	38.939
Rice	14.569	2.3	19.055
		72.2	
Yucca	3.713		9.151
Potato	413		4.810
Tomato	1.610		21.055
Cabbage	378		1.186
Bananas	26.153		1.086.142
Plantain	11.693		192.677
Sugar Cane	23.471		875.511
Sesame	1.344		517
Coffee	102.928		41.888
Cotton	4.390		7.907

APPENDIX No. 3

Table of the Activities Programed in the
Experimental Stations

Research Sub-Project

A Plan of the Experimental Activities

PROJECT	Present Situation Year 0 (1977 = 100 %)	Y E A R S				Percentage Increase Based on Year 0
		First	Second	Third	Fourth	
Maize	67	88	104	123	141	210
Beans	54	66	74	81	88	162
Rice	68	93	109	122	143	210
Sorghum	59	58	67	81	92	155
Production Systems	10	13	18	20	25	250
Oil Seeds	120	145	168	183	208	173
Soybean	58	68	72	77	82	
Ground nut	22	25	30	35	40	
Sesame	26	36	41	46	56	
Ricinum comunis	14	16	25	25	30	
Vegetables	54	93	112	138	163	301
Tomato	13	20	25	30	30	
Potato	13	25	30	36	46	
Yucca	14	20	25	30	35	
Onion	9	15	18	23	28	
Cabbage & Red pepper	5	13	14	19	24	
Pasture and Forrage	0	18	30	37	47	100
TOTAL	432	574	682	785	907	

Source: Secretaría de Recursos Naturales.

APPENDIX No. 4

Location and Priority by Regions of the Different
Crops

Location and Priority by Region of the Different Crops

CROPS	Choluteca	Comayagua	San Pedro Sula	Ceiba	Juticalpa	Danli	Santa Rosa de Capan
Maize			X	X	X	X	X
Rice	X		X	X			
Beans		X		X	X	X	X
Sorghum	X						
Fruit Trees <u>1/</u>							
Vegetables							
Cashew	X	X	X			X	X
Potato		X				X	X
Wheat		X					X
Tomato		X					
Sesame	X						
Melon & Water M.	X						
Yucca				X			
Soybean		X	X		X		
Ground nut		X	X				
Sisal	X						
Citrus Fruits		X	X	X		X	
Ricinus communis		X					
Plantain			X	X			
Onion		X					

1/ Left to the discretion of the Agricultural Regional Directors.

APPENDIX No. 5

Detailed List of the Technical Personnel Working
of the National Agricultural Research Program of
the Section of Natural Resources

