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UNCLASSIFIED

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

HAITI

PROJECT PAPER

INTERIM SWINE REPOPULATION
(Amendment # II)

AID/LAC/P-303 &
LAC/P-161 &
LAC/P-161/1

Project Number: 521-0170

UNCLASSIFIED

PROJECT DATA SHEET

1. TRANSACTION CODE

A = Add
 C = Change
 D = Delete

Amendment Number

2

DOCUMENT CODE

3

2. COUNTRY/ENTITY

HAITI

3. PROJECT NUMBER

521-0170

4. BUREAU/OFFICE

USAID/HAITI

05

5. PROJECT TITLE (maximum 40 characters)

INTERIM SWINE REPOPULATION

6. PROJECT ASSISTANCE COMPLETION DATE (FACD)

MM DD YY
 09 30 88

7. ESTIMATED DATE OF OBLIGATION

(Under "B" below, enter 1, 2, 3, or 4)

A. Initial FY 87

B. Quarter 4

C. Final FY 88

8. COSTS (\$000 OR EQUIVALENT \$1 =)

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	1,500		1,500	5,724	368	6,152
(Grant)	()	()	()	()	()	()
(Loan)	()	()	()	()	()	()
Other U.S.						
1.						
2.						
Host Country						
Other Donor(s) IICA				577		577
TOTALS	1,500		1,500	6,361	368	6,729

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) ARDN	11	010		3,803		2,349		6,152	
(2)									
(3)									
(4)									
TOTALS				3,803		2,349		6,152	

10. SECONDARY TECHNICAL CODES (maximum 5 codes of 3 positions each)

010 070 250

11. SECONDARY PURPOSE CODE

113

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code BR BS

B. Amount

13. PROJECT PURPOSE (maximum 480 characters)

TO PRODUCE AND DISTRIEUTE IMPROVED BREEDING STOCK TO HAITIAN FARMERS DURING THE PERIOD IMMEDIATELY FOLLOWING THE ERADICATION OF AFRICAN SWINE FEVER IN THE COUNTRY.

14. SCHEDULED EVALUATIONS

Interim MM YY Final MM YY

15. SOURCE/ORIGIN OF GOODS AND SERVICES

000 941 Local Other (Specify)

16. AMENDMENTS NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page IF Amendment)

THIS AMENDMENT WILL INCREASE THE LOP FUNDING AND EXTEND ONGOING ACTIVITIES UNTIL SEPTEMBER 30, 1987. BOTH THE SWINE HUSBANDRY COMPONENT AND THE DISEASE CONTROL COMPONENT WILL BE EXTENDED.

17. APPROVED BY

Signature

CERARD ZARR

Title

MISSION DIRECTOR

Date Signed

MM DD YY
 06 23 86

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION

MM DD YY

PROJECT AUTHORIZATION

Amendment No. 2

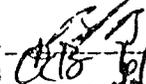
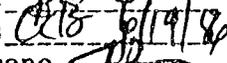
Name of Country : Haiti
Name of Project : Interim Swine Repopulation
Number of Project : 521-0170

1. This Amendment No. 2 to the Authorization for the Interim Swine Repopulation Project incorporates the following modifications to the original Authorization, as amended:
 - A. In Paragraph 1, the phrase "\$3,803,000 (Three Million Eight Hundred Three Thousand United States Dollars)" is replaced by "\$6,152,000 (Six Million One Hundred Fifty-Two Thousand United States Dollars)".
 - B. In Paragraph 1, the phrase "Period of Thirty Months" is replaced by "Period of Forty-Six Months".
2. Except as specifically amended hereby, the terms and conditions of the original Authorization of September 29, 1983, and the first amendment thereto, dated August 31, 1984, remain in full force and effect.



Gerald Zarr
Director
USAID/Haiti


DRE: RByess  3/31/86

DRE, BBurnett 
CONT, CBrooks 
C/RDO, VCusumano 
ADO, CMcintyre 

INTERIM SWINE REPOPULATION
PROJECT PAPER AMENDMENT No. 2

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I. SUMMARY AND RECOMMENDATIONS

The Project Committee has reviewed the implementation status of the Interim Swine Repopulation Project and recommends that this project paper amendment be approved, providing an additional \$2.349 million in grant funding to the Interamerican Institute for Cooperation on Agriculture (IICA). Two principal modifications to the ongoing project are hereby proposed:

first, an extension of the PACD by 15 months, to September 30, 1987; and

second, an increase in funding of \$2.349 million to allow for expanded extension and health activities. This will bring the LOP funding total to \$6.152 million.

The need for this amendment is predicated upon the continued lack of progress in implementation of the national swine industry development project funded by the Interamerican Development Bank (IDB). The original design of Interim Swine Repopulation project was based upon an understanding that the IDB project would be well underway by the current time, and that additional resources would therefore not be necessary in order to achieve a reproduction rate sufficient to replace the swine herd slaughtered under the PEPPADEP program. This is not the case, however, and the Project Committee recommends that the current project be extended and expanded in order to meet this goal.

During the proposed 16-month extension of the project, emphasis will be placed upon the following activities:

- A. Production at the Secondary Multiplication Centers (SMCs) centering on technology transfer and herd management; and
- B. Feed production, distribution and improvement from local sources. These efforts will concentrate on regional feed mills, research, credit to groups interested in establishing other feed mills and a phase-out of the current feed preparation program at a central mill.
- C. Veterinary Services to SMCs.

II. PROJECT BACKGROUND AND RATIONALE

A. Background. The Interim Swine Repopulation Project (521-0170) was designed to provide a partial solution to the problems resulting from the eradication of the entire domestic swine population of Haiti due to an epidemic of African Swine Fever (ASF). When the project was obligated in September 1983, the eradication program, undertaken by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), was virtually completed.

The disease had been introduced to the Dominican Republic from Europe in 1979, and it spread to Haiti and Cuba within a few months. Because the Government of Haiti (GOH) did not have the capability to diagnose ASF and to undertake adequate local quarantine measures, over 70 percent of the swine population of about one million died, resulting in an enormous economic loss for the Haitian small farmer. ASF was eradicated in Cuba with a loss of over 400,000 head.

Fortunately, the virus did not spread to Florida, Puerto Rico, Mexico or other Caribbean countries. USDA and the GOH, working through IICA, created a temporary organization, the *Projet d'Eradication de la Peste Porcine Africaine et du Developpement de l'Elevage Porcin* (PEPPADEP) to eradicate ASF in Haiti. PEPPADEP established "kill centers" to which farmers brought their swine and received compensation for their loss. The program successfully eliminated the remainder of the Haitian swine herd, nearly 400,000 animals, by June 1983. Its funding having expired, and the country scheduled to be declared free of ASF in domestic swine, the PEPPADEP program was terminated in December 1983.

However, wild (feral) pigs remained in some remote locations. The raking, hunting and testing of the feral swine population, as well as monitoring of the sentinel pigs, continued. Hunting and testing for ASF were carried out by a USDA-financed team of wildlife biologists from the University of Georgia.

As the U.S. and Haitian governments planned and carried out eradication of ASF, the IDB was preparing a large-scale project to replace the slaughtered swine upon completion of eradication. The initial plan was that the IDB loan would provide both for repopulation and development of a swine industry. PEPPADEP, however, warned the U.S. government that they could expect delays in the start-up of the IDB project and, therefore, there was a need to bridge the gap. Thus, the USAID mission, with supplementary FY83 funding, developed its Interim Swine Repopulation project and obligated it, through a cooperative agreement with IICA, in September 1983. The rationale for the USAID-funded interim project rested upon three assumptions:

- (1) The eradication of ASF would be completed by mid 1983;
- (2) The startup of the IDB project would be delayed until at least mid 1984 and even then it would have to pass through a construction phase before a nucleus breeding herd could be imported; and
- (3) The USAID project would be able to move first generation breeding stock out into rural Haiti without having to await the construction of a central (nucleus) breeding center: the latter could be immediately rented from the Haitian-American Meat and Provision Company (HAMPCO).

With the discovery of ASF-positive feral swine in August 1983, the GOH prevented the AID project from importing the nucleus breeding herd until March 1984, when Haiti's domestic herd was finally declared ASF-free. This herd was housed in a sophisticated nucleus breeding facility (HAMPCO) and fed high-

quality rations to fuel the highest feasible reproductive rate. IICA had begun to establish contracts with SMCs, private and voluntary organizations and indigenous groups. The SMCs would raise the second generation pigs, reproducing them to distribute to small farmers, as soon as they were weaned from the nucleus breeding herd.

By the end of 1984, a project agreement for swine repopulation was signed between the GOH and the IDB, but the IDB would still not disburse any funds until the GOH made a formal, documented funding request, matched by an increment of counterpart funds; this the GOH did not produce. By reason of the start-up delays in the AID project and the continued absence of an IDB project, in September 1984 the AID project was extended for six months to continue its swine repopulation efforts, adding a herd health management component to safeguard the breeding herd and its offspring.

The period covered by that first amendment will expire on June 30, 1986. It is now evident that the IDB project will not be implemented in the near future, which will require that the AID-funded effort be extended further. The principal advantage to extending the project now is that IICA will be able to provide feed and veterinary services to SMC swine through the weaning of the first F₂ generation piglets at every SMC.

B. Rationale. The rationale for this proposed extension of the Project is centered upon the lack of progress in implementation of the IDB swine industry development project. The interim project was originally designed to "bridge the gap" between the slaughter of the Haitian herd and the repopulation program of the IDB. As time has passed, however, the interim project has emerged as the only ongoing swine production project and its importance has increased to the small farmer. More than three hundred SMCs will have received breeding stock by March 31, 1986, and about 150 more SMCs which have organized, built facilities, applied for pigs and been evaluated will be added to the list by the end of May 1986.

