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National Program for Swine Restocking, Sanitary Vigilance
and Development of the Swine Industry

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PROJECT REPORT

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HAITI

SWINE RESTOCKING, SANITARY VIGILANCE
AND DEVELOPMENT OF THE SWINE INDUSTRY

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I. INTRODUCTION

A. Background

- 1.01 The African swine fever was detected, in December 1978, in Haiti. The economic damage done by this disease and the country's financial weakness prompted the government to request, in September 1980, international cooperation for the eradication of ASF, and on July 21, 1981 an agreement was signed between the Government of the Republic of Haiti and the Inter-American Institute for Cooperation on Agriculture (IICA) for the execution of a project for this purpose. The project was financed by contributions from three donor countries which initially committed the following amounts:

U.S.A.	US\$14,500,000
Mexico	US\$ 2,500,000
Canada	US\$ 400,000

US\$17,400,000

The actual amounts contributed were lower, for only the U.S.A. made good its contribution for the full amount committed.

- 1.02 The ASF eradication campaign, launched in May 1982, ended officially with the extirpation of the country's domestic swine population in June 1983. Of the Haitian swine population of 1,200,000 animals at the onset of the invasion by the ASF virus in December 1978, 20,000 were slaughtered at the outset at the border with the Dominican Republic, 350,000 died of the disease, 446,000 were killed and eaten by pig raisers to forestall the disease and the eradication campaign, and 384,391 were destroyed and their owners indemnified with payments totaling US\$9,548,860. The screening program conducted to seek out hogs that might have eluded the extirpation process was successful in relation to the domesticated hog population. Some wild hogs were detected and destroyed.
- 1.03 The last phase of the ASF eradication project, sentinelization, is in execution, 2,000 hogs, mostly Yorkshire sows of S.P.F., Fl grade, having been purchased in the U.S.A. for distribution to about 500 farms to verify biologically the presence or absence of the ASF virus. The sentinelization phase is expected to end in December 1983, and it is proposed to announce that the country is free from ASF at the end of February 1984 unless some animal health problem arises unexpectedly (In agreement with the International Zoosanitary Code of the International Epizootics Office). (See note at the end of Annex 9)
- 1.04 In the framework of the IDB/IICA-ATN/SF-1957-RE agreement and at the request of the Government of Haiti, the Bank requested the Inter-American Institute for Cooperation on Agriculture (IICA) to perform a feasibility study of a program for the introduction of a new swine population in the country and for the sanitary surveillance and

development of the pork industry. On April 18, 1983 IICA delivered to the Bank a draft report which has been commented upon by both the Bank and the Government of Haiti.

B. The Application and its Priority

- 1.05 The Government of Haiti has given high priority to this program, and in consequence, on September 12, 1983 the Ministry of Planning submitted on behalf of the Government an application for a loan for the partial financing of a National Swine Restocking Program.

C. Missions

- 1.06 In February 1979 the Bank was a party to a joint IDB-FAO-USDA mission to Haiti, which established the need of (i) doing a study to determine the distribution of the disease, (ii) draw up a crash program for the control of ASF in the light of the country's characteristics and present resources, and (iii) designing a long-term plan for the establishment of a live-stock production and protection infrastructure.
- 1.07 In December 1980 the Bank again sent a fact-finding mission to the country to assess the possibility of participating in the implementation of a structure for swine production and protection. An outcome of the mission was that the Bank's guides on (i) Applications for Technical Cooperation, (ii) Animal Health, and (iii) Livestock Development were supplied to the authorities of the MARNDR. The mission also worked with a local group on the documentation that could support an application for the Bank's technical cooperation.
- 1.08 In view of the urgency expressed by the Haitian Government in its request that the program be launched on the date on which the eradication of ASF was completed (in February 1984), between September 29 and October 19, 1983 a special pre-analysis mission of the Bank was in Haiti to obtain the information need to complete the project. This mission was able to obtain most of the basic information, and returned prepared to draw up the project report and the related loan proposal.

D. Conclusions

- 1.09 The proposed program is fully in line with the Bank's financial policy, and the detailed analysis of the operation presented in the chapters hereafter demonstrates its justification and feasibility.
- 1.10 In view of the foregoing, the Project Committee recommends the approval of this operation subject to the terms and conditions set forth in this report.

II. FRAME OF REFERENCE

A. Recent Economic Situation

- 2.01 For the second consecutive year, the Haitian economy was in virtual state of stagnation in 1982 after growing at a rate of 5.4% in 1980. Among the economic factors influencing the difficult situation faced by Haiti is, on the external side, the decline in the price and volume of coffee, its major export product, which failed to recover in 1982. The consequent weakening of domestic demand had an effect on industrial activity and services.
- 2.02 After the generalized decline in agricultural production in 1981 partially attributed to hurricane Allen and its impact on exportable supplies, the sector was hurt by droughts in June and July 1982 and remained depressed for the rest of the year. Despite higher coffee, cacao and meat production, the volume of coffee, cacao and other major commodities is still below output in the period 1979-80. Growth in the sector has been inadequate and erratic, and the production of many commodities has not reached the same level as in earlier years. This has led to a steady growth in food imports and greater use of marginal land in high elevation areas, to the detriment of productivity.
- 2.03 The stagnant conditions prevailing in the country and the sluggish growth in consumption have had adverse effects on industry geared to the domestic market, trade and services. This, plus smaller external demand for products processed using local raw materials, caused a decline in the industrial sector in 1981. This situation showed improvement in 1982, principally in the export goods subsector, but the decline continued for other commodities.
- 2.04 In other sectors, events have followed the same general pattern, with a few exceptions. In the mining sector, production of bauxite, which has been in a slump for several years, again failed to recover in 1982. In 1983, the company working the deposits shut down because of high operating cost, and depletion of the deposits. In the building sector, the demand for permits and authorizations for new buildings decline in 1981. At the same time, there was a drop in supplies of cement. This situation continued in 1982. The electricity sector, which continued to experience steady growth, was one sector which performed favorably. Tourism, another of the country's major activities gave signs of some recovery in 1982 after a period of weakening that began in 1980.
- 2.05 From the fiscal standpoint, the low elasticity in the taxation system caused by the preponderance of specific taxes over ad-valorem taxes was reflected in a gradual reduction in current savings in the public sector because of the increased spending in recent years. The situation became worse in 1981 when the significant decline in coffee prices caused an absolute decline in public revenues. Despite the stagnation in

government capital investments in the past four years below the levels of 1978, the deterioration in revenues meant that the overall deficit increased during the period.

- 2.06 These trends encouraged the government to take steps to realign the tax system on a more orderly basis. These included the taxation of business profits and personal income, the impact of which began to be felt in 1981. During 1982, the tax on profits was temporarily raised to 60% and at year end a 7% sales tax law was enacted to replace the generalized system of specific taxes. It is hoped that with the increase in collections the overall deficit can be cut from 8.5% of the GDP, recorded in 1981 to approximately 5% in 1982. The new customs duties, at the same time that they mean higher revenues, collections, when considered in conjunction with the other restrictive measures on foreign trade already mentioned, represent a higher average level of protection. In principle, the non tariff restraints, imposed for the first time are expected to be lifted as soon as the balance of payments problems are solved.
- 2.07 Faced with the financial maladjustment of the public sector, the government redirected monetary and credit policy towards increased funding of the higher deficit through domestic credits. This situation led to a reduction in the expansion of lending to the private sector, with a restrictive impact on industry, trade and economic activity in general. Furthermore, in terms of inflation and in order to avoid pressure on the fixed exchange system, the government imposed restraints on credit to the private sector, mainly by gradually increasing the legal reserve requirements on deposits. The reserve requirement in demand deposits and savings went up from 34 to 36% starting in October 1980. The rate on fixed-term deposits, which had been cut earlier, was left unchanged. In order to mobilize domestic funds, the rate of interest on time deposits was raised in 1980, triggering a sharp increase in such deposits during that year, although rate of the growth in quasi money later declined. The free circulation of the dollar in Haiti, although it facilitates capital flight, is currently limited by the shortage of foreign exchange, causing dollar quotations to fluctuate above the official rate of exchange.
- 2.08 Because food is a major item in the cost of living index, this index varies according to food production, which in turn is mainly a reflection of weather conditions. After soaring at a rate of 18.6% in 1981, inflation was believed to be about the same in 1982 despite a decline in prices in the early months of the year. Throughout the year factors persisted that kept the index moving upward, such as the low level of production estimated for some products, controls on food imports and higher prices for clothing in contrast to what had been happening. Although wage levels in some industrial sectors are good, the minimum wage, earned by the majority of the work force, has declined in real terms. Despite some recovery beginning in 1977, it has been impossible to match the level reached in 1972, and the minimum wage of 13.2 gourdes per day, set in October 1981, remains unchanged.

2.09 With regard to the external sector, manufacturing, has continued to grow at a steady pace principally the assembly industry, but processing for exports using domestic raw materials declined in 1981. Agricultural sales abroad have fluctuated in their share in total exports has dropped. The volume of some products fell off, other were affected by prices abroad, and still others by both factors (the case of coffee in 1981). Industrial momentum was inadequate to offset the fluctuations in agriculture; the value of total exports dropped in 1981 and in 1982 was still not expected to equal 1980 levels. In view of this, import duties were raised and measures were enacted prohibiting the importation of some 20 products and setting quotas on an additional 58 consumer items, mostly food products. Because of the low rate of growth in imports brought about by these measures, the trade deficit --which had doubled in 1981 to US\$207 million-- is expected to move only slightly upward in 1982 to US\$215 million. Capital entry was inadequate to offset the negative balance in the current account of the balance of payments for the past two years and gross international reserves were down to some US\$15 million in late 1982.

2.10 There has been no essential deterioration in the external debt in terms of service, estimated at approximately 8% of goods and services exports in 1981, because of the concessional nature of lending and the sum total of grants received which in recent years surpassed lending and enabled Haiti to keep from significantly increasing in the external debt. In these circumstances, in August 1982 the International Monetary Fund (MF) approved a stand-by agreement in an amount of SDR\$34.5 million to support a government adjustment program based mainly on a reduction of the fiscal deficit. As of late 1982, progress in achieving this goal seemed to be adequate.

B. Priorities and Outlook

2.11 The 1982-1986 development plan grants priorities to agriculture (20%), energy (18.1%), transportation (15.7%), health (8%), and education (7.7%) in terms of each sector's share in the total scheduled investment. The development strategy is based on a decentralizing of investments in order to provide a basis infrastructure for development of industrial and agricultural production. However, the existing incentives have not been very successful in attracting investment away from the metropolitan area of Port-au-Prince. Regionalization efforts are harmed by the inadequate physical and service infrastructure. Ninety per cent of the little capacity there is for electricity production is concentrated in the vicinity of the capital city. The same is true of the telecommunication systems and public utilities. Faced with financial difficulties, the government set out to cut the levels of spending public and in 1982, probably only some 60% of originally planned spending was made. The screening of the investment profile took projects financed from abroad into consideration depending on counterpart availabilities, with a tendency to delete or reduce a higher percentage of those not yet underway and those financed by domestic funds.

- 2.12 Because the goal of the adjustment plan is to reduce the overall deficit, public investment in 1983 is expected to grow only slightly, to about 8% of GDP. This continues a downward trend from a level equivalent to 12% in 1978. The exportable volume of coffee in 1983 is expected to be 40% higher than in 1981, but still short of the 1980 level. This means that the momentum in the economy will depend on the demand for other Haitian exports, including manufactures. The importability of goods and service exports has been falling behind Haiti's own import needs and this has caused a decline in buying abroad because of balance of payment problems. Therefore, external assistance will have to play a decisive role in overcoming the problem plaguing the country and have a more direct bearing on removing longstanding obstacles to development.

C. The Agricultural Sector

1. Basic characteristics

- 2.13 The basic features of the Haitian agricultural sector are its leading position in the national economy, its low productivity, and the high density of the rural population (530 persons per Km² of agricultural land). Agriculture in Haiti is based on soils that are subject to intense erosion, entirely at the mercy of the weather, and tied to a limited number of products, especially coffee, whose production and prices are erratic.
- 2.14 Agriculture provides 65% of the total employment and generates about 50% of the exports of goods. Crop-growing, largely upland crops, accounts for 84% of the sectoral product, and animal production, including fishing, for only 8.4%. Corn is grown on 26.8% of the land, grain sorghum on 22.1%, coffee on 15.7%, and sugarcane on 11.6%. Though the area under cultivation reportedly increased an average of 2.8% a year between 1961/65 and 1970, 1.4% up to 1975, and 1.9% between 1977 and 1981, the sector grew at a very slow and fluctuating pace.
- 2.15 Since because of production difficulties the agricultural sector is unable to meet needs that have been increased by population growth, the country is obliged to import not only all its wheat, ^{1/} but, in recent years, rice, corn, beans and sugar as well. Imports of foodstuffs, including beverages and tobacco, rose from US\$7.2 million in 1970, or 13.7% of total merchandise imports, to US\$67 million in 1981, or 17.0% of merchandise imports, which means that food imports climbed an average of 22% a year. The country's capacity to import all its basic food requirements is limited by the availability of foreign exchange. In 1981 the Government forbade the importation of some items (pasta, breads, etc.) and set quotas for others (wheat flour, corn meal, and soybean oil).

^{1/} It is estimated that the demand for wheat and wheat flour grows 10% a year. In 1981 imported wheat accounted for about 25% of the merchandise trade deficit and for 12% of the FOB imports of goods.

- 2.16 The problems that beset agriculture impose serious constraints on development owing to the scarcity of alternative sources of employment and declining production.
- 2.17 The number of export crops has diminished in recent years, the most dramatic case being that of sugar, which since 1977 has been a net importer of this commodity. Coffee production has also declined; in the years 1960/64 the country produced 42,000 tons a year, but since then has reached that level only in 1980, producing about 35,000 tons a year in 1979, 1981 and 1982.
- 2.18 The sector is also short of trained manpower. It is estimated that 4,450 technicians (700 of them agronomists) are needed, but only 2,856 (300 of them agronomists and 4 veterinarians) are on hand.

2: Land use

- 2.19 One of the greatest problems facing crop-growing is the extraordinary pressure exerted by a growing population on an insufficient supply of arable land. The area of the country is 2.7 million hectares, and the population is 70% rural. However, the country only has some 860,000 has. suitable for crops, of which 500,000 has. are increasingly marginal land being brought into cultivation on sloped at times greater than 40%. Meanwhile, urban growth is exerting pressure on croplands.
- 2.20 The country has a total population of 5.2 million inhabitants, 1/ which is growing at an annual rate of about 2% is in general migration from rural to urban areas everywhere. Thus, while the rural population is growing 1% a year, that of urban areas is increasing 5.2% a year, and in and around the capital as fast as 6.2% a year. The motives for this migration are a lack of idle cultivable land, lack of employment opportunities in the country side, and the existence of better services in the towns.
- 2.21 The 1971 census counted 620,000 farms with an aggregate area of 865,000 has., for an average of 1.4 has. per farm. Each farm can consist of one or more than one plot, so that the average plot size is 0.77 ha. and the average number of plots per owner is 1.8 has.. In consequence of this fragmentation of landholdings and the use of archaic techniques, crop yields and production are steadily declining. Most of the peasants by far are landowners, but their farms are so small that they are obliged to seek additional employment for most of the year.
- 2.22 Recent studies 2/ show that only 28.6% of the land is suitable for crops, and year about 43% of it is now under cultivation. Of the 125,000 has. of irrigable land, only 88,000 has. are in fact irrigated,

1/ In the year 2006 the population is expected to reach 8.1 million.

2/ By the Inter-American Institute for Cooperation on Agriculture (IICA).

and under less than satisfactory conditions, and less than 15% of the cultivable land (127,000 has.) in the country has been the object of soil studies of any depth at all.

D. African Swine Fever

1. The problem

- 2.23 In December 1978 Haiti lost its status as a country free of African Swine fever (ASF), with which, in addition to the blow dealt to its livestock economy, left the entire population, and that of the countryside in particular, bereft of the principal source of animal protein, which had traditionally helped fend off malnutrition and reduce the cost of food to the peasant family, which has been estimated at 80%. The virus that causes the disease is the greatest enemy of the pork industry, especially when it descends for the first time upon stocks of highly susceptible animals (see Annex 1).
- 2.24 The first outbreaks of the disease appeared in Haiti in the Artibonite valley in the center of the country, the source of the contagion, or rather the epidemiological source of the first foci being believed to have been the tainted waters of the Artibonite river, which rises in the Dominican Republic, where the disease was then epidemic in the northern, southern and southwestern provinces.
- 2.25 From its beginnings to the present, when the teams of local and international technicians are completing the sentinelization program to verify the absence or presence of the virus, the epidemic has been a source of enormous economic, political-social and financial difficulties.
- 2.26 The penetration and entrenchment of the virus in the Haitian hog population and the high mortality of the first months of 1979 is yet further evidence that the native Haitian pig sprang from and was genetically influenced by the first European swine brought by the Spanish, French and Portuguese into the Caribbean area.
- 2.27 The epidemiological picture of the disease's development in Haiti was classical in its first emergence, which took place in an explosive epidemic that took a heavy toll. The intensity of the disease then moderated into a more benign field clinical picture with a less virulent virus that produced typical foci with cases of subclinical course and breaking out into small, local epidemics. The pigs that survived these stages remained in certain regions as healthy carriers and, as such, potential sources of infection.
- 2.28 The economic damage to the country was severe among the rural population, for which the pig was a permanent economic factor as a reserve source of cash in household emergencies. Moreover, the ASF problem acquired greater economic dimensions at the national level because, although pork production in Haiti has not been regarded as a commercially specialized technical activity, this meat has always been the preferred source of animal protein to balance the rural diet.

- 2.29 The problem acquired an added dimension for the country in 1979, when pork began to grow scarce at regional markets and its current prices rose 45% between 1979 and 1980. Moreover, the prices of other meats (goat and beef) also rose considerably, which put them out of reach of the broad masses and left them unable to balance their diet.

2. The disease

- 2.30 African swine fever is a contagious viral disease of swine, with a short course and causing high mortality especially among domestic swine descended from European breeds. The clinical and pathological picture resembles that of hog cholera, but the disease is immunologically distinct (see Annex 1).
- 2.31 The disease is native to southeastern Africa, where it was first recognized by Montgomery in 1921. In Europe the first cases were diagnosed in 1957 in pig farms in the vicinity of Lisbon, Portugal, where the stock were fed the slops from airline catering and hotel/kitchens containing remains of pork from the then Portuguese colonies of Angola and Mozambique.
- 2.32 Spain, feeling itself threatened as Portugal's neighbor, adopted severe preventive measures against ASF at its ports and borders, and so was able to remain unscathed for three years. However, economic interests generated a smuggling trade along the long border between the two countries and the virus was finally able to get in 1964. From Spain it infiltrated France over the Pyrenees in 1964, and in 1967 the presence of the virus and disease in Rome, Italy, was verified.
- 2.33 In 1971 the virus surfaced unexpectedly in the environs of Havana, Cuba, as the first recorded outbreak of the disease in the Western Hemisphere. France, Italy and Cuba eradicated the disease by dint of severe stamping-out measures.
- 2.34 In 1978 the disease made its appearance on the island of Malta, and thereafter was diagnosed successively in Brazil, the Dominican Republic and Haiti, thus invading the Western Hemisphere a second time during the seventies.
- 2.35 The epidemiological etiology of the disease and the rapid spread of the virus in the countries mentioned were always associated with the practice of feeding and fattening hogs on slops from hotel and airline catering kitchens containing meat from animals slaughtered in infected countries.
- 2.36 The inexperience of the health authorities in the affected American countries with the epidemiology of the disease 1/ and with a virus resistant to putrefaction, heat and long stays in host animals, has also

1/ The disease was then classed as exotic to all American countries, and there was no experience in its control.

produced serious derangements in the technical and administrative organization of the veterinary services, and political, economic and social repercussions.

- 2.37 Governments, especially those of the Dominican Republic and Haiti, have taken a firm stand of combating the disease to its eradication, for which purpose they have requested international collaboration to reinforce their animal health infrastructures with additional manpower, and equipment for diagnosis, disinfection, surveillance, quarantine, and elimination. Moreover, the situation has required a hurried institutional, financial and legal restructuring of the governmental veterinary services accompanied by intensive training on the progress of the epidemic. The cost of these operations has been high, and they have been given priority in the economic-financial structure of both countries. Financing has had to be provided primarily in three broad areas of action: (a) the operating costs of the services, (b) funds for compensation to pig farmers, and (c) the introduction of new swine populations.

D. Economic Losses

- 2.38 The national pig herd, estimated at 1.2 million head prior to the outbreak of African swine fever (ASF) had the following structure: adults 400,000 head (33% of the total), juveniles between weaning and market size 500,000 head (42%), and suckling pigs 300,000 (14%). Using indicators estimated by AID and other agencies on the basis of market prices, the country is reported to have suffered a loss of US\$92 million from the total destruction of the national herd to extirpate the disease.
- 2.39 From the numbers of animals cited in the foregoing paragraph it may be concluded that each farmer who was raising pigs lost a source of savings estimated at US\$110.00. ^{1/} Further details on these economic losses may be found in the chapter containing the socioeconomic study.

F. Measures Taken by the Haitian Government

- 2.40 In 1979 the Ministry of Agriculture, Natural Resources and Rural Development (MARNDR) initiated a search at the international level for technical and financial assistance in checking and eradicating the disease, which had already been identified physically and had spread out of control throughout the country.
- 2.41 In that year the Bank received from the Government a request for a technical cooperation in the preparation of a study, in which the IDB funds would be used exclusively to compensate the owners for the mandatory slaughtering of their pigs. The Bank replied that the

^{1/} US\$92 million in losses divided among 850,000 rural pig raisers averages out at US\$110.00.

participation could be for the purpose of reinforcing the animal production and protection infrastructure and to introduce a new pig population, but not for that of compensation alone.

- 2.42 In 1980 the MARNDR authorities constituted a Committee for the Eradication of African Swine Fever which, in collaboration with AID and the USDA, worked up a preliminary project for eradication of the disease. On July 21, 1981 the Haitian Government, acting through its Ministry of Agriculture, signed a technical assistance agreement for the eradication of African swine fever (see Annex 8).
- 2.43 In November 1981 the Government of Haiti, through the Ministry of Agriculture, presented to the IDB a request for technical cooperation in preparing a feasibility study for the conduct of a Program for Swine Restocking and Sanitary Surveillance at the National Level, and later, in July 1982, asked the Bank to put on the list of projects to be worked up under the IDB/IICA-ATN/SF-1957-RE Agreement the feasibility study of the Swine Restocking Project, for whose preparation the documentation and the cost estimated in the technical cooperation request of November 1981 would be used.
- 2.44 On the basis of the Haitian Government's request, the provisions of the IDB/IICA-ATN/SF-1957-RE Agreement, and bilateral agreements concluded in the last week of June 1982 between IDB officers and the IICA/UPP Unit, it was agreed that, as indicated in the agreement, the reconnaissance mission could begin its work at Port-au-Prince on August 23, 1982.
- 2.45 In September 1983 the Government of Haiti, through its Minister of Planning, presented to the Bank an application for a loan for implementation of the National Swine Restocking Program, the technical justification for which rested on the feasibility study prepared by the IICA/UPP financed by the IDB under the ATN/SF-1957-RE Agreement.

G. Salient Measures Taken by Regional and International Institutions

1. Measures taken by PAHO and FAO

- 2.46 The official confirmation of the presence of the disease in Brazil urged PAHO and FAO to promote an emergency meeting in Lima, Peru, on July 13 and 14, 1978, which was attended by 19 countries and international institutions and a mission from the British Government. To summarize, 90 professionals, most of them veterinarians, participated. Five recommendations were put forward and one resolution which, in addition to requesting consideration of (a) the creation of an international fund for the prevention and eradication of African swine fever, (b) instructed the then GIDA/AL (International Group for Agricultural Development in Latin America) to contact the international organizations to get them to collaborate in the project.

2:47 FAO, 1/ through its headquarters and regional offices, has been continuously active against the disease since its first appearance in the Western Hemisphere (in Brazil, the Dominican Republic and Haiti) through technical cooperation programs, consultants for diagnosis, epidemiological studies, training in measures for the prevention, control and eradication of the disease and against epizootics, public information and education, the identification of country needs, and the planning of future measures especially for emergencies. FAO also convened two technical consultations, one in Mexico City (Dec. 1978) on the Risks of Contamination of Crops by ASF, and the other in Panama City (Oct. 1979) on African Swine Fever. At present it is, among other things, publishing a monthly Information Bulletin on African swine fever in the countries of Latin America and the Caribbean.

2. Measures taken by the USDA

2:48 Through its APHIS agency and the Plum Island Animal Disease Center, the USDA has been constantly concerned about and watchful of the progress of the disease in affected countries, and has collaborated closely with those countries and with institutions concerned with the problem through consultants, training, field assistance, and laboratory diagnostic confirmation services.

3. Measures taken by AID

2:49 In 1978 AID participated, among other activities, with the Dominican Republic in the planning of and financial assistance to the conduct of the campaign against African swine fever (eradication phase) with loan No. 517-T-031 in the equivalent of US\$6,000,000 and a training grant of US\$200,000. In September 1983 it entered with the Government of Haiti into a cooperation agreement providing US\$3,000,000 for the conduct of an "Interim" program to supply pigs in the short run to Haitian rural people affected by the eradication of ASF.

4. Measures taken by OIRSA

2:50 OIRSA has contributed personnel from its Animal Health Department to training courses for laboratory and field veterinarians conducted by FAO in the Dominican Republic with the participation of the country's Secretariat for Agriculture and the technical-financial assistance of the Inter-American Development Bank.

5. Measures taken by the Inter-American Development Bank

2:51 In response to the appearance of African swine fever in the Dominican Republic, in July 1978 that country requested emergency technical and financial collaboration in coping with the disease. In August 1978 the

1/ The XV FAO Regional Conference designated FAO as coordinator of measures for the prevention and control of the disease in the Region.

Bank stationed a veterinarian in the country to acquaint himself with the situation and determine the part that the Bank could play in it immediately and in the future. As a result, in November 1978 it approved the release of the residual funds of loan 350/SF-DR (US\$270,000) for the emergency purchase of vehicles and technical inputs.

- 2.52 In June 1978 the Office of the President of the Bank directed the creation of an interdepartmental group of people from DPL, OPS, DES and PRA to draw up a position paper for the Bank on the then emergency situation in Brazil and the Dominican Republic, 1/ and the threat to other countries from the disease. In July 1978 the group presented a document reviewing the action taken by the Bank in other emergencies and describing the immediate direct assistance it could provide through short-procedure technical cooperations and by rearranging current loans in the different sectors, and the possibility of making new loans for livestock repopulation under current loans and new loans that could be made to financial intermediaries concerned with livestock development. The document also pointed out that setting up an international emergency fund was not the most responsive course because such a fund, by virtue of its very multinationality, would require a complicated structure that would be slow to act.
- 2.53 In February 1979 the Bank participated in a joint IDB-FAO-USDA mission to Haiti, whose members established the need (i) to make a study to determine the distribution of the disease, (ii) to draw up a crash ASF control plan geared to the current situation and resources of the country, and (iii) to devise a long-term plan for the setting up of a livestock production and protection infrastructure. The mission considered that preparing and implementing these studies would require the joint participation of international aid and financing agencies.
- 2.54 During the first half of 1979 the Bank under ATN/SF-1702-RE, allocated technical cooperation funds in the equivalent of US\$49,000, which were used by FAO for the conduct, with the collaboration of the Secretariat for Agriculture of the Dominican Republic, the USDA, OIRSA, and the Bank itself, of three training courses in laboratory techniques for the diagnosis of African swine fever and field control measures. Those courses were attended by 76 veterinarians from Latin America, including the English-speaking Caribbean countries.
- 2.55 In December 1980 the Bank sent an orientation mission to the country to assess the possibility of the Bank's participating in the implementation of a swine production and protection structure. As a result of the mission, the MARNDR authorities were supplied with IDB Guides on (i) Applications for Technical Cooperation, (ii) Animal Health, and (iii) Livestock Development. The Bank also worked with a local group to prepare documentation on which an application to the Bank for technical cooperation could be based.

1/ Haiti was not infected until December 1978.

6. Measures taken by the Inter-American Institute for Cooperation on Agriculture (IICA)

- 2.56 Creation of the Institute's Animal Health and Plant Health Programs on the basis of proposals and resolutions formulated in the annual meetings of the Board of Directors held in Bolivia and Mexico in May 1979 and September 1980, respectively, enabled the IICA to, among other things, advance consultations with the Government of Haiti on the structuring and financing of a program for the Eradication of African Swine Fever in the country. Through the Director of the Animal Health Program IICA promoted meetings and consultations to consider the risk to the countries of North America -Canada, the Dominican Republic, Mexico, Puerto Rico, and the United States of America- of acquiring the disease because of their geographical proximity to Haiti. That Director also conversed with regional and international institutions such as CIDA, the UNDP, AID, FAO, the IDB, the IBRD, and OIRSA, which are involved in the improvement of the animal industry in the Americas.
- 2.57 During October and November 1980 IICA, pursuant to decisions taken at the meeting of its Board of Directors in September 1980, joined contributions from the Governments of Canada, Mexico and the United States of America to the financing of the Campaign for the Eradication of African Swine Fever from Haiti. In April 1981 IICA signed an agreement with the United States of America through the USDA under which the Government undertook to finance part of the Campaign for the Eradication of African Swine Fever from Haiti.
- 2.58 The USDA committed US\$14.5 million and Mexico US\$2.3 million. The Republic of Canada undertook to provide consultants, for whom it provided salaries, travel tickets, and subsistence in Haiti. In July 1981 the Government of Haiti and IICA signed a Cooperative Agreement for eradication of the disease. The financial resources put up by the donor countries were entrusted directly to IICA to act as the technical and financial executor of the Project. With these funds IICA hired international technical and administrative staff, covered the salaries and other expenses of the Haitian personnel hired by the Government, paid the compensation to the owners of destroyed pigs, and acquired equipment and vehicles for implementation of the eradication phase. This phase was launched by IICA in May 1982 in the northwestern peninsula of the country, and brought to a conclusion in the environs of Port-au-Prince in June 1983.

H: Situation on the Border between Haiti and the Dominican Republic in Relation to the Appearance of African Swine Fever

1. Geographic situation and background

- 2.59 Hispaniola island is divided by a border about 310 km long to the east of which lies the Dominican Republic with 74% of the island's area, and to the west the Republic of Haiti with 26% of that area. Both countries were infected with the virus of African swine fever in 1978, the Dominican Republic at the middle and Haiti at the end of the year. Both countries took steps to eradicate the disease with international technical and financial assistance. The Dominican Republic completed its eradication in the third quarter of 1980 inasmuch as it was invaded first, and the measures and arrangements for control and eradication pursued to good effect, whereas Haiti, with its financial limitations, finished its eradication campaign in June 1983. Both countries lost their entire swine population.
- 2.60 The two countries, aware of the political-economic and social implications of the disease, have tightened and integrated their technical relations, thereby achieving (i) an exchange of technicians and techniques in connection with field control and laboratory diagnosis procedures; (ii) communication in health matters through the technicians stationed at the border and assigned to epidemiological surveillance, and (iii) reciprocity in the quarantine inspection service at air and sea ports at which commercial aircraft and vessels call.
- 2.61 A buffer zone about 15 km wide has been established on either side of the border where no encouragement will be given to pig raising so as to avoid the primary biological factor favorable to establishment of the virus, and the border inspection services have been reinforced to control the traffic in an movement of animal products and by-products that lack official authorization and approval.
- 2.62 Between the two Programs, at the level to which they have now advanced, there is full consensus on the technical side on the need for comprehensive planning of the technology of quarantine surveillance, the strategy of operational reciprocity and the institutional structures of the Ministries of Agriculture, Interior and Defense at the level of the peripheral offices in keeping with the needs and advantages of each country's economic and social development plans along its land border. Meanwhile, the necessity is recognized of consolidating the repopulation programs and those for animal health protection, making the most of the fact that the two countries are free of the disease and in process of reestablishing their swine populations with new breeds, which has led to the training of special personnel, the pursuit of applied research in both animal production and animal health, with an improvement in the level of technical-economic culture.
- 2.63 There is evidence that the two Governments are providing each other through their respective Secretariats for Agriculture with orientation and standards that assure the homogeneity of the structure and operation

the two veterinary services and repopulation programs in accordance with effective regulations and understandings, and endowing them with functions and facilities that enable them to solve problems as they arise. In the particular case of the Haitian-Dominican border it may be said that great progress has been made in the last three years, during which time planning techniques have been adopted for the control and eradication of ASF, which affected the swine populations and the livestock economies of both countries.

2.64 The point of this is that, while no bilateral cooperative agreement has been established for their mutual benefit in the health field, the two Governments, pressed by the need to fight the disease in the same way, have set targets and goals on both sides of their border to be attained in specified time frames, and activities have been charted for that attainment and funds allocated for them, as in the following examples:

- (i) The organization and operation of two laboratories (one in each country) specifically for the diagnosis of ASF, and ongoing exchanges of techniques and technicians between them.
- (ii) The joint training of laboratory and field personnel.
- (iii) Uniformity in the system of control and surveillance at ports and borders in order to regulate the inspection of tourist luggage and the freight of travelers and merchants who transport animals and their products and by-products.
- (iv) The current review and revision of the legal structure and regulations on animal health.

2.65 It is concluded from this that the sanitary situation at the border between the two countries has improved and tends to improve further in that, instead of acting without any coordination as they used to 5 years ago, the two authorities are now functioning with a sense of reciprocity and an awareness of the larger situation.

III. IDB OPERATIONS IN HAITI

A. The Bank's Operations in Haiti

- 3.01 The IDB has granted the Republic of Haiti 25 loans totaling the equivalent of US\$207,923,000. Of this total, loans 121/SF-HA, 557/SF-HA, 631/SF-HA and 669/SF-HA aggregating US\$23,100,000 have some connection with the proposed operation. The MARNDR has been the executing agency for loans 557/SF-HA and 631/SF-HA. With loans 121/SF-HA the old Faculty of Agronomy has been changed into the present Faculty of Agronomy and Veterinary Medicine which, while not training veterinarians, is training veterinary nurses at the rate of 20 per year, who will give support to the National Swine Restocking Program. Meanwhile, the funds of loan 699/SF-HA, recently granted to the IDA1, can be used to extend credit to farmers for the acquisition of pigs produced by the National Swine Repopulation Program.

B. Operations Executed by the MARNDR

- 3.02 The Bank has granted two loans, totaling the equivalent of US\$6.8 million which are being executed by the MARNDR, and one nonreimbursable technical cooperation for the equivalent of US\$615,000 in parallel with one of those loans.

C. Status of the Operations

1. Loan 557/SF-HA

- 3.03 This loan, in the equivalent of US\$3.5 million, was approved in October 1978 and is cofinanced by FIDA in an equal amount: The Ministry of Agriculture, Natural Resources and Rural Development (MARNDR) is in charge of the execution of the program.
- 3.04 The purpose of this operation is to finance the first stage of a program for the development of the Cul-de-Sac valley, and it consists in (i) upgrading of the gravity irrigation system on about 4,000 has, complemented by the provision of extension services and farm credit; (ii) protection of the Blanche river by soil conservation work on some 2,500 has.; and (iii) provision of the physical and social infrastructure needed in the area. The total cost of the project is estimated at the equivalent of US\$8.0 million,
- 3.05 The loan included a technical cooperation in the equivalent of US\$230,000 for preparation of the final designs of the irrigation system (ATP/SF-1676-HA).
- 3.06 On October 31, 1983 the amount disbursed totaled the equivalent of US\$1,500,777, or 43% of the loan amount; well drilling and construction of the irrigation system were in progress, as were the works for rehabilitation and construction of roads in the project area and the erection of structures.

- 3.07 The execution of this project has been hindered primarily by the Executing Agency's difficulty in correctly interpreting and applying the Bank's policies on the acquisition of goods and services, which has caused the vacating of certain biddings and annulment of performances precedent to the awarding of works and acquisitions, with the consequent delays in execution.
- 3.08 To the foregoing was added delays in the preparation of plans, final designs and technical specifications required in order to proceed to the invitations to bid. The project has now entered upon a brisker phase of execution, and it is expected that the aforementioned delays will not recur, and that the disbursement period will have to be extended by about a year and a half to enable the project to be executed in full.