Technical Personnel on the Program

<u>Coordination</u>		<u>Degree</u>	<u>Job</u>	<u>Specialization</u>
1. Antonio Ramon Silva		B.S.	National Head	Agronomy
2. Mario Contreras		Ph. D	Research Tech.	Pathology
3. Juan Jose Osorto		M.S.	Research Tech.	Improvement
4. Frank Peairs		Ph. D	Research Tech.	Entomology
5. Franklin Rosales		Ph. D	Research Tech.	Improvement
6. Dan Galt		Ph. D	Research Tech.	Agri. Economy
<u>QUAYMAS EXPERIMENTAL ST.</u>				
	<u>Project</u>	<u>Degree</u>	<u>Job</u>	<u>Specialization</u>
7. Roberto Caceres	Soybean-Peanut	Agr. Engin.	National Head	
8. Rolando Rubi	Rice	Agr. Engin.	Assistant	
9. Luis Brizuela	Maize	Agr. Engin.	National Head	
10. Wilberto Fiallos	Maize	Agr. Engin.	Assistant	
11. Mauricio Rivera	Rice	Agr. Engin.	National Head	
12. Luis A. Bustamante	Soybean-Peanut	Agr. Engin.	Assistant	
13. Aroldo Paz	Prod. Systems	Agr. Engin.	National Head	
14. Antonio Marquez	Maize	M.S.	Assistant	Improvement
15. Walerio Caceres	Yucca	Agr. Engin.	National Head	
<u>LA ESPERANZA EXPERIMENTAL ST.</u>				
16. David Aguilar	Potato	Agr. Engin.	National Head	
17. Adan Bonilla	Maize	Agr. Engin.	Assistant	
18. Luis Gutierrez	Potato	Agronomist	Assistant	
<u>CHAYAGUA EXPERIMENTAL ST.</u>				
19. Amado Suazo	Rice-Maize	Agr. Engin.	Assistant	
20. Jose R. Ramirez	Soybean-Peanut	Agr. Engin.	Assistant	
21. Denis R. Ramirez	Vegetables	M.S.	National Head	Vegetables
22. Fredy Maradiaga	Vegetables	Agr. Engin.	Assistant	
23. Efrain Espinoza	Maize-Sorghum	Agr. Engin.	Assistant	
<u>LA LUJOSA EXPERIMENTAL ST.</u>				
24. Roberto Hernandez	Rice	Agr. Engin.	Assistant	
25. Rigoberto Nolasco	Sorghum	Agr. Engin.	National Head	
26. Gilberto Vasquez	Sesame	Agr. Engin.	National Head	
27. Nicolas H. Caballero		Agronomist	Station Head	
28. Vicente Ordonez	Oil Seeds	Agr. Engin.	Assistant	
29. Julio Cesar Rivera	Sorghum	Agr. Engin.	Assistant	
<u>DANLI EXPERIMENTAL STATION</u>				
30. Federico Trece Ramos	Beans	Agr. Engin.	National Head	
31. Otto Luis Tercero	Beans	Agr. Engin.	Assistant	
32. Hector Fernandez	Beans	Agr. Engin.	Assistant	
33. Jose Maria Ordonez	Maize-Sorghum	Agr. Engin.	Assistant	
<u>CHACAMAS EXPERIMENTAL ST.</u>				
34. Jose Oset Rodriguez	Vegetables	Agronomist	Assistant	
35. Rodolfo Hernandez	Maize	Agronomist	Assistant	
36. Roberto Aleman	Vegetables	Agronomist	Assistant	
37. Hector Trochez	Maize	Agr. Engin.	Assistant	

APPENDIX No. 6-A

The Costs of the Inputs per Experimental Station
and per Crop

AGRICULTURAL RESEARCH PROGRAM

COST OF INPUTS PER STATION

(in Lempiras)

Crop	Total	La Lujosa	Comayag.	La Esperanza	Guaymas	Catacamas	Danlí
Maize	41,440	6,512	5,920	1,776	17,760	5,328	4,144
Beans	40,356	-	6,156	1,368	-	6,840	25,992
Rice	33,900	9,492	5,424	-	13,560	5,424	-
Sorghum	12,204	4,068	2,034	678	-	1,356	4,068
Wheat	17,766	-	846	15,228	-	846	846
Potato	8,470	-	-	7,700	-	-	770
Sesame	11,628	11,628	-	-	-	-	-
Soybean	20,965	3,594	4,193	599	5,990	2,995	3,504
Peanut	5,391	599	-	-	4,792	-	-
Vegetables	16,215	-	8,460	705	-	7,050	-
Ricinus comunis	2,820	-	2,820	-	-	-	-
Plaintain	21,132	-	-	-	21,132	-	-
Production Systems	7,930	-	-	-	7,930	-	-
	240,217	35,893	35,853	28,054	71,164	29,839	39,413

APPENDIX No. 6-B

Agricultural Research Services

AGRICULTURAL RESEARCH SERVICES

(in Lempiras)

ITEMS	TOTAL	San Pedro Sula	Comayagua		La Lujosa	Danli	Catacamas
			La Esperanza	Comayagua			
Permanent wages and salaries	726,480.00						
Day wages	160,000.00	32,212.00	9,911.00	17,347.00	46,017.00	35,044.00	19,469.00
Different services Professional and Technical personnel	100,000.00						
Per diem and other expenses for travel in the country	20,000.00	5,625.00	1,875.00	3,125.00	3,750.00	3,125.00	2,500.00
Per diem and other expenses for travel abroad	10,000.00						
Maintenance and repairs buildings	5,000.00	2,000.00	1,000.00	500.00	1,000.00		500.00
Various non person- nel services	15,150.00	4,000.00	1,500.00	3,000.00	3,150.00	2,000.00	1,500.00
Fuel and lubricants	50,000.00	15,000.00	5,000.00	7,500.00	10,000.00	7,500.00	5,000.00
Various materials and supplies	36,700.00	7,388.00	2,276.00	3,978.00	10,555.00	8,038.00	4,465.00
Building irrigation works	115,000.00						

