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EVALUATION OF THE
RESEARCH AND EXTENSION COMPONENT OF THE
INTEGRATED AGRICULTURAL DEVELOPMENT PROJECT
No. 521-0078

BY

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TABLE OF CONTENTS

Acknowledgments	ii
Table of Contents	iv
Executive Summary	v
Introduction	1
Research Activities and Accomplishments	2
Summary	9
Economic Analysis	10
Extension	11
Training	12
Pre- and Post-Harvest Losses	13
Institutional and Financial Assessment	15
Impact	29
Appendix A	39
Appendix B	40
Appendix C	42

EXECUTIVE SUMMARY

A. Introduction

Concerns about the progress of the research and extension component of the Integrated Agricultural Development Project (PDAI) caused the USAID mission in Haiti in October, 1983 to seek assistance in the activities of the Texas A and M University (TAMU) team and in deciding future actions in research and technology transfer.

Specifically, concerns were expressed about the research capacity of DARNDR, the appropriateness of the developed technology for the Haitian farmer, the verification of research results by on-the-farm trials, and the potential impact of the developed technology on farm income. One recurrent question, "Why not use more local cultivars in the selection programs for varieties with improved production?"

Other concerns included the integration of research and extension activities, the capacity of DARNDR to financially support research, the need for vertebrate pest control, the need for and feasibility of a seed production project, and the capabilities of the processing and distribution system for improved seed and plant materials. The team realized that their evaluation could impact on the future of agricultural research and extension in Haiti as well as the role that USAID might play in it.

The evaluation team was made up of four persons, including one economist, one agronomist, one cereals/legume specialist, and one root and tubers specialist who conducted their study from November 21, to December 9, 1983. According to the Ministry of Agriculture's five-year plan, the primary goal is increased crop production to provide food-self-sufficiency for the country. To achieve this goal, irrigation and research extension of improved crop production technology are very high priorities.

The scale of the original PDAI project was substantially reduced in 1979. The revised Project Paper called for a reduction from seven to four components--research and extension, irrigation soil, conservation, and administration. The $22.6 million package for the four components included $9.3 million as a grant and $2.8 million as a loan from USAID, with the government of Haiti providing $10.5 million.

With regard to the research and technology component, grant money was to be used for technical assistance as well as long-and short-term training. Loan money would finance certain equipment and supplies. GOH funds would cover Haitian institutional staff, labor fuel and vehicle maintenance costs.

B. Conclusions and Recommendations

1. There is great need for increased food production in Haiti. Demographic studies show expected increases in population and corresponding decreases in farm size. Without increased production per unit of land even more significant deficiencies in food production can be expected. Worldwide experience suggests that improvements in food production systems can be designed by an appropriate research team and can be transferred by an effective extension service.

2. The Integrated Agricultural Development Project, Research and Extension component is a useful step in the effort to develop an effective research service, to improve the extension service, and to develop and deliver new technological packages in Haiti.

3. Nevertheless, because the job is large and complicated, it is now evident that expectations of the project have been too high. Not all of the outputs of the project have been realized nor will they be realized before the termination of the project, but very worthwhile progress has been made.

4. The Technical Assistance Team of the Agricultural and Mechanical University of Texas within the framework of the Project design has done an excellent but still unfinished job as follows·

   a. Technical progress, principally in selecting better varieties and developing technological packages for the Haitian small farmer has been surprisingly successful, yet some work remains to finish current experiments, the write-up of technological packages, and multiplication of elected materials.

   b. The strengthening of the Haitian research capacity is only partially accomplished because of a relatively weak research service structure on which to build, slow GOH response to the project agreements, lack of funds that sometimes paralyzed activities, occasional inadequate selection of counterparts, presence of counterparts in overseas training positions, and communication barriers including at times, language. Furthermore, concepts of the appropriate type of research have changed, and farming systems research, including on-the-farm research has become the vogue of the day, and indeed appears to have great promise. Nevertheless, training through counterpart assignments has been very useful.

   c. The training activities, still unfinished, consisting of short courses and short and long-term overseas training, are considered excellent, given the scope of the current project, but continued need for training is recognized. Furthermore, the need for training in farming systems research is now also evident but cannot be accomplished by this project.

d. Development of the Levy Research Station was not fully accomplished as visualized. However, the failure to terminate this responsibility was not due to TAMU team decisions (see later).

5. Sincere efforts were made by the Ministry of Agriculture, DARNDR, to comply with the requirements of the Project, but lack of timely decision and action, and even more important, of operating funds, often delayed activities.

6. Further efforts are needed to complete the project, as follows·

a. The Technical Assistance team needs to terminate final experimentation, write up technological packages, supervise or arrange for seed multiplication, aid in the development of improved facilities, help lay the basis for a long-term training policy, effect a transition of full authority and responsibility to Haitian counterparts and arrange with the Extension Service or other DARNDR personnel for on-the-farm verification and eventual tansfer of technological packages (See Appendix C.)

b. The team must complete as soon as possible the analysis of the baseline date already collected in the project areas and an evaluation of the potential impact of the new technology. This should also include relevant analysis of current socioeconomic characteristics of farmers soon to be engaged in on-the-farm activities so as to identify likely constraints and to aid in determining proper organization of that phase. In addition, the team eeconomist, in conjunction with DARNDR, CRDA and FAMV staff should develop a workable monitoring plan to trace the activities and behavior of the cooperating farmers.

c. In order to benefit from an extension, DARNDR should assure the continuance of their research team, arrange for the orderly assignment of responsibilities to current personnel and to overseas trainees, develop cooperative arrangements with the TA team for on-the-farm verification, and for eventual extension. Furthermore, during the coming transitorial phase regular meetings of DARNDR and TAMU personnel are highly desirable to reduce communication barriers and facilitate the phasing out of TAMU personnel, and the phasing in of DARNDR personnel.

7. Therefore, an extension of the current TA contract is recommended. The minimum time for an extension beyond January 31, 1984, is about 9 months if current TA PM's authorized are used for this purpose (45 PM). Nevertheless, it is not imperative that all TAMU members terminate services at the same time. It is therefore visualized that some of the team members should complete their services and phase in Haitian counterparts earlier than others (See Appendix C).

8. It is essential that the TA team, the CRDA, and the Extension Service communicate well during the recommended extension of the TA team activities. If this is not done, the objectives of the project in terms of strengthening the Haitian research and extension capability as well as the technological achievements will be lost. Therefore, the development of a joint phasing out-phasing-in plan is recommended. The TA team leader as well as CRDA and Extension Service directors should participate in this task.

9. Multiplication of valuable seed material is necessary. The TA team should plan for the systematic transfer to the Haitian team of the collections, their descriptions, and the selected materials. As soon as possible, the Haitian Research team should make the necessary decisions on management and multiplication. In addition, joint decisions should be reached as soon as possible concerning the steps to be taken on a on-the-farm verification, training of extension personnel, and eventual extension.

10. It is believed that experiment station based studies will always be a necessary complement to on-the-farm farming systems investigation. It is recommended that the plans for improvement of Levy Farm, including training, lodging, work space, etc... be promptly carried out by use of funds originally assigned to that purpose. Furthermore, the TAMU team and DARNDR should develop a plan for the use of the farm in a national program.

11. If funds can be made available for the improvement of the existing seed production, seed management, and seed storage facilities, such an assignment would greatly promote the utilization of the results of the project, and in anycase is necessary for development of effective research and extension.

12. The Project should terminate with the DARNDR research team in operation, with current research advanced to the stage of technological packages, with firm progress in on-the-farm verification, with mutually agreed on plans for extension, and with Levy Farm and Damien seed facilities improvements at least in progress.

INTRODUCTION

Project Intention

The integrated Agricultural Development Project calls for 193 PM of technical assistance in order to establish and operate an applied food crops research and extension program to increase farm productivity on a sustained and economical basis. To achieve this objective, a Technical Assistance Team was hired by contract with the Texas Agricultural and Mechanical University. The original plan was to obtain 4 long-term advisors with terms of 37 months each. The team was charged with assisting the Haitian Research Service by:

1. Strengthening the capacity of the Research service to conduct research in traditional Haitian food crops such as corn, grain, rice, sorghum, beans, cowpeas, pigeon pea, cassava, sweet potato, yams, and potato, and to deliver the agronomically and economically sound results to the small farmer.

2. Assisting in obtaining base-line farm data such as cost of production, price fluctuations, yield data, and assessing the economic viability of the research data that was to be generated.

3. Designing, developing, and implementing a training program for Haitian agronomists who were eligible under the project to pursue graduate training in the U.S. or short-term specialized training at one of the International Agricultural Research Centers such as IITA, CIMMYT, CIAT and ICRISAT.

4. Assisting the MINAG in its development of the Levy farm Experiment Station and in the supervision and conduct of Research in the Les Cayes area.

The Technical Assistance Team

Five persons were employed as the technical assistance team as follows:

PERSON	SPECIALTY OR ASSIGNED ROLE	NUMBER OF PM MONTHS*	ARRIVAL DATE
Robert L. Cheaney	Chief of Party, cereal crop specialist	36	2/21/81
Mack Fugua	Horticulturist and plant breeder, legume specialist	36	2/21/81
Marianito Villanueva	Root and Tuber crop specialist	32	6/16/81
Merritt Taylor	Agricultural Economist, farm management specialist	31	6/23/81
Yung Ping Chang	Horticultural Specialist	13	1/03/83
	TOTAL	113	

*As of January 31, 1984

RESEARCH ACTIVITIES AND ACCOMPLISHMENTS

As indicated by the composition of the TA, the TAMU Team's activities were initially divided into four specialized areas: cereal crops, legumes, roots and tubers and economic analysis. In January, 1983, a fifth member arrived to assist in the development of the Levy farm and to supervise the research team at that station. (Since much of the 45 PMs of short-term assistance programmed had not been used, some of this was shifted to the new member.)

Cereal Crops Accomplishments

The aspects of the current cereals part of the project commenced with the arrival of Dr. Robert Cheaney in February, 1981. Various counterparts and trainees have worked with him; Colette Blanchet, Mark Beauduy, Reynold Pierlus and others. At Les Cayes, Elliassaint Magloire is the collaborator. Research activities commenced in August, 1981, intensified in 1982, and were reduced due to lack of support in 1983.