All the SMCs will have to be supported with feed and veterinary assistance through the weaning of the first litter of (third generation) swine. This point will be reached approximately 16 months after distribution to the SMC. The contract with the first SMC to have received pigs terminates in April 1986. Each month thereafter approximately twenty contracts will be terminated. The project's total contractual obligation to SMCs will therefore terminate sixteen months after its last SMC distribution. If this occurs in May 1986, in order to spread project benefits to as many SMCs who are ready to receive pigs, that end point would fall in November 1987.

The project will immediately establish a central feedmill to replace the HAMPCO mill in order to provide feed to the SMCs during IICA's 16-month feed obligations, during which time additional feedmills will be organized through the SMCs in three regions of Haiti and feed trials and research on alternative local feedstuffs will be carried out. The proposed extension of the project by 16 months will allow both SMC obligations to be met and local production and milling capabilities developed.

During the commitment to the SMCs, the project extension will reinforce the efforts of the SMCs in (1) feed development; (2) animal health; and (3) extension to the Haitian farmers who will receive pigs from the SMCs. These activities will solidify the SMCs as the foundation for the Haitian swine herd.

1. Feed Development. The project was designed to produce and distribute a manageable number of foundation breeding stock (4,500 breeding females and 600

boars) to about 350 SMCs. The extension of the project will allow SMCs to reach their maximum capacity of 5,000 breeding females. Table 1 shows the potential increase in herd by the proposed PACD of September 30, 1987 given the extended project efforts compared to what could be expected if the current project ends, as now scheduled, on June 30, 1986. It should be noted that the "with project" projections are conservative.

Table 1

Comparison of Haitian Swine Population
with and without project amendment

Date	With Project ¹		Without Project ¹	
	No. Females	Total Herd ²	No. Females	Total Herd ²
5/31/86	4,887	9,774	4,887	9,774
9/30/87	34,930	68,661	19,269	37,865

¹ Assumptions:	With	Without
fertile females	80%	80%
% which farrow	75%	75%
No. litters/yr	1.5	1.0
No. weaned/litter	6.0	6.0

² Assumes 30% loss from death, sales, culls

Note: this calculation does not reflect the effect of the presence or absence of an animal health component. It does not show the economic effect resulting from sale of pigs.

The difference of over 30,000 pigs by the PACD will have several direct effects: first, 30,000 more small farm families will receive pigs sooner than they would without the extension, second, more SMCs are likely to survive than would be the case without the feed subsidy; third, the chance for the development of self-sustaining regional feedmills is increased; and fourth, there will be four times the number of swine in Haiti within a year of the project's completion. It is important to remember the political significance of the pig as well. In the post-Duvalierist transition phase, the issue of swine repopulation will be played upon by aspiring presidential candidates, and it is important to maintain the rate of pig deliveries rather than letting the project fall prey to political whims.

Feed will continue to be the limiting factor on the growth of the national herd. Therefore, the second phase of the Interim Swine Repopulation project will identify (1) available sources of protein, imported and/or produced; (2) vitamins and minerals that are most crucial to Haiti's swine rations; (3) crops that can be grown to produce food for humans and byproducts for swine; and (4) combinations of feed rations from local products best for the Haitian farms and the overall swine industry.

2. Swine health. To protect the investment made by USAID and the SMCs, the project's swine health team will continue to render swine health and herd management assistance to the SMCs and as many of the Haitian farmers as

possible. The animal health team will provide the following direct services to SMCs: (1) Develop and implement animal herd health and management procedures; (2) Provide first-line veterinary medical support; and (3) Develop materials on swine health for extension.

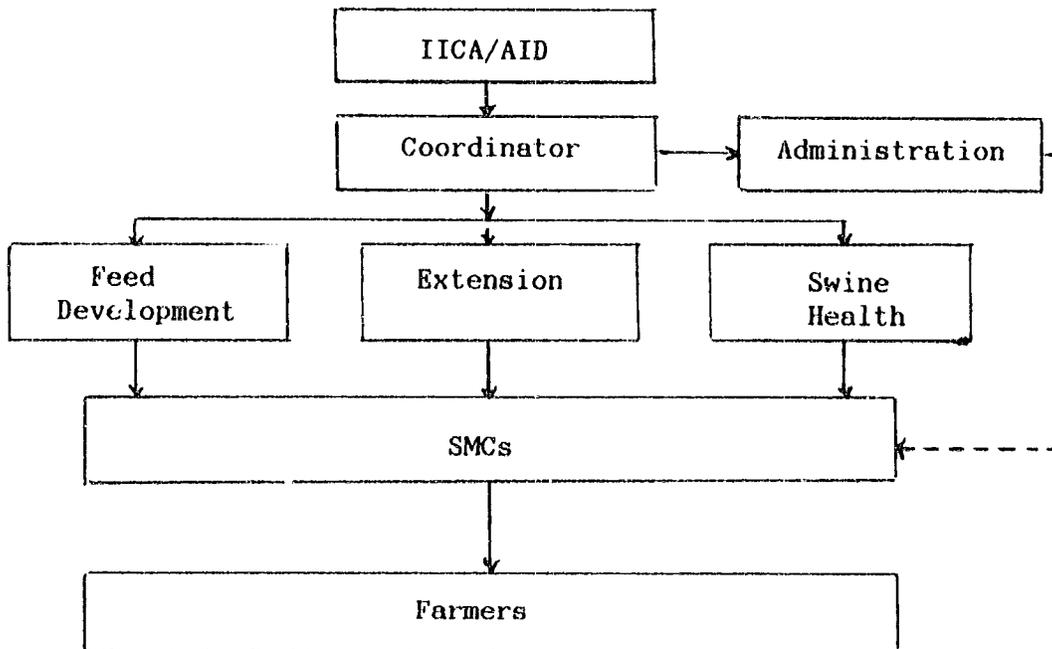
3. **Extension.** Training farm managers, farmers and GOH extension personnel in swine husbandry is crucial to the swine repopulation efforts. During the swine production phase of the Interim Swine project, most of the farm managers of the SMCs and some Haitian farmers have benefited from training in swine management. As the magnitude of swine production at the SMCs increases, the demand for training will mushroom. During the proposed additional 16 months of the project, a training and extension team will provide training to SMC farm managers and extension personnel and to GOH district agronomists in swine production and extension. The animal health component will consist of assistance to SMCs. At the same time, reinforcement of the GOH National Veterinary service, to be financed out of this Title III resources, will be developed by AID and MARNDR.

III. DETAILED PROJECT DESCRIPTION

A. **Goal and Purpose.** The goal of the project remains to restore the standard of living of the Haitian farmer to the level existing prior to the outbreak of ASF. The purpose of the project is to produce and distribute improved breeding stock to Haitian farmers during the period immediately following the eradication of ASF. The present amendment will help to insure that the repopulation rate will continue to be as rapid as possible.

B. **Project Components.** As shown in the project organigram, there are three project components: swine husbandry, swine health and extension. The IICA Director will coordinate the project, supervise operations, and will supervise directly those responsible for all the components. Project headquarters will be located at the IICA office in Port-au-Prince.

Table 2
Project Organigram



The person responsible for extension must be trained and experienced in animal husbandry. The swine health component will be directed by a veterinarian with experience in animal health. The person in charge of the feed component must be a qualified swine nutritionist, preferably with tropical experience. All three must speak English, French and/or Creole.

1. **Feed Development.** Total feed availability is the limiting factor in determining the rate of growth of Haiti's national swine herd. Without adequate feed, the rates of reproduction shown in Table 1 may drop even lower, to one five-piglet litter every two years, the average reproduction rate under traditional (scavenging) feeding.

Total feed includes protein, minerals and vitamins and energy. Haiti is currently totally dependent on the importation of protein, minerals and vitamins. The country has limited quantities of energy feeds such as wheat

shorts and rice bran, which are by-products of wheat and rice milling. Corn and sorghum, ideal sources of energy, are also available but are in short supply due to the strong demand for them as human food. Until Haiti can produce its own protein feed, therefore, the only immediate alternative is to import a protein-mineral-vitamin supplement that will be blended with locally available wheat and rice bran, or any source of locally available energy feed stuff.

As the technical analysis points out, due to problems of availability, storage and cost of various feed components, it is reasonable to expect that the project must regularly import 1,000 MT shipments of blended protein supplement rather than multiple shipments of single ingredients. The advantage of a blended protein supplement is the assurance of a well-balanced diet for the pigs at all levels of production, providing the rate of reproduction on which AID's projections of replacing the national herd are based. The protein supplement would not be imported by the project but by an established dealer in Haiti such as Purina, Carnation or both, and paid in local currency. The supplement would be tested during the life of the expansion to adjust the mix to Haiti's specific environment.

Haiti has a fixed annual supply of wheat and rice bran (energy feeds) of approximately 35,000 and 12,500 MT respectively. The combined total of a balanced ration wheat and rice bran (47,500 MT) plus the addition of ten percent protein supplement (4,750 MT imported) would yield a total of 52,250 MT per year of a balanced ration. This amount of feed has the potential of feeding at 100 percent capacity (i.e., the pig would receive no other source of feed), approximately 45,435 producing sows (52,250 MT divided by 1.15 MT/sow/year).

