PD-AAR-398

App 12A-1, Chp 12, HB 3
(TM 3:43) 9-30-82

CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) — PART I

Report Symbol U-447

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
Fruit Tree Crops Improvement Project	521-0169(4)	USAID/Haiti

4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY)

☒ REGULAR EVALUATION ☐ SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING	7. PERIOD COVERED BY EVALUATION
A. First PRO-AG or Equivalent	B. Final Obligation Expected	C. Final Input Delivery	A. Total $ 596,000	From (month/yr.) June 1983
FY 83	FY85	FY85	B. U.S. $ 596,000	To (month/yr.) March 1985
				Date of Evaluation Review June 1985

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
The attached end-of-project evaluation report recommends several actions which are to be considered and incorporated into a follow-on activity currently being developed. The following have been accepted for this purpose:		
1. Production of cashew seedlings is to be halted and the current supply of cashew seedlings at SHEEPA's three nurseries are not to be distributed until disease resistant seed and/or grafts are obtained for scion production.	R. Wilson Project Manager	July 31
2. Avocado production from seed should be halted and replaced by grafted material of proven cultivars.	"	"
3. SHEEPA, in the follow-on phase, is to concentrate only on a limited number of fruits of demonstrated technical, economical, and social potential.	"	"
4. The shade factor at the Maissade nursery is to be reduced to avoid etiolation among seedlings in certain areas.	"	"
5. SHEEPA, in the follow-on phase, is to concentrate primarily on grafted and pruned fruit trees which can be more successfully integrated into long-term intercropping schemes.	"	"
6. SHEEPA, in the follow-on phase, is to upgrade the quality of technical input by incorporating competent international consultants into the program.	"	"

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

- ☐ Project Paper
- ☐ Financial Plan
- ☐ Logical Framework
- ☐ Project Agreement
- ☐ Implementation Plan e.g., CPI Network
- ☐ PIO/T
- ☐ PIO/C
- ☐ PIO/P
- ☐ Other (Specify)
- ☐ Other (Specify)

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

- A. ☐ Continue Project Without Change
- B. ☒ Change Project Design ~~and/or~~ for follow-on phase.
  ☐ Change Implementation Plan
- C. ☐ Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

R. Wilson, Project Manager

12. Mission/AID/W Office Director Approval

Signature

Typed Name: Jerry French, Mission DIR

Date: July 3, 1935

AID 1330-15 (3-78)

XD-AAR-398-A

EVALUATION OF THE FRUIT TREE CROPS IMPROVEMENT PROJECT
PROJECT NO. 521-0169 (4)

June 24, 1985

Prepared by:

Ira Lowenthal, USAID/Haiti Extension Specialist
Dr. Giovanni Caprio, USAID/Haiti Economist
Dr. Roger Webb, University of Florida Forest Pathologist
Dr. Patricia Webb, University of Florida Fruit Crops Horticulturalist
Robert Wilson, USAID/Haiti, Office of Agricultural and Rural Development

TABLE OF CONTENTS

Page

Part I. Executive Summary

Introduction
Summary of Evaluation Findings

Part II. Extension and Training Aspects

Introduction
Extent of Goal Accomplishment
Overall Project Objectives Reconsidered

Part III. Technical and Research Aspects

Introduction
Specific Questions Regarding Technical and Research Aspects

Part IV. Economic Analysis

Introduction
The Mango Economy in Haiti
Cost Benefit Analysis
The Economy of the Small Farmer

Attachments:

SHEEPA/USAID Cooperative Agreement
Scope of Work for the Evaluation Team

Part I. EXECUTIVE SUMMARY

Introduction

In December 1982, concerned about the problems of low agricultural productivity, low income, deforestation and soil erosion, USAID/Haiti issued a Request For Technical Proposals under it's first ESF/CBI Non-Governmental Support Project (521-0169) for financing aimed at improving the productivity and quality of perennial fruit crops in the country. Proposal offerors were requested to present plans for adaptive fruit crops research, rapid multiplication and release of fruit demonstrated to perform well in Haiti, distribution and monitoring of improved fruit seedlings on producer farms, and the provision of extension and training services in the practical aspects of fruit production and management.

Following a Mission review of ten proposal responses, a Cooperative Agreement was signed on March 29, 1983 with the Societe Haitienne d'Etude et d'Execution des Projets Agricole (SHEEPA) for an initial total of $500,000 over a period of two years. The Fruit Crops Improvement Project, commonly called the SHEEPA project (No. 521-0169-4), commenced implementation shortly thereafter.

Besides agreeing to undertake a varietal research program, SHEEPA agreed to distribute 350,000 fruit tree seedlings to small farmers in the vicinity of Hinche, in the Central Plateau Region. Under the project, three field nurseries and one research nursery were to be established. Fourteen SHEEPA monitors were to be trained to distribute seedlings, operate the field nurseries, and to implement training programs for farmers. In addition, ten Ministry of Agriculture extension agents were to receive on-the-job training in fruit tree culture and management from SHEEPA.

According to the Agreement, SHEEPA was to oversee a permanent program of monitoring and extension activities for farmers and school groups in the project area, utilizing audio-visual techniqies and site visits. Emphasis was to be placed on cultivation, pruning and grafting techniques, and elements of soil conservation and intercropping.

In October 1984, three-fourths of the Agreement period complete, an additional input of $96,000 was made into the project, increasing the total funding level to $596,000. The additional funding was meant to: increase the total life-of-project seedling production target from 350,000 to 640,000; reinforce and enhance the technical training and research programs; increase the quantity of improved plant material available to the project; and to expand the target group of participating farmers from 1,000 to 2,000.

This evaluation was initiated on April 22, 1985, twenty-four months after project commencement, with the primary objective of determining the extent to which project objectives were accomplished (See the attached Evaluation Scope of Work, Port-au-Prince Telegram 0554). The evaluation team was comprised of an extension specialist, an economist, and professor of forest pathology and fruit crops horticulture. The team spent several days in Hinche, observing project implementation results and discussing the project with SHEEPA staff, monitors, and

farmers. Project files were reviewed at the SHEEPA offices and the USAID offices of Agriculture and Rural Development. Further SHEEPA and USAID interviews were held in Port-au-Prince.

Project implementation and Results

Based on the observations of the evaluation team, interviews, and readings of reports available in the project files, it is evident that the goals and objectives of the project were seriously and dilligently pursued by the SHEEPA staff under the guidance of Mr. Hugues Sylvain, the SHEEPA director. Professional, and effective backstopping support was provided by the USAID project manager, Dr. Abdul Wahab. Both SHEEPA and USAID managerial and support staffs are to be commended on the project acheivements over a relatively short period of time, and their honest efforts made with respect to the project's objectives despite what was generally considered a scope much too optimistic given the resources at hand.

Due to these efforts, most of the project objectives as outlined in the Cooperative Agreement were attained. Training and extension, and nursery establishment objectives, as well as varietal research objectives were acheived (100 %). Further discussion of the qualitative assessments of these achievements is done in the following evaluation sections, but the overall conclusion of the team is that SHEEPA has successfully established the foundation for an effective fruit crops production and extension system in the Hinche area. Also, the prospect has been enhanced for substantial economic returns for the region and participating farmers in the not-too-distant future.

The project fell short in the seedling production and distribution objectives, 51% and 26% respectively, primarily due to factors beyond the control of the project staff - drought, pest infestations. It appears in retrospect that project objectives in these areas also could have been over ambitious given SHEEPA's administrative, resource, and time constraints. As described in Part III, the scope and technical requirements of SHEEPA's responsibilities were broad and demanding, especially as they were a relatively recently established organization without substantial experience in fruit tree production. This may have restrained the project staff from ameliorating technical and seedling production shortfalls.

The project was hindered in the full quantitative and qualitative achievement of it's objectives by certain implementational problems which were not foreseen in the project design. Among the most noteworthy in the SHEEPA experience were the following:

- the unexpected resignation of the principle expatriate advisor to the project for personal reasons in November, 1983 which left SHEEPA without the single most important source of on-site technical and implementational guidance it had during the initial phases of the program. The USAID project manager made assiduous efforts to replace him, and even to substitute his own extensive professional experience for the loss of the [illegible], but time constraints and responsibilities in [illegible] [illegible] for the project. Ultimately,

equally experienced and permanent technical assistance was not contracted and assigned to Hinche for the remainder of the Agreement period. This absence of TA for all but six months of the twenty-four month project was an important change in the project setting which more than likely had an effect on the quality of the program, and the ability of SHEEPA as a relatively young local institution to establish firm technical foundations.

- the unfortunate technical interventions by the Ministry of Agriculture which slowed the importation of important plant propagation materials, and other project commodities, and led to a modification of the SHEEPA plant production schemes. By SHEEPA's account of events, it was required by the MOA to destroy a limited but important quantity of certified disease-free propagules and grafted seedlings which were components of their research and plant improvement programs. Also, SHEEPA was compelled to heavily weigh its' seedling production scheme in favor of cashews (54 %) despite unidentified disease problems in the Central Plateau and other regions of Haiti. SHEEPA's rapid start-up and early accomplishments appeared to be the cause of envy on the part of the MOA administration, and reason to assert influence over the progressive non-governmental organization. Since the change of administrations, SHEEPA has been accorded full operational independence, but it experienced irrecuperable setbacks to the plant improvement and distribution programs which became evident later in the project period.