2. Technical Cooperation ATN/SF-1673-HA

- 3.09 This operation was processed in parallel with the foregoing loan and approved by the Board of Executive Directors on October 25, 1978; the loan contract was signed on November 22, of that year. The total cost of this operation was estimated at the equivalent of US\$821,000, of which the Bank was to finance up to US\$615,000.
- 3.10 The purpose of this technical cooperation is to support the execution of loan 557/SF-HA, previously described, by providing technical services to the farmers who are to benefit from the works of the irrigation and soil conservation subprograms, and by providing technical and operational advisory services to the Executing Unit of the Program. Up to October 31, 1983 the equivalent of US\$267,000, or 43% of the Bank's contribution, had been disbursed.
- 3.11 Only the consultants in agricultural extension have been hired, and the experts who would provide technical and operational advisory services (in pasture management and the organization of irrigation districts) to the Executing Unit have not yet been provided. The beneficiary is requesting a reformulation of this operation to adapt it to the current needs of the Program.
- 3.12 Now that the project has entered a more dynamic phase of execution, it is hoped that execution of the technical cooperation will get in pace with that of the project so that it may be completed and its purposes accomplished without further problems.

3. Loan 631/SF-HA

- 3.13 This loan in the equivalent of US\$3.3 million was approved in November 1980, and is cofinanced by a grant of ECU 5.0 million from the European Economic Community (EEC). The executing agency for the program is the Ministry of Agriculture, Natural Resources and Rural Development (MARNDR).

- 3.14 The purpose of the operation is to finance a development program in the southern peninsula consisting of two subprograms: (i) a road subprogram (Subprogram A) covering the construction and rehabilitation of 179 km of secondary and access roads, and (ii) a rural development subprogram (Subprogram B). The proceeds of the Bank's loans are financing costs of the rural development subprogram, while those of the EEC grant are financing costs of the roads subprogram. The total cost of the program has been estimated at the equivalent of US\$12.1 million. On October 31, 1983 a total in the equivalent of US\$206,600, or 6.3% of the loans, had been disbursed, and ECU 459,426 (9.2%) from the EEC grant.
- 3.15 The execution of the program has been hindered in part by the difficulties encountered at the outset by the executing agency for the road subprogram in selecting consultants to be hired with EEC funds out of imperfect understanding of the donor's required procedures. The program has also suffered from the institutional weakness of the executing units.
- 3.16 The program has started to move at a brisker pace and its hoped that its execution will improve. It is clear, however, that the MARNDR is in need of institutional reinforcement if it is to perform its assigned functions properly.

IV. THE PROGRAM

A. Objective, Purposes and Targets of the Program

1. Objective

- 4.01 The objective of the project is to improve the rural diet by reestablishing a swine population in the country to take the place of the previous one, which had been the principal source of animal protein in the countryside and had been wiped out in order to eradicate the virus of African swine fever (ASF), to restore the Haitian pig farmer to a standard of living as high as or higher than the one he enjoyed prior to the invasion by the ASF virus, to improve the pig raising technology of those pig farmers, to strengthen the MARNDR's veterinary preventive medical service, and disseminate basic elements of sanitation and prevention for the breeding and utilization of pigs.

2. Purposes

- 4.02 The purposes of the program are as follows:

- (a) To establish a system for the reproduction, production and distribution of swine with appropriate technical-administrative and credit machinery for the generation of technology and its transfer to the largest possible number of medium-sized and small farmers so that they may become favorably disposed to technological change that will help improve their income levels and living standards.
- (b) To promote pig raising and integrate it into the farmer's production system especially at the level of the small farmer, who must rely on the little land at his disposal and on the labor of his family.
- (c) To produce, promote and adapt a cross-breed (hybrid) pig through the use of genetic and nutritional technologies and the management and application of preventive veterinary measures that meet the needs of the farmer and are suited to the ecological, geographical, and economic features of the country's regions.
- (d) To encourage among farmers and other pig raisers the breeding and fattening of swine by means of practical programs for the provision of technical and credit assistance in order to generate a supply of animal protein that will help improve the rural diet and to provide a line of production that without any major financial outlay will improve the family income.
- (e) To establish domestic sources of breeding animals of superior quality and acceptable adaptability to local ecological conditions, and to obtain them in good time in order to provide them to farmers preferably at affordable prices.

- (f) To generate genetic technology and material at reproduction units and multiplication centers, validate the advantages and merits of breed crosses at the demonstration centers and transfer technical procedures to farmers.
- (g) To investigate and demonstrate in practical trials the existence and yield of locally and regionally produced feeds as complements to the pig's on-farm diet.
- (h) To devise in demonstration and distribution centers practical lessons in the management and basic care required by swine in their critical periods of gestation, birth, lactation, growth and fattening based on experience validated in applied research.
- (i) To raise the technological-administrative level of the professionals and technicians of the Ministry of Agriculture involved in the program.
- (j) To disseminate in the agricultural districts of the Ministry of Agriculture basic preventive and sanitary information on the rearing and utilization of swine, preferably to the swine rearers who will benefit from the agricultural inputs of the system that constitutes the program.
- (k) To promote hygienic and sanitary conditions of slaughtering in the principal agricultural districts so as to help improve the quality of the supply of pork and pork products on local consumer markets.
- (l) To strengthen the preventive veterinary service of the MARNDR at the agricultural district level with regular on-farm assistance following specific prophylaxis calendars for the infectious and parasitic diseases of the pig.

3. Targets

- 4.03 The physical targets of the program are to build and outfit two reproduction units, 4 multiplication centers, 9 demonstration and distribution centers, a building for the Program's Executing Unit, 11 urban and 9 rural abattoirs, and 14 wells.
- 4.04 Under the Pork Production Subprogram, the production units would produce 6,000 F₁ pigs a year, the multiplication units 13,000 F₂ hybrid pigs a year, and the demonstration and distribution centers would distribute 6,500 hybrid pigs a year. In addition, 5,000 pig farmers would be enrolled under the IDAI's supervised credit system.
- 4.05 The Training and Technology Transfer Subprogram would aim for the training and instruction of 160 technicians and of 2,400 farmers a year.
- 4.06 The target of the Animal Health Subprogram would be to carry out disease prevention measures on 100% of the pig farms involved in the national program.

3. Description of the Program

4.07 The Swine Restocking Program consists of three subprograms: (i) pig production, (ii) training and technology transfer, and (iii) animal health. In turn, each of these subprograms is made up of projects, as follows:

SUBPROGRAMS AND PROJECTS COMPRISED IN THE PROGRAM

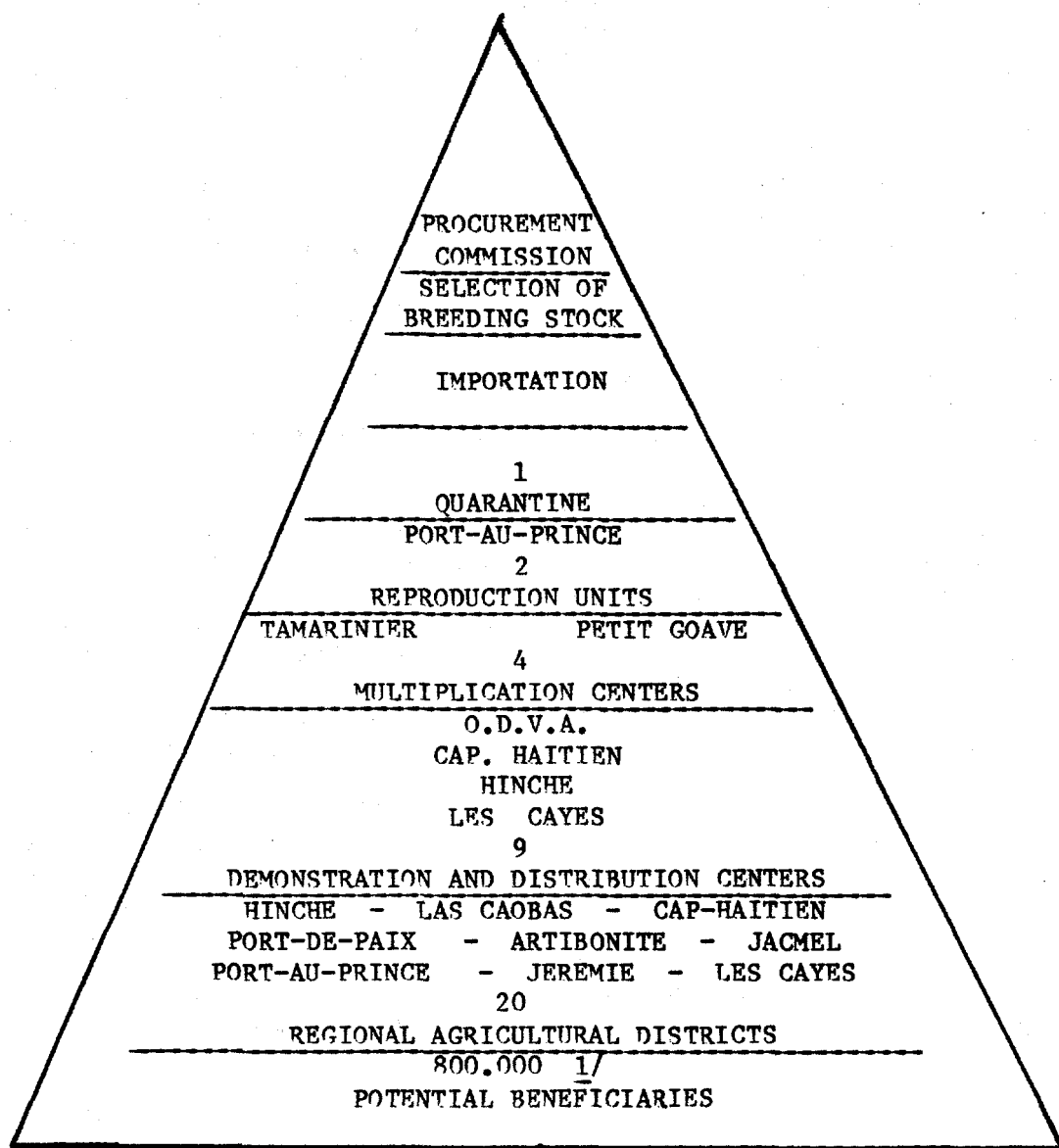
	<u>SUBPROGRAMS</u>	<u>PROJECTS</u>
THE PROGRAM	Pig Production	/ Importation Genetic Improvement Nutrition Breeding Management Multiplication Demonstration Distribution.
	Training and Technology Transfer	/ Training Technology Generation Technology Validation Technology Transfer.
	Animal Health	/ Port and Border Controls Exotic Disease Prevention Import Controls Quarantine Surveillance Epizootiological Surveillance Prevention of Infecto- contagious, Parasitic and Deficiency Diseases.

1. Pig Production Subprogram

4.08 The import, quarantine, adaptation, cross-breeding, nutrition, veterinary prevention, and pig distribution activities of this subprogram are an essential part of the technical and administrative scheme of the National Swine Restocking Program, which the MARNDR will execute through its Livestock Department in order to gradually reestablish pig farming in the country.

- 4.09 The subprogram, with its programming of sequential execution by projects, will begin with the technical and exacting work of the National Procurement Commission, which will travel abroad to select, contract for and acquire breeding boars and sows of the Duroc, Hampshire, Yorkshire and Spotted Poland China breeds guaranteed as S.P.F.F₁ (see Annex 2) with proper certification of origin and birth, of excellent phenotypic conformation, appropriate age and weight, free of hereditary defects, from farms in countries free of the diseases banned in the current sanitary regulations and provisions of Haiti (see Annex 10).
- 4.10 When they have undergone the national quarantine, diagnostic tests, and prophylaxis for diseases of swine, the breeding animals will be taken to the 2 reproduction units where the production of first-generation pigs (F₁) will be started in accordance with a crossing, gestation, nutrition, farrowing, management and weaning plan. A rigorous selection will be made among those pigs when they reach the right age and weight, and those chosen will be taken to the multiplication centers to begin the breeding of a second (F₂) generation. Crossings will be effected between purebred breeding sows and boars of the selected breeds, so that the progeny will be F₁ hybrid.
- 4.11 The four multiplication centers envisaged in the pyramidal structure (see pages hereafter) will use the same procedures and animal production and animal health technology observed by the reproduction units in the stock they receive except for a few minor changes to be made in the technical coefficients and the purity of the breeding stock. The multiplication centers will mate them with hybrid breeding stock of the chosen breeds to produce animals of alternate genetically improved characters; the possible variables are given in the cross-breeding plan.
- 4.12 In due course, the multiplication centers will deliver second-generation (F₂) swine to the 9 demonstration and distribution centers where, in addition to selecting sows and boars as breeding and rearing stock for use at each demonstration center for purposes of practical instruction to farmers, who will preferably be peasants, either individually or in association, the swine will be distributed to pig breeders already organized and motivated by the system of integrated action between the MARNDR's agricultural districts and the Swine Restocking Program (see pages hereafter).
- 4.13 The work plan of the demonstration and distribution centers will perform paired actions for (a) training the peasant in highly practical procedures, which he will learn by working with his hands, and carrying out operations with instructors who know their language and customs; and (b) the dissemination of information in the communities of each district and their involvement to enhance the Program's diffusion and penetration into gradually wider geographic areas.
- 4.14 The goals of training in short courses and practical workshops will give comprehensive coverage of management, care and feeding of the sow during gestation and farrowing, and in the suckling, weaning and rearing of the young.

PYRAMIDAL STRUCTURE AND SEQUENCE OF ACTIVITIES



1/ Total number of farmers covered by the Eradication Program and potential beneficiaries of the Restocking Program.

HAITI (0061)

SWINE RESTOCKING PROJECTGEOGRAPHIC LOCATION OF REPRODUCTION UNITS, MULTIPLICATION
CENTERS, AND DEMONSTRATION AND DISTRIBUTION CENTERS

<u>PURCHASE OF BREEDING STOCK</u>	<u>REPRODUCTION UNITS</u>	<u>MULTIPLICATION CENTERS</u>	<u>DEMONSTRATION & DISTRIBUTION CENTERS</u>	<u>PRINCIPAL AGRICULTURAL DISTRICTS</u>
			D.D.C. * (1)	ARTIBONITE * F.P.U. 10 TON. Capac.: 25 sows
			D.D.C. * (1)	LAS CAHOBAS * F.P.U. 4 TON. Capac.: 25 sows
		M.C. (1) O.D.V.A Capac.: 200 sows	D.D.C. (1)	JACMEL * F.P.U. 4 TON. <u>1/</u> Capac.: 25 sows
	TAMARINIER R.U. (1) Capac.: 232 sows	M.C.	D.D.C. * (1)	CAP. HAITIAN * F.P.U. 10 TON. Capac.: 25 sows
		M.C. (1) CAP-HAITIAN Capac.: 200 sows	D.D.C. * (1)	PORT-DE-PAIX * F.P.U. 4 TON. Capac.: 25 sows
			D.D.C. * (1)	JACMEL * F.P.U. 4 TON. <u>1/</u> Capac.: 25 sows
		M.C. (1) HINCHE Capac.: 200 sows		HINCHE * F.P.U. 10 TON. Capac.: 25 sows
			D.D.C. * (1)	PORT-au-PRINCE * F.P.U. 4 TON. Capac.: 25 sows
	PETIT- GOAVE (1) Capac.: 232 sows			JACMEL * F.P.U. 4 TON. <u>1/</u> Capac.: 25 sows
			D.D.C. * (1)	LES CAYES * F.P.U. 10 TON. Capac.: 25 sows
		M.C. (1) LES CAYES Capac.: 200 sows		JEREMIE * F.P.U. 4 TON. Capac.: 25 sows
			D.D.C. * (1)	JACMEL * F.P.U. 4 TON. <u>1/</u> Capac.: 25 sows

IMPORTATION
PROGRAM515 sows
33 boars

R.U. = Reproduction Unit

M.C. = Multiplication Center

D.D.C. = Demonstration and Distribution Center

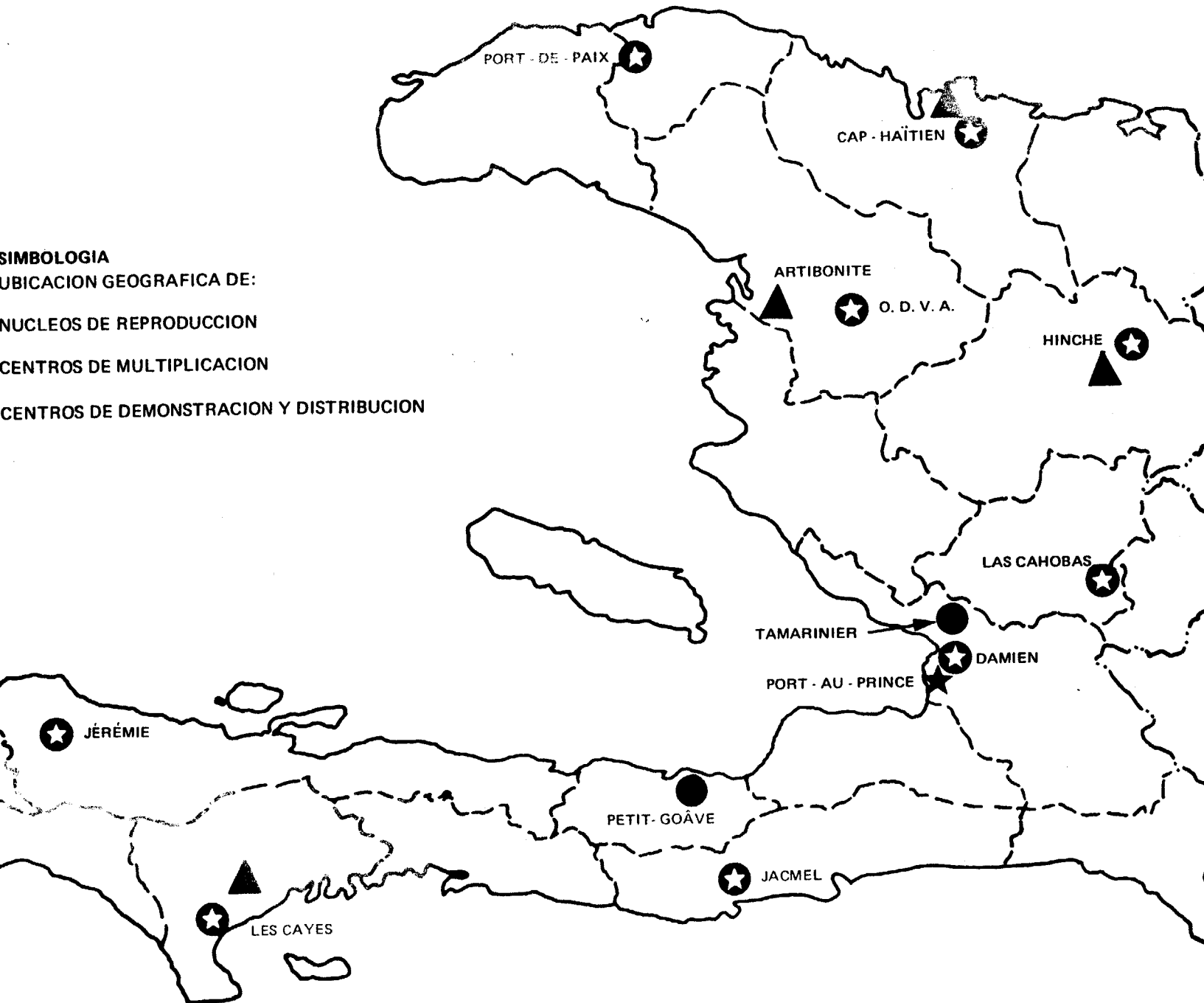
* Balanced Feed Production Units

1/ Would obtain pigs from surplus of the 4 M.C.s and provide its own feed supplements.

HAITI (0061)

PROGRAMA DE REPOBLACION PORCINA

SIMBOLOGIA
UBICACION GEOGRAFICA DE:
NUCLEOS DE REPRODUCCION
CENTROS DE MULTIPLICACION
CENTROS DE DEMONSTRACION Y DISTRIBUCION



- 4.15 This practical instruction will be promotional and ongoing, and the subjects will be scheduled for coverage at times that coincide with the breeding cycles of the stock at each demonstration center, to enable the peasant and his family to learn (i) to select future breeding sows and boars from the litters, (ii) to distinguish the characteristics that denote the development and sexual maturity of sow and boar, (iii) to tell from the behavior of the sow when she is in heat and place her with the boar at mating times, (iv) the care of the sow during pregnancy especially in regard to her feeding, (v) the care during farrowing and the first ministrations to the piglets, (vi) the marking and identification of the piglets, cutting of the needle teeth, prevention of infectious, parasitic and deficiency diseases, castration, fattening, and maintenance of the necessary reproduction and production records.

2. Training and Technology Transfer Subprograms

- 4.16 This subprogram proposes guidelines for training and adding to the technological knowledge of the Program personnel for the production of a type of pig that produces a good number of litters of satisfactory size and reaches its weight in an acceptably short time when fed solely on the locally available feeds and supplements. The aim is to train local technicians in pig production, applied research, and the generation, validation and transfer of technology at pig-breeding centers and farms.
- 4.17 Provision for this has been made through the granting of fellowships for intensive study to technical employees of the program, the holding of courses and seminars for professional and technical staff, and in-service training for the paratechnical personnel and instructors at the demonstration and distribution centers.
- 4.18 The projects of this subprogram will have the technical and administrative support of the MARNDR's Training Unit, in which both the human and the financial and technological resources will be concentrated for most efficient utilization. This joint working arrangement will make possible the coordination of activities that are mutually consistent and properly sheduled in the Program Executing Unit, the agricultural districts, and the demonstration and distribution centers themselves.
- 4.19 The operations of the technology transfer project would be proportioned to regional needs and to the availability of technology already known in the country, which has a centuries-old tradition of family pig farming on a semi-extensive basis. The goals of this project would be attained with the recruitment of farmers to the procedures for technological change and their adoption of practical procedures of proven value in increasing the family income with a minimal investment.
- 4.20 One of the largest and most important lines of activity under the subprogram is the research and trials scheduled at the demonstration centers and cooperating farms in the use of crops, their by-products, and flour-milling wastes to reduce feed costs, products that could be

used in this way being corn, sweet potatoes, cassava, ramie, pigeon peas, bananas, malanga, grain legumes, sugarcane and molasses, and also a wide variety of tropical fruits such as mangoes, avocados, oranges breadfruit and others.

3. Animal Health Subprogram

- 4.21 This is a highly important component of the National Swine Restocking Program. Its projects are intimately bound up with the other subprograms in regard to prevention and the protection of the swine to be imported, which are highly susceptible to the febrile diseases of pigs, in addition to which the country does not yet have an adequate epidemiological surveillance structure and coverage.
- 4.22 The subprogram calls for activities and investments to reinforce the quarantine surveillance and control services at ports and border crossings. There can be no doubt that the stock to be imported and bred under the Program in the short and middle run will require closer watching and surveillance at sea and airports to prevent the infiltration of pathogens of economically important diseases.
- 4.23 In regard to preventive veterinary care services at the level of the agricultural districts, the program provides for the preparation of on-farm prophylaxis calendars for the regular vaccination of the pigs against enzootic diseases and to protect against and control ecto and endoparasites.
- 4.24 The operations under the specific vaccination calendars will be conducted with the advice and under the supervision of a Haitian veterinary and a consultant who will give 100% of his time to establishing active ties between the agricultural districts and the National Diagnostic Laboratory, training an upgrading the knowledge of the corps of nursing auxiliaries with basic training in sanitary activities, and strengthening the Animal Health Communication System.

C. Cost and Plan of Investment of the Project

4.25 The total cost of the program is estimated at the equivalent of US\$23,200,000, and would be financed as follows:

(US\$ thousands)

<u>Category</u>	<u>IDB Loan in Foreign Exch. (SOF V Rep.)</u>	<u>Local Contribution</u>	<u>Total</u>	<u>%</u>
1. Engineering and Administration	<u>152</u>	<u>148</u>	<u>300</u>	<u>1.3</u>
2. Investments and Permanent Improvements	<u>3,600</u>	500	<u>4,100</u>	<u>17.7</u>
3. Investments in Other Goods	<u>6,073</u>		<u>6,073</u>	<u>26.1</u>
4. Machinery, Equipment and Vehicles	<u>3,724</u>	<u>905</u>	<u>4,629</u>	<u>20.0</u>
4.1 Machinery and Equipment	<u>2,706</u>		<u>2,706</u>	<u>11.7</u>
4.2 Vehicles		905	905	3.9
4.3 Replacement Parts and Accessories	1,018		1,018	4.4
5. Concurrent Costs		<u>2,846</u>	<u>2,846</u>	<u>12.3</u>
5.1 Real Estate		60	60	0.3
5.2 Operating Expenses		2,786	2,786	12.0
6. Unallocated Expenses	<u>3,279</u>	<u>1,225</u>	<u>4,504</u>	<u>19.4</u>
6.1 Contingencies	<u>1,387</u>	436	<u>1,823</u>	<u>7.8</u>
6.2 Cost Escalation	<u>1,892</u>	789	<u>2,681</u>	<u>11.6</u>
7. Financial Charges	<u>572</u>	<u>176</u>	<u>748</u>	<u>3.2</u>
7.1 Credit Fee		176	176	0.8
7.2 Interest	398		398	1.7
7.3 Inspection and Supervicion	<u>174</u>		<u>174</u>	<u>0.8</u>
Grand totals	<u>17,400</u>	<u>5,800</u>	<u>23,200</u>	<u>100.0</u>
Percentages	75.0	25.0	100.0	

1. General

4.26 For the proper implementation of the infrastructure and effective execution of the program, it has been considered necessary to provide the program not only with correct planning, but also with the installations and means of work needed to attain the set goals. The principal investments include the construction of offices, reproduction units, multiplication centers, demonstration and distribution centers, urban and rural abattoirs, and the sinking and outfitting of wells as sources of water. Also included in the basic categories are the acquisition of machinery, equipment, vehicles, replacement parts and

accessories, and of breeding stock. One of the items of importance in the program is the acquisition of inputs, notably basic feeds and feed supplements for the correct feeding and nutrition of the animals. It is considered that the project would then have a solid and functional logistical infrastructure suited for the gradual implementation of the various activities envisaged for accomplishing the purposes and goals of the project. The table of the project's costs comprises the following items:

- 4.27 Engineering and Administration US\$300,000. The preliminary draft designs for the architectural and urban planning of the physical works envisaged, including the central office, the breeding and distribution centers, abattoirs, etc., were prepared for the feasibility study done by the ICAUPP Unit, and the final plans for those works were contracted for with the Haitian consulting firm of Artech, S.A. by the IICA office at Port-au-Prince on the basis of the specifications and sanitary safety measures indicated by the consultants of the ICAUPP Unit.
- 4.28 Construction US\$4,100,000. This item includes the following works:
- (a) Central Office of the Program US\$56,640. The construction of a building with enough space to accommodate the entire program headquarters, including its units for administration, planning, education and publicity, sanitary advisory services, especially in the areas of epidemiology, supervision, and the conduct of specific subprograms; and field coordination. The design is considered functional and consistent with the various regulatory functions that the central staff of the program will be performing; the spaces and traffic paths are proportional to the numbers of staff envisaged, and the arrangement of the internal divisions corresponds to the sequence of and coordination among the activities.
 - (b) Reproduction Units US\$587,701. These will be rural structures specifically designed in their arrangements and facilities for administration, and the housing, feeding, handling and application of preventive health measures to the contingent of animals with which the production subprogram is to begin; auxiliary services have been envisaged for all collateral needs of the breeding program and for maintenance of the breeding stock. The reproduction units would be erected on grounds already owned by the Ministry of Agriculture, Natural Resources and Agricultural Development. One would be in the community of Tamarinier about 20 km north of Port-au-Prince, and the other in the community of Petit-Goave, about 70 km southwest of Port-au-Prince.
 - (c) Multiplication Centers US\$1,189,812. These rural structures, all designed to the same standard plan, would also have all the facilities needed for administration and for the housing, feeding and handling of, and application of preventive health measures

to the animals to be bred to supply pigs to the demonstration and distribution centers. The multiplication centers would be located: (i) near Deschapelles in the Artibonite Valley; (ii) at Cap Haitien; (iii) at Hinche; and (4) at Les Cayes. Each center could accommodate 200 breeding sows.

- (d) Demonstration and Distribution Centers US\$1,216,439. Nine of these centers would be built, in the first place, as facilities for training, instruction, and the validation of technology, and, in the second place, as centers from which to distribute the pigs to be sold to peasants and pig farmers through the network of 20 agricultural districts. These centers will be located at (i) Artibonite, (ii) Las Cahobas, (iii) Jacmel, (iv) Cap Haitien, (v) Port-de-Paix, (vi) Hinche, (vii) Port-au-Prince, (viii) Les Cayes, and (ix) Jeremie. In addition to the structures for these centers, 8 units for the preparation of feed concentrates would be set up, outfitted, and put into operation, 4 of them with capacities of 10 tons and the other four with capacities of 4 tons a day.
- (e) Urban Abattoirs US\$356,658. Eleven urban abattoirs would be built for the slaughtering of pigs for communities under sanitary conditions so as to prevent diseases communicable to human beings, especially those caused by bacteria and parasites.
- (f) Rural Abattoirs US\$383,750. Nine of these abattoirs would be erected to establish and extend the structure that the country needs for the marketing and distribution of dressed meats. The engineering report provides comprehensive information on the geographic location of these facilities, their capacities, dimensions, and the municipal lands provided for them.
- (g) Wells US\$294,000. Fourteen wells would be sunk as sources of water for the centers at Tamarinier, Petit-Goave, Cap Haitien, Hinche, Jacmel, Port-au-Prince, Ducis, and others that are fully described in the report on the engineering works.
- (h) Improvement of the Quarantine Station US\$15,000. The programming provides for improvements to the facilities of the Ministry of Agriculture and Natural Resources for the reception of domestic animals imported from abroad, especially in regard to feeders, watering troughs, drainage, fencing, the incinerator, and other passive safety measures essential to safeguard the animals to be imported as breeding stock during their forty-day stays in the station.

4.29 Technical Inputs US\$6,073,000. This category covers the acquisition of feed concentrates for the balanced nutrition of the swine of different ages and in different physiological states, specific biologicals for the prevention of enzootic diseases, medications and veterinary products for the control of external and internal parasites, and laboratory reagents and materials for the food science analysis of rations and the diagnosis

of diseases that may attack the herds. It also includes materials for the protection of the personnel, educational and audiovisual materials, seeds and plant material for the establishment of areas of greenery at the demonstration centers, agrochemicals, and cleaning materials and disinfectants. Also covered in this category are the allocations for the acquisition of high-pedigree breeding stock in certified health abroad, and the acquisition of draft animals locally.

4.30 Machinery, Equipment and Vehicles US\$4,629,000. This item includes:

- (a) Agricultural Machinery US\$1,425,000. This category comprises the acquisition of agricultural machinery and implements for use at the demonstration and distribution centers in the training of and instruction to technicians and peasants. This includes basic equipment for the feed preparation units, the acquisition of agricultural implements such as plows, rakes and seeders for use with draft animals, and wagons for carting material at the centers, motor-driven spray pumps, portable irrigating equipment, tillage implements, hand saws, shovels, hoes, wheelbarrows, mattocks, etc.
- (b) Laboratory Equipment US\$100,000. This category includes special equipment for the routine food science laboratory work of testing the balanced rations and feed supplements to be used in the maintenance and rearing of the swine; the basic equipment and working materials that would be needed by the national veterinary laboratory for its diagnostic and other routine tests for preventive supervision of the various pig production units, and the acquisition of microscopes, centrifuges, ovens, incubators, potentiometers, sterilizers, stills, etc. Itemized lists are on file in PAF/LIV for reference.
- (c) Other Equipment US\$988,000. The acquisition of equipment for handling animals in the field, for education and information, for refrigeration, radio communication, offices, cleaning and disinfection, incineration, general electric power generation (generators), for slaughterhouses, and for tagging livestock.
- (d) Field Equipment US\$100,000. The basic equipment needed for the technical units and teams that would be performing the following tasks in the field: vaccination, the identification and tagging of animals, the taking of biological samples. The performance of autopsies, disinfection, etc. Includes thermometers, phonendoscopes, syringes, needles, holding gear, bleeding equipment, test tubes, suitcases, rubber gloves, rubber raincoats, overalls, rubber boots, brushes, buckets, spray pumps, etc.
- (e) Office Equipment and Furniture US\$75,000. The organization, outfitting and putting into operation of the Central Office, 2 Reproduction Units, 4 Multiplication Centers, and 9 Demonstration Centers will require the provision of the office equipment and

furniture needed for the conduct of the administrative, accounting and coordination tasks envisaged in the plan of action. The item covers the acquisition of typewriters, calculators, fans, and other equipment, chairs, books, closets, file cabinets, tables, armchairs, blackboards, etc., all of local manufacture.

- (f) Communications Equipment US\$190,000. For greater efficiency in the sending of communications, shortening answering times and responding quickly to technical-administrative consultations over long distances, the Project's programming calls for equipment for rapid communication at any hour of the day or night for the reporting of special situations, unanticipated changes, and the control of techniques in the field. For these purposes the project envisages the acquisition of radio transmitters and receivers for the central and regional offices, and of materials and equipment for installing them.
- (g) Information Equipment US\$150,000. The programming of the plan of action envisages that, before any activity were started, a census survey to identify and determine the locations of all farms, and a community information campaign, would be carried out in every region and district. The purpose would be the physical and geographic identification of each operations district, to acquaint the pig farmers and people connected with the animal production industry with the purposes and benefits of the program, especially as to the system for pig distribution, technical assistance, and the transfer of technology. To ensure that printed materials and equipment are available on schedule, specific apparatus must be acquired. It may be pointed out that, in addition to the informational and promotional material that could be printed in the MARNDR's Information Unit, it would also be necessary to print up health record booklets, cards, forms for certificates and model contracts, etc., etc., on commercial printing presses, for which funds are provided under the heading of Inputs. The equipment includes mimeograph machines, photocopiers, a stencil cutter, letter stencil sets, cameras, projectors, recorders, amplifiers, drafting materials, etc.
- (h) Refrigeration Equipment US\$50,000. In the analysis it was determined that the equipment under this head is essential for the preservation and distribution of the vaccines and antigens that would be needed under the Plan of Action to carry out the scheduled immunoprophylactic activities and diagnostic tests in the field. This equipment consists of refrigerators and freezers to be installed in the centers for keeping sera, biological specimens, vaccines, and antigens, and also insulated boxes and bottles for the distribution and holding of the biologicals to be used in the periodic field activities.

- (i) Other Equipment US\$590,000. The scheduled operations in the units and centers will necessitate the purchase of primary equipment such as that described above, but complementary and collateral operations in the areas of preventive health at ports and border crossings, in abattoirs, balanced feed production units, irrigation, instruction in meat technology and animal tagging will require the acquisition of other equipment, such as incinerators, high-pressure pumps, electric power generators, motors and centrifuge pumps, slaughtering instruments, and livestock-tagging equipment.
 - (j) Vehicles US\$905,000. This category covers the acquisition of 4-wheel vehicles, and of trucks and motorcycles. The first-named machines would be for the general transportation needs of the staff and the two other types of vehicles for the haulage of inputs and stock, and for assisting in the technology transfer and monitoring operations. The central level (the directors, administrators and consultants) would have at its disposal 7 vehicles for management, supply and advisory operations, the regional level (the reproduction units, multiplication centers, and demonstration and distribution centers) 25 vehicles for the conduct of diverse animal production and animal health operations at the district level, and the inspectors, extension workers and supervisors would use 51 vehicles, consisting of motorcycles and jeep-type machines, for the routine work of overseeing the observance of work schedules.
- 4.31 Replacement Parts and Accessories US\$1,018,000. This heading is provided to cover the needs preponderantly for maintenance of the vehicles, and to a lesser extent other equipment such as that for agriculture, communications, information, refrigeration, etc. The envisaged estimates amount to 5% of the value of the equipment in the first year, to 10% of it in the second, 15% in the third, and 20% in the fourth, etc. All replacement parts and accessories would be imported.
- 4.32 Itemized lists of the equipment, machinery and vehicles referred to in paragraphs 4.30 and 4.31, above, are available for consultation in the files of PAF/LIV. The quantities and types of equipment envisaged are necessary and proper for the proposed operations, and the quantities requested are sensibly apportioned among the different offices and depots of the units and centers. Much of this material would be brought in from abroad except for the furniture available from local manufacturers. No difficulties of supply are expected in relation to any of the sources cited.
- 4.33 Real Estate US\$60,000. Some land would have to be acquired on which to erect structures and enlarge existing buildings for the envisaged rural facilities. The MARNDR already has possession of the land on which the structures for the Central Administration Office could be built. Of the lands for the units and centers, 92% has already been arranged for with

municipal authorities, and it remains only to acquire grounds for 3 demonstration centers, for which the above amount would be provided.