Principal tasks of the cereals program were the collection, introduction, evaluation and multiplication of varieties of corn and sorghum and experiments to define the details of the technical package. The numbers of experiments, sites and objectives or purpose are summarized in the attached table.

SUMMARY OF NUMBERS OF CEREAL CROP EXPERIMENTS*

CROP	DAMIEN	LES CAYES	OTHER AREAS	TOTAL
Corn				72
Varietal Trials	4	2	6	12
Multiple Cropping	4			4
Seed Increase	2		1	3
On farm Demonstrations	8		45	53
Sorghum				16
Varietal Trials	4			4
Seed Increase	2			2
On farm Demonstrations	2		7	8

*As of November, 1983, whether finished or not.

Some specific activities are:

CORN (Zea Mays). During 1981-82, twelve corn varieties from CIMMYT (including two local Haitian varieties) were evaluated at DAMIEN and Les Cayes. The results were two superior varieties: La Maquina 7827 and La Maquina 7928 over Chicken Corn and Les Anglais. Criteria used for selection were organoleptic evaluation, tolerance to dry conditions, plant height, ear height, shelling percentage and grain yields with and without fertilizers. The selected introductions La Maquina 7827 and La Maquina 7928 produced yields of 63 and 64 percent more grain than chicken corn.

During 1983, three trials completed at DAMIEN varieties N requirements and cropping systems. Also, six on farm trials compared fertilizer versus no fertilizer at Dufailly and Desvarieux. A corn variety trial at Gonaives and Corn/Sorghum cropping system evaluation was completed at Dufaily. A corn variety trial with five entries is in progress at DAMIEN, as well as a Corn/Sorghum/Pigeon Pea cropping system. Seed multiplication in progress is: 10 ha of La Maquina 7928 and 3 and 2 ha of La Maquina 7827 and chicken corn respectively at Levy Farm, Les Cayes. At DAMIEN, 1/10 ha each of Amarillo Cristalino and Amarillo Dentado are being multiplied.

GRAIN SORGHUM

(Sorghum Bicolor). During 1981, four observations were collected: evaluation of 17 Texas varieties resulting in four selections (RTAM 428, CS 3541, BTX 624 and Hegari); observation of seven Israeli varieties resulting in three selections (HL4-3, HL-3, and HL-2); testing of thirty varieties, of which 14 selections were made (two are cultivated locally and the balance was developed by ICRISAT, and received from CIMMYT, of which the two local varieties (Madame Avocat, Gros Gougon) did not qualify as they were tall growing, matured later and the grain was lost due to sorghum midge attacks, and (d) twenty-six hybrid sorghums from TAMU were tested and are not being recommended because of seed cost, and being a synthetic hybrid must be purchased yearly.

For 1982, eight experiments were planned. Two at Gonaives, which were lost, and one at Croix-des-Bouquets, which had to be replanted twice. The twenty grain selections made in 1981 were planted at DAMIEN, and these twenty were further reduced to two selection for further testing in 1983.

During 1983, one sorghum variety test with thirty entries was completed at DAMIEN, as well as an on farm variety test at Gonaives. There is in progress also at DAMIEN a corn/sorghum cropping system trial.

The evaluation team believes that the cereals work is at the point where the immediate phasing in and transfer of responsibility to a Haitian counterpart is desirable. To facilitate this, a contract extension of approximately 14 OM for Dr. Cheaney is necessary. During this period, time should be sufficient to: complete experiments, write technological packs, advise on seed production, etc. and the other activities outlined in Appendix C.

Legume Crops Accomplishments

The current legumes work accomplished in the project commenced with the arrival of Dr. Mack Fugua in February, 1981. The counterparts working with him are Mona Fils Aime Gaston, Gabrielle Preuillon Beaudin, and others. At Les Cayes, the collaborator is Elliasaint Magloire. Research activities commenced in mid-1981, were intensified 1982, and slowed due to lack of support in 1983.

Principal tasks of the legumes program were the collection and evaluation of local selections, the introduction and testing and selection of named varieties from out of the country. This was followed by the multiplication of seed from the selections made from the legumes studied, such as: cowpea, fieldbean, Lima bean, pigeon pea, soy bean and peanut. Adequate information was gathered to define sufficient details for preparation of technical packages, and developing on-farm demonstrations.

As a result of these evaluation tests, the following legumes were selected: Cowpeas; VITA-4, TX-23-B, TX-PE, TX-31-3-3, TX-426-014D, TVX-3516-009, and TV-4072-1C-01D. Lima Bean; Naine, field bean; Damien 544, Damien 359, DRA Tamasulapa. Pigeon pea: UW-17 (obtained from Universidad Autonomous Santo Domingo but originally developed by the University of the West Indies in Trinidad). Soybean: Imperial Improved Pelican. The peanut trials are still in the field. None of the Winged bean lines evaluated are recommended.

Some specific activities are:

COWPEA (Vigna Unguiculata). During 1981, four trials were initiated at DAMIEN, three consisting of introductions from the IITA' and one from TAMU, making a total of fifty-one varieties from which twenty-two were selected for testing in 1982. Also, an associated cowpea/sweet potato trial was carried out with yields of both crops being less than the monoculture crops (cowpea yielded 1100 vs 790 kg/ha, and sweet potato yield 9659 vs 8763 kg/ha). The twenty-two selections that were made in 1981 were planted in 1982 and from this planting six selections were made.

Seed multiplication of one cowpea variety of 177 kg was completed in 1983. In December, a cowpea adaptation trial consisting of 10 lines is to be planted at DAMIEN.

COMMON BEAN

(Phaseolus, Vulgaris). During late 1981, varieties were received from CIAT, and also collected locally, for evaluation for disease resistance (golden mosaic and yellow mosaic)

In early 1982, four separate trial with all of the above mentionned bean varieties were made at DAMIEN. Ten selections were made from the CIAT accessions and ten from the local variety collection for furtner evaluation and seed increase. The disease resistant black bean accessions from CIAT have yields of dry beans ranging from 1447 to 2029 kg/ha, depending on the five selections. The highest five red bean accessions from CIAT had yields from 723 to 1344 kg/ha. The ten local Haitian selections, of which four are black, had yields ranging from 753 to 1194 kg/ha and the balance are beans of assorted shades with yields ranging from 758 to 845 kg/ha. The imported accessions appear superior yielders under the same conditions.

During 1983, a black bean trial with 14 entries was completed at DAMIEN, as was a red bean trial with 12 entries. In bean breeding line adaptation and BGMV trials, a total of 630 entries were evaluated and completed at DAMIEN (900 Kg of seed increase of 5 varieties is in progress). Seven on-farm demonstrations were completed, three at Les Cayes and four at Marigot.

Trials to be planted in December are: one black bean with 14 lines and one red bean with 12 lines, both at DAMIEN. Also to be accomplished, the adaptation of 20 bean selections and the evaluation of 200 BGMV resistant lines (both trials are for DAMIEN/Seed increase: 5 varieties on one ha at JACMEL)

WINGED BEAN

(Psphocarpus Terragonolobus). During 1982, eleven foreign accessions and one local variety were established in an adaptation trial. All produced beans, but seeds were collected for future trials from only three selections.

LIMA BEAN

(Phaseolus Lunatus). In 1982, thirty Lima bean accessions were received from CIAT. These and Naine, a local variety, were planted. Naine was the only selection demonstrating resistance to BFMV. No yield data was collected. In 1983 ten kg of Lima bean seed was multiplied at DAMIEN.

SOYBEAN

(Glycine Max). In early 1982, 16 accessions received from Intsoy were planted and produced favorable yields. The two yielders, ACC 2129 improved pelican, and 552 produced 1908, 1881 and 1670 kg/ha respectively.
During 1983, the top three yielders will be planted for continued selection.

PIGEON PEA

(Cajanus Cajan). During early 1982, TAMU received a photo-period insensitive variety, UW-17, from UASD in D.R. Two trials were established using a local variety and UW-17. Mature peas were harvested the first week in November from the UW-17 variety. The local selection had not started to bloom. Total dry pea yields harvested at 172 days from planting was 1506 kg/ha and 1316 kg/ha from the irrigated and non-irrigated trials respectively. The local variety, being photo-period sensitive, had not matured through the month of December. Twenty-five kg of UW-17 seed was distributed to farmers for trials and seed increase.

During 1983 a corn/pigeon pea cropping system and nitrification study was established and is in progress at DAMIEN. 350 kg, of seed has been produced also at DAMIEN. At present approximately 100 kg of UASD is being multiplied. Seed for on-farm demonstrations in the 20 districts was distributed and two have reported. On-farm demonstrations are in progress at Jacmel and Croix-des-Bouquets. Thirty-six lines are to be planted for evaluation in December 1983.

OKRA

(Abelmoschus Esculentus). During late summer of 1981, "Clemson Spineless" was planted, yielding 1251 kg/ha of dry seed. Okra, besides being a human food item in the greenpod stage, yields an edible oil from dry seed. During December 1983, three Okra lines for adaptation tests are to be planted at DAMIEN and two on farm demonstrations (Jacmel and Croix-des-Bouquets) are in progress. Seed multiplication of 30 kg at DAMIEN is completed.

SUMMARY OF NUMBERS OF LEGUME CROPS EXPERIMENTS*

CROPS	DAMIEN	LES CAYES	OTHER AREAS	TOTAL
Cowpea				7
Varietal Trials	3	1		4
Seed Increase	1			1
Multiple Cropping	2			2
Field Bean				4
Varietal Trials	3			3
Multiple Cropping	1			1
Lima Bean				2
Varietal Trials	2			2
Pigeon Pea				4
Varietal Trials	2			2
Seed Increase	1		1	2
Winged Bean				3
Varietal Trials	2			2
Seed Increase	1			1
Soy Bean				2
Varietal Trials	2			2
Peanuts				
Varietal Trials	1			1

*As of November, 1983, whether finisned or not.

The evaluation finds that tne legumes' work is advanced to tne point that it is advantageous to start tne immediate pnasing in of the Haitian counterparts for tne TAMU team member. This would be facilitated by an 11-montn extension of Dr. Fuqua's contract. This would permit tne completion of legume work in progress, and allow time to accomplisn th activities listed in Appendix C.

Root Crops Accomplishments

SWEET POTATO

(Ipomoea Batatas). In 1981, a trial with 20 entries was established from which six selections were made.