This annual amount of feed will cover obligations to SMCs through the end of their contracts. The project does not intend to provide feed for any other pigs. However, it must be noted that additional feed demands will be created in Haiti throughout the same period. With the addition of feeding and fattening offspring, at a modest projected rate of production between SMCs and farmers supported by the project, feed demand will be triple that amount by the PACD. Further, sentinel pigs and those of the private sector will add to the feed demand; therefore, a feed deficiency crisis could occur sooner than the proposed PACD.

This constraint has been anticipated since the start of the Interim Swine Repopulation Project, and the search for crops to be grown in Haiti to produce energy feeds will play a major role in the proposed project extension. Thus, the project is confronted with two related but distinct feed problems: how to manufacture a steady supply of feed, an average of 400 MT/month, for 16 months (through September 1987); and simultaneously to assist in establishing one or two feed mills through a cooperative credit approach with the SMCs.

The proposed monthly feed production will supply SMCs through the period of project contract obligations. It will also test the proposed protein supplement in the field to insure that its performance is adequate for Haitian conditions and allow time to organize the regional feed mills (i.e., time to identify the sites, establish management procedures via an SMC cooperative system, and assist with credit negotiations).

Under this phase of the project, the regional feed mills will sell feed to the SMCs whose feed subsidy will be terminated, which will insure that they can meet their obligation to the farmers for high quality feed to insure high reproduction rates. As the regional feed mills become established and begin

producing feed, the project's feed mill in Port au Prince will cease operating. Responsibility for feed production can be transferred to interested SMCs within the central region under the same cooperative arrangement developed in other regions.

Every local organization sponsoring more than seven secondary multiplication barns under this project has expressed a spontaneous interest in organizing a cooperative feedmill to service not only their affiliated hog barns but also neighboring piggeries in their zone. Several of these local organizations have already taken certain of their own initiatives in this regard:

The Convention Baptiste d'Haiti (CBH) has received, installed and is operating a feedmill in Quartier Morin donated to them by Heifer Project International (HPI). This feedmill is now serving five CBH piggeries and seven Union Evangelique Baptiste d'Haiti (UEBH) piggeries in the north.

The Institut Diocesain d'Education des Adultes (IDEA) has approached USAID and IICA about a similar installation for the Catholic Church sponsored SMCs in the north.

The Cooperative de Developpement pour la Vallee (CODEVA), which sponsors 35 piggeries of its own, has already approached two international PVOs, the IDB and the French government for a feedmill of their own.

The Eglise Episcopale, which sponsors three SMCs and five piggeries in the Leogane area, has made a similar request of AID and IICA.

Finally, in the southwest, where World Vision's IRD program and the association of coffee cooperatives (UNICORS) sponsor 105 piggeries between them, a feedmill has long been requested. IRD is willing to provide the staff, management and a milling specialist, if AID and IICA can help them to set up a mill.

The last area is destined to be one of the sites for regional mills under this amendment.

Swine Production Budget. The project committee examined several options for alternatives to the Hamco site for feed production. The following budget is illustrative of the cost of renting a site for this purpose:

Table 3
Feed production Facilities

Rent, \$1,350/month for 16 months	\$21,600
Electricity, est. \$1,125/month	18,000
Materials and equipment	50,000
Total	\$89,600

The Ministry of Agriculture's feedmill was considered, and the Ministry officials promised that the project could use it if the above site is not ready by June 30, 1986. IICA could pay appropriate fees to assure electricity can be connected quickly. The landlord could sign a lease beginning June 1, but should receive some advance for repairs to building. There is water on site and a wall around it, so pigs could be boarded there in temporary shelter if any remain at Hamco after June 30.

The fourteen jeeps which IICA has been using were acquired from the PEPPADEP

project four years ago. Because of the rigorous schedule of SMC visits (the veterinarians and extensionists visit sixty SMCs each week), these jeeps are very worn and their maintenance costs are now prohibitive. The project will therefore finance the procurement of new vehicles.

Replacement stock. In some cases, defective breeding stock were delivered to SMCs. In order to keep the reproduction rates as high as possible, the project should allow for replacement stock for these defective pigs through the weaning of the first third generation litter. With the closing of the Hampco production facilities, there will be no readily available source of replacement pigs. This poses a problem for the breeding component of the project. It is proposed that one or two small breeding facilities with 20 to 50 females be established in SMCs and that their production be used for replacement stock. The sows could be provided from the 150-sow foundation herd.

2. Animal Health. A team of five veterinarians will detect and deal with any animal diseases in the SMC herd, including exotic diseases which might be introduced to the country. They will also monitor the SMC pigs' health and routinely report their observations. Finally, they will continue to instruct the SMC managers and staff in how to conduct a simple animal health program.

Each of IICA's five international veterinarians will be given a region in which to work, where he will be responsible for 40-60 SMCs. They will be responsible for assisting the extension agents in training SMCs in animal health, as well as providing veterinary services to the SMCs. They will continue to collect systematic health information on the SMC herd and report it to the GOH, the National Veterinary Service laboratory, and the animal husbandry component regarding suspected diseases. They will also respond to sick calls at GOH piggeries and in the private sector in the region.

Title III Program. It is proposed that an expanded bilateral swine health effort be designed and funded from Title III. Negotiations have begun with the Ministry of Agriculture concerning the respective roles of IICA, AID and the Ministry in this effort. Annex C describes the proposed Title III program in detail. In brief, the current Title III swine husbandry and health program consists of two projects, as follows:

Swine Repopulation. This was approved for funding by USAID on 1/15/86 for \$50,000. Its objectives are three:

- 50 GOH piggeries established in west and transversal regions;
- assistance in animal feeding given to 210 small farmer swine raisers; and
- veterinary care for 1740 swine.

So far there has been little progress, due to late approval and inability to initiate the program during civil disorder. Implementation has now begun, six months behind schedule, and should progress steadily.

Animal Health and Husbandry Improvement. This FIOP was approved for funding by USAID on 3/6/86, with \$550 thousand approved for FY 86. There are 13 objectives listed, including:

- animal laboratory equipment purchased,
- vaccination material purchased and vaccination of animals against various animal diseases, and

disease surveillance begun at points of entry into Haiti.

There has been no progress, due to late approval and inability to initiate during the recent civil disorders. The program will begin shortly and should progress steadily, six months behind schedule.

The proposed Title III program would expand these two projects over the next two or three years to institutionalize the laboratory and disease surveillance activities in the Ministry's national veterinary service. The Ministry has begun negotiations with the IDB to fund some of these activities over the long term.

3. **Extension.** The purpose of the extension team is to transfer technology in order to maximize the swine reproduction rate. The team would train primarily the SMCs, made up of farm families, private and voluntary organizations. The specific training topics include feed and water for swine management; temperature effects on swine; parasite and disease control; simple veterinary care; post-natal care of piglets; breeding; housing; and swine marketing.

The extension coordinator at project headquarters in Port au Prince will coordinate the extension team. His team will be composed of five extension agents, each responsible for one of five regions in the country. They will also assist in the creation of regional pharmaceutical centers and regional feed mills to be owned and operated by associations of SMCs.

IV. PROJECT ANALYSES

A. TECHNICAL ANALYSIS

A detailed technical annex is given as Annex A. The principal emphasis in the annex is upon the feed question, and the design of a national feed production program. As pointed out above, the project will strive to develop cooperative feed ventures, in which groups of SMCs and other organizations will work together to establish economically viable feed production units. During the early part of this extension and while the cooperative development movement is progressing, IICA will continue to assure feed supply from a central location in or around Port-au-Prince.

The project will finance research on local supplies of feed, and will finance the costs of a full-time animal nutritionist to undertake a search for local feed sources.

The animal health program is discussed in Annex C. It is planned that the national animal health program will be financed out of an eventual Title III project, but the needs of an effective national program to complement this project are laid out. The extension and training components are discussed as well.

E. SOCIAL SOUNDNESS ANALYSIS

The present project paper amendment will result in no modification to the conclusions of the social soundness analysis contained in the original project paper. However, as the number of pigs approaches that projected for the end of the project, feed will become more scarce and the possibility of disease transmission will increase. The establishment of feed mills at the SMC level will meet the first need, while the design for a Title III-funded public sector animal health service (Annex C) will meet the second. The design for the feed mill organization will continue to target the benefits to middle and lower strata peasants.

C. ECONOMIC ANALYSIS

The economic analysis is given in Annex B.

The project continues to demonstrate an extremely high private return to farmers and a high internal rate of return (over 100%). As most of the economic issues concerning swine production are discussed in earlier versions of this Project Paper, the analysis concentrates on other issues, such as commercial swine production and SMC income projections.

D. FINANCIAL ANALYSIS

The project budget is given in Table 4. The current status of the complementary Title III program is discussed below.

The method of payment, which heretofore has been a periodic advance, will be modified under the current amendment to allow for use of IICA's Federal Reserve Letter of Credit in the US.