APPENDIX No. 7

Research Projects with Crops the Section of
Natural Resources is Carrying Out

1. Maize Project

- 1.1 Improve the varieties being cultivated at present, or introduce new varieties, that are widely accepted, having a high nutritional value and high yields.
- 1.2 Zone the use of the maize varieties being planted at present.
- 1.3 Produce fast maturing varieties (90-100 days) that are suitable for the ecological conditions found in the east, south and northern zones.
- 1.4 Fertilize the soil in a given area with the object of discovering the most suitable dosis.
- 1.5 Take the precautions necessary to combat Downy Mildew in the near future.
- 1.6 Begin improvement work to produce maize varieties that are suitable for the high land areas in the country.

2. Bean Project

- 2.1 Make improvements by selecting the bean varieties being used today, or if this is not possible, introduce new varieties that are widely accepted, highly resistant and high yielding.
- 2.2 Study and determine the correct dosis of fertilizer for the principle bean zone in the country.
- 2.3 Collect sufficient information so that the most suitable method of controlling the snail in the area where these mollusks are a pest, can be selected.
- 2.4 Discover which are the principle plant health problems in the most important zones, their effects, how important they are and the best control methods.

3. Rice Project

- 3.1 Obtain varieties that are resistant to or which tolerate piricularia, which give economically good yields and which are of acceptable quality.

- 3.2 Discover the most economical and effective method of controlling pests and weeds in this crop.
- 3.3 Determine the economically optimum fertilizer requirements for the rice crop in a specific zone.
- 3.4 Determine what are the water requirements and the best irrigation method for an area sown with rice under rainy season conditions.

4. Sorghum Project

- 4.1 Introduce varieties that are not sensitive to the photoperiod and which have the same quality characteristics as the creole types.
- 4.2 Determine which are the latest or maximum dates for planting sorghum in the areas where the crop is important.
- 4.3 Decide which method or methods are most suitable for utilizing the varieties being planted at present for two uses.
- 4.4 Introduce improved sorghum varieties into the zone along the El Salvador frontier.
- 4.5 Introduce varieties that are resistant to the bird attacks.
- 4.6 Begin work aimed at introducing sorghum "escobero".

5. Production Systems Project

- 5.1 Decide which is the most apt production system for the peasant settlement around the Guaymas experimental station.

6. Horticulture Project (tomato, potato, onion)

Begin work to select the best varieties of each crop being studied.

- 6.2 Identify the principle plant health problems, discover how important they are and the control methods in pre-determined horticultural areas in the country.
- 6.3 Decide which are the most suitable dates for planting certain vegetables, so that the risk of disease can be reduced to a minimum and the market requirements met.

- 6.4 Determine the best dosis of and method of applying fertilizers to the most important species in the eminent-ly horticultural zone.
- 6.5 Discover which is the best method of storing those vegetables that have to be stored.
- 7. Oil Seed Project (soybean, ground nut, sesame and ricinus comunis)
 - 7.1 Begin to select the varieties.
 - 7.2 Discover which are potentially the main areas for producing these species.
 - 7.3 Determine which is the latest sowing date in each area where the crops are important.
 - 7.4 Determine what the economically most apt fertilizer requirements for these crops are in a determined zone.