In 1982, two trials with eight local accessions were made, one at Les Cayes and the other at DAMIEN; eight sets of variety tests, with six at DAMIEN, one at Les Cayes and one at a farmers field at Croix-des-Bouquets, consisting of a total of 78 accessions. Ten selections were made for the next cycle of plantings. A variety test was also conducted at Los Palis.

CASSAVA

(Maninot Esculenta). During 1981, 42 accessions were obtained and established in a germplasm collection. Five trials were made during the year, with harvests to be made at 6, 8, 10 and 12 months intervals to determine optimum harvest cycle.

During 1982, ten sets of trials were established; four in Hinche, and one at les Cayes. Seven varieties of the 18 accessions evaluated yielded more than 20t/ha. Two sets of replicated trials were again established with the same varieties. Also, studies in cassava storage of tubers and propagating material were made.

WHITE POTATO

(Solanum Tuberosum). Seven lines from CIP were planted, and despite a heavy ant infestation, yields comparable to 12t/ha were obtained. Two selections were made for further testing. This test was repeated with six lines the following summer. At harvest the tubers were of non-marketable size, indicating that the varieties tested may be grown in the winter months only, in lowland areas. Eight more accessions were obtained and established.

MALANGA

(Xanthosoma Spi). Four introduced accessions were evaluated at nine months of age, with two selections yielding more than 8t/ha. Malanga will be tested as an intercrop plant with banana.

YAM

(Dioscorea Spp). Propagating materials of several introduced varieties is under way.

Cropping Systems: with the food crops listed above, many systems and crop combinations have and are being evaluated, not only at DAMIEN but elsewhere in the Cul-de-Sac, Hinche, Les Cayes, Jacmel, Marigot, and other sites not visited by the evaluation team. Intercropping systems that appear to be successful are cassava-bean, cassava-cowpea-corn-sweet potato, and sweet potato-corn-cowpean-cassava.

SUMMARY OF NUMBERS OF ROOT CROP EXPERIMENTS

	DAMIEN	LES CAYES	OTHER AREAS	TOTAL
Sweet Potato				
Varietal trials	17	3	7	27
Horticultural variables	4	-	-	4
Multiple cropping	3	1	1	4
Cassava				
Varietal trials	9	2	7	18
Horticultural variables	3	4	1	8
Multiple Cropping	4	1	-	5
Other roots and tubers				
Varietal trials	7	-	-	7
Horticultural variables	1	-	1	2
Multiple cropping	-	-	-	-
TOTALS	48	11	16	75

*Whether or not finished, November, 1983.

The evaluation team believes that the root and tuber crops' work has come to the point where it would be advantageous to begin immediate phasing of Haitian replacements for the TAMU team member. This would be facilitated by a 3-5 months' extension of the contract of Dr. Villanueva. It is visualized that technological packages can be prepared, most critical experiments finished, and arrangements made for multiplication and distribution by extension service during that period (See Annex C for activity detail).

SUMMARY

Of the food crops evaluated in the hundreds of tests and trials conducted, the most outstanding based on yield, acceptability, nutritional value, storage capability, pest and disease resistance and other valuable criteria are the following:

CORN: La Maquina 7827, La Maquina 7928, Amarillo Dentado and Amarillo Cristalino.

SORGHUM: SEPON 77, SEPON 78, and SEPON 80-38. Cowpeas: VITA-4, TX-23-B, TX-PE, TX-31-3-3, TVX 426-013D, TVX 3516-09G and TVU 4072-1C-01D.

FIELD BEANS: DAMIEN 544, DAMIEN 359 and ICTA Tamazulama. Lima Bean: Naines. Pigeon Pea: UW-17 (obtained from Universidad Autonomus Santo Domingo). Soybean: Improved Pelican. Wingbean: Non-recommended. Peanuts: Trials are incomplete.

SWEET POTATO: Negsale, Mona Sent, Madona Buacale.

CASSAVA: Marieta, Carne Blanca, Madame Francoise, CMC-40, Blanquita, CMC 321-188, CM 323-375, and MCOL 1684.

ECONOMIC ANALYSIS

The Economic/Farm Management component of the Research/Extension part of PDAI provides for 27 person months of long-term technical assistance and short-term advisors, as needed. As of December 1, 1983, 32 PM have been provided by the TAMU member responsible for the farm management activity (the Project Paper states that a total of 39 PM will be provided, but the TAMU contract specified only 37). The team member responsible for this sub-component arrived in Port-au-Prince on June 23, 1981. The duties of this individual, as defined by the contract with TAMU (contract 521-0078-C-00-1010) are:

- Assist the CRDA (SERA) in designing and planning research programs which are economically feasible and adaptable for target farmers.

- Assist in the analysis and evaluation of the recommended technological packages - in order to assure the development of research programs appropriate to the Haitian milieu in terms of selected technologies and inputs.

- Assist in developing experimental designs for the study of variables involved in traditional Haitian farming systems (both on flatlands and hillsides).

- Assist in conducting comparative studies of mono-culture croppins vs. multiple cropping techniques.

- Assist in the training of counterpart economists/farm managers aimed at establisning a farm management and economic analysis unit in SERA (now CRDA).

Activities and Evaluation

1. The TAMU economist, in cooperation with DARNDR personnel developed a questionnaire in 1981. (TAMU Progress Report February 1982, Page 76). The questionnaire was used to collect data from three locations: Saint Louis du Nord, Jean Rabel, and Bombardopolis.

The results from these surveys are shown in the previously-mentioned progress report (pages 56-58).

Although the initial questionnaire sought to obtain information about farm families, the reported information shows only cost-of-production data. The results presented in terms of inputs and labor categories contain sufficient detail. However, the data are converted from farm level units to $/ha so the actual farm level costs and incomes are not available. In addition, there is no mention of how many schedules were collected, farm size or other farm characteristics. Although the data presented may facilitate comparisons across time, they do not provide a basis from which to judge farmer welfare or likely impacts of eventual technological packages on farmer welfare. At the time these data were collected no official counterpart was named to the TAMU economist, so little formal counterpart training was generated.

2. The TAMU Annual Report of 1982 (February 1983) contains additional cost-of-production data collected during 1982. The data were collected from four regions:

REGION	SCHEDULES COLLECTED*
Cul-de-Sac	27
Les Cayes	100
Central Plateau	60
Jacmel	20

*Numbers provided by TAMU Economist Merritt Taylor.

The data collected and reported in 1982 followed much the same format as for those collected in 1981. However, the 1982 report contains additional information about cropping patterns and the methods used to collect the data.

The data collection method appears adequate. The general procedure was to contact community leaders explain the purpose of the survey, interview those leaders, then to call farmers together for an interview. Occasionally, when group meetings could not be arranged, farmers were directed to a given location where they were interviewed. The data collected provide the beginning of a baseline data set, particularly for cropping patterns. But, as with the first effort, the report does not contain sufficient information about numbers of schedules collected, distribution of farms by farm size and crop or other farm characteristics. It is, therefore, difficult, from a "farm-systems" point of view, to determine precisely what the characteristics of the target farm group may be. On the whole, however, a great deal of data has been collected and, when fully summarized, should provide a basis for evaluation of such technological packages as may eventually be recommended.

Recommendation

Since the data collected have not been fully utilized, priority should be given to complete this task. Completed analyses would provide valuable baseline information, point to needs for further investigation, and help to develop a system for monitoring the on-farm trials which are under way (some have been completed but results are not yet available). This effort should include an analysis of costs specific to the farm trials so that economic cost-benefit analyses can be made between research station and on-farm research. This analysis should include appropriate consideration of risk and return from the point of view of both the research per se and the cooperating farmer. In order to accomplish these tasks it is recommended that the TAMU economist remain in Haiti an additional seven months. (See Annex C for specific work plan recommendations.)

EXTENSION

The RE component of PDAI has as one of its goals to strengthen the link between DARNDR's research an extension departments and to improve the extension service's ability to deliver the tech-packages developed by research. Emphasis was to be placed on establishment of a research/extension

system. It was envisioned in the Project Paper that extension workers would be recruited to assist the research element with on-farm trials as a way of training extension personnel for a later "outreach" program.

Activities

The project provided for up to 20 SERA (CRDA) technicians to attend short-term training in both research and extension. Annex B shows a summary of training actual and planned activities. As it shows, two in-country courses have been held; one on Cassava Production (July, 1982) and one for PDAI persons. Annex B also shows a total of 8 persons sent to short-term overseas training. A comparison with the 1982 TAMU Annual Report shows a total of 9 short-term trips (one person twice). Not one of these trips was related to the extension effort. It is apparent that the extension component has not received the attention given to the research part of Research/Extension. However, there are several in-country courses planned for 1984.

Recommendation

This evaluation has concluded that the TAMU team begin immediately to prepare for transfer of responsibility to Haitian counterparts. This should include not only research but also extension. As a part of this activity the team should work with the DARNDR extension staff to complete training materials already under preparation. This should include, as well, the on-site involvement of regional extension persons, as envisioned by the Project Paper.

At this juncture, it may in fact be more effective to plan for interface between PDAI/RE and the farm systems work planned under ADS II so as to avoid competition between the projects for the limited number of counterpart persons available at the regional levels.

TRAINING

The TA team did establish an effective training program based on funds available and human resources assigned. The evaluation finds that their training program will be of long-term benefit to Haiti. We urge that overseas trainees be permitted to complete their studies without recall for urgent service in Haiti. A summary of training efforts in counterparts on-the-job, long and short-term overseas training courses is given in Appendix B.

The need for training in agricultural research and extension is urgent in Haiti, and a major effort in training still needs to be made, as well as a continuing future program. The Evaluation Committee has not yet seen adequate future plans for continued training, and suggests that training be an important part of follow-on projects.

PRE- AND POST-HARVEST LOSSES

The Vertebrate Pest Control Project, a cooperative effort of DARNDR, the Denver Wildlife Research Center (DWRC), and USAID/HAITI, has been operating since May, 1980. The Project objective is to increase food production of the small farmers by reducing crop losses to vertebrate animals. This is being accomplished, and the ultimate goal of the Project is to develop the capability within DARNDR to independently continue programs to reduce crop losses in the country after the Project terminates. The development of laboratory facilities, and the training of capable personnel are therefore of the utmost importance to the success of this Project.

The scientific staff have identified in the twenty agricultural Districts at least eight vertebrate pests responsible for various degrees of damage in the seed, vegetative, mature or storage stages of more than thirteen important food crops utilized in Haiti.