These points receive further treatment in Part III of the evaluation.

The economic analysis presented in Part IV points to substantial positive benefits accruing to the participating farmers from project interventions. This finding is made despite the shortfalls in tree production and distribution, and the elimination of the percentage of overall distributions made of cashew from the analyses because of dubious future returns. Positive economic returns result primarily from mango seedlings distributed under the project.

Part II. EXTENSION AND TRAINING ASPECTS

In general, the SHECRA extension approach seems to have been adequate to the admittedly limited tasks undertaken in the project's first two years of operation, i.e., the promotion of increased and more systematic fruit-tree planting among the local population, through the production and delivery of seedlings, along with a minimum of technical assistance, to project participants. Those features of the approach that have been most effective are based on a classical extension strategy of labor-intensive, face-to-face motivational and service interactions between the extension agents and their individual clients, supplemented initially by some group-based promotional efforts through community meetings, audio-visual presentations, mass media, and field days.

The agents, or monitors, are carefully selected young people of both sexes from the local area. They have been brought up in towns, by and large (Hinche and Thomonde), but come from families with agricultural backgrounds and are generally familiar with the local peasantry, from which they are not far removed. (Interestingly, one of the monitors had something of a problem when attempting to work directly in her own locality, because of local patterns of jealousy and competition, and finally had to be transferred to an area some miles away from her own home, in another part of the project's zone of operations.) Furthermore, the monitors appear to be well-motivated, and have maintained that motivation even through a period of some uncertainty concerning the future of the project and, hence, of their jobs.

Unfortunately, this evaluation took place only after the project had had to suspend its operations due to termination of its original grant, and the actual extension activities of the monitors could not be observed directly. Therefore, no assessment of the actual extension/interaction process, nor of the agents' general skills in this regard, can be made. (An assessment of their technical training and expertise appears in the Technical Evaluation, Part III of this report.)

Acceptance rates among peasants initially contacted by the animators appear to be about 25%. Thus, one animator reports promoting the project with about 250 peasants of his locality on an individual, house-visit basis, and winding up with 56 actual participants during the planting season. A variety of constraints, particularly the lack of sufficient land resources to make participation attractive, may account for this relatively low acceptance rate, which need not be attributed to deficiencies in the agent's approach or motivational skills. In any event, the monitors are each carrying a respectable work load, particularly when transportation difficulties and the labor-intensive nature of their task are considered. In addition to their direct extension work with participants, they are also responsible for recruitment of new participants, nursery work, demonstration grafting in farmers' fields, reporting, trial-farm work etc. In the 1984 planting season, they averaged a reported 56 outplanting clients each.

[illegible] participating farmers are [illegible] inconsistent. Therefore, questions [illegible] benefits with respect to [illegible] partially, in the absence of

more extended fieldwork. The detailed data available for part of the 1984 planting season can probably be extrapolated, however, and include information on the total land holdings of participants. Therefore, the following points can be raised.

Overall, the average total landholding of project participants is 3.2 karo, or over 4 ha. This average varies from 1.9 to 5.2 karo (2.5 - 6.7 ha.) in each of the 11 localities, covered by the data. While land distribution figures for these localities within the Plateau are unavailable, the SIP team reports that average landholdings throughout the Plateau are relatively high, standing at about 2 ha. (1.6 karo) per proprietor. Using this crude standard, it is suggested that the average beneficiary of the SHEEPA project is anywhere from somewhat to significantly richer in land resources than many of his neighbors. This conclusion is mitigated to some degree by the fact that a small number of extremely land-rich participants in every locality serve to inflate the overall averages. In all but one case, in fact, the median of total landholdings for project participants fell somewhat lower than the averages, indicating that relatively smaller farmers were perhaps better served by the project than the averages alone would suggest. Nonetheless, in no instance was the median for any locality below 2 karo (2.6 ha.), which is well above the 2 ha. average landholding cited by the SIP team. Therefore, more than 50% of the project's participating farmers (1984 season, data available) were above average in terms of their individual land resource base. Moreover, as the Economic Analysis suggests, the largest landholders appear to have received a disproportionate share of the outplanted seedlings, although this is most likely a simple artifact of their ability to absorb more seedlings, rather than the result of any actual bias in the structure and organization of the project's extension system itself.

In general, these results concerning the distribution of project benefits are not surprising, and simply suggest what we have known all along -- the ability to benefit from, or even to utilize, improved or increased productive inputs is roughly proportional to the current resource base of individual smallholders. This is particularly true in the case of an input like fruit-tree seedlings, which necessarily require a land "surplus" for large-scale plantings. It will become even more of a factor, perhaps, when a greater emphasis is placed on grafted seedlings, for these have certain water and care requirements which may only be able to be met by selected farmers with more or better land and financial resources.

On the other hand, many smaller farmers will eventually benefit from even the few trees they have been able to plant, as the Economic Analysis clearly shows, and this would not have been possible without the SHEEPA intervention. Moreover, when and if the project proceeds to a second phase, as proposed, the spread of benefits is likely to increase. This follows directly from project plans to concentrate (1) on grafted and pruned fruit trees which, in spite of their potential limitations noted above, can be more successfully integrated into long-term intercropping schemes than can full-grown, non-grafted [illegible] wild, [illegible] developing, through [illegible] form. [illegible] such [illegible] systems, incorporating fruit [illegible]

because no portion of his limited landbase need be devoted wholly, nor even primarily, to fruit production, as is currently the case. Indeed, only when such systems are more fully elaborated and extended, will projects such as SHEEPA be capable of realizing their fullest potential in this regard.

Extent of Goal Accomplishment (end-of-project)

A. Thirteen monitors trained in various aspects of horticulture, soil conservation and extension, although technical training, in particular, has been found to be lacking by the technical evaluation team.

Also, 12 employees of MARNDR, scheduled to be seconded to SHEEPA, have also received the monitor training course.

Total of 25 monitors trained, or 104% of the goal of 24.

B. 1) Between 160,000 and 164,000 seedlings outplanted, by the project's own account, w/approximately 132,000 going to individual farmers in project zone.

Outplantings thus stand at 26% of the goal of 640,000.

2) Between 283,000 and 324,000 seedlings produced in SHEEPA nursery.

Production stands at 51% of the goal of 640,000.

3) Survival rates currently stand between a low of 54% over 2 planting seasons in Thomonde, to a high of 94% on some supervised plantations. Average survival rate for 1984 is reported at 77%, whereas for 1983, a higher, but not clearly specified, rate is claimed. Further losses for the 1984 planting season can be expected in the next 6 months.

C. Minimally, at least 829 farmers have received seedlings from the project, 372 in 1983, and a minimum of 457 in 1984. Due to an unspecifiable percentage overlap from one year to the next, the actual number of distinct individual participants cannot be determined accurately.

Less conservative estimates, based on animators' reports, rather than file data sheets, indicate a total of 992 recipients (372 and 620) over the two planting seasons. In addition, 25,000 trees sold to the ODBFA were destined for distribution to some 200 farmers, bringing the total of recipient units to some 1,192.

Claims of some additional 1,300 potential participants who have "committed" themselves to planting seedlings this year cannot reasonably be considered here, and no percentage of goal achievement can be calculated, given the rough estimates appearing in the original project [illegible].

[illegible]

D. The "extension materials" created by SHEEPA thus far include: 1 videotape of approximately 50 minutes explaining the project and introducing its facilities and staff, supposedly to potential peasant participants; 1 slide show, without written script, of SHEEPA's activities to date; and 1 "brochure," which is actually a one-sheet handout attempting to explain, through words and line drawings, how to plant a fruit tree; and, some radio "spots" that were broadcast locally but not reviewed by the evaluation team.

Technically, therefore, the project has accomplished its goal of creating "some" audio-visual extension materials. On the the other hand, it is the consensus of the evaluation team that all of these materials fall far short of what might have been accomplished, given the time and resources involved.

The videotape is overly long and quite boring, actually, with little or no technical or instructional content of any kind (e.g., how to care for a newly out-planted seedling, or how and where to plant it). The creole used, and some of the few concepts it attempts to express, did not strike this viewer as readily accessible to the average peasant. Much more importantly, the video's aim did not seem to be actual communication, properly speaking, in the first place -- rather, it is a full-length "promotional" film, apparently designed to "sell" SHEEPA and its activities to some unspecifiable, but surely not "peasant," audience. On this point, it should be noted that peasant response to video presentations made available in their home localities is bound to be good, no matter what the content -- the technology itself, being virtually unknown, stirs interest and excitement. More the pity, then, that such a potentially fruitful tool has not been utilized more effectively in terms of its style and content.

The "brochure," on the other hand, errs in the opposite direction, in some ways. It is overly telegraphic, both visually and in its text, while covering one single topic -- how to prepare a hole for fruit tree outplanting. Its relatively simple message is too dependent on three lines of creole text that are probably inaccessible to most peasants, and the accompanying line drawings are too schematic, even to the point of including a draftsman's convention in order to specify the dimensions of the hole. This material clearly was not field tested. As an aide-memoire for an animator it is much too elementary; and in any event, 10,000 were supposedly printed, indicating that the intent of the handbill was actually communication with peasants themselves. In short, this was another unfortunate foray into audio-visuals.