- 4.34 Technical Cooperation US\$935,000. A nonreimbursable technical cooperation would be provided for the instruction and training of the Program's technical personnel under fellowships for intensive instruction at specialized institutions and pork projects in operation. In addition, consultants would be hired to advise the Executing Unit and the reproduction units, multiplication centers and demonstration and distribution centers in the areas of reproduction, production, health, marketing and meat technology.
- 4.35 A total of US\$935,000 would be provided to cover 42 fellowships abroad for a total of 125 fellowship/months and 7 consultants for a total of 102 man/months. Of this total, US\$910,000 is nonreimbursable funds for technical cooperation and the equivalent of US\$25,000 a contribution of the MARNDR to pay local costs.
- 4.36 Organization US\$2,846,000. This category would be financed in its entirety out of the local contribution in local currency, and covers remunerations, travel costs, and general expenses, as follows:
- (a) Remunerations US\$1,842,000. The remunerations referred to here are confined exclusively to those of the new managerial, administrative, specialized professional, technical and auxiliary personnel of the units, centers and fields to be hired gradually over the first six (6) years of the Program in accordance with envisaged needs. The numbers and categories of personnel to be employed, and the remunerations they would receive, are considered reasonable and constitute one of the greatest efforts and budgetary increases to be undertaken by the MARNDR for the execution of the Program.
 - (b) Travel Costs US\$166,000. The calendar of travel costs was fitted to travel envisaged to be required for activities outside of Headquarters and jurisdictional limits by both the Headquarters and regional personnel. Activities of individuals were established on the basis of the level and post of the staff member, average number of days he or she would be on duty away from his office and beyond reach of it, and the rules established by the MARNDR's administration. The amount of the travel costs item was fitted to the projected volume of operations, particularly as regards supervisory, animal production control, and information work. The activities that would require additional remuneration have been calculated relative to the increase of activities of the field staff during the peak work seasons and to the geography of the different regions.
 - (c) General Expenses US\$778,000. The structural characteristics of the Program make for an activities programming that demands constant attention and administrative supervision by the

executing unit at both the central and regional levels, and harmonization so that both the personnel and the equipment, facilities and matériel will allways be in readiness to respond to and support the carrying out of programmed activities on schedule.

- 4.37 The needs under this head embrace the provision of public services such as electric energy, drinking water, telephones, gas, fuels and lubricants, transportation of personnel, equipment, materials and biological specimens, and communications, office supplies, insurance, hygiene and cleaning services, maintenance of buildings and equipment, and local costs of the nonreimbursable technical cooperation. The determination of basic needs was guided by the infrastructure of the volume of personnel, the programming of the required equipment, the established goals, and the integrative and coordinative links between the Program and other ministerial departments of the Government and international institutions operating in the country.
- 4.38 The following table summarizes the needs under the above heads during the different years.

CONCEPT	Year I	Year II	Year III	Year IV	Year V	Year US\$
(1) Remunerations	36.3	159.1	512.3	556.3	578.0	1,842.0
(2) Travel Costs	3.5	17.5	46.5	48.5	50.0	166.0
(3) General Expenses	14.0	43.0	174.0	217.0	330.0	778.0
TOTAL	53.8	219.6	732.8	821.8	958.0	2,786.6

- 4.39 Unallocated Expenses US\$4,504,000. Because of the complexity of the investments and operating costs to be required for implementation of the infrastructure, setting up the Program, and executing the technical-administrative programming, provision would have to be made for outlays that cannot be estimated at the planning stage. Accordingly, an amount of about 10% for contingencies to cover expenses that might throw out the financial balance of the amounts envisaged in the categories of the Investment Plan. The amount calculated for this category is US\$1,823,000 of which US\$1,387,000 would be part of the loan funds, and the equivalent of US\$436,000 would be covered by the MARNOR's local contribution. The factors established by PRA in its circular of September 1983 were applied to obtain the figures for Cost Escalation, which comes to US\$2,681,000, of which US\$1,892,000 is part of the loan and US\$789,000 of the local contribution.

- 4.40 Inspection and Supervision Costs US\$174,000.

4.41 The local counterpart funds, totaling the equivalent of US\$5,800,000 would be supplied in accordance with the Investment Schedule given in paragraph 5.63, below, out of budgetary appropriations that the Central Government would provide for the purpose. Nevertheless, it is worth nothing that a few days ago OPEC expressed interest in possibly participating in the cofinancing of this Program.

4.42 It is recommended that resources of the Fund for Special Operations (FSO) be used because Haiti is a relatively less developed country and the project is in the agricultural sector and designed to reestablish the production of swine, which are the preferred source of animal protein for the low-income sector of the Haitian population.

D. Technical Cooperation

4.43 In parallel with the possible loan it is recommended that the Bank grant a nonreimbursable technical cooperation in the amount of US\$910,000 for the institutional strengthening of the MARNDR and the Executing Unit in technical, administrative-accounting-financial and operating aspects so that the two agencies may efficiently perform their proper functions.

4.44 To accomplish the aforementioned purpose the MARNDR would hire 7 individual consultants for the following areas and periods.

<u>Field of Specialization</u>	<u>Period of Service (months)</u>
(1) One specialist in pig production and nutrition	24
(2) One specialist in genetic improvement	24
(3) One specialist in pork technology	6
(4) One specialist in administration	12
(5) One marketing specialist	6
(6) One veterinarian specializing in pig production	18
(7) One specialist in technology transfer	<u>18</u>
	108
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4.45 In addition, fellowships would be awarded to 42 staff members of the MARNDR responsible for execution of the program for refresher training abroad, each for 3 months, in the following fields:

<u>No. of Fellowship Recipients</u>		<u>Field of Training</u>	<u>Man/months</u>
(1)	12	Feed production and pig management	36
(2)	6	Genetic improvement	18
(3)	15	Preventive animal health	45
(4)	6	Rural management	18
(5)	3	Technology transfer	<u>9</u>
TOTAL			126 =====

4.46 The Plan of Operations is provided as Appendix 5 of the Loan Proposal. It must be mentioned that if for any reason the loan were not approved, this technical assistance should be executed because the MARNDR and its Livestock Department are in need of strengthening in the aforementioned fields.

V. PLAN OF EXECUTION

A. General Observations

- 5.01 The Plan for execution of the Swine Restocking Program covers all the coordinated procedures and specific activities directed at accomplishing the purposes, attaining the goals, and implementing the entire system in accordance with the envisaged strategies.
- 5.02 The institutional, financial, technical-administrative, economic and legal aspects of setting up the Program would be a preliminary part of the plan of action, and its functionality and responsiveness would depend on the real and coordinated participation of the Executing Unit at the central level.
- 5.03 On the basis of the objective, purposes, goals, strategies and priorities of the Program, the Plan of Action would not only schedule joint actions and common working procedures for the different subprograms, but would also combine and share resources and technologies with other Government programs for the improvement of the agricultural sector.
- 5.04 The structural and dynamic part of the Program would be the execution of the subprograms and their projects at the central and regional level, which will call for manpower training, physical infrastructures, the importation of breeding stock, equipment, technical inputs and a variety of other resources, all provided in good time so as to keep the Program moving forward in coordination as required in the timetables.
- 5.05 Joint actions will require machinery for communication and the establishment of responsibilities in bilateral agreements for cooperation between the MARNDR and the local, regional and international agencies concerned.

B. Implications for the MARNDR

- 5.06 Through the MARNDNR the Government has expressed its concern to begin the reestablishment of the country's swine population upon termination of the sanitary measures complementary to the ASF eradication process, the liquidation stage of which was completed in June 1983.
- 5.07 To meet these commitments and attain these priority goals, essential to restore especially to the rural population a resource that was at once a store of cash value and source of dietary protein, the MARNDR has been compelled to turn to the Government for financial aid, restructure its internal organization, and redirect its public assistance policies in order to generate the rapid growth of livestock production that the country requires.
- 5.08 The Swine Restocking Program is designed first and foremost to set up the structure for a national system for the production of foods of

animal origin; in consequence of the eradication of ASF and the slaughtering of the entire national herd necessitated for that purpose, the Program is directed at restocking the country with breeds of better heridity and improved resistance to disease.

- 5.09 Moreover, in view of the country's traditional need to introduce lines of plant and animal production in which it can become self-sufficient or to reduce its dependence on imports, and to reduce the growing shortage of animal products and by-products, the MARNDR has expressed a wish to use the institutional, physical and technical resources of the Repopulation Program as a starting point from which to extend its efforts for animal production and protection to other species (cattle, goats and poultry) once the restocking task is accomplished.
- 5.10 The design and implementation of the Swine Restocking Program implies for the MARNDR a financial effort, a shift of policy, and an opportunity to strengthen its present institutional operation with a scheme for livestock development through which it could achieve real ties and coordination with the agricultural sector. Examples of this are the goat improvement program going forward with Winrock and the projections for the pork technology and marketing program that would be started once the Restocking Program were functioning normally in the demonstration centers and agricultural districts. The technical cooperation component of the Restocking Program would provide for the hiring of two experts in pork technology and marketing for the last-mentioned activity.

C. General Structure of the Plan of Action

- 5.11 The scheme for execution of the Plan of Action envisages appropriate joint activities between subprograms and projects for the mutual complementation of their needs and procedures, and to avoid duplications of effort and get more results.
- 5.12 The main technical-administrative thrust of the Program is in the direction of gradually building up the physical plant, training the personnel, reestablishing a pig population, establishing a feeding and handling system for pig raising, strengthening veterinary surveillance and preventive care, and assisting pig farmers at the agricultural district level through extension, technology transfer, and farm credit.
- 5.12 The technical, administrative, political and socioeconomic activities are grouped and coordinated in assemblages of procedures that are mutually compatible and complementary so as to facilitate the conduct of the subprograms and projects that make up the Program.
- 5.13 The Plan of Action relies on the effectiveness of the specific vertical organization approved by the Minister of Agriculture, the financial support of the Ministry of Planning, and the production technology and backing of the organization in the districts.

D. Coverage of the Program

- 5.15 The Program area will be the entire country and be divided into four regions, there will be two (2) reproduction units, four (4) multiplication centers, and nine (9) demonstration and distribution centers established at different locations. The Program's primary purposes were given priority by the Government when it decided to eradicate African swine fever by slaughtering the country's domesticated pig population with compensation to its owners, and they will be accomplished through preferential assistance to small (peasants) and medium-scale farmers provided by the twenty agricultural district offices under the technical and administrative supervision of the MARNDR.

E. Strategy

- 5.16 The strategy will consist in the selection, acquisition and importation of breeding stock of characteristics in relation to pig husbandry, heredity and resistance to disease make them suitable for restocking purposes in the Haitian environment. In breeding the Program will follow a scheme of crossings among the chosen breeds designed to obtain hybrid progeny of improved fertility, natality, prolificity, precocity, adaptability, and capacity to convert feed into meat.
- 5.17 As to the means devised for bringing the Program to pig farmers and obtaining greater coverage in the agricultural district, well in advance of the distribution of pigs those farmers will be informed, trained, organized and instructed not only to motivate them but also to upgrade their technical knowledge and operating methods. As a complement to this the Program also envisages understandings with the Institut de Développement Agricole et Industriel (IDAI) to promote and expedite the credit that the farmer would need to acquire needed inputs in good time and on favorable terms.
- 5.18 To strengthen the MARNDR's manpower in the animal production and protection subsector the Program would provide a technical cooperation component for the hiring of experts in administration, in nutrition, genetics and meat technology, in marketing, in veterinary medicine, and in technology transfer, and intensive training for intermediate-level technical personnel abroad.
- 5.19 To assist the farmer with appropriate technologies, the general programming would include applied research activities that would be conducted at the breeding and multiplication centers for the generation of technologies that would then be validated at the demonstration centers and on cooperating farms for release to farmers. The applied research would be carried out by means of practical trials in genetics, nutrition, handling, administration, and animal disease prevention.

F. Organizational Scheme

- 5.20 The Program's organizational structure is a scheme for the technical and administrative strengthening of the Ministry of Agriculture and necessity for its policy of expanding and providing timely assistance to the livestock subsector in the areas of animal husbandry and animal health. The institutional formula proposed for execution of the Program does not call for any restructuring of the present Livestock Department, but to make it functionally effective. It may be mentioned that at each of the executive, administrative and coordinating levels the aim is the integration of activities and disciplines and active participation by pig farmers through the farmers' organizations.
- 5.21 To coordinate and integrate the pursuit of objective and accomplishment of purposes, the schematic organization is proposed which is illustrated in the organizational chart (see paragraph 4.07).
- 5.22 The general conduct of the Program would proceed at four main levels which would be, in descending rank, as follows:
- (a) Institutional Policy Management, at which highest authority and decision-making power is vested in the Minister, who delegates to the Secretary of State, who in turn coordinates with the Executive Director on the operation, strategy and advisability of the Program in the country.
 - (b) Regulatory and Advisory Level, at which the Director for Animal Production presides over the regular and special sessions and hears the views of his associates and advisers on the presentation of situations and the Program's annual plan of operations and its budgetary and administrative needs. The Director of the Program makes the presentation and, in his capacity as Secretary ex officio with a right to speak but not to vote, prepares the minutes showing the suggestions and recommendations made.
 - (c) Executive Management Level, headed by the Director of the Program, who in special situations must consult the Director for Animal Production, and in routine matters acts with the support of the chiefs of the technical and administrative units in the conduct of activities for breeding, multiplication and demonstration; distribution, training and technology transfer; and infrastructure, technical cooperation, disease prevention, supervision, statistical records, and evaluation.
 - (d) Regional Integration Level, at which the chief of the agricultural district presided over the local consultative council, whose members are the regional representative of the J.D.A.J., the head of the demonstration and distribution center, and a representative of the local farmers' association, for the purpose of supervising the operation of the organization of the system between the Program and the district, the accomplishment of the purposes, and their mutual interests.

G. Technical Basis

- 5.23 The Program is designed to improve the situation of animal production and animal health in the country and to meet, in the short and middle run, Haiti's needs for the systematic reestablishment of pig raising, the pork industry, and the consolidation of the National Veterinary Service. Execution of the Program is expected to result in the development of appropriate technologies and in the establishment of systems that promote an improvement of the livestock subsector throughout the country. The Program, while specific in its restocking stage, is intended to promote an integration of services so as to sustain animal production and industrial operations that will benefit a large proportion of the small farmers and peasants who own swine, and who prior to the outbreak of African swine fever possessed no technology whatever for rearing, feeding and handling pigs or for keeping them healthy. Moreover, the working guidelines are directed not only at the improvement of the technical and administrative aspects of the MARNDR so that it will be more efficient and responsive in providing the services that the subsector requires, but also at promoting the socioeconomic advancement of the peasants and their communities.
- 5.24 In preparing the project those real limitations and salient problems were taken very much into account which hinder the improvement of rural life in Haiti, and especially those that particularly affect the setting up of the Swine Restocking Program. The factors considered in this regard were (a) the high percentage of rural families who do or could raise pigs, (b) the peasants' present lack of technical knowledge of how to raise and keep domestic animals properly for profit; and (c) the fact that for the last 50 years the Haitian peasant has raised and produced native pigs of a very particular general constitution, of low productivity and no profit, as a household activity in which the pig foraged for its food in the local vegetation and among the agricultural wastes that accumulated more as garbage than as by-products (mangoes, avocados, almonds, papaya, bananas, sugarcane bagasse, etc., etc.; moreover, that pig was very hardy and hence did not require much hygienic or sanitary treatment, which did not, however, except it from a high post-farrowing mortality.
- 5.25 Hence, the introduction of appropriate technical bases for improving the rates of farrowing, growth and meat production rates of pigs raised by peasants on private and shared lands with the requisite assistance and technology transfer would be a true blessing for these rural families, as it would help raise their income and improve the rural diet. Pigs have traditionally been the Haitian peasant's chief source of animal protein.
- 5.26 The project's context also provides alternative techniques for reaching the peasant through appropriate, functional mechanisms and providing the assistance and basic training that the project's programming will require. No less important are the implications of using existing lines of credit to meet needs for on-farm investments for water,

installations, feeds, and conditions for the management and health of the pigs, which will ultimately have a beneficial effect on the environment as well.

- 5.27 The technical bases and production coefficients would contribute to the attainment of the envisaged goals, which are designed and quantified with a view to the reestablishment of a pork production improved by (a) crossbreeding and selection, (b) feeding, (c) management, and (d) hygiene and disease prevention.

H. Integral Programming

- 5.28 The Program consists of three (3) subprograms and fifteen (15) projects, of which 2 subprograms and 12 projects would be executed in the field directly in breeding units, at multiplication centers and demonstration and distribution centers, and on the lands of cooperating farmers. Each of the subprograms shown in the schematic design has been programmed for coordination with and integration into the setting up of the Program and the execution of its different stages and functions. Thus, the Production subprogram will not attain the goal of the Distribution project unless it is coordinated in good time and gradually and sequentially integrated with the Training and Technology Transfer subprogram, and the two subprograms together have the coverage and protection of the Animal Health subprogram.

I. Conceptual Diagnosis

- 5.29 The Program has been planned on the hypothesis that the country is undertaking for the first time to set up and carry out a program designed on a technical basis to yield results in the short and middle run in the areas of production, organization, and transfer of technology to farmers, respectively. The diagnosis is based on a total lack of any stock whatever in the wake of the eradication of ASF, on the source of the epizootic, and on the real limitations of the country, which for many years helped prevent it from developing a pork industry of acceptable production coefficients and better profit margins.
- 5.30 Against this background and with the evidence that the average Haitian pig raiser knows very little about animal production techniques and must be motivated by the availability of inputs and operating procedures which, being within his reach, would enable him to start producing in the short run, the Program has been designed with a view to intensive functional production in units and centers and on a scheme of extensive or gradual semi-intensive production by peasants, in which management and disease prevention in the family household will be the focus of daily interest.

J. Production Subprogram

- 5.31 This subprogram has been designed in the light of the known needs and limitations on a scheme of integral intensive production in which each

of the projects provides, in addition to short-run activities, complementary measures in a time sequence so that production costs will go down and profits up. There are essentially five (5) activities for setting up, conversion, production, demonstration and distribution, and each comprises a series of actions and problems whose performance and solution will gradually have to be combined if the pork production goals are to be attained.

1. Purposes

- 5:32 The purposes of the Production Subprogram are (i) to select and acquire pedigree breeding stock from specialized farms that can certify their sires as S.P.F.F₁; (ii) to quarantine and adapt imported sires and taking care to ensure that future sires reach sexual maturity in good time with proper nutrition, handling and disease prevention; (iii) on the basis of records from the farms of origin, to select future breeding stock -both breeding sows (breeding abilities) and boars (progeny testing)- as they develop in order to obtain desirable traits in future generations and higher yields. From the standpoint of phenotype, muscular conformation and a well-proportioned bone structure must be looked for; (iv) to establish and guarantee a source of feed that will provide the basic nutritional elements needed at the different ages and physiological states of pigs; (v) to establish at the reproduction units a calendar or basic management practices for boars, for sows that are in season, pregnant, nearing term, and lactating, and for shoats, and the maintenance of breeding and farrowing records; (vi) to design a breeding scheme for utilization of the F₂ breeding stock to be reproduced for distribution purposes; (vii) to organize the demonstration centers with a scheme for practical instruction in all aspects of breeding, feeding, management, and disease prevention practices; and (viii) to establish a system for the distribution of pigs through the agricultural districts, which will be fully integrated with the regional bank credit system and the Extension and Technology Transfer System.

2. Targets

- 5:33 Attainment of the set targets depends directly on the implementation of the Program, and particularly of its institutional-financial-structural and technical parts at both the central and regional level. The principal targets would be (a) (i) the importation of 552 certified S.P.F.F.₁ breeding animals of the following breeds: 128 sows and 8 boars of the Hampshire breed, 128 sows and 8 boars of the Spotted Poland China breed, 128 sows and 8 boars of the Yorkshire breed; (ii) preparation of the Quarantine Station at Port-au Prince; (iii) the construction, outfitting and putting into operation of 2 reproduction units; (iv) the construction, outfitting and putting into operation of 4 multiplication centers; (v) the construction, outfitting and putting into operation of 9 demonstration and distribution centers; (b) the production and distribution of (i) 5,200 F₁ hybrid pigs/year at the reproduction units (2,784 boars + 2,400 sows); (ii) 12,600 F₂ hybrid pigs/year at the multiplication centers (6,336 boars + 6,264 sows);

(iii) the distribution of 6,264 F₂ sows and the production of 2,400 F₃ pigs/year (1,200 boars + 1,200 sows); (c) the conduct of 212 experiment trials at the 2 reproduction units, 4 multiplication centers, 9 demonstration centers, and 10 pig raisers' farms; and (d) to establish the technical coefficients of hybrid crosses at the fourth consecutive farrowing of a single sow under intensive and semi-intensive breeding conditions.

3. Strategy

- 5.34 The working procedures and technical guidelines of the reproduction units and multiplication centers would be of an intensive nature with highly controlled management, nutrition and disease prevention technologies. Production at the demonstration and distribution centers and on the farms of individual and associated pig raisers would be on a semi-intensive basis with the application of basic technologies suitable to the structures and operating capacity of the pig raiser especially in handling, feeding and health protection. The activities for the generation, validation and transfer of technology would always be backed up by trials and practical work done by the farmers under the supervision of the Programs's technicians and paratechnicians at the regional level.

4. Salient activities of the nutrition subprogram

a. Importation

- 5.35 This activity would be the starting point for the restocking activities, and is regarded as a basic project of the Production subprogram as shown in the schematic design of the Program. Since one of the principal factors involved in accomplishing the purposes and goals of the Program is the genetic quality and disease resistance of the breeding stock to be used in the swine restocking process, the MARNDOR, through the Executing Unit, would acquire abroad, through the agency of a National Procurement Commission, pigs of breeds adaptable to the environment in the country. The constitution of the Procurement Commission, its responsibilities, the selection and purchasing procedures, breeds, quantities, countries of origin, sanitary requirements (in regard to prophylaxis and quarantine), animal production techniques, insurance coverage, transportation, and form of payment, are all given in Annex 3.

b. Genetic improvement and genotypical and phenotypical selection of the male and female individuals of each breed

- 5.36 The objective of this activity is to develop hybrids that are better-adapted to the climatic and environmental conditions of Haiti, by means of crossbreeding of selected imported breeds and selection of the descendance that have the most recommendable characteristics for Haiti. For this purpose: (a) at 6-7 months the development of the females will be compared with the particulars of the parents on precocity, prolificacy, number of births per year, birth rate, weaning rate and average weights of offspring at birth and on weaning; (b) at eight

months the development of the males will be compared with the particulars of the parents in progeny tests; and (c) it will be determined the mating system to be used, which could be: (i) system of absorption crossing or back-crossing; (ii) system of pure line breeding, i.e., of purebred stud stock with purebred sows of another breed; or (iii) system of hybridization or cross breeding of three breeds. 1/

c. Nutrition

- 5.37 The principal function of this component in the general context of the Program and the Production subprogram would be to supply a rational, practical, inexpensive feeding compounded of locally available nutritional elements. At first, and in the first few years, the reproduction units and multiplication centers would depend on the balance rations produced by the SONUAN plant. 2/ The demonstration and distribution centers would formulate and provide a diet consisting of a combination of balanced rations and foraging. This combination would be part of the strategy for and process of adaptation especially of pigs intended for the peasants.

d. Breeding

(1) The Haitian creole pig

- 5.38 One of the severe impediments in the way of Haiti's improving the breeding of its swine herd was the type of the native animal whose survival was based on self-selection, producing over many generations a highly inbred, hardy animal with a phenotypic conformation that betrayed an excessively small skeletal development and fragility of the extremities, of large head and snout, shallow body and narrow thorax. Both females and males grew slowly and as a rule the females had only 6 to 8 teats. Apart from these genetic traits, the creole pig was a poor breeder, unprofitable, the survivor of a series of adverse factors, notably malnutrition, improper handling, and the lack of any disease prevention measures.

(2) Breeding material of the program

- 5.39 To meet the need for the intensive production in a short time of a volume of pigs suitable to reestablish the country's pig herd, which had to be slaughtered in its entirety to eradicate African swine fever (ASF), the Program has scheduled the acquisition of breeding stock of breeds that are prolific and of good fleshing abilities, and which, in addition to being of good heredity, can guarantee good disease resistance because they will be certified S.P.F.₁.

1/ See Annex 5.

2/ Société de Nutrition Animale.

(3) Breeds selected

- 5.40 On the basis of ancestry, conformation, and production efficiency, 4 meat, ham and bacon breeds (Hampshire, Duroc, Spotted Poland, and Yorkshire) from the United States and England have been chosen for the two main lines of action under the Breeding project: (i) the rearing of pure-bred lines, and (ii) the rearing of marketable lines (see Annex 4 for a brief description of the breeds).
- 5.41 Of the different breeding systems under the Breeding Plan, two lines of action have been chosen: (i) crossing between animals of the same breed but different parentage to perpetuate breed purity, and (ii) crossbreeding or hybridization between animals of 2 or 3 breeds to obtain progeny with hybrid vigor (heterosis) with desirable qualities such as early sexual maturity, prolificity, and high feed conversion capacity.
- 5.42 Crossbreeding between pure breeds will be the predominant practice under the Program to meet the need for the production of marketable swine of high vigor that can withstand the rigors of confined pen rearing (at the reproduction units and multiplication centers) and adapt to the environment, the feeding, the handling and sanitation they will encounter on pig-raising farms when they leave the demonstration and distribution centers.

(4) Reasons for preferring crossings for hybrid vigor

- 5.43 This crossing is preferred in order (i) to obtain rapid yields with reduced times and costs, (ii) to combine the salient characters of two or breeds in order to obtain a larger volume of animals from which the most adaptable and productive can be selected, and (iii) to capitalize on the advantages of the progeny of technology transfer trials.

(5) Advantages of hybrid vigor

- 5.44 The advantages of hybrid vigor are (i) rapid growth (precocity), (ii) efficient feed conversion, (iii) more farrowings/year and larger litters (prolificity), (iv) greater uniformity in the development and conformation of litter mates, and (v) the obtaining of improved mothers, which normally produce pigs of higher average weight at farrowing and weaning.

(6) Strategy

- 5.45 Since the Program is designed to produce a high proportion of hybrid pigs that grow rapidly and fatten early, the reproduction units will work with four (4) pure breeds from which chiefly three crossbreeds will be developed: (a) simple bilateral, (b) backcrossing and triple-breed revolving crosses, in which boars of 2 or more breeds can be crossed with the sows of one generation (see Annex 5).

(7) Limitations of hybridization

- 5.46 The excellence of hybrid vigor is obtained only by crossing superior animals of different breeds; however, this practice cannot replace or reduce the need for good nutrition and handling of the herd.
- 5.47 On the basis of the indicated criteria the Program envisages: (a) the acquisition of breeds rated as of top quality; (b) the provision of proper nutrition, handling, and disease prevention measures; (c) rigorous selection especially to keep in the herds sows without any history of problems (i) at puberty, (ii) antepartum or (iii) postpartum; (d) the replacement of female culls with young sows from mothers of good breeding and suckling abilities; and (e) the replacement of male culls with boars of lines or parentage showing evidence of good breeding aptitude and for which semen testing (pH, motility (%), concentration morphology (%) of normal and abnormal sperm) has been frequent.

(8) Management

- 5.48 Herd management will generally be part of the technical structure of the Plan of Action and a subject of utmost importance in personnel training, and will be the basis of most technology transfer procedures. The programming envisages management activities in both the maintenance of physical facilities and of the equipment and supplies to be required in the different stages and sequences of the Program.
- 5.49 To manage the execution of the Program the directors and technicians must have knowledge of crossbreeding, balanced feeding practices, production control, and disease prevention measures. Financial-administrative effectiveness and monetary returns will follow from good judgment and appropriate management of the reproduction units, multiplication centers, and demonstration and distribution centers.
- 5.50 Direct and indirect activities for good management are concerned with: (i) the acquisition, transportation and quarantining of breeding stock; (ii) the layout, distribution, maintenance and equipment of the physical installations of the reproduction units and the multiplication and demonstration centers; (iii) the preparation and delivery of feeds; (iv) crossbreedings; (v) gestation; (vi) farrowing; (vii) lactation; (viii) weaning; (ix) disease prevention; and (x) records.

(9) Multiplication

- 5.51 The multiplication project will be executed through 4 multiplication centers each with a capacity for 200 breeding sows. The primary function of those centers will be to produce F_3 sows with the breeding material received from the reproduction units. The multiplication centers will then supply the demonstration and distribution centers. In them pig farmers will be able to buy both male and female F_2 pigs. However, the programming envisages that the breeding material selected at the reproduction units will go preferentially to the multiplication centers. The regular production of the 4 multiplication centers will be 12,673 animals a year.

- 5.52 The breeding material from the reproduction units will be kept in the multiplication centers for about 3-1/2 months in order to: (i) complete their growth and sexual development; and (ii) adapt them and then put them into a gradual mating program similar to or the same as that in effect at the reproduction units.

(10) Demonstration and distribution centers (DDCs)

- 5.53 The main activities at the 9 demonstration and distribution centers will be the implementation of programs of practical instruction in pig raising at the peasant level and the distribution of the pigs produced at the 4 multiplication centers through the 20 agricultural districts, but those activities would be concentrated for the most part in the 9 agriculturally most active districts.
- 5.54 As a result of the Program, 9 of the MARNDR's agricultural districts will become the seats of demonstration centers, which, with an infrastructure geared to agricultural production, will become centers for instruction by demonstration to help farmers learn appropriate pig-raising technologies.
- 5.55 The DDCs would have a dual role in that, on the one hand, they would distribute pigs through a program for the organization of pig farmers with technical and credit assistance to be provided by the Government not only to combat malnutrition, but also to step up the production of meat of a very early-maturing domestic animal whose limited requirements makes it possible for a peasant to obtain sizable yields even with limited technical knowledge.
- 5.56 Moreover, the programming envisages the implementation of a package of technical components complementary to the peasant's practical knowledge. This implementation will take place in educational and training events at centers in which the pig-raising farmers will learn by doing. Ordinarily the peasants, either singly or as families, will conduct their own projects both at the centers and on their own farms with rudimentary agricultural implements and materials. The most important product of the Program will be, essentially, the pigs and the basic inputs that the pig-raising peasant will receive to breed rear, and fatten hogs.
- 5.57 The centers will have or seek access to the various academic disciplines for the training of teams of instructors in the different subjects for upgrading the knowledge of the pig-raisers and consolidating the system of instruction by demonstration. All the technology that can be generated in the reproduction units and multiplication centers will be validated with studies and trials in the demonstration centers and then become subject matter for the activity of technology transfer to farmers.
- 5.58 The object of the Training and Technology Transfer subprogram at the DDC level is to provide in-service instruction to produce technicians, paratechnicians and pig raisers who are mentally adjusted to the facts of their own capabilities and environment.

- 5.59 The demonstration and distribution centers will also offer opportunities for the conduct of applied research trials to students of the Faculty of Agriculture and Veterinary Medicine for the preparation of practical theses for their degrees, and for engaging in research and reaching with a social service orientation.
- 5.60 The programs of the different centers, while similar, will not necessarily be the same, but will differ in the contents and proportions of their research and teaching activities. Whatever the orientation, however, it will always be directed at accomplishing the purposes of the Program.
- 5.61 On their technical and administrative sides the DDCs will be under the Executing Unit of the Program, and closely coordinated and integrated with the agricultural districts, and their activities will be integrated with the IDAI and the farmers' associations so as to consolidate the agricultural production system.
- 5.62 It is considered that, through the activity of distributing pigs as an additional food of animal origin, the Program will also contribute to an improvement of family incomes, employment, and nutrition.
- 5.63 The investment schedule for the Program is as follows:

SWINE RESTOCKING PROJECT

L		1363.0	208.8	4192.0	1287.6	3394.0	1640.8	3368.0	1266.8	5083.0	1396.0	17400.0	5800.0	23%
												75%	25%	

K. Training and Technology Transfer Subprogram

- 5.64 Because of the scarcity of trained manpower in the country, the Program will provide personnel for itself, especially at the intermediate technician level for field work on farms and with farmers' associations, through activities in two main areas of action -training and technology transfer- as follows:

(a) Training

- 5.65 This activity will take the form of (i) in-service training in short courses for technicians of the Program and the MARNDR and for organized pig raisers in the agricultural districts, as part of the integrated programming of the Program and the MARNDR, and (ii) study under fellowships abroad for the acquisition of basic knowledge in food technology through SPECIAL INTENSIVE PROGRAMS to be conducted on pig farms and institutions specializing in pork production. This activity will be financed with funds from the nonreimbursable technical cooperation proposed in parallel with the recommended loan operation (see Annex 7).

(b) Purposes

- 5.66 The purposes of the training activity would be: (i) to upgrade the technical and administrative skills of the staff assigned to the Program; (ii) to promote conditions conducive to the acquisition by technical and paratechnical personnel of practical knowledge adaptable to agroclimatic and social conditions in the country; (iii) to improve the performances of the human resources by training them by the learning by doing procedure in basic aspects of the breeding, feeding, management and prevention of disease in pig herds; (iv) to foster the organization and integration of technicians and farmers; and (v) to determine with the trained personnel involved in the pork production strategy the technical, social and economic constraints on rural development and especially on the adoption of new technologies.

- 5.67 The aims of this activity are (i) to establish the technical and paratechnical personnel instruction and training module in the MARNDR, and (ii) to instruct and train 1,800 technicians in procedures and technologies of pig breeding and production and 23,355 farmers in pig-raising practices.

(b) Technology transfer

- 5.68 For this part of the subprogram 9 demonstration centers will be erected with physical facilities and the provision of inputs for the implementation of the activities called for by the Program strategies in each district. Each center will be technically and operationally subordinate to the Executive Management of the Program and be headed by an agronomist with his assistants. This agronomist, as chief and coordinator of production, distribution, training, and technology

transfer, will oversee the work of the local technicians and coordinate his operations with the consultants.

- 5.69 The demonstration and distribution centers will validate the technology generated under the Program, especially in the reproduction units and multiplication centers. They will also generate procedures for the practical application of pork production technology so that results obtained in one area or district may be transferred to others of similar ecology and socioeconomic conditions.

Purposes

- 5.70 The purposes of the technology transfer activity are: (i) to promote and expand the use of innovative technologies especially for the breeding and feeding of swine by practical procedures adaptable to the agroclimatic conditions and available resources; (ii) to promote a gradual increase in the local pig raiser's operating capacity by providing him with techniques and inputs that will enable him to improve the essentially deficient structure of his farm, which uses typically rudimentary methods; (iii) to investigate and demonstrate the existence of local agricultural resources suitable as animal feeds from crops, agroindustrial by-products, crop residues and tropical fruit surpluses; (iv) to generate, validate and transfer semi-industrial pig-raising technology as a means of upgrading the operating capacity of small and middle-scale pig raisers and so of providing more employment for the rural family and of raising the peasant's output and income; (v) to characterize and identify geno and phenotypically a type of hybrid pig that is adaptable to the country's ecology and the particularities of the Haitian peasant environment; (vi) to determine in each region and agricultural district the advantageousness of setting up associative swine production arrangements among the farmers (pig raisers' associations) so as to consolidate in each region a system for the production of foods of animal origin; and (vii) to promote and motivate the ongoing conduct at demonstration and distribution centers of trials specifically directed at finding practical solutions to problems of livestock production.

Goals

- 5.71 The goals would be:

- (a) To establish in the first two years of the Program the physical and technical-administrative structure needed to provide the Program with equipment, structures, services and complementary installations.
- (b) To conduct the experiment trains referred to in Annex 8.

L. Animal Health Subprogram

- 5.72 This subprogram is a very important part of the technical production side of the Swine Restocking Program. The schedule activities are

essentially complementary to the animal production system and concerned with disease prevention.

- 5.73 The basic activities are arranged for in 3 projects named in the schematic design and are directed at consolidating the quarantine surveillance service at ports and border crossings, cooperating in extending the epizootiological surveillance operations of the National Veterinary Service, and developing a line of prophylactic measures for the prevention and control of infectious-contagious and parasitic diseases of swine.
- 5.74 The purposes of this subprogram are: (i) to strengthen the equipment of the Quarantine Surveillance Service at ports and border crossings; (ii) to coordinate the operations of the reproduction units, multiplication centers, distribution centers, and pig farms covered by the Program with the Epizootiological Surveillance System of the National Veterinary Service and the diagnostic laboratory; and (iii) to establish and carry out calendars of prophylaxis at the units, centers and pig farms of the agricultural districts for the prevention of infectious-contagious, parasitic and deficiency diseases of swine.
- 5.75 The targets are: (i) the installation of 7 incinerators at seaport, airport and parcel post offices for the destruction of all substances and products potentially capable of transmitting diseases or of introducing into the country the pathogens that cause them, (ii) to organize and coordinate with the national Veterinary Service the Animal Disease Reporting System for periodic transmissions by radiotelephone or regular fortnightly reports on the hygiene and health problems of the pig population, and (iii) to systematically vaccinate all pig herds against erysipelas and leptospirosis, and to provide and periodically to oversee treatments against internal and external parasites, particularly for protection against lung and intestinal worms, cystercosis, lice and mange.
- 5.76 Activities under this subprogram will be coordinated with the National Veterinary Service through a veterinarian assigned to the Swine Restocking Program to be responsible for:
- (a) Updating the animal health regulations with a view to the coming declaration in which the MARNDR will announce that the country is free of African swine fever.
 - (b) Training and supervising the technical and auxiliary veterinary staff stationed at the demonstration and pig distribution centers and in the agricultural districts directly associated with the Program.
 - (c) Overseeing the installation and operation of the incinerators at sea and airports and laboratories.