Pre- and Post-Harvest Losses of cereal and legume crops have been identified as most serious, and the problem is being addressed. It has been demonstrated with farmer participation and acceptability to be cost effective in rice. The principal vertebrate pest in this crop is the rat, causing 5 to 15 percent damage; this has been reduced to 1 percent with effective baiting. For every $1.00 spent on rodent control, a $10.00 to $20.00 profit increase is realized in rice.

Other crops subject to damage by vertebrates must be considered, whether damage occurs during planting, growth period or in post-harvest storage. These crops include cereals, legumes and vegetables. In such crops, methods must be developed to alleviate damage by rats, dogs, village weavers, crows, woodpeckers, parakeets, doves and waterfowl. No figures on actual crop losses were made available, Special efforts must be made to develop a control strategy to reduce annual losses on small farms.

It is felt that the basic capability now exists in DARNDR to investigate and develop programs to reduce losses in some of the crops due to vertebrate pests. The training of research an extension staff must continue and more experience be gained. To accomplish this, the current work should be continued, with the recommendation of complete phasing-out and the phasing-in of counterparts of this project by September, 1984. (See Appendix C for a suggested scope of work for the remainder of the Project. Table 2 contains a suggested $114,000 budget for the continuation.)

TABLE 2
ANNUAL PROJECT BUDGET
VERTEBRATE PEST CONTROL PROJECT

USAID/DARNDR/DWRC

USAID

Salaries and Benefits	$ 58,000
Project Leader (includes differential)	
Project Expenses - Denver	
Equipment and Supplies (for Haiti)	4,000
Shipments to Haiti	1,000
Storage of Household Effects	1,000
Overhead (28% of above total)	17,920
	$ 81,920
Project Expenses	
Cost of Living Allowance	$ 600
Housing Allowance	10,000
Educational Travel	900
Out of Country Travel	2,000
Equipment (local purchase)	2,000
	15,500
SUB-TOTAL	$ 97,420

GOH

Local Travel	2,000
Supplies and Materials	7,000
Secretary Salary	7,500
	$ 16,500
TOTAL	$113,920

INSTITUTIONAL AND FINANCIAL ASSESSMENT

A project evaluation inevitably produces a list of institution and operational constraints which, when compared between countries, and across projects, (even to some degree through time), seem always to produce the same list. Given A.I.D.'s years of experience in project implementation, we should, by now, be more surprised by the absence of certain constraints than by the fact that they are once more in evidence. Since several of these institutional constraints are outside the operational sphere of any specific project, we should be even less surprised that these same elemental constraints are repeatedly encountered.

As a whole, PDAI is no exception, the RE component has naturally encountered the same constraints. These constraints have been outlined in several evaluations of DARNDR institutional structure and of either the entire PDAI project or of individual components. Some of them are:

1976	MASI' Analysis of Institutional Capability of Haitian Ministry of Agriculture
1979	Integrated Agricultural Development Project Paper
1982	Integrated Agricultural Development - Audit Report No. 1-521-82-16
1983	(September) Evaluation of the Irrigation Component of the Integrated Agricultural Development Project No. 521-0078.

There have been many other analyses of projects both by AID and by other donor agencies. From those, an the studies listed above we can compile - in broad terms - the constraints as follows: (1) Organizational structure, (2) Administration (control and operations), (3) Financial Resources, (4) Human Resources, and (5) Project design

Organizational Structure and Administration

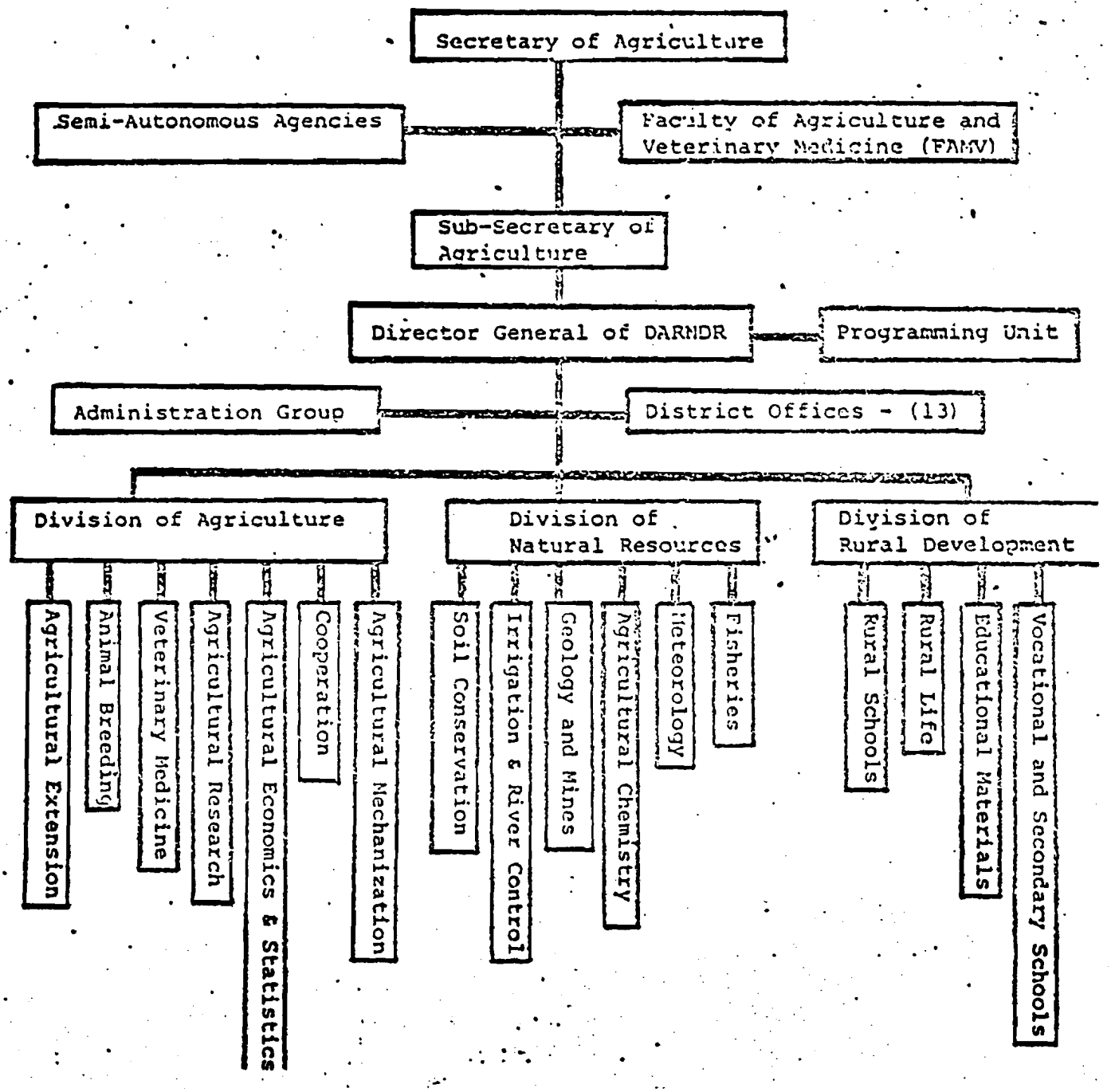
Previous evaluation reports and institutional analyses have pointed to organizational structure and administrative control as one of the major constraints to timely satisfaction of Project goals. For the purposes of this evaluation, we will not reiterate the findings of past analyses, except to note where significant changes have occurred. And there have been several both at the DARNDR level and within the Agricultural Research Service which the RE is intended to strengthen. The principal structural changes have been:

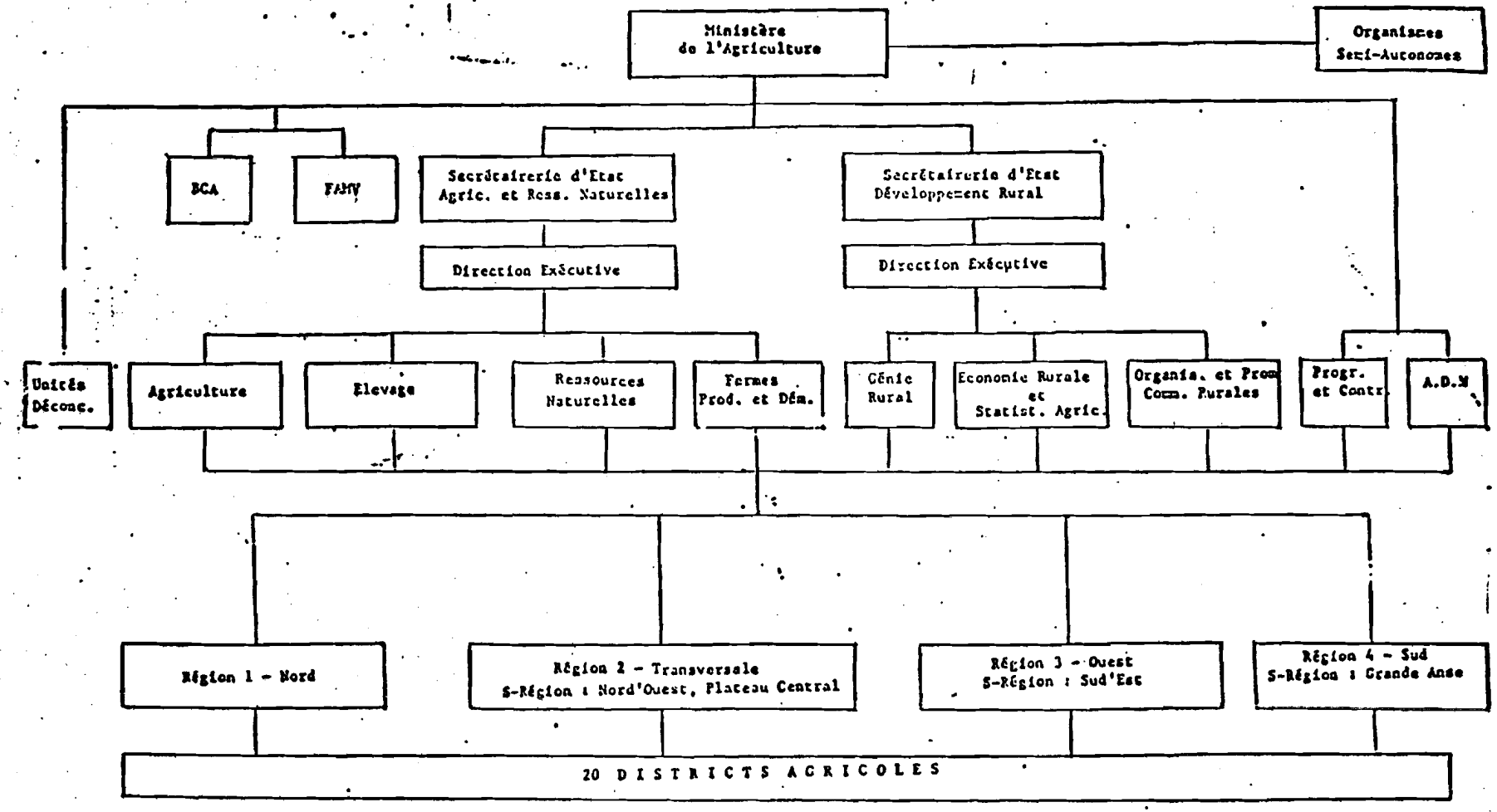
1. reorganization of DARNDR,
2. strengthening of the administrative structure of PDAI, and
3. a re-alignment of the Agricultural Research Service (SERA) from DARNDR into FAMV as CRDA.