The slide presentation includes a few interesting shots, but remains unscripted and untested with a peasant audience to date. There is some potential here, perhaps, but again the object seems to be promotional, in a very limited sense, and not educational or oriented towards technology transfer.

E. Where available data is specific enough, our calculations indicate that trees received by peasant participants were outplanted at a density of approximately 150 trees/Ha, or 140 trees/ha. Therefore, with between [illegible] and [illegible] seedlings outplanted over the LOP, between [illegible] and [illegible] hectares were directly affected. Of course, this is a much lower density than originally anticipated, [illegible]

density is approximately 700 trees/ha.), and perhaps indicates that peasant participants are taking seriously the possibility of staple crop intercropping, at least for the first few years of growth.

Total area covered, at relatively low density, by project outplantings stands at 229% - 234% or original goal.

Overall Project Objectives Reconsidered

Of the three overall project objectives, the one most clearly on its way to fulfillment is that of "increasing rural sector revenues". The economic analysis (Part IV of this evaluation) provides convincing detail and discussion.

Achievement of the other two major project objectives is more difficult to assess. Impacts on deforestation and erosion have to do with factors about which there is little currently available data. For deforestation per se, the actual rate of destruction and natural decline of the existing 3,000,000-plus tree population of the Central Plateau is not known, and therefore the degree of impact of the SHEEPA project cannot be specified. Certainly, however, the outplanting of some 160,000 fruit trees represents a significant accomplishment in this connection, irrespective of originally stated numerical targets or the actual deforestation rate. This is particularly true when the localization of the project in selected areas within the Plateau is considered. These target areas have surely benefitted, in some degree, in terms of "reforestation."

The erosion control impact of the fruit-tree outplantings, and of the project's direct concern with soil conservation, however are much more difficult to ascertain, and cannot be projected with any certainty. What we do know is that particular care apparently was not taken, in most cases, to ensure the appropriate spatial configuration of outplantings on any single plot, nor to select participants in terms of erosion-related criteria nor, finally, to attempt to group participants in terms of common conservation measures to be undertaken across several, individually- held plots.

Outplantings scattered across the landscape, on plots averaging .93 ha., but ranging anywhere from .16 ha. to 20 ha. -- with these latter larger plots likely to be on flat or only slightly sloped land -- are unlikely to have any significant or lasting impacts on soil erosion per se. On the other hand, SHEEPA has been experimenting with a number of mechanical erosion-control techniques that might be employed in conjunction with tree planting, including contour canals and "individual terraces," or catchment areas, in order to enhance water retention for each seedling outplanted. The latter technique, although not sufficient as an erosion-control measure in and of itself, has been extended to peasants by the project's agents. In addition to its immediate water-retention benefits, such individual terraces may serve as one element in a comprehensive erosion-control package, when and if SHEEPA is able to formulate and extend such a program.

[illegible]

outplantings have been of mango, cashew, and avocado seedlings. These products are of considerable nutritional value in terms of protein, fats, and vitamins, all of which are lacking, at least seasonally, in the peasant diet. On the other hand, perfectly edible (if not marketable,) mangoes are already rotting in great quantities in The Plateau during their fruiting season which, as elsewhere in the country, is characterized by an annual cycle of glut and scarcity. The same is likely true of avocadoes, if we may base our judgements on experience in other parts of Haiti. The project, however, has been emphasizing the introduction of more marketable varieties of these two fruits, however, rather than concentrating on extending their growing season with the introduction of earlier and later maturing varieties. This latter approach would be more likely to have some significant and direct impact on peasant nutritional status, by ensuring local availability over a longer period each year. As for cashews, which constituted 54% of total outplantings, the project has attempted to replace a local product that is fast disappearing because of an as yet unidentified disease. Technically, there are grave reservations concerning the eventual success of this effort, at least until the infestation is positively identified and disease-resistant strains are located, propagated, and distributed. While the cashew was an important part of the local diet, it is of primary interest as a high-value commodity on the international market and this, probably correctly, seems to be the primary way in which it is seen by SHEEPA, as well. In sum, direct nutritional impact has not been a primary concern of the project and, certainly, extension education relating directly to diet and nutrition has not played a significant role in its activities to date. On the other hand, the potential nutritional effects of significantly increased incomes for peasant participants (see Economic Analysis) are not inconsiderable.

Part III. TECHNICAL AND RESEARCH ASPECTS

Introduction

Without long-term agroforestry research in Haiti it is impossible to effectively prescribe ameliorative agricultural production to reduce erosion and improve peasant food-and income-generating opportunities. At the very least, a pilot project should have been conducted to build a foundation upon which to conduct the project just completed. Without this, the project could not have possibly met the anticipated objectives since the quality of plant production and extensionist skills was not established firmly enough to meet the quantity expected in the unrealistically short time period of the project. Project effectiveness was reduced since the mission of the project became diluted by the added burdens of: a) building a research base (which often was not available by the time extension activities were being conducted); and, b) setting up a center of operations. SHEEPA made considerable progress in establishing the nursery sites, its training and extension program, and its production capacity, but due to limitations in time, staff and administrative capability they were unable to meet the goal of a strong varietal research program linked to an income-generating and erosion-controlling seedling planting program.

A serious paradox was noted relative to environmental quality and time constraints. Due to environmental degradation occurring over the previous 300 years or more, the generally unproductive soils now existing in the Central Plateau hinder expanded agroforestry efforts. However, over the next decade, agroforestry efforts of a monumental scale are required to stabilize erosion problems and hopefully begin to restore soil fertility. Achieving the project objectives of overall trees produced and distributed would be a significant accomplishment under even the best of circumstances but given the current levels of time, funding, research data, and technical skills, it would appear unlikely that a significant impact will occur.

Due to drought conditions, a small number of seedlings (160,000 versus the projected total of 640,000) were distributed to peasant families. Approximately 54 percent, or 88,560 of the distributed seedlings are cashew; 35 percent, or 57,400 are mangos; and approximately 11 percent, or 18,040 are varieties of citrus, avocado, papaya, annonaceae, sapotaceae, passion fruit, breadfruit, and other exotic tropical fruits. Before additional time and money are spent, it is imperative to review the short-and long-term gains, if any, from this distribution. During the course of the project, the Haitian government was reported to have required SHEEPA to unexpectedly enhance the production levles of cashew seedlings. This was unwise since a disease, apparently anthracnose, was already widespread and had caused almost complete losses among nut yields from older trees in the Central Plateau. Seedling production from seed of undetermined genetic resistance is a serious mistake since the seedlings would probably experience high levels of disease incidence and [illegible]. The fungal inoculum pressure on cashew in the plateau. Fertilized cashew seed is available from Brazil and should be imported [illegible]. The [illegible] of [illegible] problems [illegible] the [illegible]

SHEEPA nurseries should not be distributed prior to grafting. In the future, SHEEPA should concentrate only on a limited number of fruits of demonstrated technical, economic and social potential.

Grafting of citrus onto seedling sour orange rootstock was appropriate as undertaken by the project and should be expanded, if possible, in future efforts. Avocadoes do not produce fruit reliably from seedlings grown from seed. Avocado scion material should be either cleft-grafted (seedling should be 4-6 weeks old) or veneer-grafted. Mangoes do produce quality fruit from seed due to their polyembryonic growth habit but scions of preferred local or exotic cultivars should be either chip-budded or veneer-grafted to improve yields. Our overall suggestion is to intensify grafting skills of the extensionists and concentrate more upon grafting or budding at the nurseries rather than at individual peasant farms to increase the number of successful grafts and the overall efficiency of future efforts. Production of seedlings from seed for distribution is undesirable in terms of consistent quality and the length of time required before fruit production occurs. Unfortunately, not but a small fraction of the trees produced and distributed under the project were grafted despite the continuous urging of the USAID project manager and the apparent understanding of the rationale behind this on the part of SHEEPA staff. SHEEPA inventories list a total of approximately 400 grafted fruit trees.

Stateside universities maintain expertise in forestry and tropical fruit production and could be used more effectively in transferring this information to SHEEPA. Both short- and long-term faculty and graduate student assignments are possible. Many of the technical problems encountered by the project could have been reduced or avoided if more individuals had been identified and contacted. It is extremely unfortunate that the long-term, on-site advisor was lost and could not be replaced. It appears that the guidance and project initiatives made under his service were valid (grafting, budding, importation of valuable plant materials, and monitor and farmer training in propagation techniques) and they should have been followed even after his departure. Project correspondence points to consistent attempts on the part of the USAID project manager to emphasize these practices.

The use of expensive synthetic fertilizers does not appear to be a cost-effective means for improving plant nutrition. A project might be supported whereby mycorrhizal fungi occurring on local rootstocks are identified and propagated to inoculate roots of grafted seedlings prior to outplanting. Once inoculated with the appropriate mycorrhizal symbionts, seedlings survival and development should be greatly enhanced. In addition, mulching, composting, and the use of animal fertilizers could be emphasized.

Development of a fruit tree production industry in the Central Plateau is desirable. Organization of cooperatives where more intensive fruit culture would occur, such as high-density plantings, may provide more cost-effective production measures, such as pesticidal applications, not feasible with individual peasant-oriented activities. However, the [illegible] fruits for export would require greater number [illegible] extension-oriented production [illegible]

mango, upon arrival would either greatly reduce its value for export or else make it entirely unacceptable. Solar-drying of fruit is a proven simple technique experimented with under the first project phase. Its use should be expanded to preserve the nutritive value and storage capability of local fruits as well as lower transportation costs, although SHEEPA resources and interest would have to be expanded to adequately deal with solar drying technologies.