- (d) Supervising adherence to the prophylaxis calendars and checking to ensure that biologicals and vermifuges are of the recommended types and qualities.
- (e) Supervising and coordinating the working procedure for composing epizootiological protocols and for communicating them to the Veterinary Service and the diagnostic laboratory.
- (f) Overseeing the system for the importation and exportation of animals and animal products and by-products through ports and the national quarantine station.

Haiti is on the verge of completing the eradication of African swine fever in December 1983. From the epidemiological standpoint the disease has been eradicated and the causal agent has disappeared, since the biological screening or sentinelization program has detected no situation or symptomatology to suggest its continued presence. However, the country and the replacement swine population will have to live with the permanent possibility of the disease's recurrence if the veterinary services were ever to grow careless and relax their vigilance.

- (g) Reporting on and characterization of the health and sanitary situation of the pigs harbored by the network of facilities of the Program and the agricultural districts.
- (h) Establishing the information indicators and channels for epizootiological communication between the Swine Restocking Program and the National Veterinary Service.
- (i) Determining the activities of the auxiliary staff in obtaining and forwarding epizootiological information and divulging it when it returns in processed form.
- (j) Encouraging the use of the information in the centers, and especially in the demonstration centers, and evaluation of the office or of failings in the Veterinary Service at the level of the Program.

M. Pig Distribution System

1. General remarks

- 5.77 The system as proposed is simple and designed with procedures that are quickly and easily carried out, the IDAI having discovered from experience that new operations in the livestock subsector could be made more expeditious. The formalities are abbreviated and combined so that farmers will not run into bureaucratic obstacles.

- 5.78 There will be enough pigs and complementary inputs available under the Program that, starting in 1986, the 9 centers will have no difficulty in supplying the agricultural districts with pigs for breeding, rearing, and fattening, the production projections indicating that needs, especially those of the peasants and other pig raisers, will be amply covered.

2. Preliminary tasks

- 5.79 It must be noted at the outset that the Program will work with the agricultural districts to carry out a regional promotion as soon as it, the Program, is set in motion, so as to motivate the pig farmer, publicize its own purposes, and make known the procedures to be carried out to qualify for the benefits.
- 5.80 In due course the centers will start the training and instruction activities using pigs to be selected for moving ahead with the practical instruction events. For their part, the districts will organize the farmers, prepare file cards, and even compile a roster of the farmers of each community so as to class the beneficiaries by strata as to families and associations.
- 5.81 The plan of organization and work has been designed on the basis of local experiences of the IDAI, and hence constitutes a model that can be adjusted as the Program advances.

N. System of Follow-up, Control and A Posteriori Evaluation

- 5.82 The purpose of the system of follow-up, control and a posteriori evaluation that has been proposed and discussed with MARNDR officials is to increase the efficiency of public investments by the livestock subsector. The system will cover each of the three subprojects and will allow the preparation of background information on the situation existing prior to start-up of the project, measurement of the changes during its execution and evaluation of the results subsequent to its completion.
- 5.83 The breakdown of the items of project evaluation is shown in Annex 7.15 of the Project Report, including the progress indicators. The Executing Unit would be responsible for the system.
- 5.84 Within 12 months from the effective date of the contract, MARNDR shall submit the description of the system required to compile and process the data for making the annual comparisons to evaluate the project results achieved and the baseline data in accordance with the categories agreed upon with the Bank (see Recommendation 2). In addition, annually from the third year of the effective date of the loan contract, up to five years following the date of the final disbursement of the loan, MARNDR shall present to the Bank the annual comparative data mentioned above. (See Recommendation 4.)

- 5.85 At the end of the fifth year from the date of the final disbursement, MARNDR shall submit to the Bank the a posteriori evaluation report, including an economic quantification of the results based on the methodology agreed upon with the Bank within 12 months from the effective date of the loan contract. (See Recommendations 2, 4 and 5.)

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VI. THE BORROWER AND EXECUTING AGENCY

A. The Borrower

- 6.01 The borrower would be the Republic of Haiti, which would undertake to make the local counterpart contribution through appropriations on the National Budget.

B. The Executing Agency

- 6.02 The executing agency would be the Ministry of Agriculture, Natural Resources, and Rural Development (MARNDR) through its livestock Department (LD).

1. Purposes of the MARNDR

- 6.03 The purposes of the MARNDR as set forth in its Organic Law are (a) to promote the increase of agricultural production with a view to national self-sufficiency and the improvement of the national trade balance; (b) to protect the environment, with special emphasis on the preservation and rational utilization of the natural resources, and (c) to help improve the standard of living of the Haitian peasant through the process of rural development.

2. Functions of the MARNDR

- 6.04 To accomplish the purposes stated in the foregoing paragraph, the MARNDR has the functions of (a) planning and directing the utilization of the resources in its sector with a view to (i) increasing the yields of current croplands by the use of improved methods and more advanced techniques, (ii) supervising the rational utilization of the renewable natural resources, and (iii) ensuring the satisfaction of the most urgent needs of the rural population; (b) coordinating all actions with public and private entities with a view to a balanced and equitable development, and a fair distribution of the benefits thereof; (c) providing agricultural technical assistance at advanced, intermediate and vocational levels; (d) guaranteeing to the rural population access to production resources such as land, water, credit, and the most modern technology available, and (e) making the physical and legal cadastre of the countryside and administering it with a view to regularizing the land tenure system.

3. Organization of the MARNDR

- 6.05 Up to the promulgation of a new Constitution of the Republic of Haiti on August 27 1983, there was a Department of Agriculture, Natural Resources and Rural Development (DARNDR) headed by a Secretary of State. The DARNDR underwent several changes of organization, the latest of them in consequence of the new Constitution, under which the Department has become a Ministry headed by a Minister of Agriculture, Natural Resources and Rural Development.

- 6.06 While no new organic law has yet been promulgated for the MARNDR, on the basis of the new Constitution, a Decree of 29 August 1983 designating 2 Secretaries of State for the MARNDR, and an order of the Minister, the Ministry is divided into two State Secretariats, one of Rural Development (SEDR) and the other of Agriculture and Natural Resources (SEARN). Each state secretariat is headed by a secretary of state, responsible for policy matters, and an Executive Director (see Annex 6.1).
- 6.07 The SEARN is composed of 4 departments: (a) Plant Production, responsible for crop production, crop protection services, and agroindustrial services; (b) Natural Resources, which covers the protection of forests and wildlife, hydraulic resources, soil conservation, fisheries and cartography; (c) Livestock, comprising two sections: Veterinary Services and Animal Production, and a small administrative unit; and (d) Production and Demonstration Farms. The SEARN also has responsibility for the 20 agricultural districts into which the country is divided, grouped into 4 regions.
- 6.08 The SEDR has 3 departments as follows: (a) Rural Community Promotion and Organization, including agricultural training, training in rural trades, cooperatives, home economics, and rural development; (b) Rural Economics and Agricultural Statistics, which covers agricultural statistics, marketing and economic studies; and (c) Rural Engineering, covering agricultural water resources, rural environment, and equipment. The SEDR is also responsible for integrated rural development projects and coordinates the operation of the Farm Credit Bureau (BCA) and the Faculty of Agronomy and Veterinary Medicine.
- 6.09 In addition to the departments described above there are three more directly answerable to the Minister: (a) the Construction Unit, of departmental rank, which operates all the Ministry's heavy equipment; (b) Planning and Control, responsible for (i) planning the MARNDR's activities and projects in keeping with the Government's current policies, (ii) monitoring and verifying those activities, and (iii) making periodic evaluations of all projects in execution and suggesting corrective measures; and (c) administration, one of the largest departments with a staff of more than 200 people, responsible for all aspects of administration and accounting. Its functions include personnel administration, accounting services and issuance of checks, budgets, supplies inventories, transportation services, garages, and general administration.
- 6.10 This structure is the third since autumn 1982. As a result of these reorganizations, in addition to changing the former Secretary of State into a Minister, two posts of Secretary of State have been created to replace the former General Director of the Department; 2 new posts of Executive Director have been created, and the number of departments has been increased from 5 to 10; the staff have not been much concerned, however, for these are merely internal organizational changes that have affected the numbers of the personnel only marginally.

4. The Livestock Department (LD)

- 6.11 As noted in paragraph 6.07, above, the Livestock Department consists of the Veterinary Service Section, the Animal Production Section, and a small administrative unit. It has a staff of 25 people, including the 4 veterinarians in the country, and is responsible for the animal production, research and experimentation, animal health, veterinary, animal quarantine and livestock extension services, and all functions and services related to livestock (see Annex 6.3).
- 6.12 The Program's Executing Unit (EU) will be part of the LD, in which it will operate autonomously, but under the supervision and authority of the Director of the Department, to whom the Coordinator of the EU will be answerable; at the termination of the Program the EU will be absorbed into the LD as a section on a part with the two existing sections.

5. The Agricultural districts

- 6.13 The agricultural districts provide a very important link between the peasant and the Government, employing 55% of the Ministry's staff. There are 20 districts grouped into 4 geographic regions, each of which is headed by a Regional Director. The four regions are I (North), II (Northwest), III (Center), and IV (South). Each district embraces several agencies and is responsible for the experiment and demonstration farms in its territory. the MARNDR has 78 agencies and 16 research and demonstration farms (see Annexes 6.4 and 6.5).
- 6.14 Each district has its director, who is answerable to the director of his region. The district is divided into two sections, one, generally small, the administrative section, consisting of an administrator and 3 or 4 persons, and a technical section, which may have a staff of 30 to 100, depending on the district.
- 6.15 The function of the district is to execute the programs of the MARNDR, provide assistance to peasants in all aspects of crop-growing, animal production, and soil conservation, and to organize them into cooperatives and provide vocational training not only to the farmers but to all members of the rural family, including the wives and daughters of the peasants.

6. Personnel

- 6.16 Owing to the many organizational changes that the Ministry has undergone in the last two years, no comparative data are available on the personnel classed by departments and occupations. The staff of the MARNDR has been contracting slowly while that of the autonomous agencies has been growing, as can be seen in the following table:

	<u>Fiscal Year</u>		
	<u>80/81</u>	<u>81/82</u>	<u>82/83</u>
Personnel of:			
Management	111	110	110
Administration	629	633	417
Agriculture	445	352	241
Natural Resources	151	147	183
Agricultural Districts	<u>1,039</u>	<u>1,017</u>	<u>1,155</u>
SUBTOTALS	2,375	2,259	2,106
Semiautonomous agencies	<u>727</u>	<u>M/D</u>	<u>2,152</u>
TOTALS	3,104		4,258

6.17 This table shows that on September 30, 1983 the staff of the Ministry was about 11% smaller than it had been in 1980/81, while that of the semiautonomous agencies has risen to the level of the Ministry's. This has happened because of the increase in the number of these agencies, such as the BCA, ODVA, FAMV, ODPG, and ODN. The staff of the Departments of Agriculture, Livestock, and Animal Production was reduced 20% in fiscal 81/82. In 1982/83 it was reduced again chiefly by a transfer of people to the agricultural districts, where the staff increased 14% in the same year.

6.18 Of the total of 4,258 persons in the employ of the Ministry and the autonomous agencies, 67% are technical and 33% administrative personnel. Again, 58% work in the field, of which contingent only 7% are administrative staff and the other 93% are field technicians and professionals, as shown in the following table:

<u>Location</u>	<u>Total Staff</u>		
	<u>Technical</u>	<u>Administrative</u>	<u>Total</u>
Headquarters	571	1,234	1,805
Field	<u>2,285</u>	<u>168</u>	<u>2,453</u>
	2,856	1,402	4,258

6.19 The personnel of the MARNDR in fiscal 1982/83 may also be classified as follows:

Professionals	410
Technicians	789
Administrative	73
Support	<u>834</u>
Total	<u>2,106</u>

7. Administration and administrative procedures

- 6.20 The MARNDR functions with a centralized manual system. None of its financial or administrative operations is mechanized. Every department has an administrator who, depending on the size of the department, may have a small staff. However, this staff only serves as liaison between its department and the financial administration, but itself has no financial functions.
- 6.21 The Administrative Department, with 200 employees, is divided into 8 sections (see Annex 4) as follows: (a) Personnel, (b) Accounting, (c) Budgets, (d) Procurement, (e) Inventories, (f) Files, (g) Vehicle Maintenance, and (h) Auditing.
- 6.22 There is no manual of procedures. However, there are some individual operations for certain operations which are known to the individuals concerned.
- 6.23 Expenditures are recorded for each department and not for each section within a department. This method did not get in the way of an assessment of the efficiency and expenditures of the Maintenance section, which employs 35 mechanics and maintains about 175 vehicles of different types. On grounds of efficiency and capacity, the Program's vehicles would not be maintained by this section except in emergencies.
- 6.24 Each accountant is assigned one or more departments, depending on their sizes, and a ledger and record of checks are kept separately for each department. There is also an extensive classification of costs. Not many of the available accounts are used, however.
- 6.25 The same methodology is used for the 20 agricultural districts. An accountant carries a ledger subdivided into sections, one for each district, and all expenditures are entered at the Headquarters level on the basis of the documentation attached to the requisition for the replenishment of funds sent in by each district.
- 6.26 This system of carrying records by hand will be more cumbersome now that the new structure has increased the number of departments from 5 to 10.
- 6.27 The financial and accounting function of the district office administrator is chiefly to supervise the two principal bank accounts in use, one for the pesticide income and the other for general expenses. More accounts may be in use (projects, farm operations, etc.) depending on the size of the district and the range of its operations.
- 6.28 The funds assigned for the operations of the MARNDR are transferred to it monthly by the Ministry of Finance at the rate of 1/12 of the amount on the annual budget. At this writing there are 28 bank accounts in use, down from the 50 in use in 1982 and 88 in 1981. These bank accounts are the individual accounts of the counterpart funds of each

project and of the operating budgets. The Administrative Department is now trying to reduce the bank accounts to one per department, and to keep individual records of the accounts of each project as a responsibility of the individual department.

- 6.29 Purchase orders are initiated in the individual department and transmitted to the Administrative Department for processing, verification against the budget, and authorization. All purchases are cash, as few suppliers are prepared to extend credit for 30 or 60 days. Pro-forma invoices are obtained from suppliers, which are then attached to the documents sent in to the Treasury for issuance of the checks.
- 6.30 The check-issuing procedure is kept separate and well verified for internal auditing purposes. It is time-consuming, however, and under ideal conditions takes at least 2 weeks. To begin with, a regular request for a check must be authorized at several levels in the MARNDR and then submitted to the "Board of Accounts" of the Ministry of Finance, which functions as a center for the verification of supplies and services (verifying prices, suppliers, terms of sale, and whether government regulations have been complied with) and, finally, submitted to the Treasurer, who then issues the check and sends it to the initiator of the request. Requests for checks to be charged to the local counterpart funds of a given project have to undergo an additional step. They must first be sent to the Minister of Planning for verification that the expenditure qualifies for charging to the project, and are submitted to the Board of Accounts and to the Treasurer for normal verification and issuance of the checks.
- 6.31 This procedure will also have to be followed to replenish the account of the local counterpart funds for this Program. The Program Coordinator has indicated, however, that the delay can be avoided if requests are hand-carried to the different offices and the Treasurer. Checks are signed jointly by the Ministers of Agriculture and Finance or by persons deputized by them for the purpose.
- 6.32 The foregoing procedure, already tediously protracted, will become even more protracted with the introduction of a new procedure requiring requests for checks for purchases of materials and services to be approved by the Treasurer before the checks can be issued.
- 6.33 The Administrative Department issues very few reports for the use of management. At the level of the Director a quarterly report is issued of the number of active projects with the budgeted amount of the local counterpart funds compared with the actual expenditures. This report is fairly new and has been compiled retroactively to 1980-81. Any information on the general status of a project must be obtained through its coordinator.
- 6.34 At the level of the Minister a monthly consolidated report is put out which tabulates the total expenditures of the different departments in comparison with the corresponding budgeted amounts. No detailed partial reports are compiled for distribution at the level of the directors. Nor

is there any distribution of reports at the district level. However, each district director sends the Ministry a monthly activities report covering, among other points, sales made during the month, personnel, and activities in the district.

8. Budgets

- 6.35 The MARNDR operates with two budgets, the operations budget, compiled by the Budgets section of the Administrative Department and whose funds are provided by the Ministry of Finance, and the development budget, prepared by the Planning Department and transmitted to the Ministry of Planning, the funds for which are provided mostly from external sources with a small contribution from the Treasury.

(a) Operations budget

- 6.36 The operations budget of the MARNDR is one of the Government's smallest, accounting for not more than about 5% of its total operating budget over the last four years. The budget is divided into parts for the different departments and semi-autonomous agencies under the authority of the Ministry. The following table shows the structural change that the Ministry underwent when the number of its departments was increased from 5 to 9. However, it does not reflect the latest change of organization, which is too recent for the MARNDR to have made all the requisite changes yet.

Ministry of Agriculture, Natural Resources and Rural Development

Operations Budget

	<u>Budget</u>			
	<u>1983/84</u>	<u>1982/83</u>	<u>1981/82</u>	<u>1980/81</u>
Office of the General Director	645	528	656	795
Administrative Department	672	1,147	1,145	1,263
Agricultural Department	798	1,077	1,082	1,038
Natural Resources Department	306	316	318	320
State Farms and Agricultural Districts	1,894	1,617	1,604	1,478
Programming Department	121	--	--	--
Rural Economic Affairs Department	54	--	--	--
Livestock Department	163	--	--	--
Rural Engineering Department	220	--	--	--
National Council on Cooperation	--	--	--	155
IPHCADE	--	--	--	539
Artibonite Valley Development Agency	924	882	1,029	1,089
Gonaives Plain Development Agency	108	--	--	--
Faculty of Agronomy and Veterinary Medicine	390	--	--	--
	<u>\$6,295</u>	<u>5,567</u>	<u>5,833</u>	<u>6,677</u>
Annual Operations Budget of the GOH	136,000	108,000	117,000	112,000
MARNDR as % of GOH Budget	4.6%	5.2%	5.0%	5.9%

- 6.37 As shown in the following table, on average, more than 90% of the budgets of the last 3 years has gone for remunerations and less than 10% for all other expenditures, which are usually supplies, electric power, telephone service, etc. This budget has no capital items, needed vehicles being acquired under projects financed by external sources. The same holds for the construction of major structures, etc. Official cars for the Minister and Secretaries of State) are financed by the Ministry of the Interior and National Defense.

	<u>1983/84</u>		<u>1982/83</u>		<u>1981/82</u>		<u>1980/81</u>	
Personnel	5,574	89%	5,317	96%	5,148	88%	5,172	78%
Other costs	721	11%	250	4%	685	12%	1,505	22%
Total budget	<u>6,295</u>		<u>5,567</u>		<u>5,833</u>		<u>6,677</u>	
Actual expenditures	--		n/a		5,799		6,306	
% of expenditures	--		n/a		99.4%		94.4%	

- 6.38 The amount budgeted for remunerations is usually utilized in full, and any difference between budget and utilization occurs in supplies, as happened in 1981/82 and 1980/81, when only 99.4% and 94.4% of the budget was spent, respectively.
- 6.39 The greater part of the MARNDR budget goes to the farms and districts, which will take US\$1.8⁹ million, or 30%, of the 1983/84 budget. One of the smallest appropriations, US\$163,000 or 3% of the budget, would go to the Livestock Department, which would be in charge of the Program.

(b) Development budget

- 6.40 The MARNDR's development budget is a responsibility of the Planning Director, who compiles it in consultation with the Minister and in keeping with the Ministry's policies and long-term plans. The budget is then submitted to the Ministry of Planning, which integrates it with the national budgets to be financed with internal and external resources, and submitted to the Ministry of Finance for approval.
- 6.41 The Ministry of Finance allocates a block of funds as permitted by the availabilities, and those funds are then distributed by the Planning Ministry of Agriculture. As a rule, any reductions from the original plan are made in consultation with the Ministry of Agriculture, and unilateral action is avoided.
- 6.42 The MARNDR's development budget, shown in the table below, is quite large by comparison with its operations budget, amounting in fiscal 1983/84 to the equivalent of US\$38.5 million, or 18% of the development budget of the Government of Haiti.

Development Budget
(US\$ millions)

	<u>1983/84</u>		<u>1982/83</u>		<u>1981/82</u>	
Total GOH development budget	219.5	100%	216.7	100%	196.3	100%
Ministry of Agriculture	38.5	18%	35.5	16%	48.0	24%
No. of projects budgeted	33		33		48	
No. of active projects	27		27		28	
Local counterpart budget	--		8.2		11.4	
Actual expenditures	--		n/a		6.1	
Percentage of execution of local counterpart funds budget	--		--		54%	
No. of international agencies involved in external financing	14		11		11	

6.43 The budget for fiscal 1983/84 includes a total of 33 projects, of which 27, or 81%, are active, compared with only 48 projects under the 1981 budget, of which only 28, or 58%, were active.

6.44 Those 27 active projects are financed by 14 different international organizations; 5 of them are for integrated rural development, 6 for agricultural production, 4 for institutional support, and 4 for irrigation and water resources. Although the coordinators of the individual projects carry the accounts for them, the MARNDR has no consolidated reports on their status or any comparative information on their budgets on the utilization thereof.

6.45 Each project has its own records, and the funds are handled by its administrator. As a result, they are not reflected in the records of the MARNDR, and the only information on record in the department concerned is that relating to the local counterpart funds provided by the Treasurer, which are recorded by each project along with the expenditures made from them.

6.46 Therefore, any information required on the general status of a project must be obtained from its coordinator through the department under whose responsibility the project is being executed. It was not until last year, in consequence of the latest reorganization, that the administration of the Ministry attempted a retroactive tabulation of the comparative records on counterpart funds. However, those records are neither uniform nor consistent owing to the changes made in the reorganizations and the rotations of personnel.

- 6.47 In 1981/82, for example, only 54%, or the equivalent of US\$6.1 million, of the local counterpart funds budgeted, was utilized, which could have happened either because (a) the funds were not appropriated, or (b) the executing unit of the project was unable to use the funds available. This can be shown with the figures available for fiscal 1980/81, which indicate that, of the total local counterpart funds budgeted, in the equivalent of US\$8.6 million, 89% was appropriated and only 67% of what was available was utilized, for a total budget utilization of 60%.
- 6.48 While the General Management of the Ministry has the authority to obtain that information and oversee the execution of the 33 projects budgeted under its aegis, very few steps have been taken to do so, and they have been slow and yielded scant results. The only figures available on the MARNDR's general budget execution capacity are those on the projects financed by the IDB, which were executed 53% in fiscal 1981/82 and 42% in 1982/83.

9. Auditing

- 6.49 The General Administration of the MARNDR has an internal auditing unit. However, it reports to the Director of Administration, who is also in charge of all accounting and financial operations. The section has a staff of 3 and its auditing work consists in routine verifications of the expenditure records and bank account settlements. It would not audit the activities of the Executing Unit of the Program. The Government of Haiti has no auditor general to audit the MARNDR, which is indeed not subject to any auditing at all. Because of this, it is recommended that the borrower undertake that the financial records of the Project are to be certified, for the duration of its execution, by a firm of independent public accountants.

10. The executing unit

- 6.50 The project will be executed by an executing unit situated within the authority of the Secretary of State for Agriculture and Natural Resources and operating within the organizational structure of the livestock directorate. This Unit will strengthen the institutional structure of the directorate and in time, after the execution of the project will become an integral part of its organization in the form of an individual section. The coordinator of this unit will have full authority and autonomy in the execution of the project, the unit will operate under the broad norms and policies of the directorate and its coordinator will be responsible directly to its director.

11. Organization

- 6.51 Because of the high significance the project carries and its impact in that national economy, a high level co-ordinating committee will be created, composed by the two Secretaries of State and their executive directors, the livestock director and the project coordinator, who will convene quarterly to review the progress and the results of the project and assist in resolving any political bottlenecks that may arise.

- 6.52 A second advisory committee will be created at the director's level, consisting of the livestock director, and the heads of the veterinary and health services as well as the project co-ordinator to monitor the project and provide help and advice if needed in important decisions. This committee will be convening monthly.
- 6.53 The organization of the executing unit itself will be composed of the project co-ordinator in charge of a purchasing committee, a technical section, a production section and the administration. (See Annex 6.6).
- 6.54 The purchasing committee will be responsible for determining the type, price, quality of animals to be bought and make all relevant decisions for this process. The committee will be composed of the co-ordinator, the veterinary, the Administrator and the Zootechnician.
- 6.55 The technical section will be composed of two areas (a) animal health, and (b) transfer of technology. This area will be composed of specialists in animal nutrition, genetics and veterinary and an extensionist. This unit will execute the subcomponents of animal health and transfer of technology and provide the technical basis for the whole project in the production and adaptation process of the animals in the country, the animal health and protection program as well as the education process at the farmer level through the districts.
- 6.56 The production subcomponent section will consist of the two reproduction nucleus with 18 people each, 4 multiplication centers with 18 people each, and the 9 distribution centers with 12 people. Each strategically placed throughout the country and totalling 219 people. This section will also include an Agricultural economist at the Headquarter level who will perform evaluation studies.
- 6.57 Each of the reproduction nucleus and the multiplication and distribution centers will be under the authority of an agronomer who will be responsible directly to the executing unit's coordinator. Each of the reproduction nucleus and the multiplication centers will have an administrator in their staff, and they will receive all the administrative support of the district's directorate were they will be located.
- 6.58 Administration - this section will be comprised of 9 people headed by a qualified administrator with one accountant; one assistant accountant; one purchasing agent; one in charge of payroll and filing; two secretaries and two chauffeurs. This section will perform all the financial and administrative functions of the project, provide assistance as well as training to the field administration, and act as a liaison between the project and the DARNDR administration directorate.
- 6.59 Agricultural districts - the 11 agricultural districts that will have no demonstration centres will be serviced by the closest center in the area and will be fortified with one extension agronomer to service the area farmers in transfer of technology. All districts will be fortified with two animal health agents to carry out the animal health program.

- 6.60 At the field level (demonstration centres) consulting committees will be organized, one for each distribution centre, composed of the district director, the IDAI representative, the demonstration centre agronomer and a representative of the local co-operative organization to monitor and ensure that the program is indeed achieving its functions, and maintain a liaison between the local population and programs.

12. Personnel

- 6.61 The total number of persons required for the execution of the projects is 285. Of these, 38 will be provided by the Ministry of Agriculture from within its organization and the remainder will be new personnel to be hired.

The total manpower is divided as follows:

Executing Unit	15
Reproduction Centers	37
Multiplication Centers	74
Distribution Centers	108
Support to the districts	<u>51</u>
Total	285

- 6.62 Eight of the distribution centers include an animal feed production unit, employing 2 full time laborers and sharing and additional one with the center, in the function of storekeeper (See Annex 6.7). This personnel could be further divided by profession as follows:

	<u>Total</u>	<u>Provided by DARNDR</u>	<u>To be hired</u>
Specialists, Agronomists and Veterinarians	19	19	--
Veterinary Nurses	15	15	--
Administrative and Secretaries	16	1	15
Extensionists and Animal Health Agents	52	--	52
Other (chauffeur, labour)	<u>183</u>	<u>3</u>	<u>180</u>
	285	38	247
	100%	13%	87%

- 6.63 The above table indicates that all the qualified personnel (13%) will be provided from DARNDR's existing personnel. The agricultural economist has been identified and will be acquired at a later date. Of the remainder, 65% constitutes unskilled labour and 24% the administration and extension staff. The latter, which is comprised of 68 people is available within the local labour force and its inclusion is gradual with 8 people during 1984, 9 in 1985, 33 extensionists for 1986, 12 in 1987, and the remaining 6 in 1988.

13. Administration and system

- 6.64 The project will operate under a simple manual budgetary system similar to and compatible, to the one used by the Ministry of Agriculture, but much condensed, still permitting full accountability of the project and availability of data for special studies if required.
- 6.65 A budget will be issued by the project's headquarters administration for each center, based on their individual forecasted volume of operations, with the number of accounts to be used kept at a minimum. Headquarter administration will also maintain a record of all expenses by centre for control and accountability purposes.
- 6.66 Each center administrator will be responsible for paying their general expenses as well as the maintenance of their vehicles which will be done locally. A bank account for this purpose will be opened at the "Banque Nacional de Cr dit" where one month's budgeted expense funds will be deposited. Disbursement from this account will be made by checks requiring the signature of the center's administrator and the district director. Replenishment of these funds will be made monthly by Headquarters, upon presentation of a requisition with an attached list documenting all expenses paid during the previous month. Any other purchases that are not qualified as general expenses such as special equipment, or machinery as well as capital expenditures will be made at the Headquarter level by the administration.
- 6.67 Salaries and travelling expenses will be issued by the project at Headquarters and the checks will be mailed at month end to each center. This is similar to the current DARNDR procedure and it is operating without any problem. Animal feed, medicine, and desinfectants will be purchased in bulk by Headquarters. The centers will submit requisitions for these items to Headquarters, where after approval by the coordinator, they will be grouped by the administrator and purchased in bulk. These will be then shipped directly to each center charging their respective accounts. The individual centers will need only to record the quantity and value in their stock cards kept for each of these items, for inventory control purposes.
- 6.68 The distribution centers who will have animal feed production units will keep a raw material stock and a finished good stock card record in both weight and dollars for information and costing purposes only. Monthly reports of inventories will be mailed to Headquarters and periodic checks by the Headquarter's administrator or coordinator will be conducted.
- 6.69 All sales of animal feed, medicine and pigs for slaughter will be deposited in a separate account in the "Banque Nacional de Credit", and all proceeds will be transferred to Headquarters. No checks will be issued by the centers on this account. This system avoids excessive administrative work at the center level, and all expenses can be

recorded as well as controlled by Headquarters, who will have a more qualified administrator and personnel in their staff. Monthly budget v/s actual reports will be issued and mailed to each center for information purposes. Also, each center will have in its records, all pertinent information for any cost or other studies wished, such as cost of porc sold per lb., etc.

- 6.70 To secure the proper function of the system and in the absence of any written documentation we have recommended the hiring of an administration and systems consultant to document the function of the administrative personnel as well as the system and procedures. This consultant will also return when the multiplication and distribution centres begin functioning to make any necessary adjustments.

14. Distribution methodology

- 6.71 The distribution of pigs will begin during the 3rd year of operations with about 1800 F1 sows for sale and approx. 2800 boars ready for slaughter. Distribution of F2 will also begin during 1986 with an initial number of 1148 animals. The supply is stabilized in 1988 with a constant supply of 6200 animals at the distribution centre level for sale to all farmers and interested parties.

	<u>1986</u>	<u>1987</u>	<u>1988</u>
Pigs sold for slaughter weight of approx. 100 kg.	2868	8460	9180
Excess sow's sold, 2 months old	1840	2400	2400
Pigs distributed to farmers	1148	6264	6264

- 6.72 The distribution of pigs will be available to both farmers and farmers's cooperatives. It will be made on a first come first served basis and bearing in mind always the needs of the small farmer. At present there are no large scale pig farmers or speculators in Haiti, so the possibilities of requests for large stocks of animals from the distribution centre which may hurt the small farmer are almost nonexistent. The sale of pigs will be made both, in cash, or through credit from IDAI. Funds for this purpose are available through the Global Credit Program Loan to IDAI (699/SF-HA).

Although IDAI's credit regulations do allow the financing of such loans, the above will nevertheless be modified to specify that financing of pig purchases by the farmers will only be for pigs purchased by the present project.

- 6.73 The farmers applying for pigs will be evaluated by the agronomers of the district, to verify that the installations for maintaining the animals

are adequate. ^{1/} Following that, a sales agreement will be signed between the producer and the project for the representative amount of a minimum economical unit consisting of four pigs (or more if the farmer can afford) including animal feed and medicine.

- 6.74 Farmers who cannot afford the purchase of an economic unit of four pigs, could be organized in cooperative groups that can purchase at least one such economic unit. Credit accessibility will be easier for these types of cooperative groups because of IDAI's past good experiences in similar type loan repayments. These groups would be organized by either the project's field personnel or the districts' "animateur" in charge of "organización campesina". Purchasers who wish to acquire one or two animals only, will be able to do so.
- 6.75 The above mentioned sales agreement will serve as the basis for the farmer to obtain credit through IDAI if he cannot purchase the animals for cash. Once the credit is approved, IDAI will automatically transfer the corresponding funds to the project's account, in the Banque Nationale de Crédit, and endorse the farmers agreement, who in turn will take delivery of the stock or have it shipped to his farm by the project.
- 6.76 Farmers who are able to purchase their stock in cash and already have installations approved by the district agronomers will directly deposit the funds to the project's bank a/c and collect their stock or have it delivered.
- 6.77 The total amount required to finance the credit if all farmers purchase through this method would be about \$750.000. It is estimated however that at least 30% of the farmers will be purchasing in cash. This amount includes the purchase of pigs a 6-month supply of feed as well as the required medicine. It does however exclude installation costs and any credit required for purchasing F1 animals from the reproduction centers. These latter animals bearing a double cost will be absorbed by the producers who have the means to either purchase these animals for cash, or obtain credit privately. Credit through IDAI however, could still be obtained for these type of animals. These credits will be of short term (12-14 months) allowing nevertheless the farmer to benefit from the reproduction process of his pigs which requires approximately a year.
- 6.78 An agreement will be signed by IDAI and the Ministry of Agriculture representing the project, stipulating this methodology and the responsibilities of each institution. IDAI has branches and centres in all distribution centres with the exception of Jeremie. People in that area will be served by the closest IDAI office available, with the assistance of the districts extensionists.

^{1/} See Annex 6.8 on detailed methodology.

- 6.79 The above methodology was designed in a manner with which funds will not have to change hands (except for the case of the construction of the pig installation) thus eliminating excess handling and the possibility of error. They are instead transferred directly between the credit institution and the bank.
- 6.80 The project will open a bank account with the Banque National de Credit in each of the distribution centre locations. These accounts will be used strictly to deposit funds for the sale of pigs, food, and medicine. Deposits to these accounts will be transferred to the Headquarter's account in Port-au-Prince.
- 6.81 Sales of pigs for slaughter will be made strictly on a cash basis through the local middlemen and butchers. A sales register and receipt book will be kept, and checks or funds received will be deposited daily. A monthly report of all sales will be sent to the Headquarters stating the number of animals and amounts, which will be compared against the amounts transferred by the bank, at the Headquarters account.

15. Vehicle maintenance

- 6.82 The project will operate a total of 43 vehicles and 40 motorcycles (see Annex 6.9). Of these, 7 will be used by the Headquarters personnel of the Executing Unit and will be situated in Port-au-Prince and the remaining vehicles will be in the field, in the various locations where the centres will be situated. During the first 12 months of operation the borrower will maintain the vehicles through the dealerships in Port-au-Prince. Following that period the borrower will maintain the vehicles in the various garages existing within the various centres areas. Parts availability does not appear to be a problem, for any major work required, however, the borrower will send the vehicles to the dealer in Port-au-Prince. The DARNDR facilities will not be used since most of the vehicles will be in the field and the dealerships are better equipped for any major work that may be required. The borrower will also maintain full insurance coverage on all the vehicles used by the project.

16. Control of funds

- 6.83 The project, at the Headquarters level, will operate with three bank accounts, two at the "Banque de la Republique d' Haiti" and one at the "Banque Nacional de Credit". The first account at BRH will be used for the deposit of the BID funds and the second for the deposit of the local counterpart funds. Replenishment of the local counterpart account will be made through DARNDR according to their standard procedures. Checks drawn on that account however will be made directly by the project and both accounts will be accessible only to the coordinator and the administrator. All checks drawn will carry the signature of both officials. The account with the "Banque Nacional de Credit" will be used to accumulate all funds from the sales of animals feed, etc. No checks will be drawn on this account and the funds will be transferred to Treasury who will rechannel them to the local counterpart account at the BRH.

6.84 The centres will be operating with two bank accounts, both at the "Banque Nacional de Credit". The first will be used for the deposit of all sales made and transferred to headquarters and the second will be used for payment of the current expenses of the centers. This latter account will be replenished by Headquarters. These accounts will be administered by the center administrator and checks drawn will carry the signatures of the administrator and the district director.

