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4/7/86 App 12A-1, Chp 12, HB 3
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CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) — PART I

Report Symbol U-447

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
Goat Production Improvement Program	521-0181/2	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 FY 84	B. Final Obligation Expected FY 87	C. Final Input Delivery FY 87	A. Total $ 1.56 m. B. U.S. $ 1.00 m.	From (month/yr.) 5/84 To (month/yr.) 4/86 Date of Evaluation Review 9/12/86

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 evaluation found that the project has until now been focusing primarily on the establishment of a breeding stock of crossbred goats for distribution, and has reached approximately 39% of the targeted primary recipients after about two-thirds of project implementation time has elapsed. The distribution system of male goats to farmers was found to be inadequate, primarily because there was little follow-up effort to check on the performance and impact of the genetically improved stock on the community, although procedures and forms for extension visits were developed. Moreover, little evidence was found that quality control measures were enforced, and recipients were not required to make any initial preparations, like building adequate shelter, before receiving an improved goat (p.4). The Ministry of Agriculture's (MARNDR) lack of commitment was found to be critical in the failure of the project to		

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 ☒ Change Implementation Plan
- C. ☐ Discontinue Project

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

Abdul Wahab, Project Manager, USAID/ADO
Dean Treadwell, Project Coordinator, USAID/ADO
Robert Gilson, MEO, USAID/DRE
Daniel César, USAID/DRE

12. Mission/AID/W Office Director Approval

Signature: Gerald Tarr

Typed Name: Gerald Tarr, Director

Date

CTIONS DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR	NAME OF OFFICER RESPONSIBLE FOR ACTION	DATE ACTIO TO BE COMPLETED
establish the required extension, distribution and information systems. For example, counterpart staff and extension personnel were not appointed in a timely fashion, and salaries were not paid on a regular basis, which resulted in low staff morale. Explaining in part MARNDR's modest support effort was the fact that project systems became overextended as a result of expanding project activity focus from the original Papaye/Hinche farm to Gonaives, before an adequate extension model and support system was developed. The initial project, begun in 1982, was regionally based, when Winrock International joined with the United Methodist Church of Arkansas to construct a goat production facility in Hinche, situated in the Central Plateau region of Haiti. The requirement to attract donor funding resulted in USAID buying into the project in 1984, and the scope of the project was subsequently expanded from a regional focus to a national program with the proposed construction of a second goat production center in Gonaives for the western region, and the addition of an extensive technological transfer component. This expansion was effected too early in the life of the project and resulted in the overextension of project operating systems. The evaluation team therefore recommends that the thrust of the project be refocussed on the Hinche District, allowing for concentration of project resources to that area, and the development of prototype models for carefully phased extension to targeted hillside areas (pp.2,5 and 25).		

ACTIONS DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR	NAME OF OFFICER RESPONSIBLE FOR ACTION	DATE ACTIO TO BE COMPLETED
Inadequate performance in establishing the above systems has hampered progress toward accomplishing the project's objectives of stimulating household and commercial consumption of goat meat and other by-products (milk, cheese, yogourt, etc.), and increasing producers' income. This is to be explained by the role of livestock in the Haitian economy, which is regarded primarily as a cash investment, rather than as a protein source. Improving breed characteristics is therefore not a sufficient condition for livestock development. An integrated package must also include feeding, nutrition, health, marketing and management systems (p.24).		
Underlying the foregoing discussion is the impression that project designers made numerous assumptions for project success, but may have failed to plan for the establishment of the necessary institutional and policy infrastructure contributing to bringing the assumptions to fruition, in the Project Agreement and the Technical Assistance Team's contract. Referring to the Assumptions column of the Logframe, Appendix I, p. 157, it is not enough to assume that the GOH will on its own initiative establish policies to encourage local livestock meat and milk production, or that small producers can be motivated to consume goat meat and milk products, without developing a framework and agenda to identify, address and resolve policy discussions, or implementing some kind of a campaign to encourage and provide incentive to producers to increase milk and meat consumption.		

ACTIONS DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR	NAME OF OFFICER RESPONSIBLE FOR ACTION	DATE ACTION TO BE COMPLETED
The evaluation team recommended the following measures be carried out to redirect the project toward addressing the project goals until the PACD of May 31, 1987. Based on an expenditure analysis performed by the evaluation team, it was determined that surplus funds will be available at the PACD. An extension is recommended only if the following benchmarks are substantially achieved by May 1987:		
1. That MARNDR agree to honour its counterpart obligations. A revised plan requires this Ministry to provide a total of $53,270 broken down into the following categories, for the 1986-87 period:	- MARNDR - WINROCK	7/86
a) 14 project staff, at a cost of $30,270;		
b) vehicle support for $15,000; and		
c) travel and per diem, for $8,000 (see Table 13.2, p. 125).		
Project staff selected should be highly motivated, qualified individuals having a strong interest in developing the goat industry. Job descriptions should be prepared in advance of staff assignments and Chief-of-Party and USAID consulted before appointments are made (p.21);		

ACTIONS DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR	NAME OF OFFICER RESPONSIBLE FOR ACTION	DATE ACTIC TO BE COMPLETED
2. Activities on the Papaye Farm must be redirected to maintain the current goat herd of 300 breeding does, while major emphasis is placed on the development of stud nuclei breeding centers in the private sector, i.e., groupements or PVOs. Four breeding centers must be established by the PACD. Off-farm (producer) activities should take precedence in allocation of resources. The establishment of the nuclei breeding centers should be done in concert with the implementation of recommended activities on development of technical packages and initiation of marketing alternatives (see below). Centers are expected to allow for setting in place a higher level of management, e.g., tagging, weighing, health, buck replacement, etc., than a regular recipient of a genetically improved goat. Contracts between the center and recipient stipulating conditions bearing on several program aspects, e.g., mating, distribution and doe exchange etc., need to be signed. Project staff should make sure that households in the area surrounding these nuclei centers fully benefit from the program (pp.21-22);	- MARNDR - WINROCK - Selected PVOs	7/86- 5/87
3. A minimum of four tech packs should be designed, installed and evaluated, reflecting different option sets for the multiple package components described in Appendix 15.4 (pp. 145-148). Ration formulations based on locally available feedstuffs and nutrient analyses need to be completed.	- MARNDR - WINROCK - USAID	7/86- 5/87

ACTIONS DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR	NAME OF OFFICER RESPONSIBLE FOR ACTION	DATE ACTIO TO BE COMPLETEI
Acquisition of seed and plant stock for recommended forage plants, and multiple on- and off-farm field trials must be made as soon as possible (p.22);		
4. training materials should be developed in French and Creole, utilized and modified as experience dictates, by the PACD (p.22);	- WINROCK - MARNDR	9/86
5. a marketing strategy should be designed, developed and implemented. A study identifying constraints and opportunities for marketing alternatives for goats and their by-products for the Hinche District area would be an initial first step. The study, focusing on strategies for groupements, PVOs amd private individuals, should specifically look at input and output marketing channels for livestock products with the aim of recommending a pilot marketing project for goats. After alternative marketing channels are targeted for testing, an economic analysis of the necessary production and tech packs would be done to tailor the appropriate system to the different market niches identified; and	- WINROCK	8/86- 2/87
6. a project information system, providing feedback information on animals distributed and their impact on local herds, must be put in place.	- WINROCK - MARNDR	8/86