The reorganization of DARNDR has just begun, but it should help to relieve one frequently mentioned constraint - centralization of decision making and the resulting work-load on a relatively few officials. Figure 1 shows the structure of DARNDR before reorganization and Figure 2 shows the beginnings of the new structure.

Figure 1

ORGANIZATIONAL STRUCTURE OF THE DARNDR





ORGANIGRAMME MINISTERE DE L'AGRICULTURE (PROJET)

Figure 2

BEST AVAILABLE COPY

The principal change, at the Ministry level, is the separation of DARNDR into two major components, each under a Secretary of State: One for Agriculture and Natural Resources, and one for Rural Development. The new structure, as shown by Figure 2, is more complex than the previous one, and from the point of view of PDAI and its RE component, will require more coordination. Two positive recent changes should help to facilitate this coordination (from the RE standpoint). The first is the strengthening of the PDAI administration and the second is the reorganization of the research under the Faculty (FAMV). Past evaluations have suggested that a director dedicated specifically to the Project be appointed. This has been done and has already helped to smooth the operations of PDAI and its RE component, especially financial control and reporting.

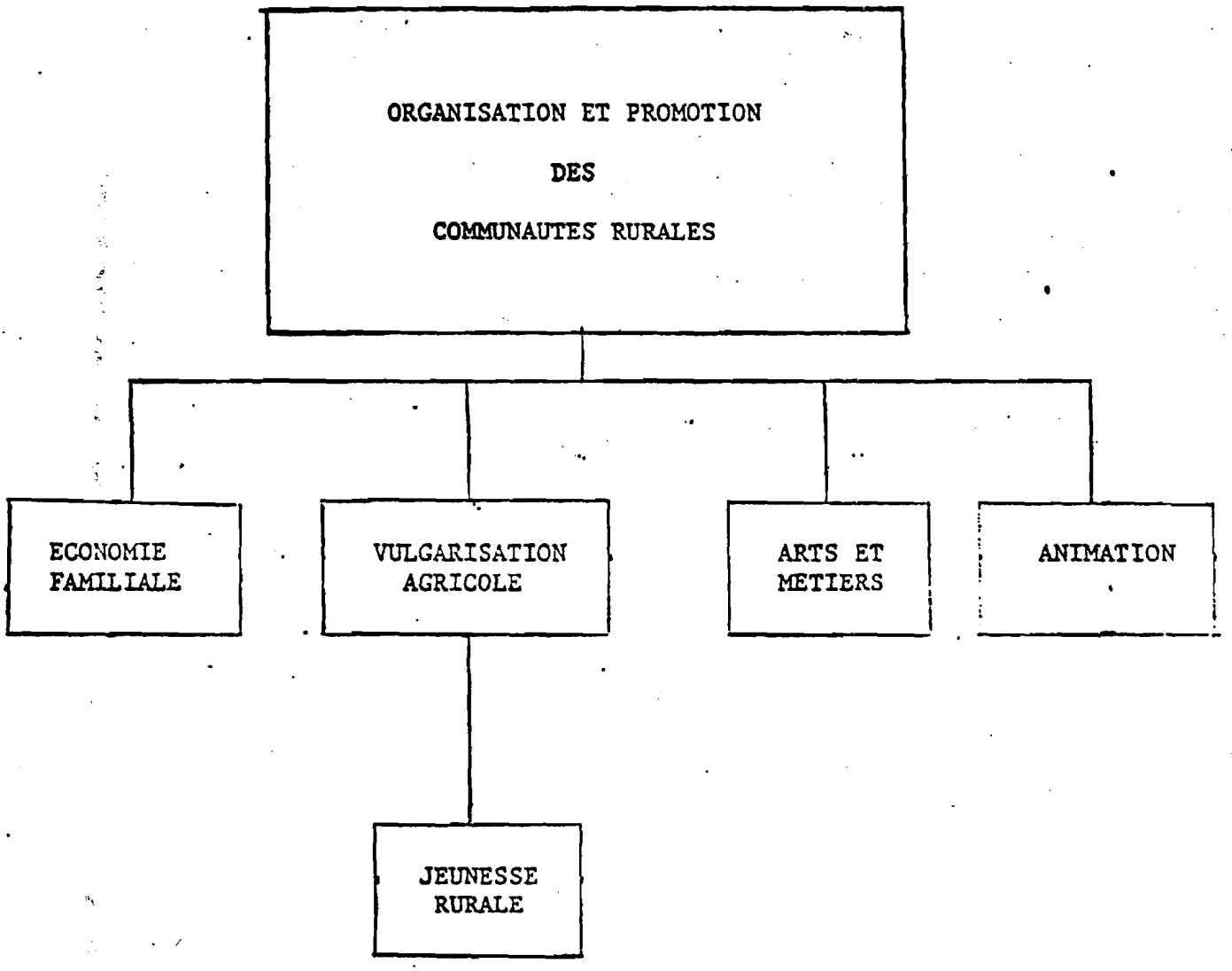
The repositioning of SERA under the Faculty, while separating the direction of the research from the direct organizational position of PDAI within DARNDR, still creates a central national research organization now called CRDA. Figure 3 shows the structure of this new organization. One aspect of this re-alignment which may need careful monitoring is the coordination of the RE activities under PDAI and the further development of CRDA's national research program. It will be the link between CRDA and Extension which determines the eventual success of the RE effort as defined by the Project Paper. Since a new Project (ADS II) is positioned at this level, coordination between it and PDAI/RE should be simplified. It is in consideration of these factors which leads this evaluation team to recommend that TAMU begin an orderly transfer of plant resources and responsibility to CRDA and that the TAMU contract be extended so as to facilitate the completion of work, transfer of activities and phased reentry of DARNDR personnel now on long-term training.

The structure of the Extension Service has also changed under the reorganization. The extent of this change can be seen from Figures 1 and 2. Before the reorganization the Extension Service was under the Division of Agriculture, now it falls under the Secretary of State for Rural Development and it is now part of the component titled "Organization and Promotion of Rural Communities". A measure of the difference between the old and the new structure can be seen from Figure 4 (past) and figure 5 (present). The new structure, among other things, has streamlined the Service. In 1976, the central office had 13 personnel; it now has 2 (next month, two more will be added). In addition, there are now 48 agents in the various Agricultural Districts, a decline of 83 since 1976. As in the past, the field agents report to the District Agronomes who in turn report ot the Secretary of State (Natural Resources). Thus, the "Vulgarization Agricole" still acts as an advisor service to the field extension staff. This of course, means that additional coordination efforts must be made:

a. between the two major sides of DARNDR
b. between the office of Vulgarization Agricole and the District Agronomes
c. between CRDA, Vulgarization Agricole and the District Agronomes.

The new structure would appear to have complicated somewhat the extension process. But, the much reduced size of the Central Office staff may actually allow the extended project to capture a lost opportunity. It would seem appropriate to begin immediately to formulate operational plans and materials (with some short-term training if possible) for the coming farm-trial work.

Figure 5


ORGANISATION ET PROMOTION
DES
COMMUNAUTES RURALES
ECONOMIE FAMILIALE
VULGARISATION AGRICOLE
ARTS ET METIERS
ANIMATION
JEUNESSE RURALE

Since the Central Office must operate primarily as an advisory service, and since they have an intense interest in the preparation of materials for those trials, the TAMU effort should include this office in the development of tech-packages. This will facilitate the eventual training at the District level and, if this begins immediately, will help to smooth and speed the process of moving those packages into the field. The success of this stage of the project will be dependent on how well these training and coordination activities are done and on the financial and material support available. Since the majority of the on-farm work would depend on the separate districts, it is their budgets which must support the extension effort. A comparison of Table 3 (Salaries) and Table 4 (Total budget) for the "Fermes d'Etat et District Agricoles" implies an operations budget of Gourdes 120,000. Since these funds must support the entire Districts' operation, it is apparent that additional funding is necessary. Fortunately, for the near term, the new ADS II project has budgeted support for this work (a total of $2,539,000 for Farming Systems Research, of which $455,000 are from the GOH). This would appear to provide sufficient funding. However, the TAMU economist (with appropriate counterpart participation) should provide an analysis of the costs incurred for the on-farm trials carried out to date, and those yet to be initiated. This information will then provide a means for budgeting the ADS II work as well as providing a means of evaluating the economics of on-farm vs. station research.

Human and Material Resources

A lack of adequate support from the standpoint of counterpart personnel is a constant reminder of the importance of long and short-term training such as that included in PDAI, and of the longer term benefits to be gained from technical assistance efforts. At this juncture, the principal concern is about the assignment and support of returning trainees and the coming need for trained extension personnel. In previous evaluations and institutional reviews, frequent mention is made of sudden reassignments of DARNDR personnel. If the project is to attain its goal of strengthening Haiti's ability to improve food production and rural farm life, then these trained people must be assigned to CRDA on their return, along with sufficient financial and material support. As this evaluation points out, although much has been accomplished, the task is not complete. Therefore, the human capital developed through the training program must not be diverted to other tasks. The RE effort, when initiated, has a slow start because there was inadequate office space and materials, little transportation or research facilities and because counterparts were not assigned until several months after the TAMU team arrived. There have been other constraints, particularly a shortage of vehicle maintenance. But, the situation has vastly improved since project inception.