17. Financial Aspects

6.85 The project will begin in 1984 with the creation of the Executing Unit and will be gradually taking form until 1986 were by the end of that year the complete program will be operating and the first revenues will be realized. The following table illustrates a cash flow with the revenues generated by the project and the incremental expenses incurred. These figures do not include the personnel that presently exists within DARNDR and will be transferred to the executing unit or any of the loan finance expenses which will be absorbed by the Government of Haiti.

in 000's of US\$

	1984	1985	1986	1987	1988	1989	1990
Inflow Revenues	--	--	548.0	1427.1	1460.8	1396.5	1341.5
Inflow Aporte L. 1/	83.8	419.1	1077.9	1076.5	1120.8	1185.1	1240.1
Outflow 2/	83.8	419.1	1625.9	2503.6	2581.6	2581.6	2581.6
Net	ø	ø	ø	ø	ø	ø	ø

in 000's of US\$

	<u>Revenues</u>		<u>Expenditures</u>		<u>Diff.covered by DARNDR</u>
Executing Unit	--	--	67.5	3%	67.5
Reproduction Centres	459.7	34.2%	561.5	22%	101.8
Multiplication	725.2	54.1%	1171.3	45%	446.1
Demonstration	156.6	11.7	495.8	19%	339.2
Extension	--	--	285.5	11%	285.5
	1.341.5	100%	2.581.6	100%	1240.1

1/ See Table 6.11.

2/ See Table 6.12 and 6.13.

- 6.86 The majority of the revenues (see Annex 6.10) are generated through the sale of pigs for slaughter (79%). These revenues tend to decline in the latter years until prices are stabilized in 1990 as the shortage of pork terminates. The revenues of young pigs distributed represents only 21% of the total and these carry a steady price of 25.00 a head, throughout the project. For the first five years or during the execution of the project the operating expenses will be covered by the revenues and the aporte local, the sixth year will be also covered through the financing of the animal feed made by the bank in the last year of execution. The project however, is not self sustained and beginning the 7th year of operations or 1990 the Ministry of Agriculture will have to maintain a constant contribution to the project of 1.2 million. This will be absorbed by the project as indicated in the following table.
- 6.87 An expense reduction to alleviate the government contribution will be difficult, as 51% of the total represents animal feed and medicine and only 6% represent general expenses.
- 6.88 The amount of 1.2 million required annually by the project beginning in 1990 and beyond, represents an increase of 19% over the 1983/84 DARNDR budget of US\$6.3 million.
- 6.89 Therefore, upon completion of the goals of the project, which will be attained during the seventh year (1990) when the country will achieve a pig population equal to that which existed prior to the disease, the Government, in consultation with the Bank, will decide whether to continue the program at a reduced scale and utilize the installation and infrastructure in other type of livestock programs.

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VII. JUSTIFICATION OF THE PROGRAM

A. Technical Feasibility1. Concept and Strategy of the Program

7.01 From the study and analysis performed, it may be concluded that the Program is feasible from the technical standpoint. This view is supported by the following points:

- (a) The Program arises out of the country's urgent need to reestablish its swine population, which had to be slaughtered in toto when it was attacked by ASF.
- (b) The country's principal domestic animal was traditionally the pig, whose breeding in the rural household was of basic importance to round out the rural diet and fend off malnutrition.
- (c) The Program consists of priority subprograms designed:
 - (i) to strengthen the technical-administrative infrastructure of the MARNDR as the Ministry responsible for the policy of improving, preserving and reviewing the national stocks of domestic animals, and
 - (ii) to generate technological knowledge and transmit it to the small and middle-scale farmers as a means of helping them to improve their animal and land resources.
- (d) The technical bases and strategy proposed for practical, applied research into techniques of production and, when validated, for their demonstration to farmers on their own lands, will contribute in the short and middle run to improve production coefficients, the hygienic condition and health of pig herds, the income of the peasant families, and nutrition in the rural sector.
- (e) The programming and the technical arrangements of the Plan of Action have been found compatible with the new rules and structure of the MARNDR.
- (f) The renewal that the Program will produce at the regional level with its strengthening of administrative functions and of education, extension, organizational, communications and credit services, will strengthen the operation of economic forces essential to consolidate the process of technological, political and social improvement.

2. Need for the Program

- 7.02 The proposal to reestablish the swine population indicates that the country is prepared to make the many efforts required to repair the political, economic and social ravages wrought by ASF and to restore to the Haitian countryside an asset that has been at once a source of savings, income, employment and nutrition.
- 7.03 In its concern to contribute to the creation of conditions in which agricultural activity can be productive in every region of the country, and so keep the rural inhabitant attached to his soil and discouraged from migrating to town, the Government has designed the Restocking Program to operate on two lines: firstly, in the short run to bring back the pig, from which foods of animal origin will be produced to stave off malnutrition and generate savings, and secondly, to implement a national infrastructure for agricultural production with new policies and procedures in which other sectors will be fully involved, such as education, environmental improvement, health, and marketing.
- 7.04 As a developing country, Haiti needs agricultural projects to enable it to meet its greatest needs, among which food production is the highest priority. It also is in urgent need of resources and inputs with which to raise crops and livestock efficiently not so much by bringing additional lands under cultivation and grazing, as by applying a technology and strategy that will raise the productivity of the unit of area in its existing ecological setting.
- 7.05 The Swine Restocking Program is structured technically and administratively to respond to the country's urgent needs for institutional reorientation, gradual technological change directed at producing more with the existing natural resources, and providing the inputs needed to obtain higher yields, such as breeding stock and basic inputs (water, balanced feed rations, vaccines and different drugs, plant material, agrochemicals, etc.).

3. Production Subproject

- 7.06 For the proper implementation of the infrastructure and effective execution of the Program, it has been considered necessary to provide it not only with correct planning, but also with the facilities and means of work needed to attain the set goals. The principal investments are the construction of offices, reproduction units, multiplication centers, demonstration and distribution centers, urban abattoirs, rural abattoirs, and the sinking of wells and providing them with pumps to serve as sources of water supply. Other basic categories are the acquisition of machinery, equipment, vehicles, replacement parts and accessories, and breeding stock. One of the most important items is the acquisition of inputs, notably the purchase of basic feeds and feed supplements for the correct feeding and nutrition of the herds. It is considered that in this way, the project will acquire a solid and functional logistical infrastructure suitable for the conduct of the different activities envisaged for attaining the purposes and targets.

- 7.07 The preliminary draft designs for the architectural and urbanistic layouts of the physical works envisaged, such as the central office, reproduction units, distribution centers, abattoirs, etc., were worked up as part of the feasibility study performed by the ICA/UPP Unit, and the final plans for those works were prepared by the Haitian consulting firm of Artec, S.A. under contract to the ICA office in Port-au-Prince on the basis of the specifications and health safety measures indicated by the consultants of the ICA/UPP Unit.
- 7.08 The designs for the structures called for under the subproject are regarded as functional and suited to the operations to be carried on in them. They are of modest dimensions and have been designed and calculated by an expert in rural construction for pig-raising operations with technically sound attention to working areas, staff circulation paths, the installation of equipment and the handling of the stock, and with an architecture suited to tropical climates and passive sanitary protection measures, especially at the reproduction units and multiplication centers.
- 7.09 The types and quantities of machinery, equipment and vehicles envisaged are necessary and proper to the proposed activities, and the quantities requested are rationally distributed among the different offices and warehouses of the units and centers. Much of it would be brought in from abroad except for such furniture as could be purchased from local industry. No difficulties of supply are anticipated from any of the sources cited.

4. Training and Technology Transfer Subproject

- 7.10 The activities under the Technology Transfer subproject would be proportioned to regional needs and to the availability of technology already known in the country, which has a centuries-old tradition of raising pigs on a family and semi-extensive basis. The goals of this subproject would be attained with the recruitment of the farmers to the procedures for technological change and their adoption of tested practical procedures for improving the sources of family income with small investments.

5. Animal Health Subproject

- 7.11 This subproject is a very important component of the National Swine Restocking Program. The projects involved are intimately linked to the other subprojects in regard to the protection from disease of the pigs to be imported, which are highly susceptible to the febrile diseases of swine, in addition to which the country does not yet have an adequate epidemiological surveillance structure or coverage.
- 7.12 The overall programming of the subproject includes activities and investments to reinforce the quarantine surveillance and control services as ports and border crossings, for the livestock to be imported and bred under the Project in the short and middle term would have to be watched much more carefully at ports and airports so as to prevent the infiltration of the pathogens of economically important diseases.

B. Institutional and Financial Viability

1. Institutional Viability

- 7.13 The Ministry of Agriculture National Resources and Rural Development is the only government related institution with the experience necessary to carry out the project. MARHDR has experience with projects financed by international organizations and is presently involved in the active execution of 27 different projects in their field. All the skilled professional personnel required to carry out the present project have been identified and the great majority are presently within the DARNDR organization and will be transferred to the project.
- 7.14 To fortify the executing unit's capabilities a number of consultants will be hired in the institutional administration as well as technical fields to help set up the operation and then monitor and/or evaluate its different steps. The infrastructure created by the project will remain and be integrated in the livestock directorate of DARNDR as a section and will be the basis for different other livestock programs to be undertaken in the future by the Ministry.

2. Financial Viability- Local Contribution

- 7.15 The Government of the Republic of Haiti is operating under two budgets, a national operating budget financed mostly by the Government itself and a development budget financed through external loans and donations.

Republic of Haiti
General Budget
(in millions of US\$)

	<u>1983/84</u>	<u>1982/83</u>	<u>1981/82</u>		<u>1980/81</u>	
	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Actual</u>	<u>Budget</u>	<u>Actual</u>
Revenues	190.0	150.0	169.0	145.0	143.0	131.0
Loans	12.0	30.0	39.0	47.0	50.0	35.0
Total Revenues	202.0	180.0	208.0	192.0	193.0	176.0
Operating Budget	137.0	109.0	117.0	113.0	112.0	108.0
Loans Repayments and Special Funds	46.0	47.0	54.0	50.0	44.0	51.0
Development Budget and Local Counterpart	19.0	24.0	37.0	29.0	37.0	17.0
	202.0	180.0	208.0	192.0	193.0	176.0

- 7.16 The national operating budget is used mostly to finance the operation of the various ministries. This amount represents 68% of the total budget for 1983/84. A smaller portion 33% is used for loan repayments and

extraordinary expenses and 9% as the local counterpart for projects representing 19 million for the same period. The % of the local counterpart funds in comparison to the total budget have been diminishing in the last four years.

Year			Budget	Actual \$ disbursement	%
1980/81	19%	or	37 million	17	46
1981/82	18%		37 million	29	78
1982/83	13%		24 million	n/a	--
1983/84	9%		19 million	--	--

- 7.17 The development budget is a little larger than the national budget and is composed on the average with 1/3 national funds and 2/3 external funds. Of the 151.7 million of external funds indicated in the 1983/84 budget, 89 million or 59% are donations and the remaining are from international institutions.

Republic of Haiti
Development Budget
(in millions of US\$)

	1983/84		1982/83		1981/82	
External Sources	151.7	69%	140.8	65%	130.3	66%
National Sources	67.8	31%	75.9	35%	66.0	34%
Total	219.5		216.7		196.3	
PL 480 & Donations		11%		10%		16%
Treasury		9%		13%		18%
Public Corporations		11%		12%		--

- 7.18 Again, of the remaining one third which is financed by the local resources only 9% comes directly from the Treasury, 11% from PL 480 donations and 11% from revenues generated from public companies. The latter is very volatile and is one of the reasons why the Government is falling short of contributing the budgeted local counterpart funds (see previous Table, 46% for 80/81 and 78% for 81/82). Although the budget for fiscal year 83/84 has been published and this project is not included, the local counterpart is only US\$100,000 or .5% increasing to US\$400,000 or 2.1% for 84/85. From there on the amount increases to over a million dollars which represents over 6% of the local counterpart budget. Considering however that the local counterpart contribution funds are usually 85% of budget this could represent almost as high as 8% of the budget.

- 7.19 The project begins generating revenues however during the third year of operation which surpass the amount of funds required as local

counterpart for each of their respective years beginning in 86/87 for a grand total of 4.7 million. The current project's local counterpart needs as a percentage of the 83/84 budget is compared to the revenues generated as follows:

	Local Counterpart <u>Funds Required</u>	<u>% of Budget</u>	<u>Revenues Generated</u>
83/84	.1 million	.5	-- million
84/85	.4 million	2.1	-- million
85/86	1.0 million	5.3	.5 million
86/87	1.1 million	5.8	1.4 million
87/88	1.2 million	6.3	1.5 million
88/89	1.2 million	6.3	1.3 million
	<u>5.0</u>		<u>4.7</u>

- 7.20 Officials of both, the Ministries of Planning and of Finance indicated that due to the national importance of the project the local counterpart funds required will be placed on top priority and included in the budgets of the above years, also the revenues generated will be redirected through Treasury to finance the project.

C. Socioeconomic Analysis

- 7.21 This section evaluates the socioeconomic impact of introducing a new pig population in Haiti from the standpoint of production. It also analyzes the effects of the project on the nutrition of the Haitian population.

1. Introduction

- 7.22 As an immediate consequence of the eradication of the Haitian pork population, the average per capita consumption of meat dropped from an estimated 6.63 kg/person/year in 1970 to 4.0 kg/person/year in 1983, to which latter figure population growth and stagnation of production also contributed. On the basis of FAO's recommended meat consumption (10 kg/person/year) there was already a deficit of 3.4 kg/person/year before the slaughtering of the pig population, and this deficit would rise to 7.8 kg by the year 2000 unless a reliable source of meat supply can be found. It must also be noted that about 50% of the total meat consumption (and hence of the animal protein) was provided by pork, which has not been entirely replaced. This situation is of transcendent importance to the country, where the most common nutritional disease is protein-energy malnutrition, from which more than 70% of all preschoolers suffer (27% of them have 2nd and 3rd-degree malnutrition), which in association with other infectious diseases has resulted in a high mortality in Haiti and slower and less body development in the population. Moreover, the pig is the principal alternative as a reliable supply of protein to reduce the rate of protein-energy malnutrition owing to the very limited usefulness of Haitian rangelands for any other species of livestock (see 7.14).

- 7.23 In addition to the foregoing, it is considered that the pig has been the peasant's chief source of savings owing to the finely atomized structure

of the land tenure (81% of the farms are smaller than 1 hectare in size), which does not allow larger animals to be raised, and also because the pig is regarded as offering the fastest way the peasant has to capitalize his assets.

- 7.24 In the light of the foregoing considerations, the introduction of a new pig population has been analyzed as a production project for its effect on the Haitian farmer in terms of the conventional socioeconomic parameters (NPV, IRR, etc), which also brings out its implications for the consumer.

2. Background

- 7.25 In mid-1978 the Dominican Republic was pronounced infected with African swine fever (ASF), which was later found to be present in Haiti by observations made in Artibonite Valley. Of a national herd of about 1.2 million pigs in 1978, 50% were eliminated by the disease itself and by peasants who expected their stock to catch it. In a program of systematic pig slaughtering (PEPPADEP), the country's entire pig population was later wiped out. The direct economic impact of these events was felt in significant changes in the prices of both pork and its substitutes (beef, goat, and other meats). In addition, there appears to have been speculation in the production of substitute meats, for the cattle and goat herds in 1979 grew beyond traditional levels at which they had remained static for more than 25 years, implying a lower offtake rate and additional distortion of the structure of meat prices.

3. Evaluation Methodology

(a) Location and use of infrastructure

- 7.26 To attain greater and more effective distribution of pigs throughout the country, 9 of the 20 agricultural districts were selected as locations for demonstration and distribution centers. In selecting these sites, requirements were imposed as to the physical facilities that must be on hand (electric power, water, roads, etc.), which narrowed the field down to the following towns as the best locations: Les Cayes, Hinche, Cap Haitien, Artibonite, Jeremie, Port-au-Prince, Jacmel, Port de Paix, and Las Cahobas. To supply these centers, four multiplication centers would have to be built, and would be located in the first four named of these towns. To determine the flows and destinations of the supplies of animals produced in the multiplication centers, a "transportation" linear programming model was designed as follows:

$$\text{Minimize } Z = \sum_{i=1}^m \sum_{j=1}^n C_{ij} X_{ij}$$

subject to:

$$\sum_{j=1}^n X_{ij} = S_i, \text{ for } i = 1, 2, \dots, m$$

$$\sum_{i=1}^m X_{ij} = d_j, \text{ for } j = 1, 2, \dots, n$$

$$X_{ij} \geq 0 \text{ for any } i, j.$$

Where Z is the functions of costs to be minimized from source of supply i to destination j .

X_{ij} is the flow or quantity of supply from source i to destination j .

S_i is the expected supply or production.

d_j is the quantity demanded.

C_{ij} is the cost implicit in the transportation from source i to destination j .

- 7.27 With the figures from Table 7.1 of the Economic Annex and using the LINPROG program processed in the IDB's computer, it was found that the optimal system of supply would be as follows:

<u>Source of Supply</u> (Multiplication Centers)	<u>Destination ^{a/}</u> (Distribution Centers)
Les Cayes	Les Cayes
	Jeremie
Hinche	Hinche
	Port-au-Prince
Cap. Haitien	Cap. Haitien
	Port de Paix
Artibonite	Artibonite
	Las Cahobas

^{a/} The residual production of the 4 multiplication centers would constitute the supply for Jacmel.

- 7.28 By the same process it was found that the optimal solution for delivering pigs from the breeding units to the multiplication centers would be from Tamarinier to Artibonite and Cap Haitien and from Petit-Goave to Hinche and Les Cayes.

(b) Feeding Requirements

- 7.29 The total feed requirements for the Program were obtained on the basis of balanced diets recommended on pig farms of 2.5 kg/day for fattening animals, 0.5 kg/day for piglets up to 3 months old, 3.0 kg/day for sires, and 2.6 kg/day for sows, and assuming growth of the herds at the reproduction units, multiplication centers and demonstration centers (see Table 7.2). Allowance was also made for the need to provide balanced feeds to farmers receiving the distributed pigs on the assumption that they could provide 50% of the animals' needs and complement their diet with fruits, food wastes, etc. As can be seen in Table 7.3, the total feed requirements come to about 11,000 tons/year.

- 7.30 A balanced-feed plant (SONUAN) is operating at present in the environs of Port-au-Prince with enough installed capacity to supply those feed requirements. However, the transportation costs involved in supplying the different areas of the country would considerably increase the cost of the feeds (Table 7.1). Because of this, and to avoid dependence on a single source of feed, provision has been made for acquisition of the equipment needed for mixing, chopping and drying feed on the premises of each distribution center.
- 7.31 The capacity of this equipment has been scaled to the regional feed requirements, with Artibonite, Cap Haitien, Hinche and Les Cayes being slated for capacities of 10 tons/day and the other centers for 4 tons/day each.

(c) Evaluation Period

- 7.32 To determine the period over which the performance of the Project would be evaluated, criteria were considered that would have to relate to the same time frame. On the one hand, it would have to be ensured that the pig population is built back to its level prior to the eradication (1.2 million animals) and, on the other hand, a volume of meat would have to be supplied that would provide the consumption levels recommended by FAO 1/ (10 kg/person/year), and also that the flow of direct benefits is stabilized, and, lastly, the project would have to be kept from growing so large as to impose excessive recurrent costs on the country.
- 7.33 According to the Project's multiplier effects, Haiti would be considered as restocked with its pig population between 1990 and 1991, and with offtake rates that would achieve FAO's recommended consumption levels. Moreover, stabilization of the flow of benefits would come about in 1993 (year 10 of the project), which is why that year has been chosen as the last year for evaluation purposes.

(d) Scope of the Evaluation

- 7.34 As previously mentioned, pig-raising was the principal source of savings for the Haitian peasant and at the same time the chief source of animal protein for the population. While the economic viability of the project could be equally evaluated at the level of either the consumer or the farmer, the latter option has been chosen because the farmer would be the direct beneficiary of the scheme proposed in the project. However, as shown hereafter, the impact of the pig restocking program has been quantified in its nutritional aspect to analyze requirements on the one hand and availabilities on the other.

1/ A condition relating only to the meat supply and disregarding factors of disposable income.

4. Benefits of the Program

(a) Direct benefits

- 7.35 According to the pig distribution programming (Table 7.2), about 8,664 sows a year would be delivered to beneficiary peasants, of which 2,400 would come from the breeding units and 6,264 from the multiplication centers. The production obtained from the first generation of these sows during their breeding life (estimated at 5 years) was regarded as a direct benefit because the breeding stock for a second generation would be different from the original stock and attributable solely to the peasant and not to the project. Moreover, it was assumed that the farmer would fatten the males and 25% of the females bred from the first generation delivered, and sell or keep the rest of the females as a source of capitalization or as replacements.
- 7.36 At the Project level direct benefits would also follow from the fattening of the males produced in the breeding units and the multiplication and distribution centers. The principal technical assumptions on which the benefits to be obtained at the different levels considered are based as follows:

	<u>Breeding Units</u>	<u>Mult. & Dist.Cents.</u>	<u>Peasant Level</u>	<u>Pre-era- dication</u> a/
Fertility (%)	80	80	70	ND
litters/year	1:8-2:0	1:8-2:0	1:5	1:0
piglets weaned/litter	7:25	8:25	5:0	3-4
adult mortality (%)	2:5	2:5	5:0	ND

a/ Essentially estimates made by the IDB mission during the analysis process.

- 7.37 Tables 7.2 and 7.4 were compiled on the foregoing assumptions to show the direct benefits in terms of animals produced at the Project level and at that of the farmer. As can be seen in them, in the year of stabilization (1993) there would be 39,199 sows farrowing (not including the progeny of the first generation obtained), 294,000 piglets would be weaned per year, and 174,564 males would be fattened by peasants. In addition, the Program itself would be producing about 10,000 fattened males from 1,500 breeding sows.

(b) Indirect benefits

- 7.38 One of the most important indirect benefits of the Project would be its multiplier effects. For purposes of the analysis the only benefits considered are those deriving from the first generation of females delivered to the farmer. However, the pig herd would continue to grow

independently of the existence of the Project, through the 2nd, 3rd and subsequent generations of the existing breeding sows. As can be seen in Table 7.5 of the economic annex, there would be 539,000 sows in production by 1990 and 1.8 million by 1991. In addition, 700,000 pigs would be in fattening by 1990.

- 7.39 The foregoing would yield additional benefits to the consumer which were also not considered as direct in the analysis. Basically, it would be assumed that a larger supply of meat would bring its prices down from present levels (see price analysis), which would raise consumption and improve the nutritional levels of the population. Table 7.6 was constructed from this standpoint, and projects the growth of the population to 6.6 million inhabitants by 1993 (year 10 of the Project). In addition, estimates and projections of per capita meat production have been done to 1993 on the basis of offtake rates, reports of existing abattoirs, availabilities, and the population's own growth rate. As can be seen in Table 7.6, an offtake rate of 800,000 pigs/year would be achieved between 1990 and 1991 to afford a minimum consumption of 10 kg/person/year in accordance with the FAO recommendation. ^{1/} Of these 10 kg/person, it was estimated that 7.4 kg would be pork, and the rest beef, goat and other meats.
- 7.40 It is worth mentioning that benefits (unquantified) would follow from the technical support that would be provided to beneficiary farmers under the AID "INTERIN" Program (section 6.06) in addition to the disease prevention support that would be provided to reduce the risk of contracting African swine fever or other infectious-contagious diseases.
- 7.41 Lastly, the manure to be produced by the pigs under the Program and kept by the peasants can be used as organic fertilizer under plantations and crops. The benefits from this by-product were not quantified in the analysis of the Project.

5. Assignment of Costs and Benefits

- 7.42 By the year of stabilization of the project (1993) an income of US\$1.4 million would be earned a year in animals fattened and females produced at the units and centers of the Program. Of this figure, however, US\$276,600 would be financial income and not economic benefits (Table 7.7), because in relation to females sold to the farmer, who would collect residual benefits when he replaced them. Thus, to avoid double counting of benefits, only those benefits are considered which are derived from discarding of the animal. The same treatment was given to the peasant's investments in the acquisition of breeding sows from the Program's distribution system, the cost of which would be counted twice if the sales value of those animals were regarded as acquired in the course of their maintenance and care at those centers (Table 7.8).

^{1/} In terms of supply, without regard for the income factors involved.

- 7.43 When all the economic costs of the incremental investment at the level of the Program had been included, an estimate was made of the value of the acquisition of replacement parts, accessories, laboratory and information materials, throughout the service life of the Project. The same procedure was taken for the operating costs, consisting essentially of remunerations and feed expenditures. In short, an amount of US\$2.9 million was provided to cover these items throughout the evaluation period (tables 7.7 and 7.8).
- 7.44 At the farm level it was found that by the year of stabilization of the Project, the economic costs involved would total US\$14.4 million, of which 97% would be for feeding the herd; the remaining 3% would be essentially for labor. It was assumed that 100% of the care of the pigs would be provided by the family, and that each beneficiary farmer would have 2-3 pigs. Even without any financial flows for this purpose and if the opportunity cost of the family labor is close to zero, a value of US\$1.00 per day was assigned for every 40 existing breeding sows. ^{1/}
- 7.45 It may be mentioned that US\$1.2 million included in the economic costs of the project are for disease prevention activities at ports and border crossings, and for execution and operating purposes (incinerators, informational equipment and materials, laboratory equipment, biologicals and vaccines, and health screenings). This will reduce the risk of contracting African swine fever and other diseases specific to swine. This support would be additional to the presence of inspectors at sea and airports and border crossings, and to the laboratory exclusively for the diagnosis of African swine fever built by the PEPPADEP. Though it was recognized that a reduction in the risk of infection with any disease is an implicit benefit of the project, it was not possible to isolate the value of this benefit as had been done for the implicit cost. However, it could be assumed conceptually that any marginal lowering of the index of the risk of infection would account for much of the benefit that could accrue. These benefits would not be for Haiti alone, for the risk of any disease such as African swine fever would imply an equal or greater risk for other pig-raising countries such as the United States, Mexico, Canada, and the other Caribbean countries, and this was the risk that prompted the program for destruction of the swine population of Haiti.

^{1/} It was assumed that one person could tend 40 sows. Moreover, the Annual Report for 1983 of the Integrated Agricultural Development Project of Texas A & M University at Port-au-Prince yielded figures on the opportunity cost of labor which place it at US\$1.00/day. For purposes of the analysis, it was assumed that the market price of unskilled labor would be very close to or the same as its efficiency price, and hence no adjustments were made for this.

6. Pricing Scheme

- 7.46 One of the main problems in obtaining the prices used for the Project was the inconsistency of the statistical information and primary sources, or indeed the very lack of them. What follows will also present the situation created by the wiping out of the swine population, which distorted the system of prices both of pork and of other meats as well.
- 7.47 An analysis of the cross-elasticity of pork relative to beef and goat was made on the basis of secular data on their production and prices to determine the extent to which these meats could be substituted for each other (positive elasticities). However, the interdependence of those substitutions could not be specified because the condition of "..., all other factors remaining constant" was not fulfilled inasmuch as the wiping out of the swine population had reduced the supply of pork to a low level (the validity of this was borne out by the finding that starting in 1978 meat prices far outstripped inflation and other food prices, at the time owing to external factors). The only tenable conclusion was that, if pork production became "unlimited", its price and the prices of substitute meats would tend toward equilibrium and decline asymptotically over time (at real prices). On this assumption, the retail price of pork in 1978 (\$1.34/kg) was multiplied by the observed rates of inflation up to 1983 and incrementally by an estimated 8% rate up to 1990 (the year up to which the restocking has been projected) to obtain the limit toward which the unit retail price would tend (\$3.82/kg), for which intermediate points between 1983 and 1990 were found by linear interpolation. To find the corresponding prices to the farmer for the live pig, a carcass yield of 44 kg/100 kg of live animal (45%) was assumed. It was further assumed that 32.5% of the final value of the animal would be kept by intermediaries and carriers.^{1/} The result was a price to the farmer of \$1.20/kg, as shown in table 7.9.
- 7.48 Since, generally speaking, prices in Haiti represent the real cost to the economy deriving from a supported exchange rate of G.5 = US\$1, and in the absence of subsidy of tax policies (in relation to the income or expenditure of the Project) to modify the structure of market-efficiency prices and costs, it was not considered necessary to use any factor for adjustment between the financial and efficiency prices used in the analysis.
- 7.49 In view of the determination of the Government of Haiti to deliver pigs to farmers at their real cost, a scheme of prices was devised based on the characteristics of the pigs, depending on the generation and the net income obtainable. The result was the following scale of properties:

^{1/} Between 10% and 20% would go to the urban warehousemen and carriers, 10%-20% to regional intermediaries (Madame Sara), and 5%-10% will remain at the local level, so that, on average, 67.5% of the value of the product will remain in the hands of the peasant.

<u>Cost (\$)</u>	<u>Net Income</u>	<u>Generation</u>	<u>Properties</u>
		F 1 <u>Imported Females</u>	High genetic and sanitary value.
266 <u>1/</u>	1575	F 2 <u>Reproduction Units</u>	Lower genetic value, lower sanitary value, greater weight value.
		F 3 <u>Multiplication Centers</u>	Lower genetic value, lower sanitary value, same weight value greater adaptability.
25-30 <u>2/</u>	180-150	F 3 <u>Distribution Centers</u>	Same as above.
		F 4 <u>Peasant</u>	Lower genetic value, same weight, greater adaptability.

7.50 Assuming the weight of a breeding female at three months is 19 kg (equivalent to \$20) would mean that an additional \$5 per female would be attributable to the animal's genetic value (20% of the total value).

7. Results of the Analysis

7.51 When all the direct benefits and economic costs previously described were added in, an internal rate of economic return of 13.2% (table 7.10) was obtained, generating \$780 in net present value (discounted at 12%) over an evaluation period of 10 years. This IRR, though apparently marginal, adequately represents the opportunity cost of capital in Haiti; moreover, it has to be understood that the multiplier effects of the Project become quite visible in subsequent years. According to an evaluation over 15 years (table 7.11), the economic return rises to 22.2% with a net present value of \$11.9 million (discounted at 12%), which attests to the validity of this argument.

7.52 Considering the benefits to the consumer in the form of surpluses to him (following from a drop in pork prices as the supply increases), according to the foregoing (8.31) the Project would generate \$5.14 millions in net present value (discounted at 12%). Moreover, the internal rate of return would rise to 19.6% (table 7.10 A).

1/ Estimates of the value of a female at three months.

2/ Obtained in proportion to cost and to income generated.

- 7.53 The proportion of the per capita income spent on consumption was determined (95%) for purposes of considering the impact of the Project on the nutrition of the population. Also, on the basis of values for earlier years it was estimated that 4% of the annual consumption was of meat. With these data the amount disposable for meat consumption was projected to 1993 and, divided by the unit price considered (\$3.95/kg at the retail level, and \$1.20/kg to the farmer), was found to yield a per capita consumption of 8 kg of meat a year (7.12), which is only an average of 2 kg short of the level of meat consumption recommended by FAO (10 kg/person/year) instead of a gap of 7 kg in the absence of the Project (see table 7.6).

8. Sensitivity Analysis

- 7.54 To test the rate of return obtained from the Project, changes were assumed in the benefits, operating costs, and investments. As can be seen in Table 10, the system is fairly inflexible to changes in investments (only when these are increased more than 15% does the IRR show values lower than the minimum estimated opportunity cost of capital at 12%). To benefits and operating costs, however, the system is fairly flexible, and responds to any marginal movement with significant changes in the rates of return.
- 7.55 It must be noted that the factor of greatest weight in the Project's benefits is the technical indices of the herd (owing to the breeding traits of the pigs, which have great multiplier effects) and not the unit price of the meat; hence the special emphasis during execution of the Project on the attainment of those indices.

9. Analysis of Beneficiaries

- 7.56 According to information compiled by Clarence Zuvekas, Jr., ^{1/} in 1971, Haiti had 616,710 farming units, a figure which is presumed to continue in 1983 (in 1950 there were 565,500 units, for an increase over 21 years of only 9%). Assuming 6 members per rural family, 3.7 million persons are involved in primary production pursuits. The same source (table 7.13) indicated that 97% of the farming units covered 14% of the area and 90% of the units 62% of it.
- 7.57 The number of pigs per farming unit was estimated at 1.8 in 1970, which declined to about 1 per family in 1979 because of African swine fever. On the basis of the multiplier effects of the Project, by 1991 every rural family would have 3 pigs, for an increase in savings (relative to the situation prior to the wiping out of the swine population) equivalent to 1.2 pigs.
- 7.58 The data presented in table 7.13 yielded a Gini dispersion coefficient of .51 based on the Lorenz curve displayed in Table 7.14 (note that for 1950 the Gini coefficient was .49, which is why it has been assumed that there has been no change in the number of farming units in 1983).

^{1/} Land Tenure, Income and Employment in Rural Haiti. A Survey, USDA, 1978.

- 7.59 The low-income threshold in Haiti has been estimated at 2,704 gourdes per capita (\$540 per capita) in December 1982, which, assuming an average family of 6 members, and inflation at 8% in 1983, yields a family income of \$3,500 a year. Moreover, this income level has been estimated to correspond to a family holding of 3.5 hectares (2.7 carreaux). Table 7.13 shows that 95% of the farming units are within that size class.
- 7.60 Moreover, it was assumed that in the middle and long run the distribution of pigs among farming units would acquire the configuration prior to the wiping out of the swine population, that is, as illustrated in this table: 1/

<u>Farm Size (Has)</u>	<u>No. of Pigs as % of Total</u>
0.01 - 0.49	26.0
0.50 - 0.99	24.4
1.00 - 1.99	26.3
2.00 - 4.99	18.1
5.00 - 9.99	5.2
10.00 - 19.99	--

- 7.61 In addition to the foregoing assumption, during execution of the Project, special care would be taken to direct the distribution of pigs to the small farmer, 2/ which, it is expected, would result in the assumption's being fulfilled in its entirety.
- 7.62 In considering the foregoing points, it would be assumed that 95% 3/ of the net benefits at the farmer's level would go to low-income earners, in addition to which there would be the transfers of benefits to the public sector. According to the methodology proposed by the Bank for the treatment of flows to the public and private sectors, 95% of the flow to the private sector would go to the low-income sector, as shown in the following table:

- 1/ Source: Enquête Socio-Economique. Résultats du 1er Questionnaire Annuel. Programme de Développement Régional Intégré. Haiti, 1978.
- 2/ Through economic production units the smallest farmers would be associated in a scheme for support to the Project.
- 3/ A system of ownership/property centered on the median of the assumed range was considered.

DISTRIBUTIONAL IMPACT 1/
(US\$ thousands)

	Low Income Earners	Other Types of Producers	Total Private Sector	Public Sector	Total
Investments	936.5	47.9	984.4	7,399.6	8,384.0
Operating and Maintenance Costs	23,312.7	1,227.0	24,539.7	10,854.5	35,394.2
Gross Benefits	37,708.4	1,984.7	39,693.1	4,866.9	44,560.0
Net Benefits	13,459.2	709.8	14,169.0	(13,387.2)	781.0

$$\text{Proportion of benefits to low-income farmers} = \frac{13,459.2}{14,169.0} (100) = 95\%$$

1/ Not counting the benefits to the consumer in the form of surpluses. However, there is not assumed to be any variation in the distributional impact since these benefits are included, 97.8% of the persons employed being among the lowest-income earners, receiving 84% of the total income.

LA ENFERMEDADA. LA ENFERMEDAD

- Virosis Africana dei Maiale - Peste Porcina Africana
- Afrikanische Schweinepest - Peste Porcine Africaine
- African, Swine Fever - Pestis Africana Suum

EPIZOOTIOLOGIA

- La Peste Porcina Africana (PPA), es una enfermedad viral altamente contagiosa de los animales porcinos, confinada hasta 1957 al continente africano, pero que en los últimos 25 años se ha extendido a Europa Occidental y el Hemisferio Americano. Tiene sintomatología en muchos aspectos similares al Cólera Porcino o también llamada Peste Porcina Clásica de los cerdos; sin embargo, el virus de la PPA es inmunológicamente distinto. Los cerdos inmunes a la Peste Porcina Clásica son completamente susceptibles a la PPA. Los brotes de la PPA en los cerdos domésticos a menudo siguen al contacto con facóqueros (Phacochoerus), cerdos de los matorrales, los cuales sirven como portadores de la infección y reservorios del virus.

El virus causante está presente en todos los líquidos, tejidos y excreciones de los cerdos infectados agudamente y periódicamente es liberado en las descargas de los animales portadores.