ACTIONS DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR	NAME OF OFFICER RESPONSIBLE FOR ACTION	DATE ACTIO TO BE COMPLETED
PART II		
Mission was generally pleased with the overall quality and usefulness of the contractors' report. The time-phased activity schedule and lessons learned laid out in pages 20 through 25 of the report, will be instrumental in helping the Mission to redirect project effort during the remaining time of the LOP period. The evaluation team went beyond fixing blame and concentrated on analyzing problems and constraints impeding progress, and proposed well considered measures to redirect project activities. The recommendations were found to be appropriate and sufficiently detailed to allow for effective implementation. With respect to format, it is our opinion that section 3 ("Overview of Evaluation") should have been included in the Executive Summary, sub-section 1.7 ("Methodologies Used in Evaluation"). Likewise, sections 4 ("Background Information") and 10 ("Implications of the Goat Project for Hillside Conservation Farming") should have been included in section 5 ("Project Description").		
The contractors did not directly address the issue of project sustainability, one of the "cross-cutting issue" requirements mandated by AID/W. The conclusion, however is clear by inference, because as is stated in page 74 of the report, the contractors found that if a project		

ACTIONS DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR	NAME OF OFFICER RESPONSIBLE FOR ACTION	DATE ACTION TO BE COMPLETED
budget does not include funding for extension activities, it is less likely that MARNDR will be able to carry out such activities. In point of fact, the project budget provides funds for the formal training courses only, but not for field visits by extension workers or other support costs. Based on the foregoing, it is clear that the likelihood of MARNDR picking up the costs of continuing project activities beyond the project termination date is seriously subject to question.		
The Mission was also pleased with the evaluation report's assessment of how the project relates to our overall strategy regarding hillside farming and the need to design and develop interventions which will not result in further deterioration of Haiti's marginal natural resource base, but rather enhance and enable productive usage of these resources. The evaluation clearly indicates that, if done properly, goat raising and hillside farming can be conducted in a totally complementary manner, and one that works to actually upgrade the existing environment.		

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Submitted to

Ministry of Agriculture
Natural Resources and Rural Development
Port-au-Prince, Haiti

U.S. Agency for International Development
Port-au-Prince, Haiti

Winrock International Institute
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Route 3
Morrilton, AR 72110

NATIONAL GOAT PRODUCTION IMPROVEMENT PROGRAM - HAITI MID-PROJECT EVALUATION

Contract No. 521-0181-3-40083

May 9, 1986

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1. EXECUTIVE SUMMARY

1.1 Purpose of Evaluation

The purpose of this evaluation study is to serve as a tool for assessing the impact of the Goat Production Improvement Project (GPIP) at its mid-point in the life of the project. The evaluation team was instructed to examine the technical and extension aspects of the project to determine if progress is being made toward reaching the goals and objectives set out in the grant.

The USAID Mission in Haiti also requested that the team look at how the GPIP project fits into the Mission's Action Plan for hillside land management.

1.2 Summary of Project Description

1.2.1 Purpose

The purpose of the GPIP project was to establish within the Ministry of Agriculture and Natural Resources and Rural Development (DARNDR) the capability to:

- multiply superior animals
- adapt technology to local conditions and improve the traditional production system
- train technicians and producers
- deliver technical assistance and improved animals
- promote and assist in the formation of nuclei family farmers who will breed improved animals
- identify and assist in the establishment of credit and marketing mechanisms

1.2.2 Project Funding

The project has three major participants: MARNDR, Winrock International, and USAID. The financial contributions to the project by each party are:

MARNDR	$ 180,000
USAID's Operational Program Grant (OPG)	$1,000,000
Winrock International	$ 380,000

1.2.3 Duration of the Project

The GPIP is a 3-year project beginning on June 1, 1984 and scheduled to terminate on May 31, 1987.

1.2.4 Implementing Agencies

The principal participants in the implementation of the project are MARNDR (Government of Haiti) and Winrock International, Morrilton, Arkansas, U.S.A.

USAID has contributed to the project financially with an Operational Program Grant (OPG).

1.2.5 Historical Perspective

The Goat Production Improvement Project began in 1982 when Winrock International joined with the United Methodist Church of Arkansas to construct a goat production facility at Hinche in the Central Plateau of Haiti. In 1984, USAID bought into the project and the scope of the project was expanded from a regional focus to a national program with the proposed construction of a second station at Gonaives in the western region. An extensive component was added with emphasis on technology transfer.

1.3 Summary of Major Findings

The evaluation team reviewed the GPIP project after a dramatic change in the political structure of Haiti. The current political instability has directly impacted on the outcome of one component of the project. Beginning January 31st and through subsequent weeks, the project site at Gonaives was completely destroyed by an unknown group of people during the revolution. A total of 160 animals were stolen from the farm, the wire fence around the perimeter of the farm was taken, and the farm buildings were vandalized.

The evaluation team made a special trip to the farm site and could see that Dr. Manual Sanchez had done a remarkable job in construction and start-up of the Gonaives Center in about six months, June to November, 1985. The team wishes to recognize his achievement and joins him in the disappointment he feels for the lost opportunity for the people who will not benefit from the impact of the project.

At the same time, the evaluation team wants to recognize Mr. and Mrs. Ed Geers for their courage and fortitude to maintain their presence at the Papaye Farm even with the signs of obvious threats to their possessions and the goat project site. Their courage to stay in the face of adversity saved the remaining site from certain ransacking. Their long association in the project area and their obvious respect from the local inhabitants has permitted the project to continue. The particular dedication of the MARNDR support staff on the farm must also be commended.

The recent events not withstanding, the evaluation team was able to move freely within the country to assess the progress of the project at Papaye Farm in Hinche. The findings of the team are enumerated as follows:

1. The project proposal was not realistic in its goals and objectives given the length of time it takes to successfully implement a livestock project. The role of livestock in the Haitian rural economy will make it difficult to increase meat and milk consumption without a major sustained technology transfer effort through a comprehensive extension program.

2. The project has focused primarily on establishment of breeding stock of crossbred goats for distribution. The team considers this to be Phase 1 of the project. Emphasis now needs to be shifted to the technology transfer phase with reorientation to off-farm activities.

3. Fifty-seven improved crossbred bucks have been distributed as of April 1, 1986. The project has reached approximately 39% of its targeted primary recipients at this point in the life of the project. Four goats have died and one was stolen which reduces the impact on secondary beneficiaries.

4. The distribution system of bucks to farmers has been inadequate because little follow-up has occurred to check on their performance and the impact on the community. Although procedures and forms for extension visits have been developed, no feedback mechanism is operating for tracking an animal's performance and the impact on the communities. No quality control is present on placement of bucks, and recipients are not required to make any initial preparations, i.e., shelter before receiving a buck.

5. The effectiveness of the training programs for recipients is questionable. Visits to households' of many recipients found that several of the essential management tools were not being performed. Training materials are not available in French or Creole after two years of the project. There was a visit by an extension consultant in July 1985, but materials are not yet

available in the field. Materials are necessary for an effective education program.

6. Concern exists about the commitment of MARNDR to provide necessary support for the project. Counterpart staff and extension personnel have not been appointed in a timely fashion. Salaries have not been paid on a regular basis which has resulted in low morale among staff. Project equipment has not been provided which has limited the effectiveness of the extension component.

7. No advancement has been made in establishment of nuclei breeding stations for involvement of off-farm participants. Clarification is needed on what is proposed so work can begin immediately.

8. The use of local materials for fencing and shelters is demonstrated on the Papaye Farm. Tech packs have not been adopted and tested for small farmers goat production off the Farm.

9. The expected increased value from a crossbred buck in a farmer's herd is too early to evaluate. The off-spring have only 1/4 exotic blood, and the limited data suggests animals do better under traditional management than when managed on the farm. If no new marketing strategies are recommended for the farmers, potential value of the animals might be dissipated over time as animals remain in the herd.

10. With a lack of increased utilization of meat and milk, herd numbers could grow and percentage offtake remain the same or fall. Efforts are needed to stimulate market demand for goat products.