Specific Questions Regarding Technical and Research Aspects

- Will the selected cultivars of mango, cashew, orange, grapefruit, and avocado increase field production and fruit quality of these tree crops in Haiti? If not, what cultivars will?

Cultivars from exotic sources need to be imported and their use as scion material expanded. Local mangoes provide several good selections but should not supplant a program of adaptibility trials for exotic cultivars. Cashew production should be halted until anthracnose-resistant seed is obtained from Brazil for scion production. Avocado production from seed should be halted and replaced by grafted material of proven cultivars.

- Will the domestic use of these selected cultivars improve the nutritional diet of the local inhabitants?

Yes.

- Is the adoptive research being conducted at the lowland and upland sites approriate for the development of the tree crop?

There was no differentiation between lowland and upland site adaptability. Research base needs to be greatly expanded and conducted with a more rigid technical framework provided by international consultants.

- Have adequate relationships and linkages been established with research institutions in Jamaica, Puerto Rico, D.R., and the U.S.? What further could be done to enhance the relationships and linkages?

Attempts have been made to initiate linkages but these have not resulted in consistent, long-term involvement necessary for the project. This seems to be the fault of the responding institutions or individuals. The University of Florida should become more involved with project activities and steps taken to negotiate reimbursement of fees, travel expenses, graduate student exchange programs, etc.

- Have the plantings of the young seedlings been made in accordance with good horticultural practices?

Yes.

- What are the field losses of seedlings with the [illegible]

First-year outplanting losses were reported to be abnormally low (5-to-7%) but second-year losses were abnormally high (30%) due to drought.

- Will the plantings of the fruit tree crops on the hillsides succeed and if so, will they reduce soil erosion? Should changes be made in the cultural practices, species selection, spatial arrangements, and the incentive structure?

Hillside plantings will succeed in theory but in practice millions of trees will have to be planted in the Central Plateau to have a long-term impact on reducing soil erosion.

- Are there specific diseases in Haiti which will limit the longevity and/or productivity of the fruit trees? Are there significant diseases present on existing seedlings?

A yet to be identified disease on cashew is so severe that production using local seed should be halted immediately in favor of obtaining disease-resitant seed for scion material from Brazil. Citrus scale and sooty mold were observed on citrus seedlings but not at an economically important level.

- Are nutrient and fertility deficiencies evident on existing seedlings in the nurseries and in the growers fields? If corrective fertilizer treatments are required, recommend timing, rates, and form of applications to be made.

Nutritient deficiencies are evident on cashews which may be due to absence of suitable indomycorrhizal associates. Fertilizers are probably not acceptable long-term solutions to the peasant-oriented problem of sustaining fertility and accpetable plant nutrition of cashews and other selected varieties.

- Are the climatic conditions of the project zones limiting in any way to the cultivars which have been selected for production?

No, except for unexpected droughts which may interrupt planting schedules.

- Is the operation of the two satellite and primary nurseries in accordance with good nursery management practices?

Yes, although the shade factor at the Maissade nursery needs to be reduced to avoid etiolation among seedlings in certain areas.

- Assess the adequacy of existing roads and road networks for a future fresh fruit market operation.

Wholly inadequate to sustain any reasonable transportation effort to expand a fresh fruit market.

- If a follow-on program is recommended by the evaluation team, does [illegible] have the [illegible] technical and administrative capability to carry out the recommended program? In the event that SHEPA needs to

expand its capabilities, describe the logical course for them to follow in obtaining the desired level of expertise.

SHEEPA now possesses the technical/administrative capability to carry out a follow-on program provided the quality of technical input is upgraded by incorporating competent international consultants into the program. SHEEPA monitors should receive further training in technical skills such as grafting and budding.

- In anticipation of the increased production of cashew nuts, what arrangements should be made to insure the timely procurement of equipment, marketing and commercialization for export?

It would be premature to plan for production expansion when anthracnose is currently present in high incidence levels throughout the area of the project. The first problem to address is whether or not resistant seed from cashew breeding programs in Brazil will also be resistant in Haiti. If successfully resistant selections are determined then one may consider the next steps toward expanding production.

In order to prepare for expansion of agro-industry efforts in fruits, several aspects should be addressed:

a. Solar drying facilities should be created to facilitate storage and shipment. This would reduce dependency on immediate shipment of fresh fruit over what now are totally inadequate roads to Port-au-Prince and should increase prices of dried fruit available in the off-seasons. The University of Florida should be involved in implementing this technology.

b. SHEEPA should consider purchasing or leasing large acreages as a basis for grower cooperatives. High-density planting techniques would greatly increase yields/ha and would permit more intensive pest control and fertilization regimes which under the present individual peasant-grower system are uneconomical.

c. SHEEPA should prepare itself as a direct exporting apparatus to buyers in Florida and elsewhere to solidify markets for their cooperators and thereby increase production.

Part IV. ECONOMIC ANALYSIS

Introduction

According to the project manager only 164,000 trees have been planted, the majority of which are Cashew nuts (54%). Mango trees distributed to peasants represent 30-35% of the total or approximately 50,000 trees and are the second most important tree of the project. Several other varieties have been distributed to the peasants, such as avocado, citrus and papayas.

The economic analysis will focus essentially on the mango tree because of the severe illness menacing the cashew nut trees. It is expected that almost all of the cashew nut trees will be lost. Fifty thousand (50,000) Francis mango trees with a survival rate of 95% are the main output of the project. Some 47,500 mango trees are projected to be producing mangoes in the future.

The remaining 10-11% of the total trees planted are comprised of papaya, oranges, grapefruits and avocados which have a survival rate of approximately 20%. Because detailed information on production and marketing possibilities for these products are not available, it will not be possible to quantify the related benefits, however, the costs will be considered.

The economic soundness of the project will be determined first through analysis of the mango sector economy in order to see whether the selected tree crop (mango) are suitable for export market. The economic costs of the project will then be compared with the benefits to determine the project's net contribution to real income and welfare. Finally the participating small farm's economy will be analyzed in order to measure the impact of the project on the micro-unit.

The Mango Economy in Haiti

Haiti's mango production was estimated at about 326,000 tons in 1980, (FAO; 1980), which puts it in third place in the Americas after Brazil and Mexico. Mango trees are raised almost exclusively by small-scale farmers over a widely scattered area; there is only one large mango plantation in the Artibonite. Cultivation techniques are rudimentary; neither fertilizers nor pesticides are used.

The greatest part of mango production is either self-consumed or sold on the domestic market for local consumption. The remaining part of the production is either exported or transformed locally in order to be exported. These two export markets are discussed in turn.

a. Direct Exports

Although a wide variety of local mangoes is produced in Haiti, only the Francis mango is exported. The volume exported increased regularly between 1973 and 1983 as did unit prices (see table 17.

The Francis mango constitutes the most important fruit export, both

in terms of volume and value. The quantity of mangoes exported exceeded six thousand tons in 1983 for a value of approximately $3.5 million. The export volume in 1983 was twenty-five times greater than in 1973. The rise in price was the period 1973-1983 contributed positively to the increase in export value.

The market for exported Francis mango is essentially controlled by a single company, ASDEM, which accounted for 71% of all mangoes shipped to the U.S. Five other firms, Bussenius and Ashton being the most important, make up the difference.

The Francis mango distribution system for export includes three groups of intermediaries, the most important and probably the least numerous being the export agents. They purchase directly from the producers and from the two other intermediaries groups, the local middlemen dealers.

On initial examination, the outlook for the export of the Francis mango seems not to be promising. In fact, the US Food and Drug Administration (USDA) has stated that EDB, a fumigant used to treat the fruit, will definitely be banned as of September 1985. (The first deadline was originally set September 1984). However, fresh Francis mango exporters do not think the situation is serious because investments in costs of alternative methods of treatment are not more than $100,000. It is not necessary, according to them, to use the alternative cobalt irradiation method which requires an investment of $1.5 million, and additional production of Francis mango will be exported as before. The alternative of exporting mango puree (concentrate of mango juice) instead of fresh Francis mango has under certain circumstances some chance of success as we shall see.

b. Conasa (Conserverie Nationale S.A.)

Mango puree is exported by only one firm, Conserverie Nationale S.A. (Conasa). The firm is located in Cap-Haitien and produced approximately 2,000 metric tons of puree in 1984. Approximately 6,500 tons of fresh mangoes were necessary for this production. Conasa, which has 400 workers in the high season (April to September 4), has as its objective the production of 5,000-6,000 tons of mango puree in 1986.

Conasa has almost 40 collection centers where the mangoes are purchased from hundreds of peasants. The variety, which is the best for transformation, is the "mango bourrique" (donkey mango). Another common variety is the "mangue fil rouge". The Francis mango is still considered expensive compared to the the two other varieties, but is purchased by Conasa as well.

Because export of fresh Francis mangoes will require additional investments, the transformation of mangoes into puree for export seems to be the more probable alternative. In fact, the demand for such a product is high and Conasa is expanding rapidly.

[illegible]

The only constraint existing now for the spread of the new activities on a large scale seem to be the price of the Francis mango, which is not considered low enough by exporters, and some disadvantages related to transformation of the Francis mango. However, exporters think that an additional production might reduce the prices.