APPENDIX No. 8

Research Projects

National School of Forestry Sciences

1. Hybridization: The object is to pollinate Oocarpa and Caribe Pines. This hybridization will produce seeds for improving the species.
2. Increase resin production in the Oocarpa and Caribe Pines.
3. Vegetative propagation of both pines.
4. Establish a seed nursery in the school to produce certified seeds.
5. Test of Origin: Land parcels are being planted to certify with seeds coming from other regions and to determine which give the best results in a given ecological condition.
6. Accessibility of the pine forest.
7. Create a museum of wood samples to exchange with other countries.
8. Install parcels to study growth in different climates and soils.
9. Study the hydrographic basins. The aim is to discover the water supply so as to determine the cutting limits. This is an important project as erosion is one of the most severe problems in the country.
10. Study the biological cycles of 1200 species so that the pests can be controlled at the best possible moment.
11. Evaluation of the methods to prepare the terrain for the natural regeneration of the Oocarpa pine.
12. Germination and survival: The Oocarpa pine planted in different types and depths of subsoil.
13. Dissemination. Study how the Oocarpa pine seed falls so as to decide how many seed trees should be planted in each hectare.
14. Foliage anatomy.
15. Classification and handling of the wood fuels in Honduras.
16. Study the use of controlled burns to reduce the files under the Oocarpa pine.
17. Study the effects of the water content on the speed at which certain shrubs in the undergrowth burn.
18. Determine what the calorific power of some wood fuels is.
19. Spread and propagation of the soil under certain climatic and combustible conditions.
20. Evaluate the *Leucaena Latisilqua* as a suitable species for firebreaks.

APPENDIX No. 9

Research Activities Programed by the Regional

University Center of the Atlantic Coast

- CURLA -

1. Production Department

1.1 Plant Production Section: Will carry out applied research on the genetic material obtained from the plant department and the private and state research institutes. This section will use different programs to develop research in the following aspects:

- Determine the sowing dates.
- Determine the best spacing in sowing.
- Estimate the economically best levels of fertilizer and pesticides that should be applied.
- Estimate the levels of tolerance to insect and disease attacks.
- Use of green manure.
- Efficient planting systems.
- Use of intermediate technology.

1.2 Animal Production Section: Will carry out applied research on the material obtained from the Animal Husbandry Department. With its different programs, this section will develop research in:

- Grazing systems.
- Evaluating Pasture.
- Rationalize the consumption of foodstuffs.
- New sources of meat production.

2. Plant Department

2.1 Horticultural and Fruit, Agronomy and Special Crops Section:

Will work with research projects on improving the principal crops in the region genetically, vegetable crops, fruit trees, agronomic, industrial and medicinal crops. They will also work on the characteristics related to the plant's adaptability to the environment, introducing and harvesting native varieties, demonstrating plant species and studying genetic variability.

2.2 Plant Health Section: This section will work on identifying the most economically important diseases and insects of the principal crops in the region. It will also be in charge of drawing up a list of the principal pests and diseases the crops in the country suffer from. The list will be by zones and ecosystems, and will evaluate the different aspects of epidemiology, parasitology, ecology and economy. Furthermore, the social and economic damage caused by biocides (fungicides, insecticides, acaricides and herbicides) should be evaluated.

3. Soil Department

3.1 Geology Section: First of all this section should identify and collect rocks and minerals from the region and other parts of Honduras.

3.2 Soil Fertility: Management and Conservation Section: This section is responsible for planning and developing experiments on levels, sources and application dates of fertilizers, especially for those crops that are economically the most important for the country.

The research will also attempt to find organic manure made from raw materials found in the region.

3.3 Soil Classification and Mapping: Carry out ecology studies that include morphological, physical, chemical and biological characterization of the soils, raising, classifying and mapping soils. This type of research is basic for the development plans as it provides information about the agricultural potential of the land.

4. Animal Husbandry Department

The principal research activities this department should undertake are:

- Nutrition
- Health
- Improving and adapting the different breeds of the domestic livestock varieties to the various environments in the country.

5. Department of Forestry Management: This Department has plans to basically:

- Prepare a plan for ordering 3,250 hectares in the basin of the Pimienta and Uchapa rivers as forests.
- Prepare a project to take an inventory of 3,250 hectares in the same river basin.
- Do research on forestry transport in the country.

6. Department of Forestry Industries: The basic research activities in the Department will be:

- Undertake studies aimed at discovering the physical mechanical properties of the timber of the native species, in order to study the possible uses they can be given.

- Study the natural durability of the native species in the wood grave yard.
- Study the wood market patterns.