11. Project was decentralized and expanded to national focus before an adequate extension model and support system was developed. Only limited technical assistance from the Papaye Farm has been provided to less than 25% of the total recipients.

1.4 Summary of Recommendations

The recommendations by the evaluation team are listed for five major actitities of the project:

Papaye Farm:

1. Appointment of a farm manager and counterpart to Mr. Ed Geers by MARNDR.
2. Limit size of the foundation herd to 300 does.
3. Continue breeding plan and add 5/8 x 3/8 cross.
4. Start testing 1/2 and 3/4 exotics and a control group of Haitian goats (bucks, females, and castrates) for feed efficiency on forage, grain, and forage plus grain supplement to determine performance standards and dressed carcass weights.

Training and Extension Programs:

1. Training materials in French and Creole on goat husbandry have been delayed and are needed immediately.
2. Intensive training of trainers should start as soon as trainees are identified.
3. Streamline course to make it simple for trainers -- make it repetitive and focus only on goat husbandry.
4. Emphasize "hands-on" experience with tools available to farmers.
5. Setup schedule of visits and plan refresher courses in the field for recipients -- a minimum of 2 per year.

Development of Tech Packs:

1. Design, test, adapt, and implement tech packs. Testing of packs includes economic evaluation.
2. Tech packs need to be comprehensive but simple, and focus on:
   - confinement management
   - feeding and watering

- basic animal health
- improved forage development
- local materials

Marketing Programs:

1. Design and implement market mechanism for developing alternative outlets for goat products, e.g., milk, hides, or high quality meat.
2. Market research needed on new product development for goats -- focus on simple technologies for small-scale farm or village operations.
3. Develop and test market pilot projects, especially regarding collection, distribution, and sale of live animals and possibly milk.

Distribution of Improved Goats

1. Modify the system of distributing bucks to recipients:
   - Establish criteria and monitor its adherance
   - Recipient signs a contract
   - Remuneration for buck or doe should be continued
   - Priority given to recipients in Hinche district
   - Bucks given to recipients outside Hinche only to carefully select PVOs and groupement which have demonstrated capabilities in animal husbandry and can assure feedback to the project (USAID could assist in selection these).

2. Begin establishment of stud nuclei breeding centers that can promote off-farm production. Clarify their design and implementation and establish models in Hinche district. Experienced private sector operations should be considered, provided there are direct benefits to present farmers in the locality.

1.5 Summary of Major Lessons Learned

Important lessons can be learned from the GPIP which are especially relevant to livestock projects:

1. Animal production can work, but mortalities are high. This can be minimized through controlled breeding and improved feeding systems.

2. From on-farm production data, positive weight gains have been found between crosses and the Haitian goats. Off-farm research needs to confirm whether the relationship holds under traditional management systems. Haitian does seem to improve their performance under better management and nutrition regimes. The effect of management alone could significantly increase animal performance, with additional benefits from careful culling and selection.

3. Without development of marketing strategies for the products, e.g. meat, milk and hides, animal productivity may grow, but benefits will be minimal to farm family. External costs of natural resources depletion could increase if numbers would increase. Monitoring of herd numbers is necessary to evaluate this situation.

4. Improvement in animal genetics will not be expressed without improved husbandry technologies adapted to local conditions, and complementary extension activities to provide logistical support and training to primary and secondary beneficiaries.

1.6 Development Impact

1. The project has not produced enough animals for distribution to adequately assess the impact of the project. This is partly due to high mortalities as well as the physiological nature of livestock that require a longer time before animal numbers are sufficient.

2. Assumption that improved animals will result in increased meat and milk for households is not guaranteed. Attitudes on utilizaton of by-products need to be ascertained. Increased animal utilization will require GOH support in extension and improvement in market facilities.

3. Intra-household dynamics on labor allocation to household activities may constrain utilization of certain aspects of tech packs needed. Improved forage and livestock systems will need to be carefully tailored to household requirements.

4. Increased availability of meat and milk may not result in increased household nutrition, especially to vulnerable groups in the household: children and pregnant women. Preliminary impressions are that goats are mainly a source of cash; and when eaten in the home, meat goes mainly to the adults. Unclear whether this is primarily male adults.

1.7 Methodologies Used in Evaluation

The evaluation team conducted the assessment of the GPIP project relying extensively on project documents. The major documents used were:

- "National Goat Production Improvement Program -- Haiti: Technical Proposal," Winrock International, Morrilton, Arkansas, U.S.A. July 1983.

- "National Goat Production Improvement Program -- Haiti: Cost Proposal," Winrock International, Morrilton, Arkansas, U.S.A. July 1983.

- "Goat Production Improvement Program -- Haiti: Status Report," Winrock International, December 1984.

- "Goat Production Improvement Program -- Haiti: Status Report," Winrock International, December 1985.

- USAID Grant Agreement

- Other Documents

Besides documents, members of the team visited the Papaye Farm and the Gonaives project sites. The team had extensive consultations with Winrock staff, MARNDR staff in the head office in Port-au-Prince and the regional office in Papaye. Information was collected on operation of the project.

The team also visited recipients of improved bucks from the Papaye Farm. The following number of sites were visited:

Peligre	1 site
Croix des Bouquets	2 sites
Hinche	8 sites
Verretes	2 sites
St. Marc	2 sites
Leogane	2 sites
Gonaives	2 sites

Members of the team visited market places, abbatoirs, and processing plants to assess the marketing opportunities for goat products in Haiti.

1.7.1 Composition of Evaluation Team

The following persons served on the evaluation in specialty areas for specified time periods:

NAME	SPECIALTY	TIME PERIOD
Gerald Phillippe Auguste	Animal Science/Agronomy; Representative of Min. of Agriculture, Haiti	4/6-4/23
Raul Hinajosa	Animal Scientist USAID/RD/DR Washington, D.C.	4/8-4/23
Henk Knipscheer	Extensionist Winrock International Morrilton, Arkansas	3/31-4/12 (Haiti) 5/5-5/9 (Winrock)
Gregory M. Sullivan	Agricultural Economist; Advanced Marketing Systems; Dallas, Texas	4/6-4/23 (Haiti) 5/5-5/9 (Winrock)
B. Dean Treadwell	Range Scientist USAID/Haiti	4/6-4/25

The team members had specific roles in addressing key components on the team. Philippe Auguste was requested to look at the extension component and the role of the Haiti Government in backstopping the project. Raul Hinajosa examined production systems both on and off the farm and how appropriate production practices could interface with new marketing systems. Henk Knipscheer assessed the extension activities and their effectiveness regarding the success of the project. Gregory Sullivan looked at the economic impacts of the project and suggested strategies for integrating technical and extension aspects for the remainder of the project. He served as the team leader on the project. Dean Threadwell evaluated technological packages that considered the forage and feed system for sustaining improved goat production.

1.8 Comment on Scope of Work

A copy of the team's scope of work in found in Appendix 15.1. The Directorate of Animal Production (Director Production Animals) in MARNDR also submitted a list of questions which they asked the team to address. Copies are found in Appendix 15.2 (English) and 15.3 (French). In addition to the scopes, a personal request was made by the

Minister of Agriculture to report on the destruction of the Gonaives project site. The team made every effort to report objectively on all aspects of the evaluation within the limited time available.

2. FINDINGS, ASSESSMENT, RECOMMENDATIONS AND LESSONS LEARNED

The findings and assessment of the evaluation team are based on goals and objectives stated in the grant agreement signed between Winrock International and USAID. The actual status of the project and the team's assessments are found in tables 13.1a, 13.1b, and 13.1c (Evaluation Matrix).