Cost-benefit analysis

Assessing the economic soundness of SHEEPA require a comparison of project costs with expected benefits. The primary costs of the project are easy to identify. They are as follows:

a. USAID grant for a total amount of U.S. $596,000 over a period of twenty-four months.

b. Other costs of the project are net values of foregone production. In fact, planting Francis mango trees means giving up production of mais or sorghum which are the most cultivated crips in the project area. The net value of foregone production is a real cost of the Francis mango tree planting.

Table 2 shows how the foregone costs are calculated.

A Francis mango tree occupies hundred (100) m2 after five years. This area is practically lost for almost any other cultivation. Mais or sorghum cultivated in a traditional way (without irrigation and fertilizer) on one carreau area (12,900 m2) bring a yearly net profit of approximately $200.00 to the peasant. The space occupied by a mango tree after five or six years (100 m2) would bring $1.555 per year. The opportunity cost of 47,500 mango trees, then, is $73,862.50 (47,500 X $1.555).

Between 1985 and 1989, during the mango tree growing period, the space occupied by each tree increases gradually. The cost of the foregone production follow this evolution as shown in Table 3.

The total foregone production vary from $18,000 in 1984 for all trees planted to $37,000 in 1985 and 1986; during the following two years the costs reach $55,000; in 1988 and following years the trees are considered grown and the costs are $74,000 per year. (see Tables 3 and 5).

The Francis mango fruit production (marketed) is the most direct benefit of the project (1). According to the agricultural assessment of the World Bank (1985: Yellow cover) a ten year old mango tree produces between 20 dozen (a poor year) to 100 dozen (a good year) per year. According to the same report, a dozen brings between $0.30 and $0.60. Exporters have paid up to $0,80 a dozen. Table 4 shows that total benefits for 1994 are $1.282 million (see also Table 5).

The Francis mango tree starts producing at lower production levels [illegible] of production. It is [illegible] a mature Francis mango tree brings an average of fifteen

dozen the first year of production; twenty the second year; twenty-five the third; then thirty the fourth and forty the fifth year. Table 4 shows the related benefits by years.

The calculation of the economic return from the project is shown in Table 5. The net present value of the project is nearly $5 million when discounted with an opportunity cost of capital of 10%. In other words, $5 million in net benefits will be generated over the life of the project after all economic costs are covered, including the opportunity cost of capital. The internal rate of return is estimated to be 28.9%.

The internal rate of return has also been tested for sensitivity at various prices and with a decrease/increase in yields as shown in Table 6. In the worst possible case, with an average production of 40 doz/year per tree and at a producer price of $0.30 per doz. the internal rate of return is 17.30%. In the best case, with an average production of 100 doz/year and a producer price of $0.60 the internal rate of return is 39.10%. These calculations demonstrate that the economic return from the project will be very satisfactory under a variety of circumstances.

The Economy of the Small Farmer

It is possible to analyze the changes in the income of the farmers participating in the project. For this purpose, we will use a sample of 297 farmers out of the total 1,057 participants. During 1984, these farmers received 16,122 Francis mango trees. The average amount of land owned by the peasant family is 3.2 carreaux (1 carreau = 12,900 m2) and the average amount of land planted in all kind of fruit trees is 0.70 carreau per family.

The peasants received other trees, but we will assume that only the mango trees are of economic importance to the peasants; the other trees planted are assumed to not survive.

(1) Because of the widespread disguised unemployment in the Central Plateau, the shadow price of unskilled family labor is assumed to be zero. Labor costs related to harvests are for this reason assumed to be zero.

Under this assumotion, each of the 297 farmers in the sample planted an average of 54 mango trees with a survival rate of 95%. That means that each peasant in the sample will have an average of 51 mango trees. How reasonable is this average? According to our calculation, 97 farmers received 83% of the trees planted; 55 other farmers received 11% of the trees planted; 145 farmers or 49% of the total received only 11% of the trees planted. For this last group the average number of trees planted is 12. This last figure represents a more reasonable estimate of what the typical farmer received.

If each tree starts to produce after five years, and if each dozen sells for average of $0.45. Table 7 shows the amount received by each peasant from 1989 on.

[illegible] worthwhile to the peasant to plant 9 new trees? If the project

did not exist, the peasant would not have any other alternative than the one of planting corn or sorghum on the space occupied by the mango trees. Table 7, column 2 shows what each peasant's income would be if they were planting the above mentioned crops. Column 3 shows peasants income with the mango trees.

Although the peasant loses money the first five years, the amount lost is recuperated the sixth year. During the seventh year, the peasant receives an income which is five times greater than what he would receive by planting other crops. From the eleventh on, the new income is seventeen times greater. (2)

The calculation of the economic return to the peasant is shown in the same table. The net present value of the additional income per peasant is $1,151 when discounted at an opportunity costs of capital of 10%. In other words, $1,151 in benefits will be generated over the life of the project after all economic costs are covered including the opportunity cost of Capital. The internal rate of return is estimated to be 67%.

The internal rate of return has also been tested for sensitivity at lower prices and with a decrease in yields as shown in Table 8. In the worst possible case, with an average production of 40 doz./year per tree and at producer price of $0.30 per doz. the internal rate of return is 36.5%. These calcultions show that the economic return is very satisfactory.

Why then subsidize SHEEPA? In order to answer, let us consider a situation in which the project would not exist: What would be the peasant's behavior? He would certainly not go to other regions (or abroad) to get (and pay) the varieties which are distributed by SHEEPA in the Central Plateau and would keep planting sorghum or corn. If seedlings were given free in the region or in Hinche itself, most probably the peasants would not even go and get them because of his lack of understanding of the benefits.

(2) Shadow price of unskilled family labor is again assumed to be zero.

It is worthwhile to subsidize SHEEPA because: 1) Information are generated through systematic monitoring activities; peasants are visited regularly by trained monitors at the beginning and during the growing period. Sophisticated techniques such as grafting are carried out inorder to improve the existing vareities. 2) The peasant has to be motivated. Given his high time preference for money, he would have otherwise never participated to the project refusing with great probabilities to pay for the trees.

TABLE: 1

HAITIAN MANGO EXPORT

YEAR	Volume (MT)/Doz (000's)	Value US$	Unit Price ($US/Kg)
1973-74	136/ 24.72 *	$ 13,190	$ 0.097
1974-75	1108/201.45	203,699	0.184
1975-76	968/176	184,173	0.190
1976-77	3326/604.72	691,189	0.208
1977-78	2495/453.63	615,679	0.247
1978-79	2293/417	783,688	0.344
1979-80	6600/1200	3,564,000	0.540

* A dozen unit weighs approximately 5.5 kilos.

Sources: Customs, Agricorp, 1984

TABLE: 2

MAIS/SORGHUM: NET INCOME (AVERAGE)

Area Cultivated	Net Income (average)
1 carreau (12900 m^2)	$ 200.00
1 m^2	$ 0.01555
100 m^2	$ 1.555

Source: Evaluation of the irrigation component of the integrated agricultural development project, 1983.

TABLE: 3

SPACE/OPPORTUNITY COSTS

EVOLUTION IN THE GROWING PERIOD

(1983-85/1989)

Year	Trees Planted	Trees Survived	Area Occupied by Each Tree/Total (m^2)	Net Value Production Foregone
1983	15,000	-	$25m^2$/375,000 m^2	$ 6,000 (2)
1984	35,000	-	$25m^2$/1,187,500 m^2	$ 18,000
1985 (1)	-	47,500	$50m^2$/2,375.000 m^2	$ 37,000
1986	-	47,500	" "	$ 37,000
1987	-	47,500	$75m^2$/3,562.500 m^2	$ 55,000
1988	-	47,500	" "	$ 55,000
1989	-	47,500	$100m^2$/7,362.500	$ 74,000

(1) From 1985 on, total trees which have survived are considered as being planted at the same time.

(2) This is a rounded figure; it is the result of $0.01555 (opportunity cost for one m^2 occupied) multiplied by the total area occupied by 47,500 trees.

TABLE: 4

TOTAL BENEFITS (000's 1985 $)

SHEEPA'S MANGO PRODUCTION

YEAR	Average Yearly Production (per tree)	Average Price/doz.	Total Benefits
1989	15 doz.	$ 0.45 (1)	320
1990	20 "	"	427
1991	25 "	"	534
1992	30 "	"	641
1993	40 "	"	855
1994	60 "	"	1282.5 (2)

(1) This is a conservative estimate based on World Bank figure.

(2) To calculate this number the total number of trees (47,500) has been multiplied by the number of dozens produced and by the average price. The results have been rounded.