If there is a lesson to be learned from this, it must be that (a) some start-up problems must be expected and solved, (b) some of these problems could have been avoided if the A.I.D. project manager could have begun development of appropriate relationship within DARNDR so that necessary resources were available before (or near) the arrival of the TAMU team.

The question of vehicle and facilities maintenance is obviously larger than just PDAI/RE. And although this was an element of the activities of the Administrative component of PDAI, it still warrants attention not only for the extension of the TAMU effort but also for all projects and activities of

DARNDR. The evaluation team has made no specific recommendation on this point. We recognize that this particular constraint is likely to continue to exist. It remains for DARNDR and A.I.D. project management to work to minimize its impact.

Project Design

The evaluation team finds that the project design was adequate but that the time-frame was exceptionally short for an agricultural research effort. The team finds that the phasing of the research/extension effort which called for near simultaneous activation was not realistic. An extension program must be based on solid research information.

Financial Resources

The PDAI project, as a whole, began with a budget of $22.6 million ($2.8 million loan, $9.3 million grant and $10.5 million contribution by GOH). The project paper planned the following amounts specifically for the Research/Extension component of PDAI.

TABLE 3
RESEARCH/EXTENSION BUDGET
AS PROPOSED IN PROJECT PAPER

AID

	FOREIGN CURRENCY	LOCAL CURRENCY	TOTAL
Four long-term advisors (39 PM each)	1556		1556
Short-term advisors (45 PM)	392		392
Research Stations		76	76
Training (graduate and short-term)	276		276
Equipment and Supplies	399	51	450
TOTAL	2663	127	2750

GOH

Personnel		370	370
Labor		248	248
Operations and Maintenance		150	150
TOTAL	2623	768	768
GRAND TOTAL	2663	895	3518

Source: Integrated Agricultural Development Project Paper.

The utilization of the budget, from the point of view of A.I.D. grant and loan funds is shown in the Table 4. Of the $2,198,000 grant funds budgeted, $1,298,419.05 were expended as of 8/31/83. From the $450,000 loan funds budgeted, $308,867.78 were expended as of 8/31/83.

From the point of view of project implementation, these funds do not appear to have been, in any way, a constraint. The budget was adequate to carry the project to its current status and should be adequate to extend the long-term TA as recommended by this evaluation.

The principal financial constraint on project implementation has been the availability of GOH funding. This funding and its eventual distribution (PDAI wide) between the central bureau and the various project areas has been under criticism by the Ministry of Plan and is credited by the TAU team with creating several serious interruptions; including loss of plant trial information. There are obviously two sides to the problem. Plan, in an evaluation on the entire PDAI, covering activities from project initiation until August 3, 1983, expressed dissatisfaction with the distribution of the budget. This dissatisfaction was probably reflected in the failure to release funds for the 1982/83 PDAI budget. The first release was in March 1983, six months after the beginning of the fiscal year. Funds, as budgeted, were released in April and May, then not until September. A total of Gourdes 1,899,000 was released while Gourdes 2,500,000 were budgeted.

The impact of this on the operation of the research/extension effort is predictable. Between January and June 1983, there was no travel to project sites and efforts were concentrated on the farm at DAMIEN farm when the GOH staff were developing a concern that a greater "on-farm" orientation was necessary: reinforcing the belief that the research was too site specific.

The budget situation for the 1983/84 year, and potentially for the remainder of the project is much improved. First, following suggestions from a 1982 audit report and the recent Irrigation component evaluation, PDAI now has a fully dedicated Project Director and Administration. This has helped to smooth preparation of budget information needed by the Ministry of Plan and the delivery to administrative resources to the project. A reflection of the improved management of PDAI is given by the budget process for the 1983/84 year. The original budget request for Gourdes 3,000,000 was submitted to Plan who returned the budget with a Gourdes 2,000,000 limit imposed. This reduction, however, did not influence the research/extension component. The Gourdes 1,000,000 reduction was taken from the Conservation and Irrigation components (equal amounts). An additional change in the budget is in the distribution between the central office and the field. The 1983/84 budget is allocated with only 17.3 percent to DAMIEN.

Although, as of December 3, 1983, no funds had been released by Plan, indications by Plan are that the budgeted October and November funds will be released in December. The Project Director is confident that the budget, as currently configured, is sufficient for effective operations. This new procedure should be encouraged by the A.I.D. project manager. In addition, consideration should be given to encouraging quarterly disbursements in order to further facilitate planning and operations. This could be combined with more frequent expenditure reporting to Plan to strengthen their monitoring requirements.

TABLE 4

BUDGET AND EXPENDITURES OF LOAN AND GRANT FUNDS

GRANT

CATEGORY	BUDGET AMOUNT FROM: 1/1/81 THRU: 1/31/84	TO DATE FROM: 1/1/81 THRU: 8/31/83
Salaries & Wages		
Home Office	$ 201,419	$ 41,575.86
Field Office	523,400	445,901.16
Indirect Costs:		
Home Office	30,605	31,281.45
Field Office	236,964	154,221.45
Fringe Benefits	173,964	92,935.49
Allowances	305,192	190,633.57
Travel & Transportation	214,823	121,931.48
Participants (Long Term Training)	450,000	177,403.80
Other Direct Costs	61,640	42,534.29
GRAND TOTAL	$2,198,000	$1,298,419.05

LOAN EXPENDITURE

CATEGORY THRU: 07-16-83	BUDGET AMOUNT FROM: 07/17/81 THRU: 08/31/83	TO DATE FROM: 07/17/81
Salaries & Wages	$ 30,000.000	$ 23,208.72
Overhead and Fringe Benefits	18,000.00	16,290.49
Other Direct Costs	3,000.00	1,872.87
Procurement Including Shipping Costs	399,000.000	267,495.78
GRAND TOTAL	$450,000.00	$ 308,867.78

Source: TAMU International Programs. Fiscal Report, September 1983.

TABLE 5

BUDGET DE FONCTUIONNEMENT

EXERCICE FISCAL FINISSANT LE 30 SEPTEMBRE 1984

LISTE DES CREDITS BUDGETAIRES PAR SECTION

NOM DE LA SECTION	MONTANT EN GOURDES MOIS	EXECICE
DIRECTION GENERALE	268 567	3 222 800
DIRECTION DE L'ADMINISTRATION	280 075	3 360 900
DIRECTION AGRICULTURE	332 325	3 987 900
DIRECTION RESSOURCES NATURELLES	127 575	1 530 900
FERMES D'ETAT ET DISTRICTS AGRICOLES	788 975	9 467 700
DIRECTION PROGRAMMATION ET CONTROLE	50 550	606 600
DIRECTION ECONOMIE RURALE	22 750	273 000
DIRECTION ELEVAGE.	67 950	815 400
DIRECTION GENIE RURAL	91 650	1 099 800
TOTAL POUR LA SECRETAIRERIE D'ETAT	2 060 417	24 725 000
SERVICES EXTERIEURS		
ORGANISME DE DEVELOPPEMENT DE LA VALLEE DE L'ARTIBONITE	385 000	4 620 000
ORGANISME DE DEVELOPPEMENT DE LA PLAINE DES GONAIVES	45 000	540 000
FACULTE D'AGRONOMIE ET DE MEDICINE VETERINAIRE	162 500	1 950 000
TOTAL DU CREDIT BUDEGTAIRE DU CHAPITRE	2 652 917	31 835 000

TABLE 6

BUDGET DE FONCTUIONNEMENT

EXERCICE FISCAL FINISSANT LE 30 SEPTEMBRE 1984

LISTE DES CREDITS BUDGETAIRES PAR SECTION

NOM DE LA SECTION	MONTANT EN GOURDES MOIS	EXECICE
Traitements et Salaries	66 646	799 750
TOTAL DE LA RUBRIQUE 10: SERVICES PERSONNELS.....	66 646	799 750
Fournitures et Materiel	51 500	618 000
Services Contractuels, Divers	6 250	75 000
Electricite	4 583	55 000
TOTAL DE LA RUBRIQUE 20: AUTRES DEPENSES DE FORCTIONNEMENT.....	62 333	748 000
Bourses d'Etudes	33 521	402 250
TOTAL DE LA RUBRIQUE 40: QUOTES-PARTS ET SUBVENTIONS.....	33 521	402 250
TOTAL DE CREDITS BUDGETAIRES.....	162 500	1 950 000

EXPLICATION DES OBJECTS DE DEPENSES

NOM DE L'ARTICLE

FOURNITURES ET MATERIEL.....		618 000
Fonctionnement Cafeteria: Gdes 5.00 par Etudiant, par jour, pendant 9 mois, a 20 jours par mois	207 000	
Travaux de recherche, produits de laboratoire et autres intrants, travaux de pratiques Agronomiques : Gdes 3.000 par pois (9 mois)	27 000	
Ferme de Damien et Stations Zootecnniques. Gdes: 12.000 par mois (12 mois	144 000	
Fonctionnement de six(6) Ecoles Vocationnelles: Chatard, Dufailly, Bellnase, Laborde, Lesson, Flon et du Centre de Limbe	240 000	

IMPACT

Introduction

Improved crop production based on agricultural science and technology requires continuing research by trained, dedicated, imaginative agricultural scientists. Agricultural Development rests on the foundation of more efficient crop and animal production so that more people can be fed at a low real cost. To carry out an integrated agricultural development program, a long-term strategy must be evolved and carried out. The long-term strategy should be evolved by those Haitians working in the country with assistance from others. To accomplish the long-term objectives, several short-term efforts are often desirable and needed.

The Integrated Agricultural Development Project (No. 521-0078) is one of the short-term efforts needed as part of the agricultural development strategy in Haiti.

More efficient crop production is usually achieved by increased crop yields, using those inputs that are cost effective. To determine the practices needed to achieve this increase in efficient crop production, it is necessary to continue research on crop selection and breeding, cultural practices, nutrition, protection and harvesting methods and to provide information that can be developed into technology packages useful to the farmer. As these packages are demonstrated to work in farmer fields, farmers can choose those practices and combinations of practices most beneficial to him/her.

The extremely time-consuming and costly process of trial-and-error can be reduced with major overall cost benefits by basing agricultural development on a solid base of adaptive research information. The use of evaluated cultivars from international agricultural research centers and other national programs is logical because of the information available about each cultivar is extensive, but little information is obtainable about local cultivars, specially land races that can vary from farm to farm.