2.1 Goals of the Project

The project's goals were viewed as unrealistic given the nature of animal production in the tropics (table 13.1a). Stress, change in environment, missed synchronization in mating Haitian does, and young age of imported bucks resulted in a slow start in the breeding program. The first distribution of bucks was in November 1984.

The recipients of improved bucks generally have kept the offspring rather than selling so that it is too early to ascertain economic benefits. Producers' reasons for having goats as a source of cash indicates lower utilization rates for commercial and household consumption than projected in project proposal.

The lack of GOH/MARNDR's support has been the major factor in the project not meeting the goals at this point in the LOP.

2.2 Objectives and Outputs of the Project

The objectives (table 13.1b) and outputs (table 13.1c) of the project were compiled from the USAID's contract agreement and the Winrock International Technical Proposal. The team used project documents, mainly the "Project Status Report -- December 1985," personal site visits and discussions with project staff (both Winrock and GOH personnel), to make their assessments.

2.2.1 Multiply Superior Animals

The team found the project meeting this objective and 895 improved kids have been produced. The team realized difficulties in managing the farm, especially because of the lack of GOH support.

2.2.2 Adapt Technology Packages and Improve Traditional Production Systems

Some simple technologies have been demonstrated on the Papaye Farm, e.g., sheds, natural fences, and forage plots. The team felt that tech packs are not complete for testing in the field and there has been limited dissemination of techniques off the farm. It is essential that systematic development of tech plans for various production conditions need to be given highest priority. This effort could be closely coordinated with USAID because of numerous complementary activities, e.g., ADS II, Targeted Watershed Project, Hillside Agriculture Project, and various PVOs activities.

2.2.3 Train Technicians and Producers

The project staff has been active in various forms of training. The training has varied between domestic and international visitors. The team felt that the number of visitors other than trainees has created a burden on day-to-day management of the farm. The team felt future emphasis needs to be placed on training trainers (extensionists) who will be responsible for conducting training courses. Simple, direct, and repetitive highlights of husbandry should be emphasized. Pictoral and creole materials to give to the recipient for future reference would be useful.

The team recognized difficulty in effectively training a peasant in a 2- or 3-day visit to the Papaye station. Follow-up visits to the farm are necessary and without GOH support impact of training will be reduced, unless new alternatives can be identified.

2.2.4 Promote and Assist Nuclei Stud Breeding Centers

This component has not been formally started. Project staff are unclear what is the function for this component. In discussions with project staff, several potential sites exist for upgrading to stud breeding centers. This project component needs to be emphasized and clarified in the future because it will allow reduction of production pressures of the Papaye Farm and promote increased animal distribution at the local level.

2.2.5 Identify and Assist in Development of Producer Credit and Marketing Mechanisms.

Some work has been done toward this objective, but no implementation of mechanisms has begun. Lack of GOH support has pre-empted marketing work. A mechanism for increasing demand for goat products is essential to modernize herds and allow genetic potential to be expressed form improved animals.

2.2.6 Winrock Reporting to MARNDR and USAID

Winrock has met the reporting obligations as specified in the Grant Agreement. However, it is evident from this evaluation that Winrock has not alerted USAID in a timely manner as to the magnitude of certain problems, most specifically the serious negative impacts towards attaining some of the project objectives due to the lack of manpower and support provided by the GOH/MARNDR. Furthermore, the delivery of final, and occasionally even draft reports is excessively late (Ridenour draft/final received 8 months after consultancy; extension materials not received to date). In general, technical quality of reports is good especially the data analysis on the breeding herd at Papaye Farm. Unfortunately, several omissions or exaggerations of the project's impact detract from the 1985 Status Report.

2.3 Recommendations for Improvement of Project

The team's recommendations focus on five priority areas which are needed if the project is to achieve the goals and objectives set out in the project's contract.

2.3.1 Operation of the Papaye Goat Farm

1. The GOH needs to appoint a farm manager counterpart to learn the operation of the goat farm. The farm manager must be a motivated individual who has a strong interest in goat production. Table 13.2 is a revision of the MARNDR contribution specified in the MARNDR-Winrock agreement.

2. The farm manager should limit the stocking rate to 300 breeding does. This shifts the emphasis from expanding the herd to simply maintaining it, so as to shift emphasis to breeding, forage, production, and nutrition both on- and off-farm. The fifty hectares of the farm has a carrying capacity of no more than 300 does. Improved animals will be needed to start nuclei breeding centers.

3. Project should consider within composition of crossbred strains a 5/8 exotic and 3/8 Haitian cross to test its merit in relation to other crossbreds proposed.

2.3.2 Development of Technology Packages

1. Design, test, and implement technology packages which are adapted to local conditions. Tech packs should be as comprehensive as possible to deal with all pertinent aspects of goat husbandry under varied small farm settings, but should not be complex. Focus initially on confinement management, feeding and watering, and basic health, using locally available materials, then introduce

better breeding and marketing strategies. A logical framework for analysis and selection of appropriate options is presented in Appendix 15.4.

2. Forage production systems that will provide adequate nutrition for allowing genetic superiority to be expressed in peasants' herds need to be tested on producers' farms.

To accomplish this within the remaining LOP, a priority emphasis must now be made due to the imminent rainy season. Key activities should include: (a) procurement of seeds and plant stock for the forage species recommended by Gonzales and Proverbs; adequate quantities for a minimum of 10-test plots should be procured. If required, Operation Double Harvest should be contracted for seed storage arrangements. (b) development of a specific plan, including site selection, performance and yield assessment, in collaboration with both MARNDR and USAID, to introduce and test these plants both on and off the Papaye Farm. Forage test plots should be associated with recipients of improved goats and(or) settings representative of the main ecotypes found in the Central Plateau. (c) The services of Sanchez or a forage agronomist should be considered to initiate (and perhaps conduct) these species trials. (d) Workplans, Terms of Reference, and present status of both the crop residue and agroindustrial by-product assessment for potential feedstuffs, and the Florida A&M forage nutrient analysis program in Haiti, should be made available to all project participants immediately. A time schedule for the development of recommended rations for various small farmer settings should also be provided. (e) Based on the results of the forage species trials, detailed plans should be submitted for both followup trials, and the establishment and operation of a seed/plant stock production nursery for at least those species which performed best in the initial trials. Recommendations for appropriate grass/legume mixes at representative small farmer levels should also be provided.

All of the above activities should be accomplished in close collaboration between MARNDR, Winrock, and USAID personnel.

2.3.3 Training Programs and Off-farm Extension

1. The GOH needs to appoint a person to be responsible for the training programs and outreach activities. Training of DAMIEN staff is needed to provide adequate numbers of people to establish an extension program. Training needs to first focus on the trainers who will teach peasants both on and off the Farm. See proposed budget (1986-87) for extension outreach coordinator and three field extensionists in table 13.2.

2. The focus of the training program needs to be limited to goat management, health, forages, and also marketing skills. A plan of followup visits with information materials is needed

3. Training materials are frequently needed and should be written in French and Creole to be used in the formal course as well as outreach programs.

4. Training should further extend the use of "hands-on" experience that reinforces the formal courses.

2.3.4 Design and Implementation of Marketing Programs

1. Give immediate attention to design and implementation of a mechanism for alternative utilization of goat by-products. A Haitian could be assigned to assist the project on a full-time basis.

2. To support development of market systems, market research needs to be collected on live weights and carcass characteristics for

targeting product development. Research on possible market outlets for meat, milk, and hides needs to be conducted.

3. Project needs to begin developing marketing plans based on baseline research conducted in 2 above. Additional monies need to be allocated from project funds to set up and establish a market distribution system for market-weight animals. Project could investigate market opportunities of selling in Port-au-Prince.