- El virus es excepcionalmente resistente, manteniendo la infecciosidad después de 18 meses a temperatura ambiente, después de 1 hora a 56°C, o en jamones curados y almacenados comercialmente después de 6 meses.
- Solamente los cerdos son naturalmente susceptibles. El virus se ha pasado experimentalmente en otros animales (conejos, embriones de pollo y cultivo de tejidos). Las cepas así atenuadas no han demostrado ser eficaces desde un punto de vista inmunológico y los esfuerzos para controlar la enfermedad por vacunación específica hasta la fecha han sido inútiles.

SINTOMATOLOGIA

- Clínicamente la enfermedad presenta una sucesión de síntomas apreciables después del período de incubación y levantamiento de la temperatura a más de 42° centígrados, en el orden siguiente: depresión - debilidad - anorexia - cianosis - tos - disnea - diarrea o vómitos - caída y aspecto agonizante.
- Lesiones Anatomopatológicas

El cuadro es típico de una septicemia hemorrágica, la lesión dominante es un cuadro de fuerte congestión con abundantes líquidos serosos en el pericardio y peritoneo, ganglios linfáticos hemorrágicos y bazo hipertrófico.

- Lesiones Macroscópicas Externas

Manchas rojas localizadas de manera preferencial a nivel de las orejas, vientre y parte interna del muslo.

DIAGNOSTICO

- Generalmente se realiza con la combinación de tres técnicas:

(a) Diagnóstico experimental biológico

- (i) Inoculación del cerdo
- (ii) Inoculación del conejo

(b) Diagnóstico experimental sobre cultivos de tejidos.

- (i) Sobre órganos
- (ii) Técnicas de Hemoadsorción (I.H.A.D.)

(c) Diagnóstico experimental

- (i) Técnica ELISA
- (ii) Técnicas de Inmuno-Electro-Osmo-Foresis. (I.E.O.F.)

PRONOSTICO

- La enfermedad tiene un pronóstico muy reservado, dado su índice natural de mortalidad. En las evoluciones más benignas es el mismo, dado que el animal recuperado continúa albergando el virus, que va a terminar por causarle la muerte después de un período de portador.

TRATAMIENTO

- No existe ningún Agente Quimioterápico capaz de impedir la multiplicación del virus de la PPA en el organismo del cerdo.

PREVENCION Y CONTROL

- Ante la imposibilidad de poder aplicar la profilaxis Médico Veterinaria por no disponer de una vacuna específica, la lucha contra la enfermedad solamente puede realizarse a través de un programa de profilaxis sanitaria.
- La profilaxis Sanitaria es una medida que no siempre es fácil de aplicar, como lo demuestran los casos ocurridos en Francia-Italia - Malta- Cuba- República Dominicana y Haití.

- El plan de control por medio de eliminación del cerdo enfermo y expuesto tiene que analizar consideraciones de tipo: (i) Epizootiológico, (ii) Económico, (iii) Político-Social y (iv) Financiero.
- Para actuar de inmediato el Servicio Médico Veterinario Nacional debe estar respaldado por un Servicio Competente de campo y laboratorio que sea capaz de hacer un diagnóstico confirmatorio rápido. El adiestramiento práctico del personal de laboratorio y la dotación del equipo básico con los medios necesarios para emplear la técnica de hemadsorción para "Diferenciar" la Fiebre Porcina Africana del Cólera Porcino, puede ahorrar mucho tiempo y gastos.
- El diagnóstico confirmado debe ser seguido de estricta cuarentena y un programa de erradicación de la enfermedad por medio de eliminación del cerdo enfermo, infectado y/o expuesto.

Antecedentes históricos y distribución geográfica

- 1921 - La enfermedad es originaria de la parte Sur Oriente de África en donde fue reconocida por primera vez por Montgomery.
- 1957 - Se diagnosticaron los primeros casos en Europa en la República de Portugal, en criaderos de cerdos ubicados alrededor de Lisboa, que se alimentaban con residuos de cocina hoteleras que contenían resto de carne de cerdo procedente de posesiones portuguesas en Angola y Mozambique.
- 1960 - España, país vecino amenazado, adoptó severas medidas preventivas a nivel de puertos y fronteras, actitud que le permitió mantenerse indemne por 3 años. No obstante intereses económicos crearon comercio clandestino a través de la larga frontera Portuguesa-española que favoreció la internación del virus de la P.P.A.
- 1964 - El virus se infiltró a Francia procedente de España vía la región de los Pirineos.
- 1967 - Se confirmó la presencia del virus y la enfermedad en Roma, Italia.
- 1971 - El virus apareció intempestivamente en los alrededores de La Habana, Cuba, identificándose así, el primer brote de la enfermedad en el Hemisferio Occidental.
- Francia-Italia y Cuba erradicaron la enfermedad con la aplicación de severas medidas represivas.

1978 - La enfermedad apareció en la Isla de Malta, sucesivamente se diagnóstico en Brasil, República Dominicana y Haití, marcándose así la segunda invasión del virus al Hemisferio Occidental en la década de 1970.

- El origen epidemiológico de la enfermedad y la rápida difusión del virus en los países citados se ha relacionado siempre con la alimentación de cerdos utilizando desperdicios alimenticios hoteleros o de cocinas volantes de línea aéreas Internacionales, que provenían de animales faenados en países infectados.

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QUE SON CERDOS S.P.F. 1/

Son cerdos libres de organismos patógenos que se obtienen separándolos de la madre por medio de histerectomía 2/ dos o cuatro días antes de nacer, o por cesárea (histerotomía) para evitar que pasen a través del canal del parto.

En el caso de la histerectomía, el útero grávido se emplea como recipiente para transportar los cerdos nonatos libres de organismos patógenos a un ambiente limpio, de modo que puedan nacer sin exponerse a las enfermedades porcinas, sucesivamente son trasladados en cajas estériles para colocarlos en unidades estériles donde se conservarán inicialmente a 37.6 centígrados de temperatura y se alimentarán con dietas lacteas semisintéticas equilibradas, posteriormente se mantendrán a temperatura de 29.4 C° en completo aislamiento durante las primeras 3 semanas. Sucesivamente se empieza a suprimir la leche con alimentos de pre-iniciación. Aún cuando el número de cerdos que se pueden obtener con esta técnica es reducido y costoso, su potencial para controlar las enfermedades tales como: (i) Rinitis Atrófica, (ii) Neumonía viral Porcina, y (iii) la Disentería Porcina, su uso se ha popularizado en programas de repoblación. El procedimiento se implanta en un tiempo relativamente corto, la cerda es un mamífero múltiparo con un período breve de gestación (3 meses - 3 semanas - 3 días), lo bastante rápido para que un determinado número de cerdos S.P.F., puedan proporcionar por medio de partos normales posteriores, las bases para establecer una población numerosa de cerdos a mediano plazo.

Por qué Cerdos S.P.F. en la Repoblación Porcina de Haití

El Gobierno de Haití optó por utilizar uno de los métodos más radicales y efectivos para extirpar la Peste Porcina Africana (P.P.A.) esto es el conocido método represivo "stamping-out".

Este procedimiento en línea general se caracteriza por la secuencia de los puntos siguientes: (i) cuarentena de las fincas o lugares donde se han producido los brotes, (ii) compensación de los productores, (iii) eliminación de los animales enfermos, infectados y expuestos, (iv) limpieza y desinfección de los locales y todo el equipo, (v) rastreo y (vi) comprobación de la ausencia o presencia del agente patógeno por medio de pruebas biológicas (colocación en las fincas de animales susceptibles).

El procedimiento a pesar de ser efectivo es costoso y complejo, por cuanto, requiere financiamiento especial y consideraciones de orden institucional, epizootiológico, político-social y económico.

1/ S.P.F. es la abreviatura de "Specific Pathogen Free" y se refiere sólo a las enfermedades que son eliminadas o controladas específicamente.

2/ Extirpación total o parcial del útero.

Sin embargo, Haití entre mayo de 1982 y junio de 1983 logró con la asistencia técnica y financiera internacional erradicar la enfermedad, por lo que, debido a la total despoblación, el país a la fecha no tiene elementos biológicos potenciales de riesgo que pudieran actuar como reservorios infecciosos de enfermedades económicas propias del cerdo como lo es la P.P.A. Esta situación favorable desde un punto de vista epizootiológico se presta para repoblar el país con cerdos reproductores S.P.F. de gran superioridad zoosanitaria, por cuanto, además de garantizar que son libres de enfermedades crónicas Rinitis Atrofica Infecciosa (AR), Neumonía Viral Porcina (V.P.P.) y la Disentería Porcina están exentos de brucelosis, piojos, sarna y proceden de países y granjas libres de cólera porcina, erisipela y otras.

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PROCEDIMIENTO DE ADQUISICION DE GANADO EN EL EXTERIOR

1. Propósito

Establecimiento del Sistema técnico-administrativo y legal para la adquisición del ganado reproductor en el exterior.

2. Concepto

- (a) Debido a que entre los objetivos del Programa se propone adquirir con fondos del préstamo ganado reproductor de la especie con la finalidad de incrementar el potencial genético del rebaño nacional, el Banco y el MARNDR han acordado que dichos semovientes deberán escogerse entre las razas más apropiadas para el medio ecológico de las regiones donde estarían ubicadas las explotaciones, por cuanto, entre otras cosas, la finalidad de mejorar el caudal genético de los ganados, es aumentar la eficiencia reproductiva. Asimismo, seleccionar con suficiente acuciosidad los criaderos de cerdos acreditados S.P.F.F.1.

3. Comisión de Compra

- (a) La comisión a ser seleccionada y nominada por el MARNDR a través del programa, deberá estar constituida por: 1 (un) Ingeniero Agrónomo Zootecnista; 1 (un) Médico Veterinario Sanitarista y 1 (un) representante de los productores.

4. Pureza de las Razas y Edad

Con fondos del préstamo se podrán adquirir:

- (a) Sementales de pedigree, puros por cruza o con certificados de progenie o de producción inscritos en registros oficialmente reconocidos.
- (b) Excepcionalmente y de acuerdo a la finalidad y necesidades del programa en materia de generación de tecnología, en hibridación se podrán adquirir:
- (i) Reproductores de otras razas especializadas, diferentes a las ahora propuestas por el programa, siempre que sean puros por cruza, con certificados de progenie y acreditados S.P.F.F.1.

- 2 -

- (ii) Reproductoras hembras con un porcentaje de sangre pura del 75% o más; excepto cuando se trate de cerdas criollas encastadas tipo Centroamericanas, las que podrán tener una pureza del 50% o más; asimismo, proceder de un país libre de Fiebre Aftosa, Peste Porcina Clásica y Peste Porcina Africana.
- (c) Los reproductores porcinos deberán ser de las edades siguientes:
 - (i) Hembras - 3.1/2 a 4 meses de edad.
 - (ii) Machos - 4.1/2 a 5 meses de edad.

5. Lugar de Compra

- (a) Los reproductores se adquirirán en EE.UU.; Canadá, México o cualquier otro país Miembro del Banco, que asegure calidad Zootécnica y Zoonosanitaria adecuadas a los objetivos del Programa, libres de Fiebre Aftosa, Peste Porcina Clásica y otras enfermedades calificadas de exóticas para el país y la región.

6. Razas a Comprarse

(a) Porcinos

- (i) Hampshire
- (ii) Duroc
- (iii) Spotted Poland China
- (iv) Yorkshire.

7. Procedimientos Generales de Compra e Importación

Para cada lote de importación se observarán las siguientes normas:

- (a) La Comisión debidamente constituida, hará contacto directo con la Asociación de Criadores de cada raza en el país de origen.
- (b) Una vez seleccionados e identificados los animales, la Comisión solicitará además de las garantías de que los reproductores sean acreditados S.P.F.F.₁, los documentos de registro genealógico que comprueben la ascendencia, los certificados de origen y sanidad estatales o federales, asegurándose que cada animal y lote de animales en conjunto, cumplan antes de embarcarse, con las exigencias que establecen las Leyes y Reglamentos de importación de animales, productos y subproductos de origen animal, vigentes en Haití.
- (c) La Comisión entre otras cosas, adquirirá la Póliza de Seguro que ampare el lote contra riesgo de muerte y transporte desde el momento de embarque en el país vendedor (marítimo, aéreo o terrestre) hasta su arribo a Port-au-Prince, Haití, más un mínimo de 20 días adicionales después de la fecha de llegada.

8. Selección de Areas Geográficas para Compra del Ganado Reproductor

- (a) El MARNDR a través del Programa promoverá y coordinará la adquisición del ganado reproductor haciendo oportunamente los arreglos correspondientes para constituir la Comisión Compradora, adelantar gestiones de rigor para la importación, determinar los países y/o áreas geográficas de países con características similares a las regiones ganaderas de Haití, escoger épocas estacionales favorables a fin de obtener mejores ofertas, precios, disminuir costo de transporte y facilitar proceso de recibimiento, cuarentena y adaptación.

9. Cuarentena

- (a) El Programa con suficiente anterioridad a la llegada de los animales dispondrá los arreglos y las facilidades locales necesarias para cumplir con la Cuarentena de rigor 1/ en lo que compete a alojamiento, aislamiento, servicios de alimentación, manejo, pruebas reveladoras de diagnóstico obligatorias, cumplimiento de los períodos de observación y medidas de seguridad, tanto de los animales como del personal encargado.

10. Formas de Pago

- (a) El BID a solicitud del Programa abrirá Cartas de Crédito para la compra del ganado en un Banco del país donde se adquirirían los ganados, los pagos contra las Cartas de Crédito se harán a la presentación de los documentos siguientes:
 - (i) Factura Comercial debidamente aprobada por los Miembros de la Comisión compradora.
 - (ii) Conocimiento de Embarque de los ganados que aparecen en la Factura Comercial consignada al MARNDR en Port-au-Prince, Haití.
 - (iii) Copia de la Póliza de Seguro que cubra contra riesgos de muerte durante el embarque, transporte, desembarque y un mínimo de 20 días después de su llegada al país.
 - (iv) Se permitirán pagos por embarques parciales.

1/ Queda a criterio del Servicio Veterinario del MARNDR el cumplimiento de la Cuarentena.

LAS RAZAS ESCOGIDAS PARA EL PROYECTO DE REPRODUCCION

- Son:

A. Hampshire

Origen: Inglaterra, desarrollada en el Condado del mismo nombre

Color: Negro y su característica sobresaliente es el cinturón blanco que cubre los hombros y las patas delanteras.

Constitución: Fuerte, espalda uniformemente arqueada y bastante profunda. Jamones anchos y profundos.

Peso Aproximado: Machos = de 600 a 850 lbs.
Hembras = de 500 a 700 lbs.

B. Duroc

Origen: Norte América, se desarrolló en la Sección Noroeste de los Estados Unidos, cruzando los cerdos rojos de New York y los Jersey rojos de Nueva Jersey. Es una de las razas más populares.

Color: Rojo pálido o rojo encendido.

Constitución: Fuerte, tamaño mediano, muy prolífica y de espalda ancha y bien arqueada. Las orejas son de tamaño mediano poco levantadas, con patas fuertes y derechas.

Peso Aproximado: Machos = de 650 a 1000 lbs.
Hembras = de 600 a 700 lbs.

C. Yorkshire

Origen: Inglaterra, donde se conocen el tipo Large-White y Middle White (Blanco largo y Blanco Mediano). El tipo mediano es el más popular en Estados Unidos.

Color: Blanco, aun cuando ocasionalmente podrían aparecer manchas de pigmento negro.

Constitución: Fuerte. Los jamones son voluminosos.

Peso Aproximado: Machos = de 700 a 1000 lbs.
Hembras = de 500 a 800 lbs.

D. Spotted Poland Chine (Poland China Moteado)

Origen: Norte América, se desarrolló en los Condados de Buther y Warren en el Estado de Ohio.

Color: Negro con manchas blancas. El tipo ideal es el que tiene 50% negro y 50% blanco.

Constitución: Fuerte, originalmente se caracterizó por ser un animal profundo, con muy buena línea dorsal, buenos jamones y patas cortas.

Peso Aproximado: Machos = de 650 a 1000 lbs.
Hembras = de 500 a 700 lbs.

SISTEMAS DE HIBRIDIZACION

1) Hibridización Inter-Racial Simple

Progenitores

Descendencia

Macho = Hampshire

Machos 50% Hampshire - Duroc

Cerpa = Duroc

hembras 50% Duroc - Hampshire

2) Hibridización Inter-Racial por Absorción

	<u>CERDA</u>	<u>VERRACO</u>
	<u>RAZA DUROC</u>	<u>RAZA HAMPSHIRE</u>
PRIMERA GENERACION	<u>50% Duroc - 50% Hampshire</u>	<u>Raza Hampshire</u>
SEGUNDA GENERACION	<u>1/4 Duroc - 3/4 Hampshire</u>	<u>Raza Hampshire</u>
TERCERA GENERACION	<u>1/8 Duroc - 7/8 Hampshire</u>	<u>Raza Hampshire</u>

3) Hibridización Inter-Racial Triple Rotativo

	<u>CERDA DUROC</u>	<u>VERRACO HAMPSHIRE</u>
PRIMERA GENERACION	<u>50% Duroc - 50% Hampshire</u>	<u>Verraco -Yorkshire</u>
SEGUNDA GENERACION	<u>25% Duroc - 25% Hampshire</u> <u>50% Yorkshire</u>	<u>Verraco SPotted</u> <u>Poland</u>
TERCERA GENERACION	<u>125% Duroc - 125% Hampshire</u> <u>25% Yorkshire</u> <u>50% Spotted Poland</u>	

ESQUEMA DEL SISTEMA DE DISTRIBUCION DE CERDOS

TRAMITES

OFICINA DISTRITO AGRICOLA LOCAL/PROGRAMA REPOBLACION PORCINA

Gestión de adquisición de cerdos a crédito o al contado
Registro - Identificación y determinación capacidad del productor
Ubicación de la finca administración individual o asociado
Visita al predio y confirmación de instalaciones - Mano de obra familiar - Otras

Formulación del Plan de Trabajo (Reproducción - Alimentación - Manejo - Sanidad - Registro)

Formulación del Plan de Inversiones (Instalaciones - Pie de cría - Insumos técnicos)

Formulación del Plan de Supervisión Periódica

Formulación del Plan de Adiestramiento Periódico

Formulación de Informe Técnico del cuerpo técnico distrito/Programa de Repoblación
Sugerencias de apoyo - Criterios técnicos - Limitaciones
Opinión comité consultivo local

EVALUACION

ASISTENCIA TECNICA PREVIA

AVAL TECNICO

PRESNTACION DE SOLICITUD

APROBACION DE SOLICITUD

PROGRAMA DE ADIESTRAMIENTO

ADQUISICION DE CERDOS AL CONTADO

ASISTENCIA POST.
PROGRAMA DE SUPERVISION Y
TRANSFERENCIA DE TECNOLOGIA

AGENCIA BANCARIA
I.D.A.I

BANCO NACIONAL DE CREDITO

APERTURA DE CUENTA ESPECIAL PROGRAMA

PROGRAMA DE REPOBLACION PORCINA

CENTROS DE DISTRIBUCION DE CERDOS

ENTREGA DE: Cerdos
Insumos técnicos
Equipo básico
Material divulgativo

FINCA O PREDIO

HAITI (0061)

ANEXO No. 7

REPOBLACION FORCINA

SUBPROGRAMA DE CAPACITACION Y TRANSFERENCIA DE TECNOLOGIA

PROYECTO DE CAPACITACION POR EVENTOS Y AÑOS

	1/ CURSOS						2/ DIAS DEMOSTRATIVOS DE CAMPO					3/ ADIESTRAM. EN SERVICIO					4/ SEMINARIOS					5/ TALLERES DE TRABAJO					CHARLAS TE			
	AÑOS						AÑOS					AÑOS					AÑOS					AÑOS					AÑOS			
	I	II	III	IV	V	VI	II	III	IV	V	VI	II	III	IV	V	VI	II	III	IV	V	VI	II	III	IV	V	VI	II	III	IV	
terras	4	6	12	12	12	10	10	10	24	24	24	120	120	90	105	105	2	3	4	4	4	6	12	12	12	12	6	10	10	
	3	6	12	12	12	10	10	10	12	24	24	90	105	120	90	90	2	3	4	4	4	6	12	12	12	12	6	10	10	
	3	6	12	12	12	10	10	10	12	24	24	105	90	105	120	120	2	3	4	4	4	6	12	12	12	12	6	10	10	
	10	18	36	36	36	30	30	30	48	72	72	315	315	315	315	315	8	9	12	12	12	18	36	36	36	36	18	30	30	
	6	12	12	12	12	10	12	12	12	12	12	120	120	120	120	90	1	2	2	2	2						6	8	10	
	6	12	12	12	12	10	12	6	6	6	6	105	90	105	90	105	1	2	2	2	2						6	8	10	
	6	12	12	12	12	10	12	12	12	12	12	90	105	90	105	120	1	2	2	2	2						6	8	10	
	6	12	12	12	12	10	12	24	24	24	24	120	120	120	120	120	1	2	2	2	2	6	8	10	10	12	6	8	10	
	6	12	12	12	12	10	12	24	24	24	24	105	90	105	90	105	1	2	2	2	2	6	8	10	10	12	6	8	10	
	6	12	12	12	12	10	12	24	24	24	24	120	120	120	120	120	1	2	2	2	2	6	8	10	10	12	6	8	10	
	6	12	12	12	12	10	12	24	24	24	24	90	105	90	105	120	1	2	2	2	2	6	8	10	10	12	6	8	10	
	42	84	84	84	84	70	84	126	126	126	126	750	750	750	750	750	6	14	14	14	14	24	32	40	40	48	42	56	70	
FERENCIA																														
cas		8	10	10	10				12	12	12	45	45	45	45	45		3	3	3	3		6	6	6	6		6	6	6
les		8	10	10	10		12	8	12	12	12	45	45	45	45	45		1	1	1	1		6	6	6	6		8	8	8
		8	10	10	10		12	8	12	12	12	45	45	45	45	45		1	1	1	1		6	6	6	6		4	4	4
os		8	10	10	10		12	8	12	12	12	90	90	90	90	90		1	1	1	1		6	6	6	6		6	6	6
encia		8	10	10	10		12	8	9	12	12	90	90	90	90	90		2	2	2	2		6	6	6	6		8	8	8
	40	50	50	50	50		48	32	57	60	60	315	315	315	315	315		8	8	8	8		30	30	30	30		32	32	32
	10	60	160	170	170	150	162	188	231	258	258	1380	1380	1380	1380	1380		14	31	34	34	34	42	98	106	106	114	92	118	132
	720						839					6900						147				466					626			

s por técnico

HAITI (0061)

GENERACION - VALIDACION Y TRANSFERENCIA DE TECNOLOGIA

A DESARROLLARSE EN 2 C. de R 4 C. de M. 9 C. de D y D y 30 FINCAS COOPERADORAS

ENSAYOS	GENERACION DE TECN. NUCLEOS de REPROD.				GENERACION de TECN. CENTROS de MULTIPL.				VALIDACION de TECN. CENTROS de DEMOST.				TRANSF. de TECNOLOG. FINCAS COOPERADORAS				TOTAL ENSAYOS			
	AÑOS				AÑOS				AÑOS				AÑOS				AÑOS			
	III	IV	V	VI	III	IV	V	VI	III	IV	V	VI	III	IV	V	VI	III	IV	V	VI
A. MEJORAMIENTO GENETICO																				
(1) - Establecimiento de líneas puras	1	2	3	4													1	2	3	4
- Selección descendencia x Adaptación	2	3	3	4													2	3	3	4
- Selección descendencia x Producción	2	2	2	2													2	2	2	2
- Establecim. Coeficientes técnicos	2	3	4	4													2	3	3	4
(2) - Establecimiento de líneas híbridas	1	2	3	4	4	4	4	4									5	6	7	8
- Selección descendencia x Producción	2	3	3	4	2	2	2	2	2	3	4	4					6	5	7	8
- Fertilidad -Prolificidad- Precocidad	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	8	8	8	8
B. MEJORAMIENTO ALIMENTICIO																				
1. Confinamiento + Aliment. Concentrada	2	3	4	4	2	3	4	4									4	6	8	8
2. Confinamiento + Concentrada + Pastoreo					3	2	3	4	3	3	3	3	4	4	4	4	10	9	10	11
3. Concentrado + Suplementos de origen animal	2	2	2	2																
4. Concentrado + Suplementos de origen vegetal					1	2	2	3	1	2	2	3	2	2	2	2	4	6	6	8
5. Concentrado + Suplementos Remix-Vit.-Miner. 1/	2	2	1	1																
6. Concentrado + Suplementos Productos de la Finca									4	4	4	4	4	4	4	4	8	8	8	8
7. Estimulantes de Crecimiento	2	2	3	4	2	2	2	2	2	2	2	2					6	6	7	8
C. MEJORAMIENTO DE MANEJO																				
1. Régimen de cerdas y camadas puras	2	3	4	4													2	3	4	4
2. Régimen de cerdas y camadas híbridas					2	3	4	4	2	3	4	4	2	3	4	4	6	9	12	12
3. Destete precoz + ración equilibrada																				
4. Destete hasta el momento de venta					2	3	4	4									2	3	4	4
5. Producción de 2 camadas/año		2	2	2	2	2	3	2	2	2	3	2					4	6	8	
6. Producción de 3 camadas/año		2	3	3														2	2	3
D. SANIDAD PREVENTIVA																				
1. Profilaxis exclusivamente Médica (Piara)	1	1	1	1													1	1	1	1
2. Profilaxis Médica + Sanitaria (Piara)	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	10	10	10	10
3. Cuidados de la cerda gestante	2	3	4	3	2	3	4	3	2	3	4	3	3	3	3	3	9	12	15	12
4. Cuidados de la cerda al parto	1	2	3	4	1	2	3	4	1	2	3	4	2	2	2	2	5	8	11	14
5. Cuidados de la cerda al lactante	2	3	4	2	2	3	4	2	2	3	4	2	2	2	2	2	8	11	14	8
6. Cuidados de la camada post-destete					3	2	3	4	3	2	3	4	3	2	3	4	9	6	9	12

114 135 162 161

1/ Suplementos Inorgánicos.

N. de R = Núcleos de Reproducción

C. de M = Centros de Multiplicación

C. de D y D = Centros de Demostración y Distribución

Resumen de la
Erradicación de la Peste Porcina Africana en Haití

Aparecimiento de la enfermedad

1978. A mediados de febrero de 1978 se confirmó la presencia de la Peste Porcina Africana (PPA) en la Isla Hispaniola en República Dominicana. A pesar de los esfuerzos hechos por las autoridades zoonosanitarias dominicanas y haitianas para prevenir la entrada del virus en Haití, entre los que se destaca la creación de una zona buffer de 15 kilómetros a lo largo de ambos lados de la línea fronteriza, el virus se internó a finales de 1978 a través de las aguas del Río Artibonite que nace en Dominicana y desemboca en Haití.

1979. La presencia del virus fue confirmada en enero de 1979 por el Laboratorio de Plumb Island de Estados Unidos. La enfermedad se difundió rápidamente del Valle del Artibonite a otras regiones del país con tasas de mortalidad que oscilaron del 80 a 100%. Las estimaciones epizootiológicas realizadas indicaron que en el primer semestre de 1979 la onda epizootica mató alrededor de 350.000 cerdos. El pánico entre los productores por la mortalidad causada por el virus y el sacrificio de 20.000 cerdos a lo largo de la frontera con República Dominicana, indujo a muchos campesinos a matar sus propios animales y a sacrificarlos para consumo antes de que se enfermaran.

El mismo año el Gobierno con el auxilio de agencias internacionales y regionales estimó que la población original de 1.200.000 cerdos había bajado a 600.000. Las pérdidas ocasionadas en esa época se estimaron en términos económicos equivalentes a US\$50.000.000, situación catastrófica que afectó principalmente al estrato más pobre de la población nacional.

1980. En septiembre de 1980, durante la reunión anual de la Junta Directiva del Instituto Interamericano para la Agricultura (IICA) celebrada en México, el Ministro de Agricultura de Haití, solicitó ayuda técnico-financiera internacional para erradicar la enfermedad y restablecer la industria porcina. Sucesivamente el Ministerio de Agricultura de Haití creó el Comité contra la Peste Porcina Africana (PPA) y la comisión ad-hoc denominada Programa para Erradicación de la Peste Porcina Africana y Desarrollo de la Industria Porcina (PEPPADEP), financiada por Estados Unidos, Canadá y México, y administrada por el IICA.

1981. En julio de 1981 el IICA y el Gobierno de Haití firmaron un convenio para ejecutar la campaña de erradicación.

La erradicación por parte de PEPPADEP implicó 4 etapas:

- i) Información y motivación
- ii) Matanza y compensación.

iii) Vigilancia, limpieza y desinfección

iv) Centinelización.

Un laboratorio temporal para diagnóstico serológico fue organizado y habilitado en Puerto Príncipe por parte de personal de laboratorio que Plum Island había destacado en Hatí.

1981. En agosto de 1981 un grupo de técnicos de la Universidad de Georgia inició un muestreo de sangre que concluyó en marzo de 1982. Durante ese período se colectaron 1936 muestras de sangre, de las cuales 408 (21%) resultaron positivas. Las muestras se recolectaron en 129 diferentes puntos y áreas del país, de las cuales 85 fueron positivas, con lo que 67% de las localidades estudiadas resultaron positivas.

En Octubre-noviembre de 1981 un número mínimo básico del personal requerido entre directores y personal nacional e internacional se había organizado en Puerto Príncipe y otras localidades estratégicas del país. El plan de acción empezó sus acciones adiestrando personal así como el desarrollo de una fuerte campaña de información para explicar los objetivos y estrategias de la campaña.

- 1982 En abril de 1982 un grupo de técnicos y médicos veterinarios epidemiólogos fueron destacados en la península Nor-Oeste del país para establecer el Plan Piloto de PEPPADEP, con lo que se comprobaría la efectividad de programa de información y si las comunidades estaban listas para iniciar la fase de despoblación.

Los resultados de la evaluación fueron favorables y el 11 de mayo de 1982 inició la campaña de erradicación compulsiva por medio de la matanza de los cerdos y compensación de los campesinos y productores afectados.

Actividades de campo

Las operaciones de campo fueron desarrolladas en las diferentes regiones del país compuestas por 20 distritos y 588 secciones agrícolas; cabeceras de acción o frentes de matanza y compensación se establecieron en diferentes lugares de cada región. Avisos y llamamientos fueron enviados a los pobladores de cada comunidad 2 días antes de cada operación. Los propietarios fueron indemnizados inmediatamente después de cumplidas todas las actividades ante y post-mortem de los cerdos, un equivalente de US\$40.00 fueron pagados por cerdos adultos, US\$20.00 por animales juvenes (de la época del destete a la edad de reproducción) y US\$5.00 por cerditos recién nacidos hasta la época del destete. Adicionalmente la carcasa y/o carcasas se les entregó a los campesinos para venta y consumo.

1983. Las operaciones de matanza y compensación terminaron en junio de 1983, un total de 384.391 cerdos fueron eliminados y US\$ 9.548.860 1/ fueron pagados en concepto de indemnización.

- Haití tenía al inicio de la invasión del virus del PPA., Dic./1978 1.200,000 cerdos de los cuales, 20,000, se eliminaron en la frontera Haití - República dominicana, 350,609 murieron a causa de la enfermedad, 384,391 se eliminaron con indemnización y 445,900 fueron sacrificados y consumidos por los productores por temor a la enfermedad y a la campaña de erradicación.

Una vez que las brigadas sanitarias terminaron con la matanza y compensación, empezaron las actividades de rastreo para cerdos que por varias razones se hubieran quedado fuera de la acción de la campaña. Asimismo, a lo largo de las costas se establecieron puestos móviles de inspección para el control de animales, productos y subproductos de los mismos que eventualmente quisieran introducirse al país por vías clandestinas.

Actividades de limpieza y desinfección se cumplieron en el mismo orden y movimiento de la campaña de erradicación.

Centinelización

La prueba final para comprobar que la enfermedad ha sido extirpada y que no han quedado fuentes de virus en el país, se inició con la importación planificada de cerdos acreditados S.P.F., procedentes de criaderos especializados en Estados Unidos y Canadá. Grupos no mayores de 300 cerdos fueron importados vía aérea y distribuidos en diferentes regiones del país una vez que se superaba el período cuarentenario de 30 días. En octubre de 1983 entró el último lote de cerdos a la estación cuarentenaria de Puerto Príncipe totalizando así 2.000 cerdos que se distribuyeron en más de 500 fincas y/o lugares donde la enfermedad tuvo mayor influencia.

El proceso de vigilancia epidemiológica, observación diaria de los cerdos y muestras biológicas tomadas para pruebas de diagnóstico laboratorio no han dado todavía evidencia de que hubiera sobrevivencia del virus de la PPA.

A la fecha de este resumen elaborado por la misión con base en información suministrada principalmente por funcionarios del MARNDR, PEPPADEP y expertos del USDA destacados en el país, indican que solamente 2 pequeñas regiones ubicadas al Este de Les-Cayes y Sur de Puerto Príncipe estaban pendientes de cubrirse con el programa de centinelización.

La programación establecida indica que el proceso de centinelización debe terminar en diciembre de 1983 y si no hay apareamiento de situaciones zoonositarias inesperadas, el país podría declararse libre de la enfermedad en febrero de 1984. el último informe de la situación epidemiológica en Haití fechado nov/7/83 indica entre otras cosas, que la distribución de los 2.000 cerdos de raza Yorkshire que se importaron para fines de centinelización es como sigue:

i)	275	En cuarentena en Les-Cayes
ii)	260	En cuarentena en Puerto Principe
iii)	1.465	Distribuidos en la mayoría de las regiones (excepto regiones 3 y 5).
TOTAL	<u>2.000</u>	

Otros Problemas Zoosanitarios no relacionados con PPA

Un total de 28 cerdos han muerto por diferentes causas, entre las que se destacan 11 por rinitis atrófica, los que fueron inmediatamente segregados y eliminados.

En el grupo de cerdos importados a finales de agosto 1983 y cuarentenados en Puerto Principe, el laboratorio de Haití y de Plum Island detectaron la presencia de Mycoplasma, organismos responsables de neumonía, por lo que, las autoridades del MARNDR han tomado medidas especiales de segregación y uso de estos cerdos.

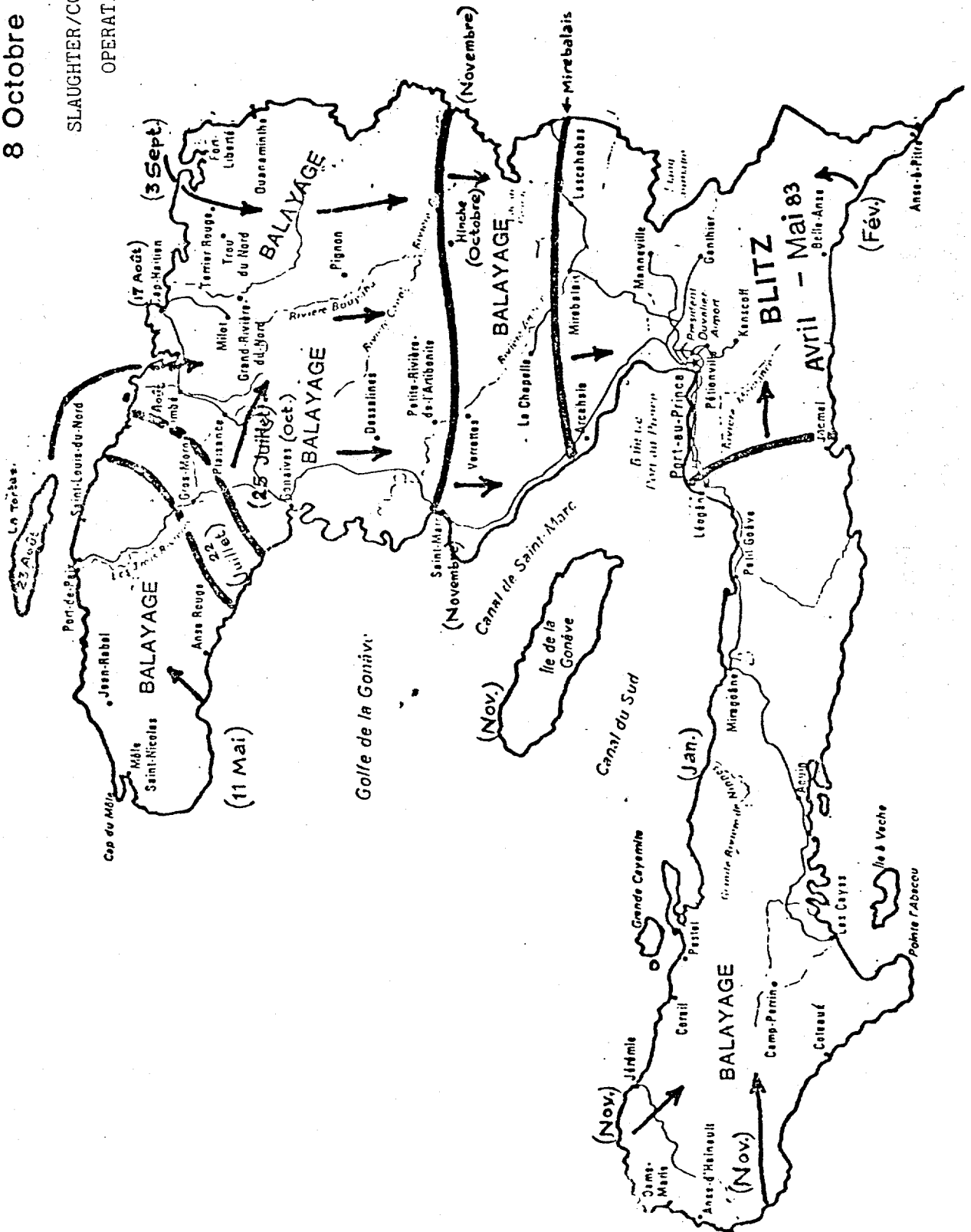
Nota

De acuerdo al Código Zoosanitario Internacional de la Oficina Internacional de Epizootias (OIE) edición enmendada en 1982, Haití se podría declarar libre de la Peste Porcina Africana, seis (6) meses después de haber practicado el "Sacrificio Sanitario". Por lo tanto, habiendo terminado el proceso de erradicación en junio de 1983, en febrero de 1984, el país podría declararse libre siempre y cuando en el lapso junio de 1983 - febrero de 1984 no irrumpen nuevos casos de PPA.