Table 4
PROJECT BUDGET
June 1, 1986 to September 30, 1987 (16 months)

	AID D.A.			IICA CONTRIB.
	F/X	Local Currency	Total	
INTERNATIONAL PERSONNEL	587,000	--	587,000	161,440
Project Coordinator	93,000		93,000	
Extensionist-Team Leader	60,000		60,000	
Nutritionist	70,000		70,000	
ST Consultants	30,000		30,000	
Administrator	70,000		70,000	
Swine Health Vet. leader	65,000		65,000	
Animal Health Veterinarian	81,000		81,000	
Two veterinarians	88,000		88,000	
Data Analyst	30,000		30,000	
LOCAL PERSONNEL		295,600	295,600	24,000
Four extensionists		120,700	120,700	
One SMC Coordinator		25,000	25,000	
One Field Ops. Asst.		32,000	32,000	
Feed Manager		33,600	33,600	
One Asst. Feed Mgr.		12,800	12,800	
10 Feedmill workers		30,000	30,000	
Executive Secretary		22,000	22,000	
Secretary		15,000	15,000	
Interpreter-driver		4,500	4,500	
LOCAL FEED DEVELOPMENT		10,000	10,000	
MEDICINE	40,000		40,000	
SUPPLIES	30,000		30,000	
EQUIPMENT	196,000		196,000	210,000
Computer	5,000		5,000	
Feedmill Equipment	11,000		11,000	
Twelve Jeeps	180,000		180,000	
EVALUATION AND AUDIT	30,000		30,000	
OPERATING COSTS	220,000	146,200	366,200	182,000
SIXTEEN MONTHS OF FEED		500,000	500,000	
FEEDMILL RENT, MNTNCE	90,000		90,000	
SUBTOTAL	1,193,000	951,800	2,144,800	
IICA INDIRECT OVERHEAD (5% on Eq.)	9,800		9,800	
IICA DIRECT OVERHEAD (10%)	99,700	95,180	194,880	
ROUNDED PROJECT TOTAL	1,302,000	1,046,000	2,349,000	577,440

E. ENVIRONMENTAL ANALYSIS

The original and amended project threshold decisions were given a negative determination, meaning no significant effects of the proposed actions were anticipated. The proposed amendment to the existing project will not monitor and evaluate the potential threat of ASF reinfection by soft-bodied ticks of the genus *Ornithodoros*. Therefore, it is highly recommended that the national animal health services (Annex C) through the MARNDR be implemented immediately.

V. IMPLEMENTATION ARRANGEMENTS

The following is an abbreviated workplan for the remainder of the project extension period. As was the case under the original project and its extension, implementation is guided closely by the project coordination committee, composed of AID, IICA and Ministry personnel.

The principal event in the near term is that the ongoing HAMPCO contract will be phased out by May 31, 1986. The following steps are necessary to achieve this goal:

- 1986: purchase additional vehicles and feedmill equipment and hire additional technicians and field support personnel;
- 1986: all field services concentrate on firmly establishing the SMCs in all basic management and administrative skills;
- 1986: project personnel and SMC personnel begin technical assistance to SMC associated farmers;
- 1986: at least two SMC cooperative feedmills established to provide feed for the SMC reproductive herds;
- Late 1986: IDB and or AID Title III funds finance and establish with MARNDR a functioning National Veterinary Laboratory including adequate field surveillance of all livestock species;
- 1987: SMC cooperative begins to provide feed for SMC associated farmers;
- 1987 and 1988: project and SMC personnel concentrate on providing technical services to SMC associated farmers.

VI. PROCUREMENT AND CONTRACTING ARRANGEMENTS

The contracting arrangements are simple, involving one obligating document. Funds will be obligated by means of an amendment to the ongoing Cooperative Agreement (CA) with the Interamerican Institute for Cooperation on Agriculture (IICA). It will not be necessary for AID to negotiate a separate contract with Hampro for rental of the nucleus breeding center, as was the case under the original project, as there will be no need for that facility as of July 1, 1986.

All procurement will be handled directly by IICA, which has an in-country procurement division with a diplomatic franchise. IICA charges a 5% overhead on indirect costs, which include equipment and 10% on direct costs and other procurement. All procurement is approved in advance by the AID Project Officer and is subject to the terms of the Cooperative Agreement Standard Provisions.

ANNEX A

TECHNICAL ANALYSIS

1. FEED MANAGEMENT.

Production. As stated in the body of the paper, the shortage of adequate feed in Haiti is the principal constraint to project expansion. Therefore, it is important that the proposed amendment examine all available sources of feed and experiment with locally-produced feed ingredients.

The pig feeds available in Haiti now come from three sources: the commercial firms, the MARNDR and IICA. The commercial feeds come from SONUAN and Purina. These firms use mainly imported feedstuffs and some local feedstuffs when quantity and price permit. The imported ingredients are in general cheaper than the ones locally produced. SONUAN uses wheat bran from the Minoterie d'Haiti in the pig rations as an important ingredient, and Purina to a lesser degree. The prices of the commercial feeds are very high compared with other sources; however, the product quality is guaranteed.

The MARNDR has a feed mill that is currently producing pig rations. They use essentially locally-available ingredients except for a vitamin and mineral premix. They used to add soybean meal as a source of protein when it was available, but now it has been replaced by cottonseed meal. Their prices are low, but the quality of the ingredients used and the performance of the pigs under those rations is unknown.

The feed that used to be produced by IICA at the Hampco mill was based on wheat bran and soybean meal, available locally, combined with imported vitamins, minerals and other additives. Some diets also added rice bran, sugar, milk and soybean oil. The performance of the pigs under this diet was good in general, although neither feed intake nor weight was recorded. Some diet-related problems were reported at the central unit and SMC level. At some some SMCs, there were cases of suspected deficiencies of vitamin A and vitamin E-Se, thought to be related to the degradation of the fat soluble vitamins with long and inadequate feed storage. At the Hampco facility, there has been a problem with bone metabolism, resulting in fragile bones with a high incidence of fractures and lesions in sows, probably related to impaired calcium absorption or increased bone calcium resorption due to an inadequacy of vitamin D, imbalance with phosphorus, low availability of Ca or disequilibrium of the acid-base balance of the diet. There were also cases of low milk production and poor condition of sows after weaning, which could be related to the composition of the diet.

Comparison of Feeds. The following table gives the cost of pig feed currently available in Haiti, in US\$ per 100 lbs.

Table 5
Feed Costs

Type of Ration	Source				
	SONUAN	Purina	MARNDR	IICA I*	IICA II**
Pre-starter	15.70			29.52	
Starter	13.70	16.00	4.26	10.47	
Grower	9.25	12.00	3.25	5.30	6.83
Finisher	9.00	8.60	3.25	5.12	6.46
Gestation		13.50	3.86	5.02	6.09
Lactation		13.50	3.86	6.34	5.93
Boars				5.00	6.10

* Cost of rations when mixing all the ingredients

** Current cost with Purina supplement + \$1.24/100 lb. feedmill production

The shortage of soybean meal due to the intermittent operation of the ENAOL plant and the immediate lack of other protein substitutes has forced IICA to purchase a protein-mineral-vitamin supplement from PURINA to be mixed with the wheat bran still readily available. The following is the composition of the Purina supplement.

Table 6
PURINA SUPPLEMENT

Ingredient	Percent
Soybean meal	40.5%
Panama hog mix 1/	40.0
Wheat bran	15.0
Calcium carbonate	3.0
Dairy mineral mix 2/	1.0
Salt	0.5

1/ Panama hog mix: 4% protein, 0.5% fat, 2.5% Ca, 1.25% P, 1-2% salt

2/ Dairy mineral mix: 16.0% P, 16-19% Ca, and microminerals.

The Purina supplement has approximately 22% protein and only 1,854 kcal/kg of digestible energy (DE). The calcium level is 2.33% and the Phosphorus level is 1.06%. The supplement is being mixed with wheat bran for the different diets in the following proportions:

Table 7
Food Values

Ration	Purina Hog Mix	Wheat bran	Protein %	Digestible Energy kcal/kg	Ca %	P %
Growing (2)	14	86	17.1	2,650	0.43	0.95
Finishing (1)	12	88	16.7	2,670	0.39	0.92
Gestation (6)	10	90	16.6	2,690	0.34	0.92
Lactation (L)*	8	12	14.1	3,025	0.72	1.12
Boars (V)	10	90	16.6	2,690	0.34	0.92

* This ration also contains 9.5% hog starter, 40% rice bran, 1% calcium carbonate, 15 ppm vitamin B12, and 291 ppm zinc.

Compared with the swine requirements taken from the National Research Council (1979), these diets are adequate in protein but are about 20 percent lower in DE, except for the lactation diet which is only about 10 percent lower. The levels of calcium are lower and the levels of phosphorus higher. The ratio P:Ca is too high, more than 2.2:1 in all the rations, except for the lactation mix in which it is 1.6:1. The Ca:P imbalance should be immediately corrected to prevent further complication in the calcium metabolism. If the current system of purchasing an imported supplement of protein-mineral-vitamins is to be continued, it is necessary to demand a product of higher energy concentration and with higher calcium content.

Research. If the success of the repopulation program is to be continued at the SMC and small farmer level, it is essential to fully utilize the available local feedstuffs. This would not only reduce the current waste or suboptimal utilization of agricultural and animal products and byproducts, but also would permit a cheaper production of pork, more accessible to the low income farmer.

The optimum utilization of the local unconventional feedstuffs has to be worked out from review of the published literature and with simple animal trials. Most of the feedstuffs available in Haiti have already been tested somewhere. The channels for the collection, processing and marketing have to be refined or established to reduce the loss, diminished nutritive value or spoilage due to high moisture or improper storage.

The introduction of new plant varieties or species should be considered to increase the availability of feedstuffs for the feeding of pigs. While special attention should be paid to feedstuffs competing with human food sources, some compromise will have to be made at some point, if maximum swine production is desired, to use certain products directly in competition to human foods.

An SMC (or group of SMCs) should be identified to do the animal trials under direct supervision from the Feed component's animal nutritionist. The SMC should be readily accessible by good, reliable roads so that the nutritionist can adequately supervise and develop the feed trials. Whenever possible he should supervise the preparation of feed batches. Finally, although not much feed would be required for any one trial, the SMC should have reliable onsite transport for feedstuffs.