2.3.5 Distribution of Improved Goats

Major rethinking is needed on establishment of a distribution system for improved bucks and later improved does.

1. Give priority in distribution of improved goats from Papaye to recipients in Hinche district. This will allow better follow-up in supervision and establishment of feedback for development of a model program.

2. Bucks can be provided to other recipients outside Hinche district but only on a limited basis and after recipients comply with certain requirements. A system of checking on bucks would be necessary.

3. Project staff, GOH counterparts, and USAID can design a set of criteria that must be met before delivery of any improved animals. Suggested criteria:
   - construction of a shelter
   - adequate fencing for a confinement pen around shelter
   - an adequate year-round water supply
   - a year-round supply of forage, feed, or fodder with confinement feeding

. Recipients of improved bucks should agree to a contractual arrangement that creates incentives to utilize the buck to its maximum potential, number of successful matings; and for receiving a doe, return one kid to the project.

2.3.6 Winrock Reporting to USAID

1. All future consultants assigned to this project should be scheduled so that completed draft reports are left in Haiti and a copy delivered to MARNDR and to AID prior to their departure.

2. Copies of monthly reports made to MARNDR (or other written reports by the Winrock field staff) should also be sent to USAID.

3. On a quarterly basis, starting in September 1986, a brief report by COP of Winrock should be submitted to MARNDR and USAID indicating the progress made on the specific benchmarks set forth in this evaluation, and identifying any specific problems encountered and possible solutions.

4. To permit USAID to analyse the financial status of this grant so that any possible extension of the project completion date can be authorized without interrupting project activities, the 1986 Annual Report should be submitted to MARNDR and USAID within 30 days of the end of 1986, and should include a projection of anticipated expenditures for the remaining LOP. Thereafter, the financial accounting submitted for all drawdowns against the FRLC should be submitted to USAID/Haiti at the same time.

2.4 Strategies for Implementation of Key Recommendations Within Remaining Time of LOP

In the view of the evaluation team, every effort should be made to redirect the project during the remaining period of the contract which expires on May 31, 1987. Approximately 40% of USAID's OPG has been

spent as of December 31, 1985. Based on projected expenses, surplus funds will be available at the end of the project's LOP. The team recommends extension of the project only if certain benchmarks can be reached during the next year (Appendix 15.8). These requirements are:

1. MARNDR provide personnel and financial support as outlined in table 13.2. This funding should be pledged as a recurrent cost. MARNDR's performance on fulfilling the contract is necessary if the project will have a sustained impact. Personnel selected are assumed to be highly motivated individuals who have a strong interest in development of the goat industry. Job descriptions should be prepared in advance of staff assignments and Chief-of-Party consulted before appointments. MARNDR must provide a plan of their intentions for the final year of the project by June 1, 1986.

2. Activities at the Papaye Farm need to be redirected such that the farm herd is maintained at the current size of 300 breeding does and emphasis be placed on development of stud nuclei breeding centers in the private sector or with groupements or PVOs. The project must successfully establish four breeding centers by May 31, 1987 if the project is to be considered for extension. Off-farm activities should take precedence in allocation of resources during the final year.

   The establishment of the nuclei breeding centers need to be done in concert with the recommended activities on development of tech packs and initiation of marketing alternatives. Nuclei breeding centers are expected to embody a higher level of management (tagging, weighing, health, buck replacement, etc.) than a regular recipient of an improved goat. Furthermore, a contract needs to be signed with participants that certain conditions will be met: matings, distributions, doe exchanges. A credit program in delivery of animals and inputs in exchange for offspring could be developed.

Nuclei breeding centers need to encompass the following groups: groupements, PVOs, and private individuals. Assurances need to be received that households in the surrounding area will be beneficiaries of the program. Develop a prototype contract between nuclei centers and secondary beneficiaries. Agreement reached before delivery of animals.

3. The project must design, install, and evaluate a minimum of four tech packs, which reflect different option sets for the multiple package components described in Appendix 15.4. Ration formulations based on locally available feedstuffs and nutrient analyses need to be completed. Acquisition of seeds and plant stock for recommended forage plants must be made by June 1, 1986, and multiple on- and off-farm field trials established during June.

4. Training materials must be in use in the field in French and Creole not later than September 1, 1986, and modified as experience dictates by the current completion date of the project.

5. The marketing study should be completed by August 1st for the Hinche district. The purpose of he marketing study is to identify constraints and opportunities for marketing alternatives for goats and their products. Since the evaluation team has placed a high priority on off-farm activities, the marketing study needs to focus on strategies for groupements, PVOs, and private individuals.

   Sara Guthrie, the agricultural economist on the project, would be responsible for conducting the study. She should specifically look at input and output marketing channels for livestock products with the aim of recommending a pilot marketing project for goats. This would include examining the current distribution system for example at Los Palis in Hinche District. After alternative marketing channels are targeted for testing, an economic analysis of the necessary production and tech packs would be done to tailor the appropriate system to the different market niches identified.

An individual needs to be identified and evaluated as an alternative market option. Cooperation from market agents and either HAMPCO or FAMEPAK could be arranged. The market pilot test would need to be completed by December 1986.

Additional resources need to be allocated to this endeavor during the final year of the project. Sara Guthrie would have to be assigned full-time to conducting the study, implementing a pilot project and submitting a written evaluation. The evaluation report should be submitted to MARNDR, Winrock International, and USAID no later than January 1, 198~~8~~7.

A long-term marketing plan for small scale production units, e.g., groupements or private individuals, needs to be completed by February 1, 1987. Project funds would need to be made available to conduct the pilot test which may require buying back animals from recipient farmers.

6. The project needs to indicate what revisions have been made in distribution of bucks and does. Feedback information must be available on animals distributed, and the impact they are having on local herds measured. Appropriate field monitoring methodologies are needed by July 1, 1986. Data processing and analysis needs to be done and analysis need to be done within Haiti and could be performed at the MARNDR office at Papaye Farm. Will Getz should be involved in identifying the key indicators that need to be measured in the villages. Data requirements should be kept to a minimum.

2.5 Lessons Learned

Several lessons are learned from the first two years of the project. These lessons should be instructive to project staff and participating agencies in directing the project during its remaining time.

1. Livestock development projects are slow in the establishment period because of the biological nature of animals. This is especially true under tropical conditions. Production estimates and target numbers of beneficiaries need to take into consideration these lower technical coefficients in livestock.

2. Improving the breed characteristics is not a sufficient condition for livestock development. An integrated package must include feeding, nutrition, health, marketing, and management systems.

3. The establishment of the goat project at Papaye Farm is an excellent base for extension of information for the Ministry of Agriculture. Activities should concentrate on transfer of technology to sites off the Papaye Farm.

4. The introduction of improved goats can be visualized as a catalyst for economic change in a rural community. The team visited a village called Los Palis in Hinche district. A motivated group of farmers, both men and women, were involved in goat husbandry. This group is active and is mobilized around having improved goats.

5. Successful implementation of a project requires a strong networking of support systems to provide information and sustain in-country participation. The GPIP project does not have this strong networking system in Haiti. There is no other experiment station conducting research on goat husbandry, and there seems to be little interaction with local universities or research institutes presently. Interest on the part of MARNDR does not seem very high.

6. Marketing constraints exist in development of agricultural products. These constraints need to be addressed early in the project rather than later. Strategies for product development takes time to implement, especially when it involves changes in consumer eating habits. Research is needed on new product development.

7. The GPIP project started as a regionally-focused project. The pressure to attract donor funding resulted in expansion of the project to a national program. This expansion was too early in the life of the project, and this created many internal difficulties. This is why the thrust of the project needs to be contained to the Hinche district so that prototype models can be developed for extension to other areas of the country, e.g. areas targeted for the hillsides.