TABLE: 5

SHEEPA/COST-BENEFIT ANALYSIS (1985 $000's)

Year	Costs: USAID Grant	Costs: Net Value of Production foregone	Costs: Total Costs	Benefits: Gross Benefits	Benefits: Net Benefits (Col 5-Col 4)	Benefits: Net Present Value at 10 percent	Benefits: Net Present Value at 30 percent
1983	310	6	316	-	(316)	(382)	(534)
1984	230	18	248	-	(248)	(273)	(322)
1985	57	37	94	-	(94)	(94)	(94)
1986	-	37	37	-	(37)	(33)	(28)
1987	-	55	55	-	(55)	(47)	(33)
1988	-	55	55	-	(55)	(41)	(25)
1989	-	74	74	320	246	168	86
1990	-	74	74	427	353	219	95
1991	-	74	74	534	460	259	95
1992	-	74	74	641	567	290	90
1993	-	74	74	855	781	364	96
1994	-	74	74	1282.5	1208.5	512	114
1995	-	74	74	1282.5	1208.5	466	88
1996	-	74	74	1282.5	1208.5	423	67
1997	-	74	74	1282.5	1208.5	385	52
1998	-	74	74	1282.5	1208.5	350	40
1999	-	74	74	1282.5	1208.5	317	31
2000	-	74	74	1282.5	1208.5	288	24
2001	-	74	74	1282.5	1208.5	263	15
2002	-	74	74	1282.5	1208.5	239	14
2003	-	74	74	1282.5	1208.5	217	11
2004	-	74	74	1282.5	1208.5	198	8
2005	-	74	74	1282.5	1208.5	180	8
2006	-	74	74	1282.5	1208.5	163	5
2007	-	74	74	1282.5	1208.5	148	4
2008	-	74	74	1282.5	1208.5	135	3
2009	-	74	74	1282.5	1208.5	123	2
TOTAL	597	1762	2359	23297	20938	4837	-87

TABLE 6

Sensitivity analysis

Internal Economic Return at Given Prices per doz.

(percent)

	$ 0.30	$ 0.40	$ 0.45	$ 0.50	$ 0.60
with assumed yields (60 doz./year)	17.3	20.6	22.4	23.3	25.5
40 doz/year	23.5	27.3	28.9	30.4	33
80 doz/year	25.5	29.1	30.6	32	34.4
100 doz/year	29.4	33.3	34.90	36.4	39.1

TABLE 7

INCOME FROM CROP/MANGO PLANTING

INTERNAL RATE OF RETURN

YEAR	(1) Area Occupied by each tree	(2) Income from crop	(3) Income from mango	Additional income (3)-(2)	NPV at 10%
1984	25 m^2	5 (a)	-	(5)	(4)
1985	50 m^2	9	-	(9)	(7)
1986	100 m^2	14	-	(14)	(10)
1987	"	18	-	(18)	(12)
1988	"	18	-	(18)	(11)
1989	"	18	89 (b)	63	36
1990	"	18	108	90	46
1991	"	18	135	117	55
1992	"	18	162	144	61
1993	"	18	216	198	76
1994	"	18	324	306	107
1995	"	18	324	306	98
1996	"	18	324	306	89
1997	"	18	324	306	81
1998	"	18	324	306	73
1999	"	18	324	306	67
2000	"	18	324	306	61
2001	"	18	324	306	55
2002	"	18	324	306	50
2003	"	18	324	306	45
2004	"	18	324	306	41
2005	"	18	324	306	38
2006	"	18	324	306	34
2007	"	18	324	306	31
2008	"	18	324	306	28
2009	"	18	324	306	26
TOTAL					1151

(a) This figure is obtained by multiplying the space occupied by each tree by 12, (the average number of trees planted by the peasant) by $0.155 (see Tables 2 and 3).

(b) This figure is obtained by multiplying the average price ($0.45) by the number of dozens produced by the number of trees. The yearly production per tree is 15 doz. at the beginning. It reaches 60 dozens after five years.

TABLE 8

Sensitivity analysis

Internal rate of return

at given prices per doz.

(percent)

	$ 0.30	$ 0.40	$ 0.45
40 doz./year	36.5	42.8	67
with assumed yields (60 doz./year)	52.3	60.6	45.8

Date 29 [illegible] 1983

Mr Hygens Sylvain, President
Société Haïtienne d'Etude et d'Exécution des Projets Agricoles
BP 1771
Port au Prince, Haiti

Dear Mr Sylvain:

Subject: Cooperative Agreement No. 521-0169-A-00-3043-00
Caribbean Basin Initiative Supplemental Appropriation

Pursuant to the authority contained in the Foreign Assistance Act of 1961, as amended, the Agency for International Development (hereinafter referred to as "AID" or "Grantor") hereby provides to the Société Haitienne d'Etudes et d'Exécution des Projets Agricoles (hereinafter referred to as "SHEEPA" or "Grantee" the sum of Five Hundred Thousand United States Dollars ($500,000) to provide financial assistance for the purpose of undertaking research to improve the genetic stock of fruit trees in Haiti, and undertaking a program of distribution of improvded fruit seedlings to small farmers in the Hinche, Thomonde, and Maissade area of Haiti, as more fully described in Attachment 2, entitled "Program Description".

This Cooperative Agreement is effective and obligation is made as of the date of this letter and shall apply to commitments made by the Grantee in furtherance of program objectives through the estimated completion date of March 31, 1985.

This Grant is made to the Grantee on condition that the funds will be administered in accordance with the terms and conditions as set forth in Attachment 1, the Schedule, Attachment 2, the Program Description, and Attachment 3, the Standard Provisions, which have been agreed to by your organization.

Please sign the original and seven (7) copies of this letter to acknowledge your acceptance of this Grant, and return the original and six (6) copies to this office.

Sincerely Yours:

Harlan H. Wehrend
Mission Director, USAID/Haiti

ACKNOWLEDGED:

By

Date 20 MAR 1980

Attachments:

1. Schedule
2. Program Description
3. Standard Provisions
4. Assurance of Compliance

Fiscal Data:

Project Number	: 521-0169 , Input No. 4
Appropriation	: 72-112/1037
Allowance	: LES3-S3-25521-KG13
Total Grant Amount	: $500,000
Amount Obligated	: $500,000
PIO/T Number	: 521-[illegible]-3-30034
Funds Available	: [illegible]
Date	: [illegible]

SCHEDULE

A. Period of Agreement

1. The effective date of this Cooperative Agreement (CA) is the signature date by the Grant Officer as shown on the cover letter, and the estimated completion date is March 31, 1985.

2. Funds obligated hereunder are available for program expenditures for the estimated period the effective date of this agreement until the estimated completion date.

B. Amount of Agreement and Payment

1. AID hereby obligates the amount of $500,000 for the purposes of this Cooperative Agreement.

2. Payment will be made to the Recipient in accordance with the procedures set forth in Attachment 3--Standard Provision entitled "Payment--Periodic Advance".

C. Financial Plan

1. The following is the Financial Plan for this Grant. A detailed Financial Plan is appended as Annex A to Attachment 2 of this Agreement. Revisions to this plan shall be made in accordance with the Standard Provision entitled "Revision of Financial Plans".

	Cost Element	Obligated Amount
1.	Personnel and Tech. Assistance	$289,032
2.	Commodities	151,656
3.	Training programs	4,420
4.	Other Costs	54,892
	TOTAL	500,000

2. The Grantee may not exceed the obligated amount set forth, nor may the Grantee adjust the costs for any individual line item by more than 15% of such line item, unless prior written approval is accorded by AID.

Best Available Document

28

D. Reporting and Evaluation

1. The Grantee shall submit the following reports, in English, at the time and in the quantities specified:

   a. Technical reports. Recipient shall submit quarterly status reports, due within one month of the expiration of each fiscal quarter under the life of the project, to the Agricultural Development Officer, USAID/Haiti, and a final report, due within one month of the expiration of the project, to the same address.

   b. Financial reports. Grantee shall submit to the responsible AID Controller all reports required under the Standard Provision entitled "Payment--Periodic Advance".

E. Alterations and Additions to the Standard Provisions

1. Of the attached Standard Provisons, the following will be deleted: 5A, 7B, 7C, 10B, 13B, 13C.

PROGRAM DESCRIPTION

I. Purpose

The purpose of this CA is to improve the quality of the genetic stock for fruit production in Haiti.

II. General Description

In addition to undertaking a varietal research program, SHEEPA proposes to undertake the distribution of 350,000 fruit tree seedlings to small farmers in the Hinche (Central Plateau) region. Seedlings will be sold for a nominal fee.

Under the project, 3 field nurseries and one research nursery will be established, and 14 monitors will be trained to distribute seedlings, operate the field nurseries, and implement training programs for farmers. The existing SHEEPA nurseries at Bon Repos and Hinche will be upgraded for the research component of the project, and project technicians will gather specimens from Puerto Rico, Jamaica, the Dominican Republic and the US. 10 DARNDR extension agents will receive on-the-job training as well.

SHEEPA will oversee a permanent program of monitoring and extension activities for farmers and school groups in the project area, using audio-visual techniques and site visits. In addition to cultivation, pruning and grafting techniques, elements of soil conservation and intercropping will be stressed.

III. Description of Activities

A. Specific Objectives

The specific objectives are described in a detailed implementation plan outlining the responsibilities of the parties to this agreement, which is appended, and which forms part of this agreement.

IV. Substantial Involvement Understanding

In addition to the criteria described in the appended scope of work, the following AID-established criteria must be met under this Agreement:

A. USAID/Haiti will review and approve all contracts for short and long-term technical assistance.

B. USAID/Haiti will participate in program development, as appropriate, and may urge and arrange the cooperation of US-based institutions such as a US land-grant university, at no cost to the present project.

C. USAID/Haiti reserves the right to conduct periodic reviews of project [illegible] the objectives described in the appended scope of work are met or [illegible].