Haiti

8 Octobre 1982

SLAUGHTER/COMPENSATION
OPERATIONS

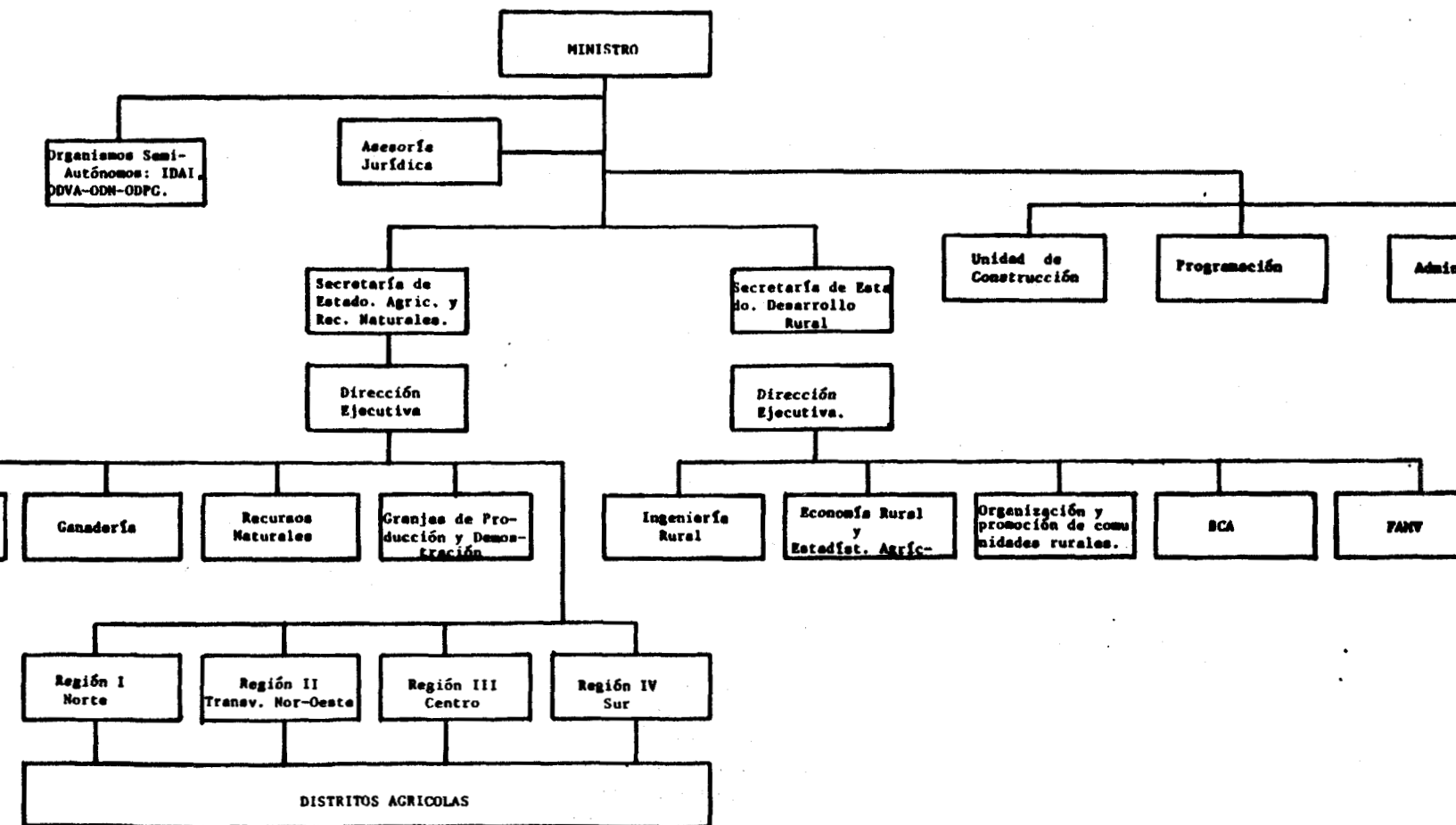


DISPONIBILIDAD EN HAITI DE FRUTAS TROPICALES
PRODUCTOS Y SUBPRODUCTOS AGRICOLAS INDUSTRIALES DURANTE EL AÑO

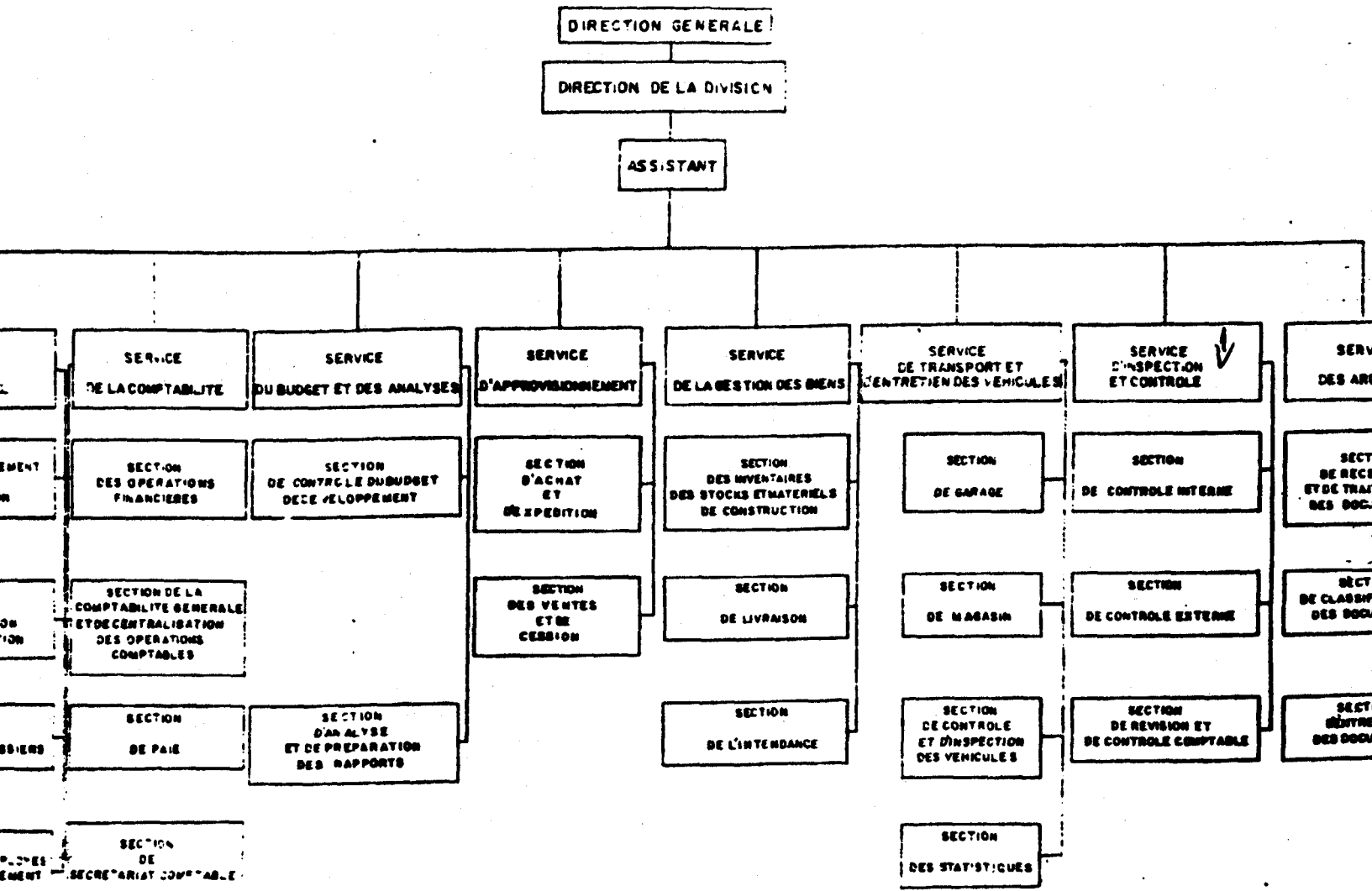
Productos Agrícolas Estacionales	Enero	Febrero	Marzo	Abril	Mayo	Junio	Julio	Agosto	Septiembre	Octubre	Noviembre
Plátano	X	X	X	X	X	X	X	X	X	X	X
Maíz	X	X	X	X	X	X	X	X	X	X	X
de semilla de algodón	X	X	X	X	X	X	X	X	X	X	X
Arroz	X	X	X	X	X	X	X	X	X	X	X
Maicillo	X	X	X	X	X	X	X				
Agua/Aguacates									X	X	X
			X	X	X	X	X	X	X		
Cow-Pea/Frijoles	X	X	X	X	X	X	X	X	X	X	X
Hojas/Tubérculos			X	X	X	X			X	X	X
Maíz/Ayote			X	X	X	X			X	X	X
Productos de fabricación-											
	X	X	X	X	X	X	X	X	X	X	X
de Caña	X	X	X	X	X	X	X	X	X	X	X
Productos de arroz	X	X	X	X	X	X	X	X	X	X	X
Productos de trigo	X	X	X	X	X	X	X	X	X	X	
			X	X	X	X					
				X	X	X	X	X	X	X	

MINISTERIO DE AGRICULTURA, RECURSOS
NATURALES Y DESARROLLO RURAL

Organigrama General

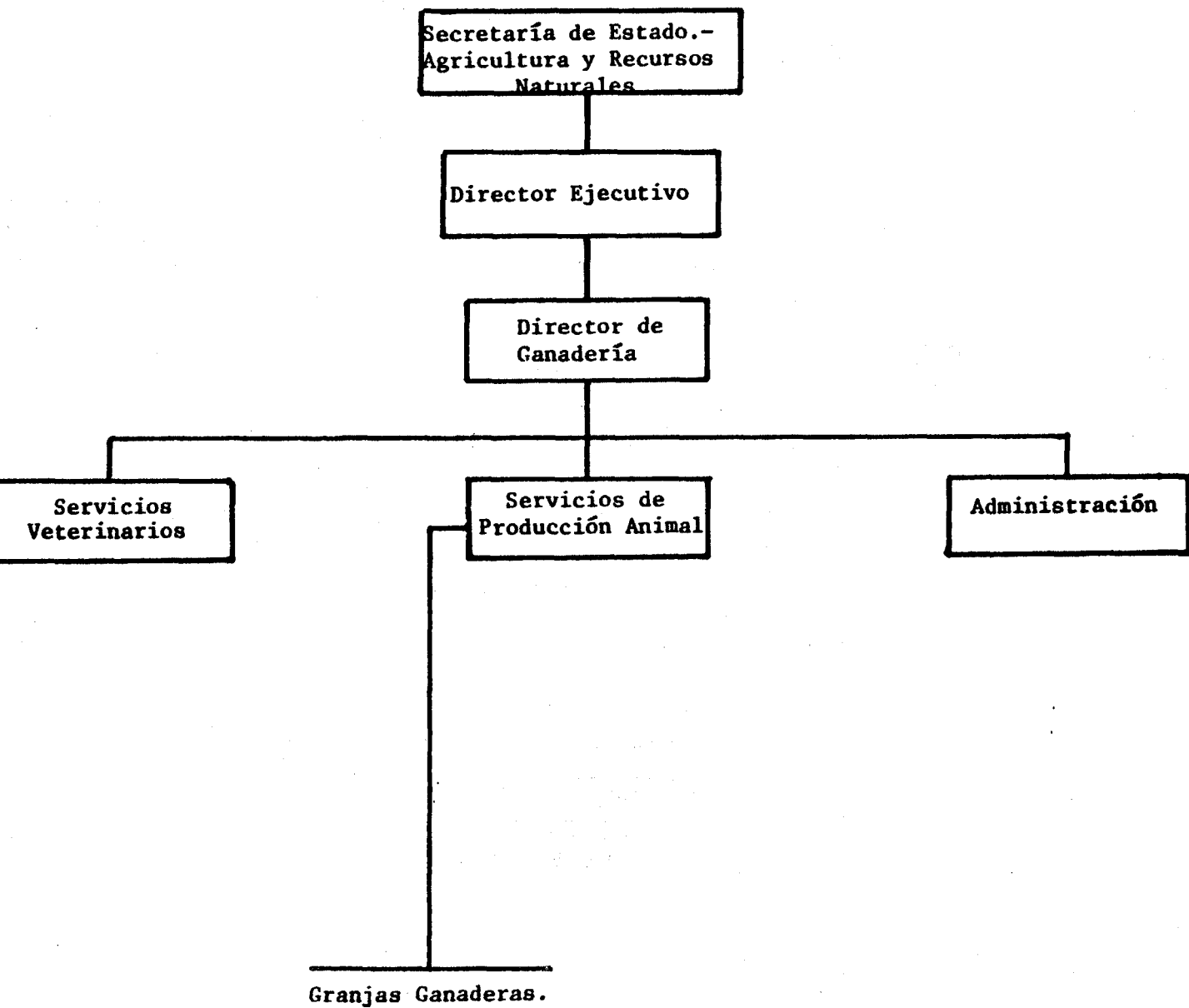


ORGANIGRAMME DE LA DIVISION DE L'ADMINISTRATION

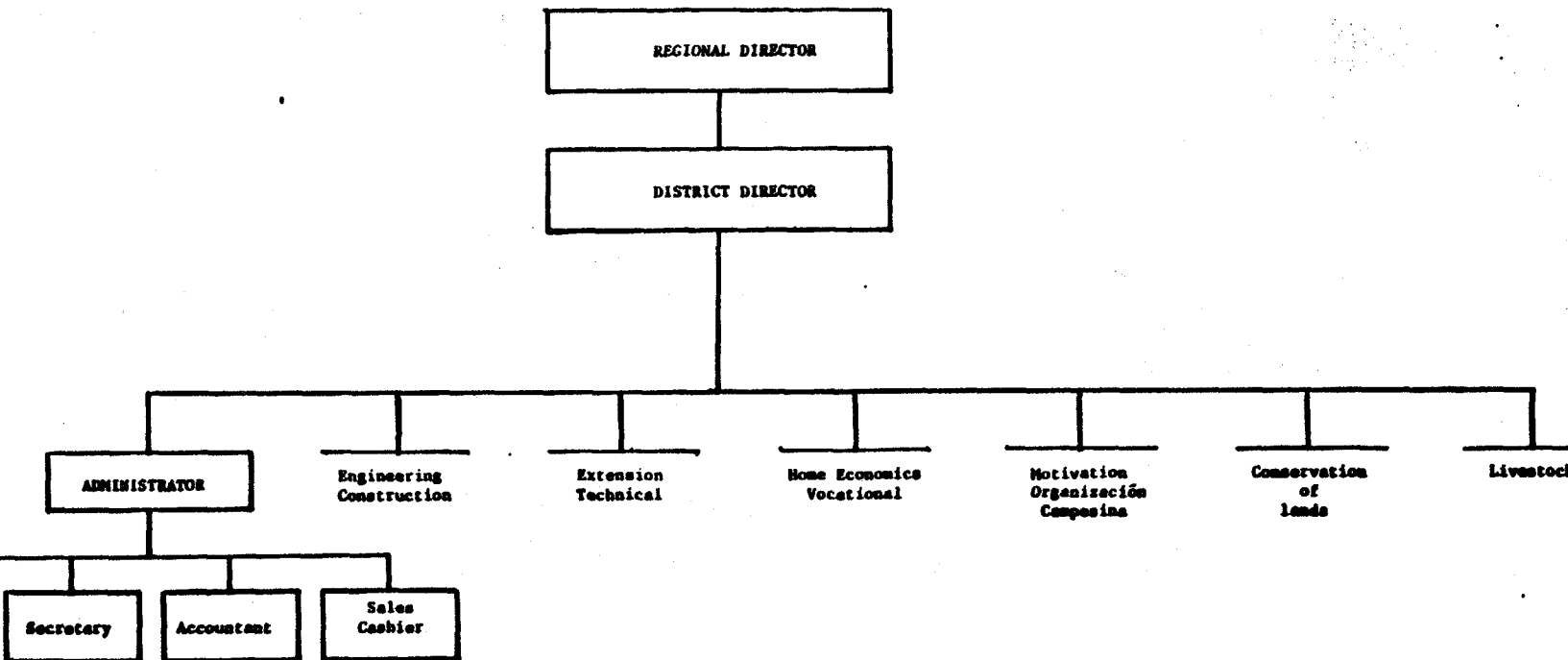


**MINISTERIO DE AGRICULTURA,
RECURSOS NATURALES Y DESARROLLO RURAL**

**Organigrama de la Dirección de
Ganadería**



MINISTERIO DE AGRICULTURA, RECURSOS
NATURALES Y DESARROLLO RURAL
Organigrama de Dirección Regional



DISTRICTS, AGENCES ET FERMES AGRICOLES

<u>DISTRICTS</u>	<u>AGENCIES</u>	<u>FERMES</u>
1. Port-au-Prince (Nord)	Archaie-Duvalier-Ville Thomazeau Bois Boen Fonds-Parisien Fonds-Verrettes	* Tamarinier (30 Ha) Damien (25 Ha)
2. Port-au-Prince (Sud)	Kenscoff Bongnotte Baussau Fonds-d'oie	
3. Gonaives	Gros-Morne St. Michel Bayonnais Desbarrières Passe-Reine	
4. St-Marc	Verrettes Petite Rivière Artibonite (Cahos) Haut de St-Marc Goyavier Camp-Marie (Bois-Neuf)	
5. Jacmel	Marigot Oranger La Vallée Bainet La Fond	Macary (4 Ha)
6. Cayes	Camp-Perrin Cavaillon St-Louis du Sud Torbeck Dubreuil Laborde/Mersan	* Levy (14 Ha) Changieux (4 Ha)
7. Miragoane	Bacconnois Dupuy Nippes Dufour	

* Ganadería.

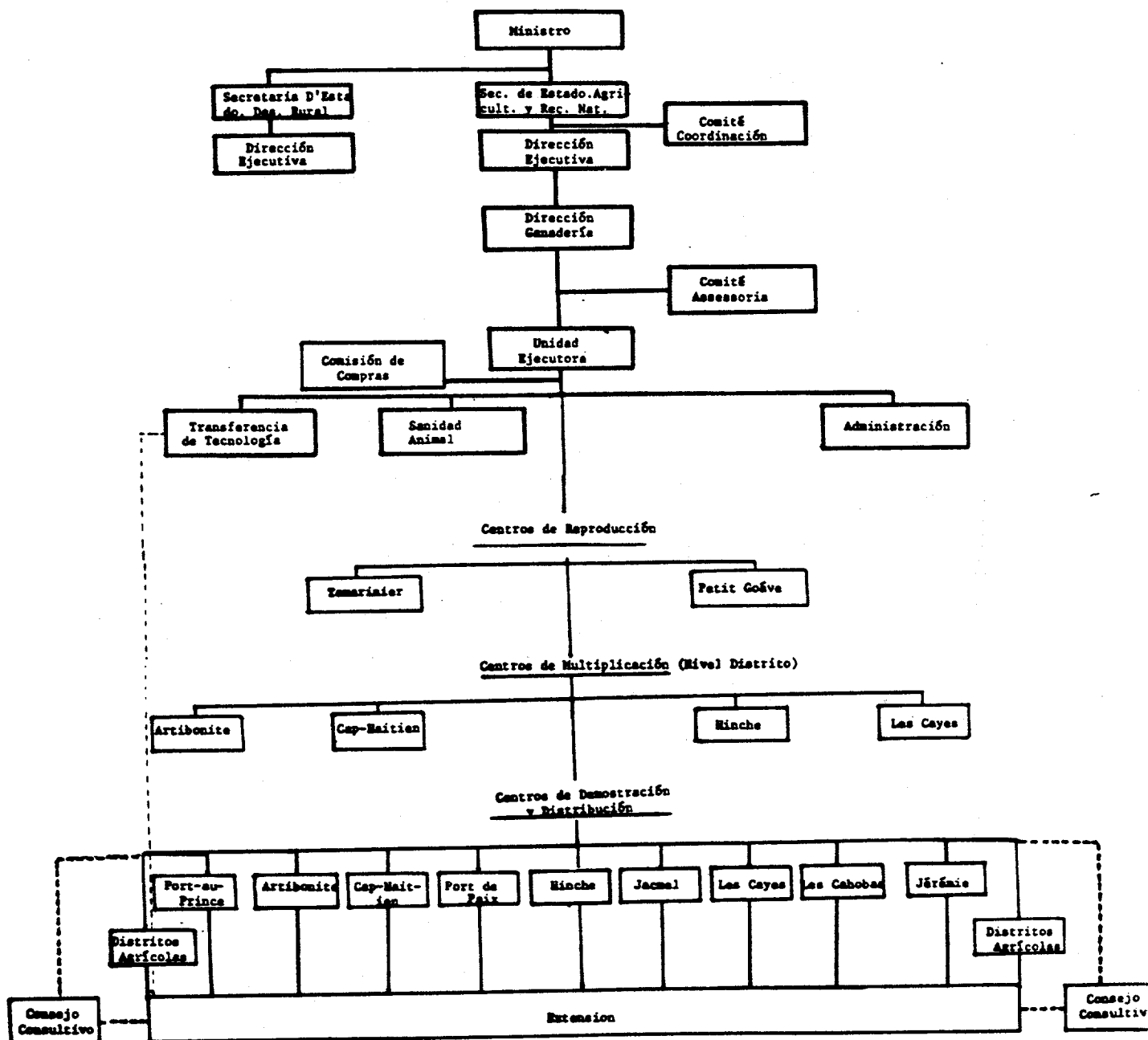
8. Petit-Goâve	Les Palmes 2e Plaine Violet Grand-Goâve		
9. Coteaux	Les Anglais Port-à-Piment Roche à Bateau		
10. Jérémie	Beaumont Corail Marfranc Abricots Prévilé	Marfranc	(30Ha)
11. Dame-Marie	Chambellan Tiburón Dame-Marie		
12. Fonds-des-Nègres	Azile Aquin Abraham Changieux	Fonds des Nègres	(25 Ha)
13. Bellanse	Thiotte Oriani Savanne Zombi	Anses à Pitres Thiotte Savanne Zombi	(9 Ha) (5 Ha) (25 Ha)
14. Mirebalais	Saut-d'eau Dufailly Lascahobas		
15. Belladère	Baptiste Croix Fer	Baptiste	(28 Ha)
16. Hinche	Papaye Maissade Colladère	* Papaye	(500 Ha)
17. Fort-Liberté	Quanaminthe Grand-Bassin		
18. Cap-Haïtien	Limbé Gde Rivière du Nord St-Raphael Pilate	* Bayeux Dondon Gran-Pré Pilate	(600 Ha) (4 Ha) (14 Ha) (4 Ha)

* Ganadería

MINISTERIO DE AGRICULTURA, RECURSOS
NATURALES Y DESARROLLO

RURAL

Organigrama de la Unidad Ejecutora



PROYECTO REPOBLACION PORCINA - HAITI

Cuadro de Personal del Proyecto

	<u>Número</u>	<u>Unidad Ejecutora</u>	<u>Centros de</u>			
			<u>Reproducción</u>	<u>Multi-plicación</u>	<u>Distribución</u>	<u>Distributos</u>
Director	1	1	-	-	-	-
Especialista en Nutrición	1	1	-	-	-	-
Especialista en Reprod. Animal	1	1	-	-	-	-
Veterinario	1	1	-	-	-	-
Enfermero Veterinario	15	-	2	4	9	-
Agrónomo Espec. en Producción Animal	15	-	2	4	9	-
Economista Agrícola	1	1	-	-	-	-
Extensionista	1	1	-	-	-	-
Administrador	7	1	2	4	-	-
Contable y Asistentes	4	4	-	-	-	-
Secretarias	8	2	2	4	-	-
Choferes, Trabajadores y Otros	179	2	29	58	90	-
Agrónomos Espec. en Extensión	11	-	-	-	-	11
Agente de Sanidad Animal	<u>40</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>40</u>
Total:	285	15	37	74	10	51
	===	==	==	===	==	==

Distribution methodology

There will be two documents for this operation, an application form and a sales agreement. 11/ There are two cases that can occur a) the producer that can afford to pay cash and b) the producer that will require full or partial credit.

- a. Cash transaction[. The producer will present himself to the distribution center and make an application for the total number of animals required. This trip also could be saved if the application is made through the visiting extensionist. The project personnel will conduct a technical evaluation of the farmer, his ability to produce, past experience, including the evaluation of his pig installation. Following this, he will complete the bottom half of the application form which consists of an evaluation report stating the number of pigs to be given, feed, medicine with the corresponding costs.

Following this step, the producer will sign a sales agreement with the project which will include the above mentioned details and present it to the Banque Nationale de Cr dit where he will deposit in the account of the project the equivalent amount. The producer will present the copy of the deposit slip to the distribution center and collect his stock or have it delivered.

The copy of the deposit slip will be attached to the project's duplicate copy of the sales agreement and filed together with his application.

- b. Credit transaction[. Again, the producer will submit an application form to the distribution center either personally or through the extensionist. An evaluation will be made of the producer just as in the case above stating the number of pigs, feed, medicine and their corresponding costs, and type of installations required. Once the technical evaluation is made and the producer's application approved, the latter will present it to IDAI to obtain credit. In the case where the entire operation is on credit, IDAI upon completing their credit evaluation will advance only the necessary funds required to construct the pig installations. Once these are completed, the project will verify the installations give final approval to the application and the sales agreement will be signed.

Upon presentation of the agreement to IDAI by the producer, the credit institution will endorse the document and transfer the remaining funds to the projects account in "The Banque Nationale de Cr dit" where they will be forwarded to the projects Headquarters in Port-au-Prince.

Upon presentation of the endorsed contract to the distribution center the producer will collect his stock or have it delivered.

11/ See Annex.

Proyecto de Repoblación Porcina
Cuadro de Vehículos
in US\$ dollars

	<u>Units</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>Total</u>
<u>Unidad Ejecutora</u>							
Director 4WD Sept. 84	1	16.150	--	--	--	--	--
Technicians CJ7 Jeeps Sept. 84	4	56.900	--	--	--	--	--
General use car	1	7.000	--	--	--	--	--
Consultants' car 4WD	1	15.000	--	--	--	--	95.050
<u>Centros de Reproducción</u>							
Technicians CJ8 Jeep/March 85	2	--	29.500	--	--	--	--
Delivery Truck 15T/July 85	1	--	48.000	--	--	--	77.500
<u>Unidad de Multiplicación</u>							
Technicians CJ8 Jeep/Sept. 85	4	--	59.000	--	--	--	--
Delivery Trucks 15T/Sept. 85	2	--	96.000	--	--	--	155.000
<u>Distribution</u>							
Technicians CJ8 Jeep/June 86	9	--	--	132.750	--	--	--
Delivery Trucks 5T	7	--	--	213.500	--	--	346.250
<u>Distritos Agrícolas</u>							
Agronomers CJ8 Jeeps	11	--	--	73.750	59.000	29.500	--
Extensionists 250 Motorcycles	40	--	--	47.600	13.600	6.800	230.250
		95.050	232.500	467.600	72.600	36.300	904.050
		95.0	233.0	468.0	73.0	36.0	905.0

HAITI. PROYECTO DE REPOBLACION PORCINA
DIFFERENTIAL CASH FLOW
(IN US\$)

GA-RPING

	1984	1985	1986	1987	1988	1989	1990	1991	1992
	----	----	----	----	----	----	----	----	----
FLOW	0.	0.	548032.	1427160.	1460820.	1396560.	1341480.	1341480.	1341480.
FLOW	83800.	419100.	1625900.	2503600.	2581600.	2581600.	2581600.	2581600.	2581600.
CASH FLOW	-83800.	-419100.	-1077868.	-1076440.	-1120780.	-1185040.	-1240120.	-1240120.	-1240120.

HAITI. PROYECTO DE REPOBLACION PORCINA
DIFFERENTIAL CASH FLOW
(IN US\$)

GA-RPING

	1994	1995
	----	----
FLOW	1341480.	1341480.
FLOW	2581600.	2581600.
CASH FLOW	-1240120.	-1240120.

- MISSING FIELD

HAITI. PROYECTO DE REPOBLACION PORCINA
CUADRO DE COSTOS OPERATIVOS POR CENTRO
(EN US\$)

GA-RPING

	1984	1985	1986	1987	1988	1989	1990	1991	1992
	----	----	----	----	----	----	----	----	----
IDAD EJECUTORA	49500.	87500.	67500.	67500.	67500.	67500.	67500.	67500.	67500.
NTROS DE REPRODUCCION	34300.	199000.	496500.	561500.	561500.	561500.	561500.	561500.	561500.
NTROS DE MULTIPLICACI	0.	132600.	562300.	1126300.	1171300.	1171300.	1171300.	1171300.	1171300.
NTROS DE DISTRIBUCION	0.	0.	306100.	495800.	495800.	495800.	495800.	495800.	495800.
STRITOS AGRICOLAS	0.	0.	193500.	252500.	285500.	285500.	285500.	285500.	285500.
TOTAL COSTOS	83800.	419100.	1625900.	2503600.	2581600.	2581600.	2581600.	2581600.	2581600.

HAITI. PROYECTO DE REPOBLACION PORCINA
CUADRO DE COSTOS OPERATIVOS POR CENTRO
(EN US\$)

GA-RPING

	1994	1995
	----	----
IDAD EJECUTORA	67500.	67500.
NTROS DE REPRODUCCION	561500.	561500.
NTROS DE MULTIPLICACI	1171300.	1171300.
NTROS DE DISTRIBUCION	495800.	495800.
STRITOS AGRICOLAS	285500.	285500.
TOTAL COSTOS	2581600.	2581600.

Proyecto Repoblación Porcina - Haiti
Cuadro de Costos Operativos
in US\$ Annually

	<u>1er Año</u> <u>1984</u>	<u>2do Año</u> <u>1985</u>	<u>3er Año</u> <u>1986</u>	<u>4to Año</u> <u>1987</u>	<u>5to Año</u> <u>1988</u>	<u>6to Año</u> <u>1989</u>	<u>Total</u>
<u>Unidad Ejecutora</u>							
Salarios	9.000	33.500	33.500	33.500	33.500	33.500	176.500
Viáticos	1.500	5.000	5.000	5.000	5.000	5.000	26.500
Carburante, Mantenimiento Vehículos	10.000	20.000	20.000	20.000	20.000	20.000	110.000
Material Educativo	20.000	20.000	--	--	--	--	40.000
Gastos Generales	9.000	9.000	9.000	9.000	9.000	9.000	54.000
Total	49.500	87.500	67.500	67.500	67.500	67.500	407.000
<u>Centros de Reproducción</u>							
Salarios	27.300	70.500	70.500	70.500	70.500	70.500	379.800
Viáticos	2.000	7.000	7.000	7.000	7.000	7.000	37.000
Alimentos	--	73.500	336.000	399.000	399.000	399.000	1.606.500
Biológicos	--	6.000	19.000	21.000	21.000	21.000	88.000
Desinfectantes y Otros Materiales	5.000	5.000	5.000	5.000	5.000	5.000	30.000
Mantenimiento de Vehículos y Maqu.	--	30.000	45.000	45.000	45.000	45.000	210.000
Gastos Generales	--	7.000	14.000	14.000	14.000	14.000	63.000
Total	34.300	199.000	496.500	561.500	561.500	561.500	2.414.300
<u>Centros de Multiplicación</u>							
Salarios	--	55.100	144.800	144.800	144.800	144.800	634.300
Viáticos	--	5.500	14.000	14.000	14.000	14.500	61.500
Alimentos	--	--	241.500	787.500	787.500	787.500	2.604.000
Biológicos	--	--	20.000	38.000	38.000	38.000	134.000
Desinfectantes y Otros Materiales	--	24.000	24.000	24.000	19.000	19.000	110.000
Mantenimiento de Vehículos y Maqu.	--	34.000	90.000	90.000	140.000	140.000	494.000
Gastos Generales	--	14.000	28.000	28.000	28.000	28.000	126.000
Total	--	132.600	562.300	1.126.300	1.171.300	1.171.300	4.163.800
<u>Centros de Distribución</u>							
Salarios	--	--	154.500	154.500	154.500	154.500	618.000
Viáticos	--	--	15.000	15.000	15.000	15.000	60.000
Alimentos	--	--	12.600	68.300	68.300	68.300	217.500
Biológicos	--	--	1.000	1.000	1.000	1.000	4.000
Mantenimiento de Vehículos y Maqu.	--	--	90.000	214.000	214.000	214.000	732.000
Gastos Generales	--	--	33.300	43.000	43.000	43.000	162.000
Total	--	--	306.100	495.800	495.800	495.800	1.793.500
<u>Distritos Agrícolas</u>							
Salarios	--	--	109.000	153.000	175.000	175.000	612.000
Viáticos	--	--	5.500	7.500	8.500	8.500	30.000
Mantenimiento de Vehículos y Maqu.	--	--	37.000	50.000	60.000	60.000	207.000
Material Educativo	--	--	20.000	20.000	20.000	20.000	80.000
Gastos Generales	--	--	22.000	22.000	22.000	22.000	88.000
Total	--	--	193.500	252.500	285.500	285.000	1.017.000
Total	83.800	419.100	1.625.900	2.503.600	2.581.600	2.581.600	9.795.600

CUADRO 7.1. DISTANCIAS ENTRE LA FUENTE DE ABASTO i CON DESTINO j,
COSTO DE TRANSPORTE DEL TRAYECO/TON., Y COSTO DE UNA
TONELADA DE ALIMENTO BALANCEADO PRODUCIDO EN i Y TRANSPORTADO

i j	1	2	3	4	5	6	7	8	9	10	11
Cayes	0	324	470	323	97	196	214	453	286	226	128
1	0	40.1	38.8	30.4	17.5	19.6	22.5	45.0	32.2	22.6	12.8
	190.0	230.1	228.8	220.4	207.5	209.6	212.5	235.0	222.2	212.6	202.8
	324	0	189	164	421	128	246	294	38	100	196
2	40.1	0	30.2	26.2	51.7	20.5	34.6	47.0	6.1	16.0	27.3
	230.1	140.0	220.2	216.2	241.7	210.5	224.6	237.0	196.1	206.0	217.3
Haitien	470	189	0	189	567	274	392	189	273	244	342
3	38.8	30.2	0	15.0	50.5	19.2	32.2	20.2	39.0	17.1	26.0
	228.8	220.2	190	205	240.5	209.2	222.2	210.2	229.0	207.1	216.0
bonite	323	164	189	0	420	127	245	168	126	100	195
4	30.4	26.2	15.0	0	42.0	10.8	23.8	19.3	20.2	8.0	17.6
	220.4	216.2	205.0	190.0	232.0	200.8	213.8	209.3	210.2	198.0	207.6
	97	421	567	420	0	293	311	550	383	323	225
5	17.5	51.7	50.5	42.0	0	31.2	34.1	56.1	42.9	34.3	24.5
	207.5	241.7	240.5	232.0	190	221.2	224.1	246.1	232.9	224.3	214.5
	286	38	273	126	383	90	208	256	0	100	158
6	32.2	6.1	39.0	20.2	42.9	12.5	24.5	35.6	0	13.9	19.3
	222.2	196.1	229.0	210.2	232.9	202.5	210.5	225.6	190	203.9	209.3
	214	246	392	245	311	118	0	375	208	148	86
7	22.5	34.6	32.2	23.8	34.1	12.4	0	34.4	24.5	15.6	9.0
	212.5	229.6	222.2	213.8	224.1	202.4	190	224.4	214.5	205.6	199.0
du Paix	453	294	189	168	550	257	375	0	256	227	326
8	45.0	47.0	20.2	19.3	56.1	22.8	35.2	0	35.6	20.1	29.7
	235.0	237.0	210.2	209.3	246.1	212.8	225.2	190	225.6	210.1	219.7
	196	128	274	127	293	0	118	257	90	30	68
9	19.6	20.5	19.2	10.8	31.2	0	12.4	22.8	12.5	2.1	6.8
	229.6	230.5	229.2	220.8	241.2	210	222.4	232.8	222.5	212.1	216.8
imientos (/Año)	1,600	1,600	1,600	1,600	600	600	600	600	600	1,000	1,000
	Les Cayes	Hinche	Cap. Haitien	Arti-bonite	Jere-mie	PAP	Jacmel	Port du Paix	Caho-bas	Tama-rinie	Petit-Goave

Para información sobre los cálculos realizados se encuentra en los archivos del Proyecto en PAF/ECA.