3. OVERVIEW OF THE EVALUATION

3.1 Objectives of the Evaluation

The Goat Production Improvement Project (GPIP) is at the end of its second year of a 3-year project. The official termination date is May 31, 1987. A mid-term evaluation is required to assess the development of the project to date, evaluate the projected outcomes of the project, and provide guidance to the Ministry of Agriculture (MARNDR), Winrock International, and USAID/Haiti on any necessary changes during the remainder of the project's life.

3.2 Methodology for Evaluation

The cross-section of professional specialties on the evaluation team provided a foundation for an interdisciplinary approach for evaluation of the GPIP project. All the team members had experience with livestock production in the tropics and were able to quickly ascertain the potentials and constraints for improved goat production in Haiti.

Each team member had copies of all pertinent documents relating to the project. The major source of written information was "Goat Production Improvement Program -- Second Status and Technical Report," published in December 1985. This document and others provided extensive information on progress of the project.

The team also met with key Haitian and U.S. project staff to be briefed on the status of the project. Government officials were interviewed at the national, regional, and district levels.

The team visited both project sites at Hinche and Gonaives to see first-hand what the project was accomplishing. Members of the team visited several recipients of improved bucks in the Hinche district and outside. An assessment of the benefits received by recipients was

evaluated. The recipient's management practices were assessed to determine what affect training and extension was having on their operation.

Interviews were held with other participants in the goat industry. Production, processing, marketing, and retailing firms were interviewed to assess the market potentials for goat products. Interviews were conducted in Port-au-Prince as well as in the project sites.

The team made every effort to dialogue in an open forum with project staff to formulate realistic recommendations. The team hopes that this evaluation report is seen as a tool for guidance during the remaining time period of the project.

4. BACKGROUND INFORMATION

4.1 Historical Perspective of the Goat Production Improvement Project (GPIP)

The GPIP started as a project between the Ministry of Agriculture (MARNDR), Winrock International and Arkansas Area United Methodist Church in March 1982. The purpose of the project was to establish a regional goat improvement center in Hinche in the Central Plateau. The project was funded at the level of $620, 979 for three years.

In May 1984, the project received an Operational Program Grant (OPG) of $1 million for expansion of the project to have a national focus. THe project funds were for a period of three years. The termination of the grant is May 31, 1987.

The decision to expand the project's focus from a regional to a national program has placed enormous strain on infrastructure and available program staff. In the December 1984 status report, reference is made to difficulties in receiving GOH staff support (p. 47). This problem has continued to constrain the full implementation of the project. In discussions with Winrock staff, the chief-of-party, who lived at Papaye Farm, could not adequately supervise the initial development of the Gonaives site. Logistics and communication prevented regular visits and certain personnel problems were allowed to become more serious than needed. This decision to expand the project to a national focus was premature and has placed the overall project in jeopardy.

4.2 Role of Livestock in Haitian Agriculture

Reliable population data for livestock do not yet exist except for preliminary data collected by the Agricultural Development Support (ADS-II) project at the Ministry of Agriculture, Natural Resources and Rural Development (Ministere de l'Agriculture, des Ressources Naturelles et du Developpement Rural -- MARNDR). These data only refer to the

south province (Department de Sud) and are shown in table 13.3. Stratification of these data in five different ecozones allows a deeper insight in the role of livestock by species (table 13.4). The data indicate the high density of goats in virtually all zones if calculated per hectare. Goat density per 1,000 inhabitants is about twice as high in the upland areas as it is in the lowland areas. Further examination of the data showed similar tendencies for sheep and large ruminants, although not as pronounced. Figures provided by Sara Guthrie implied goat densities on the Central Plateau area as high as 679 goats per 1,000 agricultural population, which would amount to more than 500 goats per total (agricultural plus nonagricultural) population. These goat density estimates imply that the total goat population in Haiti is probably much higher than the ones reported by Eriksen (1985) and Conrad (1978) who both estimate goat population of around of just above 1 million goats. However, a goat population of well above 2 million is more likely.

4.3 Market for Goats

The outlet for the farmers' goats is the local market. Between farm and markets goats often are transported "by foot." When transport is available and over larger distances goats are transported by truck or taxi as a piece of luggage. Specialized traders and large farmers transport goats by pick-up truck loading up to 30 animals per load.

Once arrived in the early morning with a goat at the market, the farmer may or may not use the services of a market trader. Such a middleman agrees with the farmer on a price, and tries during the remainder of the day to sell it for an higher price thereby pocketing the profit. If the animal is not sold, it returns to the farmer. Thus, this kind of middleman does not assume ownership of the animal and plays definitely the role of a broker. Similar kind of brokers can be found on the village level, where also goats can be traded to middlemen who assume full ownership of the animals.

Goat traders face two kinds of fees or taxes. One is the market fee, about $1.00 per goat sold. The other is an administrative fee for a "laissez passer" which allows the animal to be exported from a rural section. It is issued by the police officer or the market official at the market side. Apparently, market fees are paid by the seller, but sometimes partly also by the buyer.

The local markets for goats have no provisions for reducing stress on animals. In only one market in Thomassique was water nearby, but that was occupied by cattle. Goats stand for long periods without food or shelter waiting to be sold. In the major market north of PAP, most goats had all four feet tied together and laid flat on the ground. The shrinkage and stress on animals are extremely high. Transportation costs from Hinche to PAP is 2 gourdes ($.40) per head; and when market fees and the shrinkage are added, marketing costs are high.

Prices for goats tend to approach $1.00 per kg live weight. FAMEPAK (Family Meat Packers) at Port-au-Prince buy local goats at $0.41 per lb, which is equivalent to $0.90 per kg live weight. They generally buy per pick-up load from large goat producers. Improved breeds carry a premium of about 10% above this price (up to $1.00 per kg live weight) as their dressing percentage is found to be higher (0.46% for improved versus 0.41% for local). Of course, such a premium depends on the quality of the goat. In personal discussions with FAMEPAK, the manager said he would pay 10¢ over normal prices if animal has a uniform covering of fat.

FAMEPAK also buys by the carcass: $1.00 per lb carcass. Goat meat is sold by FAMEPAK approximately $2.00 per lb. Table 13.5 shows the prices of selected meats during the period of the team visit (April 2, 1986) and apparently have only slightly increased over the last year (since May 1, 1985). FAMEPAK slaughters presently about 30 goats per week, down from 50 goats per week before the revolution. Its market is the demand by foreigners and affluent Haitians. If lamb is not available, it is often substituted by a (good) leg of goat apparently always

to the consumers' satisfaction. The company processes the carcass and sells as bone-in pieces and sells frozen in a box. Sale price was $2.20 per lb on April 19. This product has been sold to institutional buyers, i.e. military and does well.

Port-au-Prince is the main demand center for meat. Prices of live animals in the capital tend to be about 20% higher than elsewhere in the province.

The vast majority of Haitians eat meat "fresh," i.e., the same day it is slaughtered. Goat meat is popular. Mutton, however, carries a discount as it is fatter, associated with skin disease (unlikely to be true) and voodoo practices. Haitian preference is for lean meat. The degree of substitution of goat meat by mutton is not known. For example, the ADS-II data (table 13.3) showed a substantial sheep population in the south province. The suspicion is that some of the sheep meat might be sold as goat meat.

Slaughter by-products are valued in Port-au-Prince at $3.00 to $5.00. Assuming an average live weight of 25 kg per animal and a market price of about $1.00/kg live weight, the value of the by-product is about 15% of the total value of the animal. Skins are used for art work and drums. Intestines, head and feet for soup. Outside Port-au-Prince, the value of by-products tend to be lower. For example, the value of one goat skin at Hinche is only one gourde ($0.20).