7. Forestry Department: Basically this Department plans to:

- Make a structural analysis of the wet tropical forest in the country.
- Establish permanent plots for studying tree spacing and yields.
- Make a technological study of the species in the wet and very wet tropical forests.
- Study what influence felling in a natural forest has on the quality and growth of the mass of trees.

BIBLIOGRAPHY

1. Secretaría Técnica del Consejo Superior de Planificación Económica. "Evaluación de las áreas prioritarias del problema nutricional de Honduras y sus posibles soluciones". Tegucigalpa, D.C. Honduras, Octubre 1976.
2. Secretaría Técnica del Consejo Superior de Planificación Económica. "Síntesis plan nacional de desarrollo 1974-1978". Tegucigalpa, Honduras, C.A., Agosto 1976.
3. Instituto Interamericano de Ciencias Agrícolas - OEA. "Análisis del desarrollo rural e institucional de Honduras - 1973-1974". Zona Norte Oficina de Honduras. Junio de 1975.
4. Secretaría de Recursos Naturales - Instituto Interamericano de Ciencias Agrícolas - OEA. "VII Conferencia Interamericana de Agricultura". Reunión del 5 al 10 de septiembre de 1977. Tegucigalpa, D.C., Honduras, C. A.
5. CIES IICA. "Documentos básicos de trabajo para discusión en la VII Conferencia Interamericana de Agricultura". Marzo de 1977.
6. Mario Contreras. Secretaría de Recursos Naturales. "Investigación en nutrición animal". Informe escrito enviado al CIID. Febrero, 1978.
7. Ministerio de Economía. Dirección General de Estadística y Censos. "Anuario Estadístico 1975". Tegucigalpa, D.C. Honduras, C.A. Enero de 1977.
8. Secretaría de Recursos Naturales. Dirección de Planificación Sectorial. Departamento de Economía y Estadística Agrícolas. "Compendio agropecuario". Honduras, C.A. Febrero 1977.
9. Banco Central de Honduras. "Honduras en cifras 1974-1976". Departamento de Economía. Tegucigalpa, D.C.
10. Secretaria de Recursos Naturales. "Programa de investigación agropecuaria, plan operativo para 1976". Dirección de Planificación Sectorial. Tegucigalpa, D.C. Honduras, C.A. 1976.

11. Secretaría de Recursos Naturales. Programa de Investigación Agropecuaria "Plan Operativo 1977". Tegucigalpa, D.C. Honduras, C. A. 1977.
12. Escuela Nacional de Ciencias Forestales. "Actividades de Investigación. Calendario de Ejecuciones". Organigrama.
13. Escuela Agrícola Panamericana. "Informe Anual 1976".
14. Universidad Nacional Autónoma de Honduras. Centro Universitario Regional del Litoral Atlántico. "Propuesta de una nueva estructura académico-administrativa para el CURLA". La Ceiba, Honduras, C. A. Noviembre de 1977.

INTERVIEWS CARRIED OUT

<u>Entities</u>	<u>Person interviewed</u>	<u>Job or Position</u>
1. Secretaria de Recursos Naturales	Eng. Antonio Silva	Head, Agricultural Research
	Eng. Mario Contreras	Agricultural Research Technician
2. Corporación Hondureña de Desarrollo Forestal	Eng. Miguel Ramírez	Ordering and Management Unit
3. Instituto Hondureño del Café	Eng. Roberto Banegas	Head, Coffee Extension Department
4. Consejo Superior de Planificación Económica	Dr. Carlos Selva M.	Regional Planning
5. Escuela Nacional de Ciencias Forestales	Eng. Jose Bucarey	Assistant Director
6. Centro Universitario Regional Litoral Atlántico	Eng. Miguel Alvarado Eng. Franklin Osorio Eng. Marco A. Nuñez	Director Professor Professor
7. Escuela Agrícola Panamericana	Lic. Jacobo Zelaya	
8. Banco Central de Honduras	Eng. Mario Nufio G.	Director, Livestock Birt-Honduras Project
9. Instituto Interamericano de Ciencias Agrícolas - OAS	Dr. Germán Uribe	Director, Honduras Office