The project should provide the animals for the trials and the feed, and an agreement should be made with the SMC for the disposal of the animals at the end of the trial. Funds should be allocated for chemical analysis on

certain feedstuffs or diets in order to assess their approximate nutritive value. When possible, the analysis should be made in the country at local laboratories (Faculty of Agriculture, SONUAN, ENAOL, or commercial laboratories), with laboratory methods and procedures closely supervised by the nutritionist so that he can validly and correctly interpret the results. If necessary, the samples should be sent abroad.

The nutritionist will prepare an initial working plan which is flexible enough to accommodate changes suggested by results of trials or availability and cost of feed stuffs. The following table is a preliminary list of feedstuffs that should be considered for the future feeding of the pigs:

Table 8
Potential Feeding Value for Pigs

Feedstuff	Energy	Protein	Vitamins/ Minerals
Agricultural Products or byproducts			
Corn, grain byproducts	x	x	
Sorghum, grain byproducts	x	x	
Rice bran	x		
Cassava tubers	x		
Cassava, aerial part		x	x
Sweet potato tubers	x		
Sweet potato, aerial part		x	x
Banana, plantains	x		
Various plant leaves (leucaena, gomier, grasses)		x	x
Coconut	x	x	
Royal palm kernals	x		
Mangoes, avocados	x		
Animal Products and byproducts			
Blood meal		x	x
Meat and bone meal		x	x
Fish meal		x	x
Hatchery waste		x	x
Agroindustrial products and byproducts			
Cane molasses	x		x
Cane Juice	x		
Soybean oil, lecithin	x		
Cotton seed	x	x	
Cotton seed meal		x	
Brewery byproducts		x	
Citrus pulp	x		

The following steps should be followed in the evaluation of feedstuffs:

- (1) Identification of potential feedstuffs: determine availability, current or potential at the national, regional or local levels; observe processing methods and collect samples; determine price and cost of processing.
- (2) Review literature on the chemical composition, feeding experiments and

method of use to determine the value of the feedstuffs for local conditions. Send samples for analysis at local laboratories or abroad.

- (3) Determine with the information obtained above on the availability, nutritional value and cost, the priority list of feedstuffs to consider. Design animal trials accordingly.
- (4) Carry out animal trials at SMCs. Measure feed intake and performance to determine feed conversion and the economies of using each ingredient, diet or feeding system.
- (5) Application and extension of the results at other SMCs and with farmers.

For some of the ingredients that have been tested extensively already in other tropical countries, direct applications should be made at the SMC or small farmer level. The nutritionist's cooperation with other personnel of the project, extensionists and veterinarians, is very important to supervise and help pig producers and to identify nutritional or feeding-related problems.

When the use of certain ingredients or feeding systems have been established as successful, the feed component should assure that the results and actual application are shown to producers by the extension and training component. This could be done at the continuous feed testing SMC or with the organization of field days where nutrition and other topics of interest in pig production are presented.

2. ANIMAL HEALTH

The goal of the swine repopulation program is to rebuild the national swine herd. The herd is being rebuilt from three different groups:

Swine provided by the Interim Swine Repopulation project to Haitian farmers through SMCs. These animals have been under the constant supervision of IICA veterinary personnel and their health status is well documented.

Swine provided originally as sentinel pigs and their offspring. This group has been tested for ASF and HC at intervals by GOH veterinary personnel with direction provided by a resident USDA veterinarian. However, no checks have been made on these animals since October 1985. Because the GOH veterinary service is, for practical purposes, not now functioning, very little can be said for certain about the present health status of these animals.

The third group is made of animals brought into Haiti from the U.S. by various private associations. It is believed that the health status of these animals has been closely monitored by the original importers, but their access to professional veterinary services has been limited.

The national swine herd will consist of animals from all three groups, which in some cases may all be mingled in a community. It is essential to the continued success of the repopulation program that health surveillance be established and maintained on the peasant-owned swine, since this is where the greatest risk to undetected disease outbreaks will occur. Unfortunately, this segment of the national swine herd is the least likely to receive veterinary attention unless the public sector animal health services are strengthened.

The extended Interim Swine Repopulation project will address only the health of the first group of swine, the nucleus breeding stock, and their (second and

third generation) offspring through veterinary visits to SMCs, including treatment, quarantine, and necropsy. The project currently has two full-time veterinarians. In addition, three other veterinarians attached to certain SMCs also work part-time for the project. The project lacks veterinarians for the southwest coast, the Artibonite, and the Central Plateau.

Swine diseases will reach significant incidence during 1987 due to the population density and movement of animals. The proposed public sector animal health service funded by Title III through the MARNDR (see Annex D) will address the following critical elements of animal health: a functioning local laboratory for bacteriology, ASF, hog cholera, and other viruses; disease surveillance in the field, at points of entry and at the Dominican border; tracking, testing and killing feral and semi-feral (striped) pigs; availability of necessary vaccines, bacterins, and anti-serums; availability of rapid, reliable USDA-Plum Island and Ames, Iowa testing facilities; supplementing and confirming local diagnosis; and adequate field veterinarians, transport and support costs.

3. EXTENSION

The current project has prepared well for meeting training objectives. In order to qualify as an SMC, the group must present the names of at least one *gardien* (worker), one manager, extensionists, a list of names of farmers, a map of farmers to receive the first year's production of piglets, and an extensionist assigned to each zone. The *gardien*, manager, and extensionist are under the charge of the SMC. In some cases, these personnel are paid, sometimes with project castrates. The SMC agrees that these personnel will participate in all IICA directed trainings. Also, the SMC allows its herd to be used for training. For the SMCs which have training facilities, the SMC agrees to allow the project to use these resources for the training of farmers and SMC personnel. The SMCs pay for SMC training. The project pays food, lodging (rented house) and transport to and from Port-au-Prince for training. The training assures that all SMC personnel and associated farmers practice basic swine management skills and to assure that the managers practice basic administrative and record-keeping skills.

The project has two project trainers for SMC porcherie personnel (*gardiens* and managers). When the first training began at Hampco in April 1985, the two project trainers had been farm managers for a year, participating in the adaptation of technology and training 40 Hampco workers, who are typical farmers.

The project also has three extensionists, who train SMC extensionists and farmers. As of October 1985, the project had trained 1810 participants through 190 training sessions. The talented project extensionists' type of training is strictly "hands-on, how-to." Training topics include:

One-half day on how to water, feed and clean the animals; how to observe the animals for sickness; how to take temperatures; how to treat for fever, diarrheas, leg problems; and how to read ear notches.

Four days on how to detect the heat of females; how to properly mate a male and female; how to select a male for mating; how to record the heats, the matings, and the expected farrowing date; how to prepare the animal for farrowing from the last 21 days of gestation.

Four days on farrowing and post farrowing, including ear notching; teeth clipping, cord treatment; wiping off baby pigs; treating the females for

birthing difficulties; treating the female for fever, treating baby pigs for hypoglycemia, diarrhea; avoiding squashing; stimulating milk flow; castration; weaning; injecting iron.

Additional topics should be identification of the soft-bodied ticks of the genus *Ornithodoros*, which may carry the ASF virus; basic health surveillance variables; and swine marketing.

Each training session is evaluated by both project personnel and the SMC participants. A poor or negligible evaluation by project personnel is reported to the SMC leader and a change of personnel is advised by IICA. As a result of the evaluations, several SMC personnel have been changed. Participants evaluate each training by presenting negative and positive feedback to the trainers at the end of the course. Their comments serve as the basis on which to adjust the training plans and write extension manuals, 19 of which have already been written. The trainers perform several follow-up visits after the training. These trips occur no later than 30 days after the training. The trainer decides the capability of each trainee. If further training is required, then training is repeated for that trainee.

In addition to training SMC extensionists and managers, the project extensionist is responsible for assuring: the proper condition of the porcherie and depot; that pigs are distributed to peasants; that peasants are prepared to receive pigs; that SMC extensionists perform regular services to farmers; that the SMC makes feed and medicine available to farmers; and that the SMC functions as a center according to project criteria.

ANNEX B

ECONOMIC ANALYSIS

As was the case in the original Project Paper, the revised project shows a very positive rate of return under the entire range of reasonable assumptions. The key calculations used in estimating the internal rate of return are (1) the direct costs of the project, (2) the net cost or income of the secondary multiplication centers, and (3) the projections of increases in herd size and pig production attributable to the project. The project costs were obtained from the project budget presented in the body of the Project Paper. The net income of the multiplication centers is presented in Table 9. The rate of return calculations are shown in Table 10.

It will be noted that the assumptions used in these calculations are extremely conservative. First, the reproduction rate is based on 80 percent of the sows being fertile and producing one litter of 6.5 pigs per year. The likely rate of reproduction for the remainder of the project is 1.5 litters per year of eight pigs per litter. Second, it is assumed that the commercial production of pigs to supply urban demand would have occurred in the private sector in response to market forces, even without the project. Thus, the main benefit of the project for purposes of this analysis is the pigs that will be distributed to small farmers. The implication is that, if it were not for this project, the small farmers receiving pigs would not be able to obtain them from another source. Finally, the rate of return calculations do not take into account certain nonquantifiable benefits such as increased efficiencies resulting from the extension of improved production techniques to farmers.

As can be seen from Table 10, the internal rate of return under these conservative assumptions is over 100 percent. A sensitivity analysis using varying assumptions simply indicates that the project will have an extremely high rate of return under any reasonable assumptions. The only issue that this raises is that, if this project is so profitable, it might better have been left to the private sector. However, the private sector would not have been motivated to distribute pigs to small farmers throughout the country. Even if they had been paid to do so, they would not have put the same emphasis on animal health services and herd management extension that the project has been able to do.