**CUADRO 7.2. FLUJOS DEL DESARROLLO PORCINO A
NIVEL DEL PROGRAMA (NUCLEOS Y CENTROS)**

ASIGNACION	1985	1986	1987	1988	1989	1993
<u>2 NUCLEOS REPRODUCCION</u>						
# Vientres	464	464	464	464	464	464
# Machos	30	30	30	30	30	30
# Camadas Nacidas	192	768	768	768	768	768
# Cerditos Nacidos	1,650	6,600	6,600	6,600	6,600	6,600
# Cerditos Destetados	—	5,568	5,568	5,568	5,568	5,568
- H. Vendidas	—	1,840	2,400	2,400	2,400	2,400
- M. Engorde	—	2,784	2,784	2,784	2,784	2,784
- H.F. — C.M.	—	860	240	240	240	240
- H. Reemplazo	—	84	144	144	144	144
# Machos Engordados (Venta)	—	1,808	2,712	2,712	2,712	2,712
<u>4 CENTROS MULTIPLICACION</u>						
# Vientres	—	800	800	800	800	800
# Machos	—	40	40	40	40	40
# Camadas Nacidas	—	717	1,536	1,536	1,536	1,536
# Cerditos Nacidos	—	6,884	14,748	14,748	14,748	14,748
# Cerditos Destetados	—	2,747	12,672	12,672	12,672	12,672
- H. x Dist (F ₂ - Dis)	—	1,148	6,264	6,264	6,264	6,264
- M. x Engorde	—	1,374	6,336	6,336	6,336	6,336
- H. F ₂ - CD	—	225	72	72	72	72
# Machos Engordados	—	—	5,460	6,180	6,180	6,180
<u>9 CENTROS DEMOSTRACION</u>						
# Vientres	—	225	225	225	225	225
# Machos	—	12	12	12	12	12

*Mayor información sobre los cálculos realizados se encuentra en los archivos del Proyecto en PAF/ECA.

CUADRO 7.3. REQUERIMIENTOS ALIMENTACION

	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
	<u>T O N E L A D A S</u>			
<u>NUCLEOS REPRODUCCION</u>	<u>350</u>	<u>1,600</u>	<u>1,900</u>	<u>1,900</u>
- Hembras	290	450	450	450
- Machos	25	50	50	50
- Cerditos	35	200	200	200
- Engorde	—	900	1,200	1,200
 <u>CENTROS MULTIPLICACION</u>	 —	 <u>1,150</u>	 <u>3,750</u>	 <u>3,750</u>
- Hembras	—	550	750	750
- Machos	—	40	50	50
- Cerditos	—	160	450	450
- Engorde	—	400	2,500	2,500
 <u>CENTROS DEMOSTRACION</u>	 —	 <u>60</u>	 <u>240</u>	 <u>240</u>
- Hembras	—	55	225	225
- Machos	—	5	15	15
 <u>DISTRIBUCION</u>	 —	 —	 <u>90</u>	 <u>90</u>
- Cerditos	—	—	90	90
 <u>T O T A L</u>	 <u>350</u>	 <u>2,810</u>	 <u>5,980</u>	 <u>5,980</u>
- Hembras	290	1,055	1,425	1,425
- Machos	25	95	115	115
- Cerditos	35	360	740	740
- Engorde	—	1,300	3,700	3,700
 CAMPELINO			<u>5,400</u>	<u>5,400</u>

*Mayor información sobre los cálculos realizados se encuentra en los archivos del Proyecto en PAF/ECA.

CUADRO 7.4. BENEFICIOS DEL PROGRAMA, A NIVEL DE CAMPESINO.
HEMBRAS EN PRODUCCION Y ANIMALES PRODUCIDOS

	1985	1986	1987	1988	1989	1990	1991	1992	1993
hembras	--	1,840	5,296	13,696	21,675	29,255	35,032	39,199	39,199
partos/año	--	2,760	7,944	20,545	32,513	43,884	52,549	58,800	58,800
cerdos destetados	--	<u>13,800</u>	<u>39,720</u>	<u>102,721</u>	<u>162,563</u>	<u>219,414</u>	<u>262,741</u>	<u>293,994</u>	<u>293,994</u>
machos	--	6,900	19,860	51,360	81,282	109,707	131,370	146,996	146,996
hembras	--	6,900	19,860	51,360	81,282	109,707	131,370	146,996	146,996
ventas x engorda	--	--	8,194	23,584	60,992	96,524	130,281	156,007	174,000
nuevas hembras	--	4,916	14,144	36,292	57,910	78,162	93,597	104,730	104,730
hembras de desecho	--	--	--	--	--	--	1,499	2,890	7,000

Mayor información sobre los cálculos realizados se encuentra en los archivos del Proyecto en PAF/ECA.

CUADRO 7.5. EFECTOS MULTIPLICADORES DEL PROYECTO

	3 1986	4 1987	5 1988	6 1989	7 1990	8 1991
# hembras	1,840	9,862	42,511	154,554	539,057	1,858,579
ventas x engorda	—	8,194	43,919	189,306	688,241	2,400,470
ventas x reemplazo	350	1,875	8,081	29,381	102,478	353,330

* Mayor información sobre los cálculos realizados se encuentra en los archivos del Proyecto en PAF/ECA.

CUADRO 7.6 ESTIMACION DE LOS BENEFICIOS NUTRICIONALES DEL PROYECTO.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
POBLACION (miles)	CONSUMO CERDO	PER CAPITA RES	ANUAL CABRA	DE CARNE OTRAS	(Kg) 1/ TOTAL	Consumo total de cerdo en Ton/Año	(2) Equivalente en Cerdos Extraídos	Cerdos Obte- nidos con el Proyecto	(9) Equi- valente en Ton/Año
70	4,235.0	3.27	2.71	0.55	0.1	6.63	13,860	300,000	
75	4,583.8	3.02	2.71	0.55	0.1	6.38	13,860	308,008	
77	4,749.0	2.92	2.71	0.55	0.1	6.28	13,860	308,008	
78	4,832.5	2.87	2.71	0.55	0.1	6.23	13,860	308,008	
79	4,918.7	1.37	2.17	0.44	0.1	4.08	6,739	149,756	
80	5,008.5	1.37	2.17	0.40	0.1	4.08	6,739	149,756	
81	5,009.9	--	2.71	0.65	0.2	--	--	--	
82	5,195.2	--	3.0	0.65	0.2	3.85	--	--	
83	5,293.8	--	3.0	0.65	0.2	4.0	--	--	
84	5,396.0	6.96 4/	2.39 3/	0.55 3/	0.1 3/	10 2/	37,556 5/	751,120	--
85	5,501.8	7.01	2.34	0.55 3/	0.1 3/	10 2/	38,568	771,360	--
86	5,611.6	7.06	2.29	0.55 3/	0.1 3/	10 2/	39,618	792,360	2,242 112
87	5,725.5	7.10	2.25	0.55 3/	0.1 3/	10 2/	40,651	813,020	18,457 923
88	5,843.5	7.15	2.20	0.55 3/	0.1 3/	10 2/	41,781	835,620	61,108 3,055
89	5,966.0	7.19	2.16	0.55 3/	0.1 3/	10 2/	42,896	857,920	227,795 11,390
90	6,093.1	7.24	2.11	0.55 3/	0.1 3/	10 2/	44,114	882,280	799,827 39,991
91	6,225.1	7.28	2.07	0.55 3/	0.1 3/	10 2/	45,319	906,380	2,762,908 124,330
92	6,461.0	7.34	2.01	0.55 3/	0.1 3/	10 2/	46,983	939,660	
93	6,582.0	7.39	1.96	0.55 3/	0.1 3/	10 2/	48,641	972,820	

De 1970 a 1983 basado en los niveles de extracción y composición de rebaño.

Consumo mínimo recomendado por la FAO.

Proyecciones estimadas de acuerdo al rebaño estimado y al crecimiento de la población.

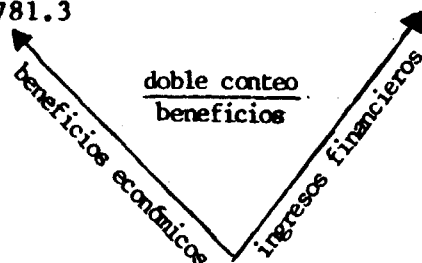
Brecha nutricional entre lo recomendado por la FAO y la oferta disponible de las carnes sustitutas.

Brecha nutricional a nivel de país a ser provista por la carne de cerdo.

Mayor información sobre los cálculos realizados se encuentra en los archivos del Proyecto en PAF/ECA.
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CUADRO 7.7. CUANTIFICACION DE INGRESOS INCREMENTALES.
(MILES DE DOLARES)

A NIVEL DE PRODUCTOR			A NIVEL DE PROGRAMA			PRODUCTOR	PROGRAMA
Cerdos Engordados	Hembras Producidas	Hembras Desecho	Cerdos Engordados	Hembras Producidas	Hembras Desecho		
--	--		--	--	--	--	--
--	--		--	--	--	--	--
--	122.9		226	120.7	10.5	122.9	236.5
1,024.3	353.6		1,021.5	276.6	27.0	1,377.9	1,048.5
2,948.0	907.3		1,111.5	276.6	27.0	3,855.3	1,138.5
7,624.0	1,447.8		1,111.5	276.6	27.0	9,071.8	1,138.5
12,065.5	1,954.1		1,111.5	276.6	27.0	14,019.6	1,138.5
16,285.1	2,339.3	187.4	1,111.5	276.6	27.0	18,811.8	1,138.5
19,500.9	2,618.3	361.3	1,111.5	276.6	27.0	22,480.5	1,138.5
1/ 21,820.5	2,618.3	882.12	1,111.5	276.6	27.0	25,320.9	1,138.5
2/		5,781.3			225.6	30,220.8	1,337.1



valor residual del rebaño
valor residual del rebaño

información sobre los cálculos realizados se encuentra en los archivos del Proyecto en PAF/ECA.

CUADRO 7.8. COSTOS INCREMENTALES (MILES DE DOLARES)

	NIVEL DE PRODUCTOR				NIVEL DE PROGRAMA		
	Inversiones (Cerdos)	Alimento	Mano Obra	Total	Inversiones	Operación y Mantenimiento	Total
1984	--	--	--	--	1,289.0	134.8	1,423.8
1985	--	--	--	--	4,203.2	655.6	4,858.8
1986	120.7	286	18.3	304.3	2,719.4	1,701.8	4,421.2
1987	276.6	1,192.5	52.5	1,245.0	996.4	2,623.8	3,620.2
1988	276.6	3,191.8	135.6	3,327.4	579.5	2,542.0	3,121.5
1989	276.6	6,117.8	214.6	6,332.4	0	2,871.7	2,871.7
1990	276.6	8,897.4	289.6	9,187.0	0	2,871.7	2,871.7
1991	276.6	11,316.6	346.8	11,663.4	0	2,871.7	2,871.7
1992	276.6	13,123.7	388.1	13,511.8	0	2,871.7	2,871.7
1993	<u>276.6</u>	<u>13,960.0</u>	<u>388.1</u>	<u>14,348.1</u>	<u>0</u>	<u>2,871.7</u>	<u>2,871.7</u>

Inversión financiera

Costo económico

* Mayor información sobre los cálculos realizados se encuentra en los archivos del Proyecto en PAF/ECA.

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CUADRO 7.9. ESQUEMA DE PRECIOS CORRIENTES DE LAS CARNES DE CERDO, RES Y CABRA. 1/

	CARNE DE CERDO (\$/Kg)			CARNE DE RES (\$/Kg)			CARNE DE CABRA (\$/Kg)		
	Detallista (corte)	Detallista (en Pie) 4/	Productor (en Pie) 5/	Detallista (Corte)	Detallista (en Pie) 4/	Productor (en Pie) 5/	Detallista (Corte) 5/	Detallista (en Pie) 4/	Productor (en Pie) 5/
1978	1.34	0.75	0.51	1.45	0.67	0.45	1.08	0.48	0.32
1979	1.64	0.92	0.62	1.84	0.85	0.57	1.50	0.67	0.45
1980	2.38	1.34	0.90	2.35	1.08	0.73	2.42	1.08	0.73
1981	2.72	1.53	1.03 7/	2.66	1.22	0.82	2.76	1.23	0.83
1982 3/	4.10	2.31	1.56	3.60	1.65	1.11	3.50	1.56	1.05
1983 2/	5.50	3.09	2.09	4.50	2.07	1.40	4.20	1.87	1.26
1984 6/	5.22	2.35	1.59	--	--	--	--	--	--
1985	4.96	2.23	1.51	--	--	--	--	--	--
1986	4.70	2.12	1.43	--	--	--	--	--	--
1987	4.47	2.01	1.36	--	--	--	--	--	--
1988	4.24	1.91	1.29	--	--	--	--	--	--
1989	4.02	1.81	1.22	--	--	--	--	--	--
1990	3.82	1.72	1.16	--	--	--	--	--	--

1/ De 1978 a 1981 se utilizaron las cifras reportadas por PEPPADEP en el report "Analyse des Prix et, d'Autres Aspects Economiques de l'Elevage Porcien", 1982 en relación a los precios corrientes a nivel de detallista.

2/ Observaciones obtenidas del reporte preparado por Sharon K. Matter, the Pennsylvania State University, 1983.

3/ Interpolación directa entre 1983 y 1981.

4/ En base a los rendimientos en canal observados.

5/ En base a márgenes de comercialización y otras transferencias.

6/ De 1984 en adelante se utilizaron proyecciones de acuerdo a la oferta estimada.

7/ Cifra que coincide con las estimaciones del PEPPADEP al momento de liquidación de cerdos, con lo cual se presumiría que todos los supuestos adoptados son correctos.

* Mayor información sobre los cálculos realizados se encuentra en los archivos del Proyecto en PAF/ECA.

CUADRO 7.10.

1990VB0/UNIT 14

COST/BENEFIT ANALYSIS

FL-HAI

LINE NO	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
10.0 BENEFITS	0.	0.	359.4	2426.4	4993.8	10210.3	15158.1	19950.3	23619.0	31557.9
20.0 INVESTMENT COSTS	1289.0	4203.2	2719.4	996.4	579.5	0.	0.	0.	0.	0.
30.0 OPERATING COSTS	134.8	655.6	2806.1	3848.8	5869.4	9204.1	12058.7	14535.1	16383.5	17219.8
40.0 TOTAL COSTS	1424	4859	4726	4845	6449	9204	12059	14535	16384	17220
50.0 NET CASH FLOW:	-1424	-4859	-4366	-2439	-1455	1006	3099	5415	7236	14338
70.0 RATE OF RETURN(X):	0.	0.	0.	0.	0.	0.	0.	0.	2.8	13.2
90.0 PRESENT VALUE:										
98.0 AT 5%	7774	0	0	0	0	0	0	0	0	0
100.0 AT 8%	4208	0	0	0	0	0	0	0	0	0
110.0 AT 10%	2334	0	0	0	0	0	0	0	0	0
120.0 AT 12%	780	0	0	0	0	0	0	0	0	0
130.0 AT 14%	-509	0	0	0	0	0	0	0	0	0
140.0 AT 16%	-1579	0	0	0	0	0	0	0	0	0
150.0 AT 18%	-2467	0	0	0	0	0	0	0	0	0
155.0 AT 20%	-3203	0	0	0	0	0	0	0	0	0
160.0 AT 25%	-4534	0	0	0	0	0	0	0	0	0
170.0 AT 30%	-5349	0	0	0	0	0	0	0	0	0
190.0 SENSITIVITY:										
200.0 BENEFITS										
280.0 +10%	0.	0.	0.	0.	0.	0.	0.	0.5	10.8	19.7
290.0 + 5%	0.	0.	0.	0.	0.	0.	0.	0.	7.0	16.4
300.0 - 5%	0.	0.	0.	0.	0.	0.	0.	0.	0.	9.4
310.0 -10%	0.	0.	0.	0.	0.	0.	0.	0.	0.	5.2
320.0 -15%	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.4
330.0 -20%	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
340.0 -25%	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
360.0 INVESTMENT COSTS										
420.0 +25%	0.	0.	0.	0.	0.	0.	0.	0.	0.	10.3
430.0 +20%	0.	0.	0.	0.	0.	0.	0.	0.	0.3	10.8
440.0 +15%	0.	0.	0.	0.	0.	0.	0.	0.	0.9	11.4
450.0 +10%	0.	0.	0.	0.	0.	0.	0.	0.	1.5	12.0
460.0 + 5%	0.	0.	0.	0.	0.	0.	0.	0.	2.1	12.6
480.0 OPERATING COSTS										
540.0 +25%	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
550.0 +20%	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.2
560.0 +15%	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.7
570.0 +10%	0.	0.	0.	0.	0.	0.	0.	0.	0.	7.1
580.0 + 5%	0.	0.	0.	0.	0.	0.	0.	0.	0.	10.2
600.0 CROSS SENSITIVITY										
670.0 -15%BNF+15% CST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
680.0 -10%BNF+10% CST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
690.0 - 5%BNF+ 5% CST	0.	0.	0.	0.	0.	0.	0.	0.	0.	5.4
700.0 + 5%BNF- 5% CST	0.	0.	0.	0.	0.	0.	0.	0.9	11.2	20.0
710.0 +10%BNF-10% CST	0.	0.	0.	0.	0.	0.	0.	9.4	18.7	26.4
720.0 +15%BNF-15% CST	0.	0.	0.	0.	0.	0.	2.5	17.2	25.7	32.6

CUADRO 7.10A.

LINE	NO	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
10.0	BENEFITS	0.	449.0	2615.9	5494.2	12127.4	20594.1	19950.3	23619.0	31557.9	0.
20.0	INVESTMENT COSTS	1289.0	4203.2	2719.4	996.4	5869.4	9204.1	12058.7	14535.1	16383.5	17219.8
30.5	OPERATING COSTS	134.8	655.6	2006.1	3868.8	5869.4	9204.1	12058.7	14535.1	16383.5	17219.8
40.0	TOTAL COSTS	1424	4859	4726	4865	6449	9204	12059	14535	16384	17220
50.0	NET CASH FLOW:	-1424	-4859	-4277	-2249	-955	2923	8535	5415	7236	14338
60.0											
70.0	RATE OF RETURN(%)	0.	0.	0.	0.	0.	0.	0.	4.8	12.0	19.6
80.0	PRESENT VALUE:										
90.0											
100.0	AT 5%	13989	0	0	0	0	0	0	0	0	0
110.0	AT 10%	9533	0	0	0	0	0	0	0	0	0
120.0	AT 12%	7151	0	0	0	0	0	0	0	0	0
130.0	AT 14%	5146	0	0	0	0	0	0	0	0	0
140.0	AT 16%	3457	0	0	0	0	0	0	0	0	0
150.0	AT 18%	2030	0	0	0	0	0	0	0	0	0
160.0	AT 20%	823	0	0	0	0	0	0	0	0	0
170.0	AT 25%	-2121	0	0	0	0	0	0	0	0	0
180.0	AT 30%	-3892	0	0	0	0	0	0	0	0	0
190.0	SENSITIVITY:										
200.0	BENEFITS										
280.0	+10%	0.	0.	0.	0.	0.	0.	0.	12.6	19.4	26.1
290.0	+5%	0.	0.	0.	0.	0.	0.	0.	8.9	15.9	23.0
300.0	-5%	0.	0.	0.	0.	0.	0.	0.	0.1	7.6	15.9
310.0	-10%	0.	0.	0.	0.	0.	0.	0.	0.	2.6	11.8
320.0	-15%	0.	0.	0.	0.	0.	0.	0.	0.	0.	7.1
330.0	-20%	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.5
340.0	-25%	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
350.0											
360.0	INVESTMENT COSTS										
420.0	+25%	0.	0.	0.	0.	0.	0.	0.	1.0	8.3	16.1
430.0	+20%	0.	0.	0.	0.	0.	0.	0.	1.7	9.0	16.8
440.0	+15%	0.	0.	0.	0.	0.	0.	0.	2.4	9.7	17.4
450.0	+10%	0.	0.	0.	0.	0.	0.	0.	3.1	10.4	18.1
460.0	+5%	0.	0.	0.	0.	0.	0.	0.	3.9	11.2	18.9
470.0											
480.0	OPERATING COSTS										
540.0	+25%	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.0
550.0	+20%	0.	0.	0.	0.	0.	0.	0.	0.	0.	7.5
560.0	+15%	0.	0.	0.	0.	0.	0.	0.	0.	0.	10.8
570.0	+10%	0.	0.	0.	0.	0.	0.	0.	0.	0.	13.9
580.0	+5%	0.	0.	0.	0.	0.	0.	0.	0.	0.	16.8
590.0											
600.0	CROSS SENSITIVITY										
670.0	-15%BNF+15% CST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
680.0	-10%BNF+10% CST	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.7
690.0	-5%BNF+5% CST	0.	0.	0.	0.	0.	0.	0.	0.	0.	12.2
700.0	+5%BNF-5% CST	0.	0.	0.	0.	0.	0.	0.	0.	0.	26.4
710.0	+10%BNF-10% CST	0.	0.	0.	0.	0.	0.	0.	0.	0.	32.8
720.0	+15%BNF-15% CST	0.	0.	0.	0.	0.	0.	0.	0.	0.	39.0

CUADRO 7.11.

T 14

COST/BENEFIT ANALYSIS

FL-MA15

COST/BENEFIT ANAL

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14
FITS	0.	0.	359.4	2426.4	4993.8	10210.3	15158.1	19950.3	23419.0	26459.4	26459.4	26459.4	26459.4	26459.4
STINENT COSTS	1289.0	4203.2	2719.4	996.4	579.5	0.	0.	0.	0.	0.	0.	0.	0.	0.
ATING COSTS	134.8	655.6	2006.1	3868.8	5869.4	9204.1	12058.7	14535.1	14383.5	17219.8	17219.8	17219.8	17219.8	17219.8
AL COSTS	1424	4859	4726	4865	6449	9204	12059	14535	14384	17220	17220	17220	17220	17220
T CASH FLOW:	-1424	-4859	-4366	-2439	-1455	1006	3099	5415	7236	9240	9240	9240	9240	9240
OF RETURN(I):	0.	0.	0.	0.	0.	0.	0.	0.	2.8	10.3	14.7	17.5	19.4	20.7
SENT VALUE:														
5X	32849	0	0	0	0	0	0	0	0	0	0	0	0	0
8X	21848	0	0	0	0	0	0	0	0	0	0	0	0	0
10X	16368	0	0	0	0	0	0	0	0	0	0	0	0	0
12X	11996	0	0	0	0	0	0	0	0	0	0	0	0	0
14X	8492	0	0	0	0	0	0	0	0	0	0	0	0	0
16X	5674	0	0	0	0	0	0	0	0	0	0	0	0	0
18X	3401	0	0	0	0	0	0	0	0	0	0	0	0	0
20X	1562	0	0	0	0	0	0	0	0	0	0	0	0	0
25X	-1659	0	0	0	0	0	0	0	0	0	0	0	0	0
30X	-3578	0	0	0	0	0	0	0	0	0	0	0	0	0
SITIVITY:														
ITS														
	0.	0.	0.	0.	0.	0.	0.	0.5	10.8	17.4	21.3	23.7	25.3	26.4
	0.	0.	0.	0.	0.	0.	0.	0.	7.0	14.0	18.1	20.7	22.5	23.7
	0.	0.	0.	0.	0.	0.	0.	0.	6.1	10.8	13.9	15.9	17.4	17.4
	0.	0.	0.	0.	0.	0.	0.	0.	1.2	6.4	9.7	12.0	13.7	13.7
	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.2	4.9	7.5	9.3	9.3
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.9	4.1	4.1
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
STINENT COSTS														
	0.	0.	0.	0.	0.	0.	0.	0.	0.	7.4	11.9	14.7	16.7	18.1
	0.	0.	0.	0.	0.	0.	0.	0.	0.3	7.9	12.4	15.2	17.2	18.6
	0.	0.	0.	0.	0.	0.	0.	0.	0.9	8.5	12.9	15.8	17.7	19.1
	0.	0.	0.	0.	0.	0.	0.	0.	1.5	9.1	13.5	16.3	18.2	19.6
	0.	0.	0.	0.	0.	0.	0.	0.	2.1	9.7	14.1	16.9	18.8	20.1
ATING COSTS														
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.7	3.6	5.7
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.8	4.6	7.3	9.2
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.7	8.2	10.6	12.4
	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.2	8.3	11.5	13.7	15.3
	0.	0.	0.	0.	0.	0.	0.	0.	0.	6.9	11.6	14.6	16.6	18.1
SENSITIVITY														
BNF+15XCST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BNF+10XCST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.3	4.1	6.1
BNF+ 5XCST	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.7	6.8	10.1	12.4	14.0
BNF- 5XCST	0.	0.	0.	0.	0.	0.	0.	0.9	11.2	17.8	21.6	24.0	25.6	26.7
BNF-10XCST	0.	0.	0.	0.	0.	0.	0.	9.4	18.7	24.6	27.9	30.1	31.4	32.4
BNF-15XCST	0.	0.	0.	0.	0.	0.	2.5	17.2	25.7	31.0	34.0	35.9	37.1	37.8

**Cuadro 7.12. Beneficios del Proyecto en Términos Nutricionales
de Acuerdo al Nivel de Ingresos de la Población.**

	Ingreso per cápita (\$ ctes 78)	Ingreso per cápita corrientes	Consumo per cápita (\$.95%)	Consumo de carne per cápita (\$.4%)	Equivalente en kilos de carne
1978	261.3	261.3	248.2	8.9	
1979	266.19	282.2	268.1	10.7	
1980	276.5	304.8	289.6	11.6	
1981	272.53	329.2	312.7	12.5	
1982	269.12	355.5	337.7	13.5	
1983	269.12	383.9	364.7	14.6	
1984	269.12	414.7	394.0	15.8	4.0
1985	269.12	447.8	425.4	17.0	4.3
1986	269.12	483.6	459.4	18.4	4.66
1987	269.12	522.3	496.2	19.2	4.86
1988	269.12	564.1	535.9	21.4	5.42
1989	269.12	609.3	578.8	23.2	5.87
1990	269.12	658.0	625.1	25.0	6.33
1991	269.12	710.6	675.1	27.0	6.84
1992	269.12	767.5	728.7	29.1	7.37
1993	269.12	828.9	787.5	31.5	7.97

* Mayor información sobre los cálculos realizados se encuentra en los
archivos del Proyecto en PAF/ECA.

W1340P

CUADRO 7.13: DISTRIBUCION DE LA PROPIEDAD RURAL 1/

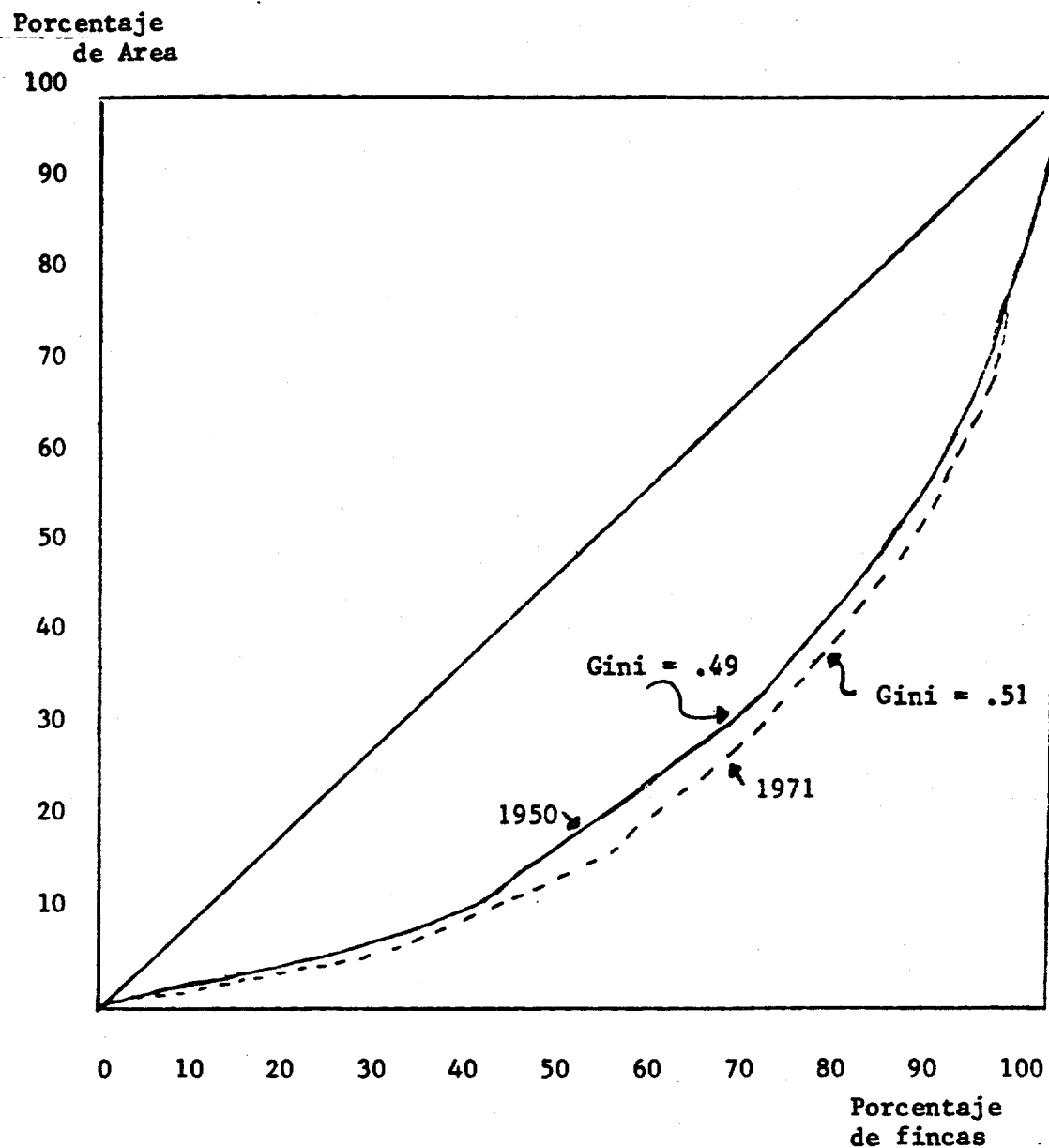
Tamaño Finca (carreaux) 2/	No. de Fincas	% de Fincas	Cumula- tivo %	Area en Fincas	% de Area	Cumula- tivo %
0.01 - 0.08	16,820	2.7	2.7	850	0.1	0.1
0.09 - 0.16	36,050	5.9	8.6	4,495	0.7	0.8
0.17 - 0.25	107,480	17.4	26.0	27,410	4.1	4.9
0.26 - 0.38	28,485	4.6	30.6	10,220	1.5	6.4
0.39 - 0.50	104,890	17.0	47.6	51,045	7.6	14.0
0.51 - 0.78	68,260	11.1	58.7	49,270	7.4	21.4
0.79 - 1.00	76,010	12.3	71.0	74,585	11.1	32.5
1.01 - 1.55	65,920	10.7	81.7	89,710	13.4	45.9
1.56 - 2.00	44,340	7.2	88.9	85,320	12.7	58.6
2.01 - 2.33	9,260	1.5	90.4	21,160	3.2	61.8
2.34 - 3.00	27,370	4.4	94.8	75,010	11.2	73.0
3.01 - 3.87	8,440	1.4	96.2	30,070	4.5	77.5
3.88 - 4.00	4,300	0.7	96.9	17,150	2.6	80.1
4.01 - 5.00	7,810	1.3	98.2	37,200	5.6	85.7
5.01 - 7.75	6,440	1.0	99.2	39,310	5.9	91.6
7.76 - 10.00	2,660	0.4	99.6	22,610	3.4	95.0
10.01 - 15.00	1,285	0.2	99.8	15,480	2.3	97.3
15.01 - 20.00	590	0.1	99.9	10,260	1.5	98.8
More than 20.00	300	0.1	100.0	3,240	1.2	100.0
TOTAL	616,710	100.0	100.0	669,395	100.0	100.0

1/ Fuente: Land Tenure, Income, and Employment in Rural Haiti: A Survey.
USDA - 1978.

2/ 1 carreaux = 1.3 hectáreas

W13402

CUADRO 7.14. CURVA DE LORENZ 1/



1/ Fuente: Land Tenure, Income, and Employment in Rural Haiti: A Survey. USDA - 1978.

Indicadores Principales para la Evolución Anual y Ex-post del ProyectoA. A Nivel de Programa:

- 1- Número de hembras en producción en los núcleos y centros del programa.
- 2- Número de sementales en los núcleos y centros del programa.
- 3- Número de cerdos engordados y vendidos en los núcleos y centros.
- 4- Número de cerditas entregadas al productor.
- 5- Coeficientes técnicos de las cerdas reproductoras:
Tasa de parición; partos por año; fertilidad; mortalidad; cerditos nacidos por parto; cerditos destetados; edad del cerdo al destete; peso al destete; tipo y cantidad de alimentación en etapa de gestación, lactación y pre-gestación; edad al reemplazo, etc.
- 6- Coeficientes técnicos de los sementales; proporción macho/hembra; tipo y cantidad de la alimentación, edad y peso al reemplazo.
- 7- Edad y peso de los cerdos engordados; tipo y cantidad de alimentación, rendimientos en canal.
- 8- Costos unitarios y globales por hembra, semental, cerdos en engorde y cerdos destetados; alimento, vacuna, medicina, complementos, etc.
- 9- Precios de venta de los cerdos engordados, de las hembras vendidas al productor y otros ingresos del Proyecto.
- 10- Mercado de la carne producida.
- 11- Distribución regional de las cerdas entregadas por cada uno de los centros de distribución.
- 12- Incidencia y record de enfermedades encontradas en los núcleos y centros del Programa.
- 13- Tipificación de los productores beneficiados; características de elegibilidad, ingresos, número de cerdos entregados/productor, sistema (crédito, contado, otro), tamaño del predio, asociado en cooperativas, etc.
- 14- Asistencia técnica proporcionada: número de visitas, resultados.
- 15- Evaluación económica y financiera de los núcleos de reproducción y centros de multiplicación.

B. A Nivel de Productor

- 1- Número de hembras en producción.
- 2- Número de sementales.
- 3- Número de cerdos engordados y vendidos (tasa de extracción).
- 4- Esquema seguido por el productor; destino de los cerditos destetados (reemplazos, ventas a otros campesinos, porcentaje de animales engordados, etc.).
- 5- Coeficientes técnicos del rebaño reproductor (igual que en el punto 5 anterior).
- 6- Coeficientes técnicos de los sementales.

- 7- Edad y peso de los cerdos engordados; tipo y cantidad de alimentación, rendimientos en canal.
- 8- Costos unitarios y globales por hembra, semental, cerdos en engorde y cerdos destetados; alimento, vacuna, medicina, complementos, etc.
- 9- Precios y esquema de la venta de carne, costos de transporte, intermediarios, márgenes de comercialización, destino de la producción, mercado, etc.
- 10- Incidencia de enfermedades encontradas.

C. De Carácter General

- 1- Evolución del sistema de precios: a nivel consumidor, intermediario, a nivel de productor.
- 2- Consumo de carne de cerdo total y per cápita. Consumo de carnes sustitutas.
- 3- Elasticidades cruzadas entre la carne de cerdo y sustitutas.
- 4- Resultados de la cooperación técnica proporcionada: número de becarios, número de consultores, programas de trabajo.
- 5- Análisis costo-beneficio del proyecto, considerando los beneficios a nivel de productor y los excedentes al consumidor, (siguiendo la metodología empleada en el Informe de Proyecto).
- 6- Impacto distributivo de los beneficios netos del proyecto.