Improved crop varieties are a foundation for increasing agricultural production. Selection among land races (local cultivars) can often identify those with greater yield potential, but the largest yield increases have usually resulted from introduction of seed from other areas. Often, the introduced cultivars have been improved by breeding with local varieties. The process of selection and breeding improved varieties requires use of scientific methods (research) if proper evaluation is to be done efficiently. Such research requires considerable time and effort, and must be a continuing process as varieties succumb to pest that adapt to them, or are introduced. The financial investment required is a very cost-effective investment as the use of these improved varieties result in increased agricultural production and income.

To get farmers to use improved varieties, an effective system of seed (or plant materials) production, processing and distribution is necessary. Such a system is absolutely necessary to capitalize on the research investment.

Seed or land materials of improved varieties must be provided to farmers with assurance of varietal purity, and be clean, pure seed with guaranteed germination. Development of a seed and plant material distribution system(s) is recommended.

Impact Research

All the selected accessions introduced from outside the Republic of Haiti, are equal or superior to the present local cultivars, when grown with or without irrigation and fertilizer. The introduced and local varieties produced higher yields with favorable cultural practices.

Two corn accessions developed by CIMMYT are identified as Amarillo Cristallino and Amarillo Dentado. Both varieties are higher in lysine and tryptophan amino acids which are very deficient in ordinary corn varieties, and their acceptance would be a nutritional break through. Their grain yields are similar to those of the La Maquina varieties.

Two new corn varieties, La Maquina 7928 and La Maquina 7827, both introductions from CIMMYT have produced good yields in three geoclimatological areas. Yields are comparable to Les Anglais presently grown, and all three varieties are superior in yield to the traditionally grown chicken corn.

The introduction of the photoperiod insensitive variety UW-17 of Pigeon Peas from UASD, Dominican Republic will permit two crops per year, which is a great advantage over the traditionally photoperiod sensitive local variety which produces only one crop per year during December-January only.

The economic impact of the research effort at Damien has an enormous potential. But, before that potential can be realized most of the recommendations set forth by this evaluation must be completed. In addition, the benefits from the completed (indeed, ongoing) central station and on-farm research cannot be expected to arrive in the very near term. However, one of the advantages of the on-farm work will be that participating farmers and their neighbors can get an early exposure to those "tech-packs" selected as most promising. Although this will necessarily be localized, the training of both farmers and extension personnel will mean later, that distribution and feedback are more effective.

Although the "tech-packs" have not been completely specified (and this, of course, is necessary before a detailed evaluation of the economic impact can be completed) there is sufficient information available to provide some general indications of the potentials. Information currently available include the yield improvements observed from the introduced plant materials, cost of production estimated for Haitian farms and cost of production estimated obtained from the research trials. Table 7 gives a summary comparison of improved and local varieties for most of the major food crops.

The production improvements indicated in Table 7 would suggest that, even under the worst conditions, the improved varieties might help to increase farm welfare. However, a relatively small (7 percent) production gain such as corn (LM7928) for low rainfall is unlikely to be sufficient to convince farmers to switch from current varieties and to accept the added financial risks involved. There is, in addition, the question of price response to increased supply, should a large number of farmers adopt higher producing seeds. Therefore, we must consider several factors in the evaluation of the economic impact: (1) the amount of yield increase, (2) the purchased input cost of obtaining that increase, (3) the rate of adoption of the improved "tech-pack", (4) the total increase in supply and (5) the effects this has on farm prices. A critical factor in transferring the potential benefits into real benefits

will be the rate of adoption. And the rate of adoption will depend (in addition to the social and cultural factors) and costs, prices, kinds of inputs required and the ability of the extension system to reach and train small farmers.

In Haiti, in the near term, all of the above factors are likely to act as constraints. First, a "tech-pack" which requires any significant increase in purchased inputs, and in turn credit is likely to encounter problems. Such a "tech-pack" would be difficult to extend (a) because the volume of credit available is not great enough. (BCA reports that its funds are fully committed. It could, of course, manage an increased demand for credit if funds were available. But, consider that a "tech-pack" which required $10 of credit, is accepted by 1/4 of Haiti's reported 600,000 farmers. The cash requirement for this input would be $1,500,000 or one-half of BCA's total funds). Other sources of credit may be sought, but credit obtained through private channels is reported to be expensive (in the ranges above 200 percent per year). This, and the practice of loaning money for short periods of time all argue for tech-packages which require minimum accounts of cash input. Since seed itself is sometimes the loan and repayment medium, the private system may in this way act as both a source of credit and a means of technology transfer. Consideration should be given to using this system as part of an eventual outreach program.

A similar constraint is likely to act to slow adoption of a package which in addition to credit also requires any significant input of imported material. This is likely to occur for two reasons: one because of currency limits for imports and because the distribution of many small amounts of material to widely distributed, small farmers would be expensive.

The benefits via impact on farm income, however, are potentially enormous. The yield increases from Table 7 would suggest that, even at low levels of farmer adoption, farm income would be improved and that nutritional intake could benefit greatly. Although exact estimates are not now possible, even a 20 percent overall improvement in output (counting level of adoption and reduced yields from potential) could generate as much as $6,000,000 in farm income.

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Source: TAMU Annual Report 1982

EXPERIMENTAL YIELDS OF IMPROVED AND LOCAL
VARIETIES IN HAITI
MAY, 1983

Crop	Yields of Improved Varieties (Kgms/Ha)	Yields of Local Varieties (Kgms/Ha)		Approximate Yield Increase With Tech. Package (Kgm/Ha or %)	National Average (Kgms/Ha)
CORN Grown on farmers fields in Central Plateau with favorable conditions					800
L.M. 7928	4586	Chicken corn	2936	1500 (50%)	
L.M. 7827	4518	Les Anglais	4512	No difference	
Grown on farmer's field in Central Platteau with inadequate rainfall					
L.M. 7928	1582	Chicken corn	1379	100 (7%)	
L.M. 7827	1234	Les Anglais	1272	No difference	
Grown at Damien under Irrigation					
L.M. 7928	3748	Chicken corn	2588	1200 (50%)	
L.M. 7827	4069	Les Anglais	3494	600 (15%)	
(Note differences are much less if not fertilized)					
GRAIN SORGHUM					700
Improved Varieties	4000-5000 2-3 crops/ year with Irrigation	Comparisons with local varieties difficult because of great difference in length of maturity. 1 crop/Year - Could exceed 5000 kgm/Ha			

Source: TAMU Annual Report 1982

EXPERIMENTAL YIELDS OF IMPROVED AND LOCAL
VARIETIES IN HAITI
MAY, 1983

Crop	Yields of Improved Varieties (Kgms/Ha)	Yields of Local Varieties (Kgms/Ha)	Approximate Yield Increase With Tech. Package (Kgm/Ha or %)	National Average (Kgms/Ha)
FLOODED RICE				2000
Improved Varieties	5000-6000 Where water is available 2-3 crops/Year could be grown	Madame Gougousse 1500-3000 2-3 crops/yeas could be grown with Irrigation	3000 (100%)	
BLACK BEANS				450 (all types)
Improved	1500-2000	400-800	1200 (150%)	
RED BEANS				450 (all types)
	1000-1200	400-700	500 (100%)	
COWPEAS				N.A.
Improved	2000-3000	No local varieties		
PIGEONS PEAS				N.A.
Improved	UASD 2000 (total of 3 harvests in in 7½ months	Local 500-600 (1crop in 7½ months)	1500 (300%)	

Source: TAMU Annual Report 1982

EXPERIMENTAL YIELDS OF IMPROVED AND LOCAL
VARIETIES IN HAITI
MAY, 1983

Crop	Yields of Improved Varieties (Kgms/Ha)		Yields of Local Varieties (Kgms/Ha)		Approximate Yield Increase With Tech. Package (Kgm/Ha or %)	National Average (Kgms/Ha)
CASSAVA @						4 tons
Improved	Harvested in 10 months					
	CMC 40	53 tons	Ti Fronte	25 tons	25T (100%)	
	M Col 1684	49 tons	Mme Francois	43 tons	No difference	

Production of CMC 40 by months

Months	Tons/Ha
6	8
8	24
10	41

SWEET POTATO @	Harvested in four months					4 tons
Improved	Mona Sent	25 tons	Negsale	15 tons		
	Madonna	25 tons			10T (67%)	
	PRS 252	20 tons				

Effect of time of planting of improved varieties

January planting 30 - 40 tons/Ha
May planting 10 - 15 tons/Ha

@ (Note that yields of local varieties of cassava and sweet potatoes can be quite high in small local areas. The movement from these areas has been very slow due to the movement of plant materials for propagation is much more bulky than for seed and the materials are more perishible. Yields of all local varieties of cassava and sweet potatoes can be greatly improved by improving themanagement techniques)

Source: TAMU Annual Report 1982

EXPERIMENTAL YIELDS OF IMPROVED AND LOCAL
VARIETIES IN HAITI
MAY, 1983

Crop	Yields of Improved Varieties (Kgms/Ha)	Yields of Local Varieties (Kgms/Ha)	Approximate Yield Increase With Tech. Package (Kgm/Ha or %)	National Average (Kgms/Ha)
POTATO	Improved tropical lowland 12 tons/Ha in 75 days	No potatoes grown in lowlands		

YIELDS OF ASSOCIATED CROPS BASED ON RURAL SURVEYS

Les Cayes Area
May 1983

Corn Monocrop

Yield range 1195-2015 kgms/Ha.

Corn-beans Association

	corn	beans
Yield range	1402-1550	192-333 kgms/ha

Sweet Potato-beans Association

	S. Potato	beans
Yield range	2145-2698 kgms/Ha	192-563 Kgms/Ha

Igname-corn-beans Association

	Igname	Corn	Beans
Yield range	1470 kgms	388 Kgms	314 Kgms.

Sweet potato-beans-cassave Association

	S. Potato	Beans	Cassava
Yield range	5363 Kgms.	753 Kgms.	5285 kgms.

PRICE RANGES / Kgm.