4.4 Goats and USAID's Action Plan for Haiti

There are three statements in the Mission's Action Plan which are directly relevant to this project. Under item 2 of the major components of the hillside strategy, which is labelled as "Development and Dissemination of Improved Technology," "the acquisition of new genetic materials...including... livestock" is identified. Under item 3, "Institutional Development," the "supply of new and improved genetic material" is an essential input "to a dynamic agricultural sector" is

mentioned, along with a long-term goal of the creation of an endowed National Agricultural Research Foundation. In the section identifying Targets and Short-term Indicators of Progress, a FY 1986/87 progress indicators under Technology Generation and Dissemination is clearly stated: "...under the Winrock Goat Project, technological improvements in types of goats, feeds, and hillside pastures will be made available."

Accordingly, the goat project was foreseen as a significant intervention within the Mission's Action Plan, and there are definitive expectations for the end-of-project outputs: improvement in goats, feeds, and hillside pastures. With the experience of time since the preparation of the action plan, these expectations can be further elucidated. Improved goats is synonomous with the genetic upgrading produced by crossing the indigenous Haitian goats with Nubian and Alpine breeds. Improvements in feeds recognizes the capability to make better use of available feedstuffs (wild forage, crop residues, and other materials) by formulating rations to provide the best nutrition possible under the varying local conditions. The interest in this aspect of the program is highlighted by the AID funding of two corollary projects which are analysing ruminant animals to identify nutrient deficiencies, and are analysing selected forage to ascertain its nutritive quality.

Improvements in hillside pastures has now been recognized to include two subcomponents. The first, which is applicable to the drier areas in northwest Haiti where land is suitable primarily for extensive grazing, encompass the traditional approach to renovating the deteriorated rangelands by reseeding with improved, adapted forage species. The goat project has a component to conduct test plots for this purpose. In other areas of Haiti, where dryland farming is more intensified and discrete pasture areas are rare, the second subcomponent has evolved into the recognition that pastures can be vertical and tall, rather than horizontal and expansive. Thus, recognizing the limited areal space available and the availability of tall and productive growing perennial grasses and legumes, hillside pastures can now be improved in the form of productive vegetation strips or small area forage banks and utilized

by a cut-and-carry or limited access grazing system. The fact that such vegetative strips, if planted along the contour, can also serve as soil and water conservation measures, fits exceedingly well into the major Targeted Watershed Management thrust of the action plan. In either case, ruminants, such as goats, constitute a major pay-off and motivation within the Mission's Action Plan.

Progress towards attaining the separate goals itemized in the Action Plan can be summarized as follows:

1. Improved (i.e., hybrid) goats have been produced and a foundation herd is established. Emphasis during the remaining life of the project (LOP) needs to be on distribution of these animals along with an adapted technology package to improve goat husbandry and management so that the animals can express their true genetic potential.

2. Nutritional analyses of both animals and available feedstuffs is underway and will be able to provide definitive information and at least limited field testing of more balanced ration formulas. this will be a significant achievement, since the poor nutritional regime of most livestock in Haiti is a major constraint on production.

3. Pasture and forage improvement activities have not been emphasized to date. The destruction of the Gonaives Farm during the political turmoil has effectively precluded any advancements in the drier, expansive rangelands of the northwest. Instead, efforts are now being concentrated in the small holding, mixed farming localities which predominate in Haiti, towards the field testing of improved forage plants and how these can best be placed within the farming systems. Since many of these localities are on the steep slopes, and the planting technique is promoting contour vegetative strips, the results of these trials can be expected to attain the specific goal of this project, and in addition the technical package and

extension methodology should be applicable to the broader targeted watershed programs described in the action plan.

5. PROJECT DESCRIPTION

5.1 Development Problem

Haiti is a country with large human and animal populations which put enormous pressure on the limited land base. The majority of the population lives in the rural areas and is dependent on agriculture for their well-being. If agricultural development is to be improved and sustained, then management of livestock must be a necessary component in the development strategy.

5.2 Project's Goals

Goats are a predominant livestock activity in the household mix of activities. In a major agricultural region where one of the project's sites (Hinche, Central Plateau) is located, a survey of producers found 80% owned goats. The goals of the project are to focus on goats as a strategy for improving the socioeconomic well-being of Haitian families. The specific goals of the projects are:

1. Increase availability of meat and milk.
2. Improve the socioeconomic well-being of 7,000 Haitian families.
3. Increase the level of income.

These goals do not conflict and together strongly emphasize a strategy for rural development in Haiti.

5.3 Project's Purpose

The purpose of the project is multi-faceted but focuses on improvement in goat production as a method toward economic development.

1. Multiply superior goats.
2. Adapt technology to local conditions and improve traditional production systems.

3. Train technicians and producers.
4. Deliver technical assistance and improved animals.
5. Promote and assist nuclei of family farmers that will breed improved animals.
6. Identify and assist in establishment of producer and marketing mechanisms.

5.4 Project's Outputs

The following outputs are expected from the project:

1. Train personnel
   - counterparts (2)
   - herdsmen (2)
   - project extensionists (6)
   - extension agents
   - small-scale producers
   - community awareness
2. Training Syllabry/Program
3. Facilities/Commodities
4. Breeding Herd
5. Stud breeder nuclei
6. Design Tech Packs
7. Delivery Systems of Technology and Animals
8. Develop Marketing Strategies

5.5 Project's Inputs

Inputs are required from three sources: Ministry of Agriculture (MARNDR), Winrock International, and USAID. These inputs include facilities, equipment, personnel support, training support, breeding animals, operating costs, and other. Inputs are summarized by each agency:

5.5.1 USAID Funded Inputs

Under an Operational Program Grant (OPG), USAID will contract with Winrock International for the provision of the following services and goods:

A. Technical Assistance

The project will provide a total of 7.05 person years in expatriate technical assistance consisting of the following personnel:

Personnel	Person Years
Senior Livestock Specialist Chief-of-Party and manager of Central Center	2.0
Ruminant Nutritionist Manager Western Center	2.0
Short-term Personnel (TDY) Marketing economist, livestock facilities specialist, range management specialist, pasture/forages specialist, others as needed, technical support staff	2.25
Educational Materials Designer	.50
Program Administrator/Coordinator Headquarters	.30
Total Personnel	7.05

B. Training

The project will provide the following training inputs:

1. Practical training in U.S.A., 6 to 8 person weeks.
2. Practical, in-country training (all centers).
   a. Herdsman -- 44 training days
   b. Project extensionists -- 56 training days

c. DARNDR extensionists -- 300 training days
d. Volunteers/agricultural developers -- 300 training days
e. Family farmers -- 700 training days
f. Community training -- 200 to 300 training days

C. Commodities

This input category includes materials, goods, vehicles, equipment, and expendables acquired throughout the life of the project.

1. Construction materials for new center.
   a. One small dwelling for herdsman
   b. Fences for the center
   c. Water development and(or) delivery system
   d. Office and storage buildings
   e. Equipment shed
   f. Livestock shed, corrals, and working area

2. Vehicles, equipment, and machinery.
   a. Vehicles: two 4WD suburbans, two 4WD pick-up trucks, and four motorcycles
   b. Machinery: one 40 to 60 hp tractor with accessories
   c. Small equipment and tools

3. Furniture and fixtures for one small office at the Western Center and for one apartment/office in Port-au-Prince.

4. Breeding animals: 20 imported goats and 50 native goats.

D. Other

Project inputs in this category are associated with the operation and support of project activities and include: (1) project personnel allowances (e.g., relocation, home leave/R&R, and rent); (2) travel and per diem; (3) operating costs (fuel, oil, feed,

medicines, supplies, etc.) of the centers; (4) communications; (5) evaluations; and (6) overhead and administrative support.