One element of the strategy to increase productivity is to extend to farmers the modern production techniques used by the SMCs. This involves the construction of facilities for a herd of 10 to 20 sows and 2-3 boars, and providing them with processed feed and health care. One economic issue related to this effort is whether these production units can be competitive with traditional farmers. Table 11 gives the costs of production for a typical commercial producer. Under the assumptions used in this table, the producer could sell his pigs for \$150 each and receive a return of 41 percent on his investment.

The key variables affecting the rate of return are the productivity of the herd, the price of feed, and the sale price of the pigs. If sows produce only one litter per year instead of 1.5, the cost per pig rises to \$141, and the return on investment drops to 7.1 percent. If the price of feed increases to \$10 per pound, the cost per pig increases to \$144 and the return on investment drops to 6.5 percent. Finally, if the sale price of pigs drops to \$125, the rate of return drops to about 10 percent. In short, the profitability of commercial pig production depends on good herd management, the continued availability of low-priced feed, and the strength of the urban market for pork.

The two constraints on the quantity of commercial production are the size of the urban market and the availability of processed feed. With respect to the size of the market, the estimated urban population in Haiti is about 1.1 million. As the swine population at the traditional farmer level increases, an increasing proportion of the urban population will purchase low quality pork produced from scavenger pigs. The unanswered question is: what percentage of the urban population will buy higher quality pork if the price difference is not too great? One indication is that imports of pork last year were about 10,000 tons, which comes out to about 18 lbs. per urban inhabitant. This quantity of meat could be produced by 1000 commercial farmers (individuals or cooperatives) each having 14 sows and two boars.

As far as the availability of low priced feed is concerned, SONUAN is now selling processed feed for \$.10 - .15 per pound. As noted above, this is too high for commercial swine production by small farmers to be profitable. The alternative is to produce processed feed using locally available ingredients. The estimated annual availability of feed ingredients at this time is 40,000 MT of wheat bran, 10,000 MT of rice bran, and 80,000 MT of soymeal.

Vitamins and mineral supplements have to be imported. Also, when the soybean oil factory closes down (as is currently the case), soybean meal must be imported. The limiting factor for feeds is the availability of bran, which accounts for 80 percent of the total content. Assuming that the bran available for swine feed is one half of the total, this would be sufficient to produce over 30,000 MT of feed.

The approach adopted by the project is to establish at least one feedmill to produce low cost feed. The financial analysis for a feedmill producing 5,000 MT per year is presented in Table 12. Using existing feed sources, the mill could produce feed for \$.055 per pound, which is well under the breakeven point for a commercial swine producer under the assumptions used in Table 13. If the supply of existing feed ingredients is interrupted or is inadequate to meet total needs, the next best alternative appears to be cassava. This would increase the cost of feed to \$117 per ton, which appears to be more than commercial producers would be able to pay. A key consideration in this calculation is the price that farmers would have to receive for their cassava to induce them to shift out of the most likely alternative crop, corn. Assuming that farmers are obtaining two crops of corn totalling 1,400 kg. per hectare and that the farmgate price is \$.33 per kg., the income per hectare is \$462. To obtain this same income from cassava, they would have to obtain a yield of 10,000 kg. per hectare and receive \$.33 per kg for the dry matter. (10,000 kg. * 25% dry matter * \$.33/kg., minus \$60/ha for fertilizer).

The conclusion of this analysis is that farmers can probably produce swine commercially as long as existing feed ingredients are available and the price of fattened pigs remains above \$150. If the feed ingredients run out, some system of combining feed concentrates with locally available agricultural by-products will probably have to be developed.

The above set of issues concerns the adoption by farmers of the relatively modern production techniques used at the SMCs. This system could potentially be adopted by 1,000 producers. If these producers were groups, of, say, 10 farmers, the beneficiaries could total as many as 10,000 farmers with benefits of up to \$3.5 million.

Another set of issues concerns ways of increasing the productivity of the hundreds of thousands of farmers who will be receiving pigs but for one reason or another will not adopt the modern techniques used by the SMCs. The most important and most obvious benefit of the project for these farmers is that they will once again have pigs as a means of capital accumulation and a source of additional income when needed. However, these farmers will be receiving genetically superior pigs that can respond better than the previous creole pig to improved swine husbandry.

The first task is to find ways of inducing farmers to raise pigs as a cash crop rather than as a "savings bank". Until this change occurs the farmer will not be motivated to invest time and money in processed or concentrated feed and other aspects of improved husbandry. If farmers continue to see pigs exclusively as a savings mechanism, it is almost certain that most of the pigs that they receive through this project will become scavenger pigs and the level of productivity will return to what it was before the arrival of ASF. The key to increased productivity is improved feed. Farmers would have to purchase feed supplements and allocate some of their time to the timely collection, and processing of agricultural by-products for feed. It appears that very little farming systems research has been carried out to identify the conditions under which this would be attractive to small farmers. Factors to take into account would be the alternative cash crops that are prevalent in the area and the agricultural by-products that are suitable as swine feed. Progress in this aspect of swine production is beyond the scope of this project, but just as the project is making attempts to improve animal health coverage and introduce SMC-type production techniques, it should seek to identify the actions needed to increase productivity at the traditional farmer level.

TABLE 9
NET INCOME OF THE SMCs

Herd size: 14 sows and 2 boars

COSTS	
Depreciation (1)	600
Building maintenance (2)	300
Management	600
Gardien 1 castrate)	250
Extension services	250
Feed:	
Sows, boars & replacements (3)	950
Females distr. to farmers (4)	352
Castrates (5) (6)	755
Medicines (45 per pig)	416
 Total	 4475
INCOME	
 Castrates (7)	 7000
Culls (8)	750
 Total	 7750
 Net income	 3277

Assumptions:

1. Cost of the facility is \$3000 depreciated over 5 years.
2. Maintenance equals 10% of the cost of the facility.
3. One ton of feed for 14 sows, 2 boars, and 3 replacements at a cost of \$50/ton.
4. Thirty-four females and 6 males receiving .5 lbs. per day for 45 days at a cost of \$.465 per pound.
5. During the first month, castrates receive .5lbs per day at cost of \$.465 per lb. there are 28 castrates.
6. Fattening requires 4 lb. of feed for each lb. gained. Castrates gain 200 lb. and the cost of feed is \$.05/lb.
7. 28 castrates (34 - 6) * \$250 sale price.
8. 3 culls (14 * .2) * sale price of \$250.

TABLE 10
IRR CALCULATIONS

Project Benefits

	Project Budget	Net SMC Income	Incr. in Trad. herd	Value of Prod.	Total Benefits	Net Benefits
1	878	-	-	-	0	-878
2	1509	-	-	-	0	-1509
3	2085	655	-	-	655	-1430
4	2000	1147	4201	-	5349	3348
5	1333	1147	13923	630	15700	14367
6			18125	2719	20844	20844
7			18125	5437	23562	23562
8				8156	8156	8156
9				8156	8156	8156
10				8156	8156	8156

Internal Rate of Return: 1.112

Assumptions:

1. Assumptions regarding the income of SMCs are explained in the notes to Table E-2. It is further assumed that there will be 200 SMCs in the third year of the project and 350 SMCs for the last two years.
2. It is assumed that any commercial production by the SMCs or commercial farmers would have occurred in the private sector even without the project. It is also assumed that traditional farmers receiving pigs from the project would not have received pigs in the absence of the project.
3. The size of the traditional herd on 9/30/87 and 9/30/88 is equal to the total size of the herd at that time as presented in Table 1, minus 16,000 pigs which is considered to be the maximum size of the commercial herd for the purposes of this analysis. The value of the herd is based on a value of \$100 per animal. The herd is assumed to double in 1989 and increase by 50 percent in 1990.
4. The value of traditional production assumes an offtake rate of 15 percent with each animal sold valued at \$100.

TABLE 11
COMMERCIAL SWINE PRODUCTION

COSTS

Building maintenance (10%)	300
Depreciation (5 yrs)	600
Management	600
Gardien (2 castrates)	300
Feed	
- Sows, boars & replacement. (1 ton/yr * 150 *19)	2850
- Animals for sale (98*.5lb.*15 days*.80)	586
(98*200 lb.*4*.075)	5880
Medicine (\$5 ea.)	580
Total Costs	11698
INCOME (101*150)	15150
NET INCOME	3452
Cost per pig	115.82
Return on Assets	41.10

Assumptions:

1. Herd size is 14 sows and two boars.
2. 80 percent of the sows are fertile and have 1.5 litters per year.
3. The average litter size is six.
4. All pigs born are fattened for sale, except those kept for replacements.
5. Feed for the first 15 days is assumed to cost \$.80 lb. After that, the pig is fed feed that costs \$.075/lb.
6. The reproductive herd consumes one ton per year. The pigs that are being fattened consume 4 lb. of feed for each pound gained. It is assumed that the average weight gain is 200 lb.