Attachment 2
Annex A

ITEMS	TOTAL	AID	SHEFFA PLEDGE	1st YEAR	2nd YEAR
I. PERSONNEL COSTS	272632.-	272632.-	--	158722.-	113910.
II. TRAINING COSTS	18420.-	4420.-	14000.-	4420.-	14000.
III. COMMODITY COSTS	162656.-	151656.-	11000.-	120140.-	42516.
IV. TECHNICAL ASSISTANCE	16400.-	16400.-	--	10300.-	6100.
V. OTHER COSTS	314892.-	54892.-	260000.-	218200.-	96692.-
TOTAL	785000.-	500000.-	285000.-	514782.-	270218.-

Attachment 2
Annex B

A.- SCOPE AND SCHEDULE OF WORK

I.- ACTIVITIES FOR APRIL 1st TO APRIL 30, 1983

1) Visits to make contacts with key Fruit Tree Crop Specialists

- University of Florida at Gainsville, U.S.A.
- Santo Domingo, R.D.
- Jamaica
- Puerto Rico

2) Purchase mostly from PUERTO-RICO and FLORIDA with delivery to HINCHE.

- 40,000 seedling for research (Viz, almond, apple, carob, date litchi, nectarine, oil palm, peach, pejibaya, plum et
- 350,000 seeds for germination and seedling production.
- 400,000 plastic bags.
- Irrigation equipment for a 2 ha. nursery.
- Nursery equipment i.e. saran, posts, tables, watering system, pump, pipes etc.
- Fertilizer, pesticides, fungicides, growth hormone.
- Audio-visual material.

3) Begin soil preparation at HINCHE, THOMONDE, MARUSADE in order to establish 3 nurseries for production and research purposes. Activities to include:

- Weeding
- Preparation of potting substrate

- Seed sowing/vegetative

  Propagation commences

- Installation of irrigation system.

- Composting.

II.- ACTIVITIES FOR PERIOD MAY 1st TO MAY 31, 1983

- Purchase additionnal local seeds for production

- Maintenance of management of seedlings sown

- Begin extension exercise through the use of Audio-visual techniques.

- Purchase of 3 U.S.A. made vehicles - 4 wheel drive and accessories.

III.- ACTIVITIES FOR JUNE 1st TO JUNE 30, 1983

- Purchase additionnal local seeds for production

- Maintenance of bags already sown

- Begin extension exercise through the use of Audio-visual techniques

- Quaterly report

- Next quaterly. Scope of work with monthly detail to be worked out by 3 BS Agricultural Technicians and Consultants.

IV.- ACTIVITIES FROM JULY 1, TO SEPTEMBER 30 1983

- Purchase additionnal local seeds for production

- Quaterly Report. Quaterly Scope of work with monthly detail

- Partial sowing of bags

- Maintenance of bags already sown

- Begin extension exercise through the use of Audio-visual techniques.

- Socio-Economic investigations

- Identification of proposed farmers' plots, projection for distribution of seedlings for definitive planting regarding types of soil and different altitude level.

V.- ACTIVITIES FROM OCTOBER 1, TO DECEMBER 31, 1983

- End of purchase of local seeds
- Filling of bags
- End of sowing of bags
- Maintenance of bags already sown
- Begin extension exercise through the use of Audio-visual techniques.
- Beginning of Grafting program
- Beginning of ordonance survey on choisen plots for planting.
- Observations and report on research
- Fence in with barbed wires and plots over all cleaning
- Quaterly Report. Quaterly Scope of work with month

VI.- ACTIVITIES FROM JANUARY 1, TO MARCH 31, 1984

- Grafting program commences
- Maintenance of bags already sown
- Begin extension exercise through the use of Audio-visual techniques.
- Observations and report on research
- End of fence in operation
- Preparation of planting structures, holds and individual horticulture terraces
- Quaterly report. Quaterly Scope of work with month

VII.- ACTIVITIES FROM APRIL 1, TO JUNE 30, 1984

- Maintenance of bags already sown (Nurseries)
- Begin extension exercise through the use of Audio-visual techniques.

- Observation and report on research
- Technical assistance on field planting
- Quarterly Report. Quaterly Scope of work with monthly detail.

VIII.- ACTIVITIES FROM JULY 1, TO SEPTEMBER 30, 1984

- Maintenance of bags already sown (Nurseries)
- Begin extension exercise through the use of Audio-visual techniques.
- Observation and report on research
- Technical assistance on field planting
- Field planting program begins
- Quaterly Report. Quaterly Scope of work with monthly detail.

IX.- ACTIVITIES FROM OCTOBER 1, TO DECEMBER 31, 1984

- Begin extension exercise through the use of Audio-visual techniques.
- Technical assistance in field planting
- Create and organize farmers in Production Groups
- Work on a fruit marketing study from HINCHE to PORT-AU-PRINCE.
- Quaterly Report. Quaterly Scope of work with monthly detail.

X.- AGRICULTURAL EXTENTION SERVICES FROM JUNE 83 TO MARCH 1985

1) To achieve this objectives: for two months SHEEPA will train 14 Monitors recruited in the Project area on Soil Conservation, Agricultural Extension Methodology, and Tropical Horticulture

- Pruning of farmers trees
- The 3 B.S. Agricultural Technicians on the job will do the training. About 10 Consultants will be used for different extension related activities.

- Training in Soil Conservation will be held right in the field. The choice of differents types of soil with regard to elevation and ecological fit for the exotic cultivars to be introduced in the Project area, will be done.

2) Monitors' Information Meeting in order to convince the farmer to integrate himself into the Project, will be held using a serious Audio-visual approach.

- Consultants technical advices will help the Monitors. This technical assistance 4 will facilite the transfer of technological packages to the farmers.

- Monitors will be assisted by three (3) B.S. level Consultants in the distribution of seedlings and follow-up field management activities.

3) Special prevision is made by SHEEPA for a practical Training in Tropical Horticulture with an emphase in Grafting. This training is open to interested Governmental and private agencies.

B.- PERSONNEL NEEDS OF THE PROPOSED PROJECT

I.- OPERATIONS FROM APRIL 1983 TO MARCH 31.1985

1) The following Seven (7) Staff members of SHEEPA will be working for this Project:

- 1 Director, M. Hugues SYLVAIN
- 1 Administrator, M. Lully TELEMAQUE
- 1 Administrator Adjoint, M. Michelot PIERRE
- 1 Secretary
- 1 Bookkeeper
- 1 Messenger
- 1 Guardian

- They will be responsible for the Administrative aspects of the Project. In addition the Technical aspects will be supervised by three Agricultural Technicians each possessing a B.S. Degree in Horticulture and on Reforestation and a minimum of 6 years of Nursery/field experience.

- They are:

Lucien BRISSON	HAITIAN	20 Years exp.
Claude C. PIERRE LOUIS	"	18 " "
Robert BLAIR	AMERICAN	6 " "

Fourteen (14) Monitors with intensive field training as described before, will join the professional technical staff after their training.

2) Conduct survey throughout the Islands of Hispaniola, Jamaica and Puerto Rico and Florida to identify and collect germ plasm and seed material of already existing improved fruit species/cultivars.

<u>From April 15, to April 30, 1983</u>

- Establish information and material exchange relationship with horticultural centers in the Caribbean area, Both private and governmental.

<u>From May 1, 1983 to June 30, 1983</u>

- Establish and maintain a germ plasm research repository for the observation and subsequent field work on the accessions.

- Maintain nursery facilities for 400,000 local seedlings for production and 40,000 seedling for research.

II.- <u>OPERATION FROM JULY 1983 TO SEPTEMBER 1984</u>

- Grafting operations and all other asexual propagation methods to rapidly multiply those accessions which are judged likely to perform will under local condition.

- Select appropriate field sites for agronomic trials, representative of at least two contrasting agroclimatic conditions (with respect to rainfall, soil types and elevation temperature).

III.- <u>OPERATION FROM OCTOBER 1983 TO MAY 1984</u>

- Establish, maintain and monitor statistically designed field trials pertaining to research and production on:

a) species, cultivar performance;

b) management techniques;

c) harvest and post harvest techniques.

- Devise and manage a system for releasing and distributing seedling material from the nursery facilities.

IV.- OPERATION FROM JUNE 1984 TO AUGUST 1984

- Provide extension support services and technical advice to growers in the planting establishment, field management, harvesting and post harvest treatment of the recommended fruit tree crops.

- Devise a manual and develop creole language training/teaching materials covering practical aspects of fruit production in Haiti.

- Provide horticultural training to interested agencies including those of the GOH.

- Gather and analyze the field and nursery data which will be generated by the Project.

- Prepare technical reports at regular intervals covering the lessons learned in the nursery and the fields.

V.- OPERATION FROM SEPTEMBER 1984 TO NOVEMBER 1984

- Prepare reports about the progress of the Project at regular intervals.

- Furnish recommendations on the most agronomically sound species, nursery techniques and managment systems for improved fruit tree crop production in Haiti.

C.- REPORTS

The Grantee will submit the following types of reports to USAID:

- Quarterly progress reports in conformance with USAID/Haiti's Joint Project Implementation Plan, beginning June 1983 through April 1985.

- Technical reports covering the status of the nursery/field trials.

- Final report summarizing the outputs of the Project, analyzing its achievements and benefits and making recommendation for improved fruit tree crop production.