Corn	$ 0.14 - 0.22
Beans	0.63 - 0.96
Sweet Potato	0.09 0.185
Cassava	0.29 - 0.88
Igname	0.27 - 0.29

Evaluation Methodology

The Integrated Agricultural Development Project (No. 521-0078) was inaugurated in 1980 and will terminate in June, 1985. The Research and Extension and Irrigation components of the project are the principal areas of work still to be completed. The Research and Extension component is conducted by the Technical Assistance Team from Texas A & M University, and the team's contract will terminate in January, 1984. Thus, it is very timely that an evaluation be completed at this time to aid in the managerial decisions necessary for the approximate 18 months remaining until end-of-project date for the research.

The objectives of the Research and Extension component, as summarized in the evaluation mission described telegram, are the following:

1. Finance a technical assistance team that will be integrated into the Agronomic Research Service.

2. Increase and train the permanent staff of the research service to the levels necessary for the satisfactory discharge of these responsibilities.

3. Establish and operate in cooperation with farmers, applied research programs on cereals, pulses, root and tuber crops, and farming systems to develop production packages that are economically usable by all farmers.

4. Construct and equip two research centers, one at Damien, the other at Levy Farm near Les Cayes and;

5. Establish and operate programs for the continuing training of research and extension staff.

The original project paper was consulted for details on the objectives.

In addition to an evaluation of project progress with respect to these objectives, the team was specifically charged with the following issues.

1. Evaluation of the research service of the MINAG and its capacity to conceptualize, plan and implement an on-going program of adaptive research for the benefit of the small farmer.

2. Appropriateness of the developed technology vis-a-vis farmer's access to supervised credit and production inputs.

3. Capacity of the MINAG to carry out a successful program of seed production, treatment, testing and distribution of those crops which have been selected for their high yielding and for nutritional potential.

4. Appropriateness of the current Extension Service of the MINAG to conduct on-farm verification work followed by on-farm adoption of the results to be extended.

5. Impact that the developed technology could have on farm income.

6. Need for continued T.A. to the MINAG, and the appropriateness of the current T.A. contractors.

7. Extent of pre- and post-harvested losses, their causes, and proposed strategies leading to their reduction.

The Evaluation Team interpreted its task, therefore, as divided into principal responsibilities, as follows:

- To evaluate the impact of the project on the research capability of DARNDR, including its ability to continue with the remainder of the project activities, and to design and carry on appropriate research after the project terminated, and to recommend future project activities with respect to development of research capacity.

- To evaluate the technical tasks performed and their appropriateness to the needs of Haiti, and to recommend future research activities.

- To evaluate the extension tasks still to be done, and the activity of the existing extension service to accomplish these tasks, including seed multiplication, on-the-farm certification, and distribution of seed and technological packages, and to recommend what tasks should be done within the framework of the current project.

The evaluation team consisted of four members, listed as follows (the team chose not to elect a leader. Conclusions given in this report are to be considered contributions of all team members).

- Franklin W. MARTIN, Research Horticulturalist, Tropical Agriculture Research Station, Mayaguez, Puerto Rico, 00709.

- Dr. Rod KITE, Agricultural Economist, A.I.D./Washington (contract) (S&T/AGR/EPP).

- Mr. George C. JACKSON, Consultant, Caribbean Research Associated, Inc. Romancan 306, Boriquen Gardens, Rio Piedras, Puerto Rico, 00926.

- Dr. Lloyd FREDERICK, A.I.D./Washington, Bureau for Science and Technology, Office of Agriculture, Renewable Natural Resources Management Division, Washington, DC.

APPENDIX A.

COUNTERPARTS TO THE TEXAS A AND M, THEIR ACTIVITIES, CURRENT STATUS AND SPECIAL EXPERTISE

TAMU Team Member	Haitian Counterpart	Dates of Assignment	Training Received	Current Status	Special Expertise
R. Cheaney	Pierre St. Clair	1/27/82 - 8/82	Field plot Tech.	Resigned	--------
	Sixto Desir	11/82 -11/83	Administration	Reassigned	--------
	Colette Blanchet	10/81 - 8/83	Sorghum research	TAMU	Sorg. Research
	Marc Bauduy	5/82 - 5/83	Cereal research	Resigned	--------
	Renold Pierlus	1/82 - 9/82	Corn research	TAMU	Corn Research
M. Fuqua	Emmanuel Prophete	11/81 - 1/82	Legume research	TAMU	Horticulture
	Gabrielle Previllon	11/81 - 1/84	Legume research	Damien Res.	Bean Research
	Mona Fils Aime	11/81 - 1/84	Legume research	Damien Res.	Bean research
	Fenel Felix	1/82 -	N. Fixation	FAMV-Damien	N. Fixation
M. Villanueva	Reynold Alexis	1/82 -10/82	Cassava prod.	Damien farm	--------
	Gardy Fleurantin	1/82 -11/83	Root-tuber prod. Research	Levy Farm	Root-tuber Res
	Lesly Remy	1/83	Root-Tuber Res.	Damien Farm	Root-tuber Res
M. Taylor	George Worleigh	1/82 -	Rural Survey Agr. Statistics	Scholarship U.S.	Agr. Economics
	Rossini Grevcouer	1/83 - 7/83	Rural surveys	Resigned	--------
Y.P. Chang	Elliassaint Magloire	1/83	Station Mgt.	Levy Farm	Corn Research

APPENDIX B

SUMMARY OF TRAINING ACTIVITIES

Types of Training	Number of persons	No. of person/months
Counterpart Experience (in service training)	15	15/209
Training courses (in country)	Cassava Production 24	One week July, 1982
	Regional Agr. Training PDAI	One week Aug., 1982
	Rice Production 24	Two weeks Feb., 1984
	Corn Production	1984
	Sorghum Production 24	One week, 1984
	Bean Production 24	Two weeks Aug., 1984
Short term Overseas	8	8/34
Long term Overseas	4	4/84
International Conferences		
	Colette Blanchet	Caribbean Food Crops Soc.
	Elliasaint Magloire	Barbados. Aug, 1982
	Jacques Backer	International Farming
	Sixto Desir	Systems Symposium
		Manhattan, Kansas
		November 1982
	George Worleigh	Cimmyt Agr. Economics
		Training - Mexico city
		and Honduras. Oct. 16-Nov. 7, 1982
	Gustave Menager	Consulted with International

APPENDIX B CONTINUED

Types of Training	Number of Persons	No. of persons/months
	Julio Barthelemy	Programs staff, TAMU and
	Remillot Leveille	Scientists of TAMU
	Lionel Richard	College Station, Texas
	Jacques Backer	Aug. 1981
	Lionel Richard	Seed production seminar for small farmers. CIAT Aug., 1983. Returned by way of Cimmyt.
	Gardy Fleurantin	Int. Root Crop. Conference - Kingston, Jamaica April 11 - 15, 1983
	Gardy Fleurantin	Root Crops Conference with CIAT, CIP, IITA. Calil, Colombia September 12-17, 1983

APPENDIX C

RECOMMENDED PERSONNEL MONTHS OF TA TIME FOR TEXAS A & M TECHNICAL ASSISTANCE TEAM

PERSON	P.M. RECOMMENDED	PRINCIPAL TASKS
Robert L. Cheaney	14	1. Begin the process of phasing-in one or more Haitian counterparts for the TA team leader, and transfer gradually full authority and responsibility;
		2. Complete present experiments on cereal grains and write technological packages;
		3. Advise on seed production, multiplication, and distribution needs of the project;
		4. Supervise phasing-out of TAMU team and phasing-in of DARNDR replacements;
		5. Aid in organization and training of extension teams to the extent that DARNDR agrees;
		6. Help organize and prepare suggested written extension training courses;
		7. Suggest desired development of national research and extension programs and staffing;
		8. Recommend new research by DARNDR and projects by USAID to complement and build on present progress.
Mack Fuqua	11	1. Begin the process of phasing-in one or more Haitian counterparts for the TA team member;
		2. Complete evaluations of bean, cowpea and pigean pea varieties, write technological packages, and other recommendations;
		3. Prepare a legume training course that can be used by FAMV or the extension service;
		4. Prepare manual on the production of legumes in Haiti

APPENDIX C

PERSON	P.M. RECOMMENDED	PRINCIPAL TASKS
		5. Suggest number of staff members needed for legume research in Haiti and recommend future research;
		6. Write termination report.
Marianito Villanueva	4	1. Begin the process of phasing-in a Haitian counterpart to replace the TA team member;
		2. Complete present experiments, with technological package and other recommendations;
		3. Establish nurseries for selected materials and develop management procedures;
		4. Prepare the cassava training course for publication;
		5. Prepare manual on root and tuber crops production for Haiti;
		6. Write termination report including suggestions for future research and extension.
Merritt Taylor	7	1. Begin the process of phasing-in a Haitian counterpart to replace the TA team member;
		2. Complete all present studies;
		3. Make suggestions for improving the cropping systems in areas where the TAMU team has operated.
		4. Estimate improvement in income that can be expected from technology developed by the TAMU team;

PERSON	P.M. RECOMMENDED	PRINCIPAL TASKS
		5. Suggest the studies in agricultural economics that should be continued and what new studies should be initiated;
		6. Suggest the number and role of Haitian staff needed to do a satisfactory job in the Agricultural Economics and Agricultural Statistics section of the Ministry of Agriculture;
		7. Write a termination report.
Yung Ping Chang	9	1. Begin the process of phasing-in a Haitian counterpart to replace the TA team member;
		2. Supervise the development of the Levy Farm and its activities;
		3. Advise on seed production costs, storage, and distribution;
		4. Help develop the plan for the strategic use of Levy Farm as part of a national plan;
		5. Write a termination report.

APPENDIX C (continued)

PERSON	PM Recommended	PRINCIPAL TASKS
James O. Keith	9	1. Begin the phasing-in of the Haitian counterpart for the Wildlife Biologist, and transfer gradually the full authority and responsibility. 2. Complete the present experiments on vertibrate pests in cereal, legume and other crops and prepare brochures. 3. Finish studies on Small Farms Pest Management, Seed Protection and Post Harvest Storage. 4. Supervise phasing-out of DWRC and the phasing-in of DARNDR replacement. 5. Aid in the organization and training of extension teams and CVO's to the extent that DARNDR agrees. 6. Help organize and assist in preparation of written training courses for extension and PVO's. 7. Offer desired alternates for the development of a National Research and Extension programs and suggestions for future staffing. 8. Complete furnishing of laboratory and animal rooms of the new vertibrate pest laboratory. 9. Write termination report including suggestions for future research and extension.