TABLE 12
ECONOMIC ANALYSIS OF FEEDMILL

	Total cost for 5,000 MT
Cost of Feedmill	

Mixer	10000
Cassava chipper	1500
Spare parts	1200
Scale	1000
Carts	200
Tools	200
Generator	300
Drums (20)	400
Cement platform	500
Bag stitcher	200
Truck	25000
Jeep	12000
Spare parts (15%)	5500
Misc. & Contingencies	5000

Total	63000
12600	
Fixed Costs:	
Building rental	6000
Phone	600
Manager	29300
Asst. Manager	12000
Truck driver	3720
Truck driver assist.	2400
Workers (5) (\$2/day)	2080
Fungicides	350

Total	56450
56450	

TABLE 13
COST OF FEED

Ingredient -----	Cost/lb -----	Cost/ton -----
Soybean meal (200 lb.)	0.130	26.00
Vitamins/minerals (20 lb)	1.000	20.00
Salts (80 lb.)	0.050	4.00
Transport of ingredients	0.011	22.00
Wheat or rice bran (1700)	0.023	39.10
	-----	-----
Total ingredients		111.10
Cost/lb with bran	0.055	
-Cassava * (1700 lb.)		
	0.095	161.50
	-----	-----
Total ingredients		233.50
Cost/lb with cassava	0.1168	

Notes:

1. The cost of feed ingredients is based on prices now being paid by the project except for rice bran which is free at present. It is assumed that its price would rise no higher than the lowest price alternative which is wheat.
2. The price of cassava is based on what would be necessary to induce farmers to shift out of corn. The calculation is as follows:

Corn: 1400 kg/ha * \$.33/kg = \$462/ha.

Cassava: 10,000 kg/ha * .25 = 2500 of dry matter

2500 * \$.33/kg = \$520/ha - \$60 (fert.) = \$460.

ANNEX C.

TITLE III NATIONAL ANIMAL HEALTH PROGRAM

By September 1987, over 65,000 head of pigs will have been produced by the Interim Swine Repopulation Project. The combined production of the SMCs, sentinel pigs, and private sector pigs will be of such magnitude that the disease risk will warrant the attention of the Ministry of Agriculture. Therefore, the National Veterinary Services Division within the MARNDR must be strengthened so that it can undertake the following activities:

Strengthen GOH Animal Health field units so that they can render animal health assistance to the Haitian farmer, and conduct surveillance and monitoring of animal diseases.

Promote GOH management of quarantine stations and border controls, and implementation of animal import regulations;

Institute a GOH system for emergency disease alertness; and

Improve and equip the diagnostic laboratory to support animal health field activities.

These functions will address the growing needs of the Haitian livestock industry.

Monitoring and surveillance. The GOH will strengthen its animal health/disease monitoring component, prepare the initial training of the veterinary nurses and coordinate field activities. It will implement an information gathering system which, combined with the data base from the SMCs, will give MARNDR an invaluable resource for the future.

Laboratory. In order to monitor the health status of the national swine herd, a functioning diagnostic laboratory is essential. The capability of the present diagnostic laboratory have been extremely limited due to insufficient space, materials and equipment, a lack of proper training and inadequate direction. To correct these deficiencies, a laboratory building has been built and funds have been identified through Title III to purchase materials and equipment.

The GOH laboratory director and the technicians have received some specialized training in the U.S. by USDA/APHIS. Unfortunately, the laboratory director has teaching duties which restrict his ability to work closely with the laboratory personnel to provide the necessary training and supervision to assure competence in diagnostic techniques. It is proposed that a veterinarian with extensive laboratory experience be retained by MARNDR to work in the laboratory.

Surveillance, Quarantine and Emergency Alertness. The specific objectives of the component are to:

improve the quarantine system as well as the surveillance and reporting system for airports, seaports and borders, setting up a workable waste disposal system for the airport;

create an emergency program ready to deal with epizootics effectively, and carry out two test exercises per year for the emergency program;

follow up leads on feral and striped pigs, and cooperate with USDA/APHIS to define and plan their role in the Haitian Disease Surveillance Program;

assist in creating greater cooperation and exchange of information with the Dominican Republic disease monitoring system, and national herd health program;

expand the health and disease monitoring system to include the private sector and GOH pigs using the 20 MARNDR veterinary nurses.

process 5,000 serum samples of the national swine herd to create a National Herd Disease Profile. Process 5,000 swine fecal samples to create a National Herd Parasite Profile; and

complete the installation of equipment and begin operations of the National Animal Diagnostic Laboratory (NADL), and train the NADL personnel.

The more effective the herd health program, the more information that will be received and the easier will become disease surveillance. The surveillance of the ports of entry and treatment of waste produced at these ports must receive serious attention, their effectiveness evaluated, and a program set up to improve these areas.

An emergency program must be set up and tested periodically to insure preparedness in case of an epizootic, so as to insure that Haiti does not have to suffer another eradication program. The goal is for the GOH to adopt and maintain a practical and workable system.

Technical Analysis of Laboratory Needs. Since breeder pigs were very carefully selected and tested to be sure they were free of infections and contagious diseases, and since no serious disease problems have yet been encountered in the several thousand pigs now in Haiti and the several hundred thousand in the Dominican Republic, most of the initial disease deterrents to production will likely be nutritional, toxic and possibly parasitic. Viral and bacterial problems will likely not be a problem until they are reintroduced, when they will cause enormous problems. Bacterial, mycoplasma and blood parasites might spread almost as quickly and prove to be almost as disastrous if introduced.

However, if restrictions are not implemented by MARNDR against animals imported from countries with endemic animal diseases, the health hazards will increase significantly. Contagious diseases pose the greatest threat to Haitian pigs; therefore, the laboratory and field animal health officials must be vigilant, using scientifically reliable and acceptable methods to confirm or deny such diseases as African swine fever, hog cholera or foot and mouth disease if they are suspected. Field and laboratory capabilities to diagnose, prevent and manage nutritional and toxic disease conditions must be developed quickly. If animal health officials are not able to effectively deal with these problems, the pigs may not survive.

Laboratory requirements. A two-pronged approach is indicated. The laboratory will most certainly need the basic expertise in:

pathology: including necropsy, clinical and histopathology;

parasitology: external, blood and gastrointestinal;

serology including hemagglutination, agglutination, agglutination-lysis, agar-gel-diffusions, complement-fixation, direct and indirect fluorescent antibody testing;

bacteriology: basic growth media, sugar and other metabolic indicators essential for purifying and identifying isolates, gram staining, and microscopic examination;

toxicology: Basic analytical procedures for heavy metals and toxic compounds, and biological test systems using fruit flies and laboratory animals for detecting insecticides and acute poisons; and

virology: this should be a section of serology initially. As the capability for maintaining cell culture systems, isolating and identifying viruses and production of viral reagents is developed, virology may become a separate laboratory section. Perhaps the use of chick embryos and the techniques applicable to these as media for replicating and identifying viruses should be the first virology attempted.

The production of vaccines, bacteria or any product that might be produced in the laboratory for administration to animals in the field must be absolutely prohibited.

While the basic laboratory capabilities are being developed in both the new and old laboratories, careful disease condition monitoring should be continued and expanded in the field. Disease conditions to be observed and documented by the animal owners include lameness, abortions, dermatitis, coughing, etc. Beginning with these owner-observed and recorded disease deterrents to production, field and laboratory veterinarians will check them out, determine the cause, and develop the most appropriate procedures for treatment and prevention in Haiti. Further laboratory development should be based upon the disease problems encountered in livestock and poultry, plus additional expertise and technology required for immediate recognition of highly contagious diseases should they enter Haiti.

Budget for laboratory. Funds should be allocated for facilities maintenance: repair, mechanical equipment, electricity, and water; capital improvements: cabinets, chairs, sinks, parking area, and incinerator; personnel: salary and training; equipment and supplies: nonexpendible and expendible. The following services are not available in Haiti:

- (1) laboratory procedures to confirm the diagnosis of livestock and poultry diseases exotic to Haiti. Tentative diagnosis can be made on basis of clinical signs, lesions and lab test that does not require the causative agent in viable form.
- (2) an external technical advisor, two weeks per quarter.
- (3) problem solving resources. It should be anticipated that problems potentially affecting national and international relations will arise and require the most rapid solution feasible. Authority and resources to rapidly bring people, equipment, supplies or whatever it takes to resolve the issue as fast as reasonably possible must be established and maintained.

Dr H A McDaniel of USDA/APHIS/VS reviewed the list of laboratory equipment prepared by Dr. Cesar Labo. He recommended that primary emphasis be placed on frozen section fluorescent antibody testing for both African Swine Fever and

Hog Cholera. Pigs could be dying of ASF and the lab test they are running would be negative. It takes at least 10 - 14 days before antibodies are diagnostically significant. Any remaining funds should be used for basic equipment for bacteriology, parasitology etc. For example, they need to be doing fluorescent antibody test for rabies. First consideration should be given to establishing the laboratory to meet the needs identified in the animals on the farms.

le 29 avril 1986

No. 447/86-FHA

Monsieur Gustave Ménager,
Ministre de l'Agriculture,
des Ressources Naturelles,
et du Développement Rural,
En ses Bureaux.

Réf: Prêt 738/SF-HA,
Repeuplement Porcin

Monsieur le Ministre,

En référence aux propositions soumises par le M.A.R.N.D.R. dans le cadre du projet susmentionné, nous avons l'avantage de vous informer qu'un examen minutieux du dossier a permis aux services concernés de la Banque de constater que la stratégie proposée diffère fondamentalement de celle définie lors de l'analyse du Projet, ayant abouti à l'Accord de Prêt entre la République d'Haiti et la B. I. D.

Considérant l'importance du Projet pour le pays et la confirmation de sa priorité évoquée au cours de réunions officielles, la Banque serait disposée favorablement à analyser cette proposition.

Aussi, dans le but de mieux évaluer certains aspects techniques et financiers, nous voyons-nous dans l'obligation de solliciter du M.A.R.N.D.R. quelques informations additionnelles et des éclaircissements sur certains points spécifiques, dans le but de définir:

- a) si la proposition du Ministère est une simple reformulation;
- b) s'il s'agit d'un nouveau projet qui nécessite d'autres critères d'analyse et une justification approfondie.

./.