38

SCOPE OF WORK

This additional grant to SHEEPA is to be deployed to:

1. expand production of improved fruit tree seedlings from the originally agreed upon figure of 390,000 by an additional 250,000 plants, thereby, giving a life of Project total of 640,000.

2. expand training activities in the areas of propagation, grafting techniques, nursery care, outplantings and tree crop management;

3. expand the target group of participant farmers from the existing 1,000 to 2,000 farmers while at the same time maintaining the present geographical ambit of the project i.e. a radius of 25-30 km. around Hinche;

4. reinforce the ongoing adaptive research being carried out in the areas of (i) species adaptation (ii) fertilizer trials; (iii) assessment of damages due to pests and diseases and their control;

5. increase the quantity of bud, wood and other plant propagules.

UNCLASSIFIED

	FROM	CLASSIFICATION
	AMEMBASSY PORT AU PRINCE	UNCLASSIFIED

E.O 12356
TAGS:

SUBJECT: Evaluation of Fruit Tree Crop Improvement Project 521-0169 (4)

ACTION: SECSTATE WASHDC

UNCLASSIFIED PORT AU PRINCE 0554

INFO: AIDAC

ref./doc: TOR: ST/PRD, D. Deely

chron: WILSON/PALMER TELCON 1/9/85

1. Per reference telcon, mission would appreciate ST/PRD assistance in identifying team to conduct subject evaluation described below. In an effort to minimize costs and at the same time engage a team of professionals capable of carrying out the technical aspects of the scope of work, mission requests ST/PRD thru ST-funded Forestry Support Program to identify USDA and USDA/Forest Service personnel available on TDY basis to conduct evaluation. Time frame for evaluation is three weeks beginning on or about March 1, but flexible depending availability and schedules of identified team members. Mission prepared to pay travel and per diem expenses of individual team members.

DRAFTED BY	DRAFTING DATE	TEL. EXT.	CONTENTS AND CLASSIFICATION APPROVED BY
E. Wilson, RDO : md	1-22-85		Jerome French, DIR

CLEARANCES:

A. Wahab, RDO_____ R.Gilson, DRE_____

V. Cusumano, C/RDO_____

UNCLASSIFIED
CLASSIFICATION

OPTIONAL FORM 15
(Formerly FS-413)
Dept. of State

50153-101

40

2. Project Background and Evaluation Scope of Work:

The USAID Mission is currently funding SRDPA (Societe Haitienne d'Etudes et d'Execution de Projets Agricoles) to execute a Tree Crop Improvement Project in Haiti. The primary objectives of the project are to improve fruit quality and to increase field yields in the Central Plateau of Haiti through the selection of fruit cultivars, multiplication of the cultivars, training of project staff and farmers, and the distribution of these cultivars small growers in the area. The project is one of the cornerstones of the mission's environmentally-oriented project portfolio.

The project was initiated April 1st, 1983, with a proposed life of the project of 24 months. The USAID Mission plans to conduct an evaluation of the project to determine to what extent the initial objectives are being accomplished and to determine whether the project should be continued. If the project is deemed worthy of continuation, the Mission needs to define the strategy of the project for the future with respect to the objective of reversing environmental degradation. In this context the Evaluation Team will prepare a concise future plan which will outline objectives, strategy, budget, personnel needs, and time table, as well as the project's relationship to other environmentally oriented activities and projects.

The Evaluation Team will address the following issues:

OPTIONAL FORM 10
(Formerly 15 41)
UnitedStates
Dept. of S

50153 201

A. Research Aspects:

1. Will the selected cultivars of mango, cashew, orange, grapefruit & and avocado increase field production and & fruit quality of these tree crops in Haiti. If not, what cultivars will.

2. Will the domestic use of these selected cultivars improve the nutritional diet of the local inhabitants. If so, to what extent.

3. Are the selected cultivars suitable for export markets. If not, what cultivars should be used particularly for the U.S. and European export markets.

4. Are the primary beneficiaries of the project small farmers, as well as large scale fruit producers, as originally intended.

5. Is the adaptive research being conducted at the lowland and upland sites appropriate for the development of the tree crops. If not, what modifications should be made to the current program.

6. Have adequate relationships and linkages been established with research institutions in Jamaica, Puerto Rico, Dominican Republic, and the U.S. What further could be done to enhance the relationships and linkages.

B. Production Aspects:

1. Have the plantings of the young seedlings been made in accordance with good horticultural practices. What

OPTIONAL FORM
(Formerly
Jan. 1
Dep. Or
50-53-201
Best Available Document

42

corrective action needs to be taken, if any.

2. What are the field losses of seedlings with the growers? Are the losses normal or exceptionally high or low. Are there specific reasons for abnormally high mortality rates.

3. What are the number of beneficiaries (farmers) and total hectares involved in the project. Can the project models developed over the first two years be replicated on a broader scale.

4. Will the plantings of the fruit tree crops on the hillsides succeed and if so will they reduce soil erosion. Should changes be made in the cultural practices, species selection, spatial arrangements, and the incentive structural.

5. Are there specific diseases in Haiti (especially foliar diseases) which will limit the longevity and/or productivity of the fruit trees. Are there significant diseases present on existing seedlings. If control measures are required, recommend chemical and/or Integrated Pest Management practices to be followed.

6. Are there specific insects in Haiti which will limit the longevity and/or productivity of the fruit trees. Are there significant insect infestations on existing seedlings. If insect control measures are required, recommend chemical and/or IPM practices to be followed.

7. Are nutrient and fertility deficiencies evident on

OPTIONAL FORM 1
Formerly FPMR 101-11.6
January 1
5010-108

50153 201

existing seedlings in the nurseries and in the growers' fields. If corrective fertilizer treatments are required, recommend timing, rates and form of applications to be made.

8. Are the climatic conditions of the project zones limiting in any way to the cultivars which have been selected for production.

9. Is the operation of the two satellite and primary nurseries in accordance with good nursery Management Practices. If not, what corrective action needs to be taken.

10. Is it financially advantageous for the grower to include fruit crops along with traditional crops such as corn, sorghum, peanuts, and cassava in his farming system.

11. Assess the adequacy of existing roads and road networks for a future fresh fruit market operation. If modifications are needed, describe the alterations and changes which will have to be made.

12. Define the economic strategy required to make this project self-supporting in the near future.

C. Extension Aspects:

1. Have the Monitors been sufficiently trained and given adequate instructions to conduct their work. If not, define what needs to be done ~~now~~ in the future to train and/or

OFFICIAL FORM 1234
(Formerly DS 4134)
Dept. of State

instruct the monitors adequately.

2. Are the monitors efficient and have they effectively carried out their assigned duties. If not, what needs to be done to improve their performance.

3. Have the farmers received adequate technical assistance and instructions from the Monitors and from SEMPA's staff. If not, what can be done to enhance the technical ~~monitoring~~ assistance aspects of this project.

4. Has the GOK been sufficiently involved in the practical aspects of the project by SEMPA. If not, what action needs to be taken.

D. Other Considerations:

1. If a follow on program is recommended by the Evaluation Team, does SEMPA possess the necessary technical/administrative capability to carry out the recommended program. In the event that SEMPA needs to expand its capabilities, describe the logical course for them to follow in obtaining the desired level of expertise.

2. In anticipation of the increased production of cashew nuts what arrangements should be made to insure the timely procurement of equipment, organization, marketing and commercialization for the export of this commodity.

3. In view of the increased levels of mango, and other fruits, what arrangements should SEMPA be making for the procurement of packaging equipment and the organization of

growers to ensure the beginnings of an agro[illegible] for the Central Plateau.

4. In view of AID's objective of reversing environmental degradation trends in Haiti, evaluate SHEPA's technical components and extension models vis-a-vis those of the Agroforestry Outreach project. Draw policy and project implication for a coherent and effective environmental strategy.

E. Composition of Evaluation Team:

All members of the Evaluation Team must have LDC experience and good interpersonal and writing skills. At least one team member should possess fluency in French at the FSI rating level of S-3, R-3. The team should consist of the following members:

1. An experienced (10-20 yrs.) Tropical Horticulturist familiar with the research and production aspects of mango, cashew, citrus and avocado. This horticulturist should preferably be knowledgeable and experienced with coconut, guava, papaya, pineapple and exotic tropical fruits. The horticulturist should be the evaluation team leader.
2. An experienced (10-20 yrs.) plant or tree pathologist familiar with the identification of tropical fruit tree diseases and their chemical and/or biological control.
3. An experienced (10-20 yrs.) Entomologist familiar with the identification of tropical fruit tree insects and their chemical and/or biological control.

4. An agricultural Economist. This individual should be totally familiar with the potential Profitability of a fresh fruit marketing operation for internal and export sales. He should have experience particularly in export marketing of tropical ~~[illegible]~~ fruits and processed fruit products. Additionally the Economist should be familiar with operational aspects of nursery management in order to determine break-even point for seedlings production price to participant farmers considering farmer attitudes towards paying for trees.

5. An experienced (5-10 yrs.) social forester, extensionist or sociologist familiar with the social, organizational, and motivational aspects of forestry programs in the developing world.

3. Actions requested: A. Identify qualified and available USDA in-house personnel with alternates; and B. cable summary C.V's of candidates to Mission EDO for consideration. Mission will respond, and commence travel authorizations. Background information and useful documentation, as well as evaluation itinerary will be forwarded for distribution to team members.