Monsieur Gustave Ménagier
le 29 avril 1986

A cet effet, nous annexons à la présente une liste détaillée des informations nécessaires. Nous apprécierions toute démarche que pourrait entreprendre votre Ministère pour que ces données et celles relatives au volet d'alimentation animale demandées par M. Sobalvarro au Directeur du Projet, M. Jacques **Backer**, au cours de la dernière mission de notre Siège durant le mois de mars, soient disponibles à partir du 12 mai prochain, date à laquelle est prévue l'arrivée en Haïti d'une Mission de la B.I.D.; cette Mission sera chargée de poursuivre l'analyse du dossier de repeuplement Forcin. Il demeure entendu que les spécialistes de la Représentation restent à la disposition de votre Ministère pour toute assistance qui pourrait être requise en la circonstance.

Je vous prie d'agréer, Monsieur le Ministre, l'assurance de notre considération distinguée.

Charles P. Greenwood
Représentant en Haïti



REPUBLIQUE D'HAÏTI

MAY 14 1986

MINISTERE DE L'AGRICULTURE, DES RESSOURCES NATURELLES ET DU DEVELOPPEMENT RURAL

No A-2: 1739

Port-au-Prince le 6 mai 1986

DATE REC'D		
USAID ROUTER		
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Monsieur Jérôme FRENCH
Directeur de l'USAID/PAP
En ses Bureaux

Monsieur le Directeur,

Ma: 5/23/86

J'ai l'avantage de souligner dans le concert des circonstances favorables à la poursuite du Projet Intérimaire et des objectifs du repeuplement porcin, l'intérêt que porte le Ministère de l'Agriculture des Ressources Naturelles et du Développement Rural à la prévention et au contrôle en général des maladies du cheptel en Haïti et au succès futur de l'élevage des porcs. Notre politique a été rendue explicite dans le communiqué du Ministère daté du 29 octobre 1984, et relative à la réglementation sanitaire régissant les importations de porcs en Haïti (Copie ci-jointe).

Conformément à ce communiqué, ce Ministère a déjà réagi et a soutenu avec ardeur toute action de quarantaine animale, moyen efficace prévenant l'introduction des maladies, et il en a fait une de ses priorités d'intervention. Aussi ce Ministère veut-il continuer à appliquer, tout en la renforçant les mesures propres à maintenir la validité de cette politique, garantie de l'essor de la production animale dans le pays; il saisit l'opportunité de rassurer l'USAID, comme toutes les autres instances d'aide et de financement, de sa détermination à lutter contre ce qui compromettrait la permanence et la sérénité de cette décision.

Je saisis l'opportunité pour vous renouveler, Monsieur le Directeur, l'assurance de ma haute considération.

Gustave Menager
Gustave MENAGER
Ministre
Ministère de l'Agriculture des Ressources Naturelles et du Développement Rural

MINISTÈRE DE L'AGRICULTURE, DES RESSOURCES NATURELLES
ET DU DÉVELOPPEMENT RURAL

C O M M U N I Q U E

RÈGLEMENTATION SANITAIRE RÉGISSANT LES IMPORTATIONS
DE PORCS EN HAÏTI

En vue d'assurer une surveillance sanitaire efficace et le succès du Re-peuplement Porcin, le MARNDR informe que les dispositions du communiqué du 20 Mars 1984 sont toujours en vigueur :

1. Il est formellement interdit d'importer des porcs de tous âges sans une autorisation expresse de l'autorité compétente du Ministère de l'Agriculture, des Ressources Naturelles et du Développement Rural.
2. Les demandes d'autorisation d'importation doivent être adressées au MARNDR au moins trente (30) jours avant la date prévue d'arrivée des porcs en Haïti, avec les mentions suivantes :
 - Le nombre de têtes à importer
 - Le nom de la ferme d'origine et sa localisation (pays)
3. Il est interdit d'importer des porcs ou des produits dérivés du porc des pays où sévissent la Peste Porcine Africaine (PPA), La Peste Porcine Classique (PPC), la Peste Bovine ou autres maladies exotiques.
4. Les porcs importés doivent provenir de porcherie indemnes des maladies suivantes :
 - Peste Porcine Africaine

- Peste Porcine Classique
- Brucellose
- Tuberculose
- Leptospirose
- Abscess de la mâchoire
- Pneumonie exotique (*Mycobacterium pneumoniae*)
- Pseudo-rage et de toutes autres maladies infectieuses ou contagieuses du porc.

5. Tout porc importé doit être accompagné d'un certificat officiel de santé dûment signé par un Médecin Vétérinaire, Officiel du Pays exportateur et portant les indications suivantes :

- Nom et adresse du producteur
- Nom et adresse de l'exportateur au cas où il n'est pas producteur
- Nom et adresse de l'importateur
- Adresse de la ferme de l'importateur
- No. du Tag d'identification que doit obligatoirement porter le porc
- Preuve de tests pour les maladies suivantes :
 - a. Peste Porcine Africaine :
 - . Enzyme Linked Immuno Sorbent
 - . Assay (ELISA) Immuno Electro
 - . Osmo Phorès (I E O P) Hemadsorption
 - b. Peste Porcine Africaine :
 - . Immunofluorescence
 - c. Brucellose :
 - . Plaque .. et tube 1-25
 - d. Pseudorage

. Sérum de neutralisation 1 : 4

e. Gastro-antérite transmissible

. Sérum de neutralisation 1 : 8

6. Leptospirose

- Sérotype pomona
- Canicola
- Ictérotémorragie
- Grippetypose

Les porcs à importer doivent avoir subi les tests réclamés vingt et un (21) à trente (30) jours avant la date d'expédition.

7. Les porcs non accompagnés de ce certificat officiel de santé et de l'autorisation d'importation seront déclarés irrecevables, saisis et incinérés, sans délai, aux frais de l'importateur.
8. Les porcs introduits dans le navs subiront une période de quarantaine aux frais de l'importateur immédiatement après leur débarquement. La durée de la quarantaine est de vingt (20) à quarante (40) jours et peut être prolongée au besoin sur l'avis de l'autorité technique compétente.
9. Durant la période de quarantaine, des tests de laboratoire seront effectués sur les animaux pour les maladies suivantes :
 - Peste Porcine Africaine
 - Peste Porcine Classique
 - Rouge
 - Tuberculose
 - Brucellose
 - Pseudo-rage

- Leptospirose
- Gastro-entérite transmissible (TGE).

La période de quarantaine sera sanctionnée d'un certificat dûment signé par un Médecin Vétérinaire préposé à la quarantaine par le Service compétent du MAPNDR.

10. Aucun porc ne pourra laisser l'aire de quarantaine, et être déplacé vers un autre point du pays sans le certificat de quarantaine officiel du MAPNDR. Des mesures légales seront prises contre tout contrevenant à ces présentes dispositions.

Ce rappel a pour objectif d'attirer une fois de plus l'attention du public en général et des éleveurs en particulier sur la nécessité d'une collaboration étroite avec le Ministère de l'Agriculture en vue d'empêcher toute réapparition de ce fléau qu'est la Peste Porcine Africaine.

En effet, après les durs sacrifices consentis par le peuple haïtien pour l'Eradication de la Peste Porcine Africaine (EPA), il est prudent voire obligatoire de prendre toutes les dispositions nécessaires en vue non seulement de protéger les nouveaux porcs introduits mais encore d'empêcher l'apparition de toute autre maladie exotique susceptible de perturber l'économie nationale.

Port-au-Prince, le 29 Octobre 1964.

MINISTERE DE L'AGRICULTURE

memorandum

DATE: RDO/86/406
April 29, 1986

REPLY TO
ATTN OF: John V. D. Lewis, RDO *JVD Lewis*

SUBJECT: Memorandum of Phone Conversation with Francois Gilbert of
the Canadian International Development Agency (CIDA)

TO: Vincent Cusumano, C/RDO

1. A year ago two CIDA consultants reviewed Canada's opportunities for contributing to the swine repopulation process in Haiti. In their conversations with MARNDR at this time, these consultants were advised to stay away from the USAID/IICA project. Rather, MARNDR expressed an interest in direct assistance. Thus, these consultants concluded that, given the impact of the USAID/IICA project, major areas needing attention were not swine repopulation per se but rather:

- Swine Health surveillance, and
- The development of locally produced/gathered/milled swine feed alternatives.

They recommended that CIDA wait to see what the IDB/MARNDR project was going to do in these two crucial areas before doing anything itself. So CIDA has been holding off in these areas, waiting for IDB/MARNDR to show their hand.

2. Meanwhile, CIDA's mission administered fund (MAF) has been making small grants (from 80,000 to 150,000 Canadian Dollars) to certain Canadian-based PVOs (CEDI, MEDA) which, thereby, have been able to participate in the USAID/IICA project as Secondary Multiplication Centers (SMCs). This collaboration has been working out well for all parties. Another consultant is coming in on May 4 to advise CIDA on how they can expand the number of these small MAF grants in the interests of swine repopulation in Haiti. Specific sub-projects will be recommended.

3. CIDA also has a PL-480-like "retrocession" gourde fund, administered through a committee comprising CIDA, TPTC, and the Ministry of Plan, which could be used, right away, by MARNDR in pursuing some of their swine health and feed development objectives. As yet no specific MARNDR sub-program in this domain has been defined, but such a prompt definition is not inconceivable.
4. The essential point, then, is that CIDA is waiting to see what IDB and MARDNR are coming up with before they make any major thrust in the swine sub-sector.

cc: J. French, DIR
C. Brooks, D/DIR a.i.
B. Burnett, DRE
J. Walker, OEA