5.5.2 MARNDR Funded Inputs

The Government of Haiti, through MARNDR, will provide the following project inputs:

A. Personnel

The personnel listed below will be assigned by MARNDR to the project on a full-time basis for the duration of the project.

1. Two counterpart managers
2. Six project extensionists
3. One project secretary
4. Two herdsmen
5. Five skilled workers
6. Three unskilled/semiskilled workers

Part-time personnel includes:

1. Translation, drafting and(or) graphics services equivalent to one person year during the life of the project.

2. One construction crew for a period of three months. A crew consists of two skilled persons (mason and carpenter) and 10 semiskilled persons.

3. Three person months of semiskilled labor per year per center.

B. Training

All in-country training will be conducted by Haitian and expatriate project personnel as part of their work responsibilities. Training inputs other than training personnel are room, meals, and

transportation for trainees. USAID funding provides room and meals. Transportation of trainees to the Central Center and(or) to the other centers is the responsibility of MARNDR.

C. Commodities

MARNDR's input in this category is 50 native does.

D. Other

Inputs associated with the purchase and(or) use of land and facilities allocated to the project and with the operation and support of the various project activities are grouped in this category. These include: (1) land, buildings, facilities, and equipment rental; (2) partial operating costs of multiplication centers (fuel, utilities, feed, medicines, and other); (3) travel and per diem of Haitian project personnel; (4) miscellaneous expendable inputs.

5.5.3 Winrock International Funded Inputs

Winrock International and the Arkansas Area Methodist Church will continue to fund expatriate personnel and operating costs at the Central Center (Hinche) during the first year of the proposed project. Thereafter, the Central Center will be funded by the Operational Program Grant. Winrock International will also contribute to the project a portion of the overhead/administrative costs previously approved by USAID in other contract agreements. In-kind contributions include a herd of 100 native does and 30 imported goats, facilities constructed at the Papaye Farm and vehicles/equipment provided to the on-going goat production project.

6. GOAT PRODUCTION ASSESSMENT

6.1 Background Information

Livestock in general play an integral part of rural Haiti. The hardy Haitian goat ranks third in livestock numbers representing 11.4% or an estimated one million head of the overall livestock population. Since the eradication of the swine population in Haiti due to an outbreak of African Swine Fever, the native or Creole goat has become an important source of protein and income for the Haitian farmer. However, the lack of resources and incentives to increase productivity have resulted in little growth of goat product output per animal unit. In general the Creole goats are usually small, average 26 kg, with slow growth rate, and low level of milk production.

The first project, entitled "Regional Goat Production Improvement Project was started on March 1, 1982 by Winrock International in a collaborative effort between the Ministry of Agriculture, Natural Resources, and Rural Development (MARNDR), Winrock International and the Arkansas Area United Methodist Church (AAUMC) in an effort to upgrade the native Haitian goat to increase their production of meat and milk. The upgrade breeding program was initiated with the importation of two sources of exotic germplasm of dairy goat breeds, the Nubian and the Alpine. These two breeds were selected over other dairy goat breeds based on Winrock's worldwide experience with dairy goats. These two breeds have proven to adapt and produce well in the Caribbean area. The first 30 purebred dairy goats were imported in January 1983, for use in the development of the composite dual-purpose goat. The composition of these 30 purebred dairy goats was 10 Alpine bucks, 10 Nubian bucks, 5 Alpine does, and 5 Nubian does.

These activities were executed under the first Winrock/AAUMC/MARNDR agreement.

In June 1984 Winrock International signed an agreement with MARNDR to extend the Goat Improvement Project with the financial assistance of USAID/Haiti who provided Winrock with an Operational Program Grant (OPG) of one million dollars.

The extension of the Regional Production Goat Production Improvement Project became a National Goat Production Improvement Project and was modified to emphasize the following major objectives:

1. The major thrust of activities would be goat breeding.
2. Develop technical packages to accompany the improved animals.
3. Emphasize extension and follow-up activities to ensure implementation of the technical packages, e.g.
   - Adequate nutrition for the improved goats produced under the project on a year-round basis.
   - Adequate water year-round.
   - Production of forage and better utilization of crop residue in order to efficiently implement a confinement systems which in turn would negate possible ecological damage from free-ranging animals.
   - Address the health problems which will increase when small ruminants are reared in confinement.
   - Address the marketing system of livestock by improving the traditional system; introducing innovative marketing ideas that will benefit and express the improved genetic value of the goats so that farmers have a real economic incentive to adopt improved management systems and devote more labor and time to their animals.

6.2 Goat Production

In Haiti livestock in general are rarely raised as a major enterprise. Instead of a specialized livestock system which is geared to the efficient production of a single product like meat or milk, they have multiple objectives. The farmer usually tries to obtain meat, milk,

breeding stock, storage of capital, and organize fertilizer all from the same animals at the same time. While this system seems to be efficient under the present system of management these objectives will likely be in conflict with each other and as a result, overall production will be minimized.

The Creole Haitian goat has been a major component of the rural Haitian system and in the advent of African Swine Fever, which eliminated the swine population, it now plays a major role as a source of protein. This project's major goal is to improve goat production within the Haitian rural environment. The objectives of the project are well established. However, due to the biological nature of livestock, this project is expected to have a life of at least 20 years, beyond the termination of the project, if full impact on the goat industry is to be realized.

Therefore the success and continuity of the project within the life of the project and beyond is contingent upon the commitment of a well-established and financially supported structure within MARNDR.

6.3 Breeding Goats

The first year of the project starting in March 1982 was developmental in nature. During this period, the foundation herd of Creole Haitian does was being acquired. This process began late in the fourth quarter of 1982 with the purchase of 54 Creole Haitian goats and was completed late in the third quarter of 1984 with the total purchase of 225 Creole Haitian does (table 13.6). The total acquisition of the foundation herd was staggered over a 20-month period for the following reasons:

1. Delay in construction of the basic facilities.
2. Technical difficulties in acquiring the Creole Haitian goats because of:
   - inability to purchase large numbers of goats at one time
   - reluctance of the farmers to sell female goats

- poor quality animals were more readily available than desired ones for the foundation herd
- stage of pregnancy was difficult to determine and the project needed nonpregnant does

These unforeseeable circumstances delayed the breeding schedule and the production of the estimated numbers of 1/2 blood kids.

The status of the foundation herd has changed since 1984 through April 1986, with the introduction of 5 Alpine and 5 Nubian does; the culling of 16 native does; and with the death of 6 of the 10 imported does. This reduced the foundation herd to 213 breeding does. The foundation herd will continue to change via a replacement program with highly selected crossbred female offsprings from the original 225 native Haitian does and 10 imported does. However, a highly selected nucleus of creole/native does will remain at the breeding center. To date 128 replacement females have been added to the foundation herd. These represent purebreds, halves, and three-quarters Alpine and Nubian females (table 13.7). Ten three-way cross kids, Alpine x Nubian x Haitian, have been born but these are in the immature or unweaned stage (table 13.8).

6.4 Breeding Program

The major thrust of the goat project is to initiate a breeding center (BC) to develop a dual-purpose-type goat. This would be accomplished by using the foundation herd of Creole Haitian goats and breeding them to two sources of exotic germplasm, the Nubian and the Alpine breeds. The first 30 exotic dairy goats were imported and introduced to the breeding herd in January 1983. These consisted of 10 Alpine bucks and 5 Alpine does; and 10 Nubian bucks and 5 Nubian does. A second importation of 16 bucks, 8 Nubian and 8 Alpine, were introduced to the breeding herd in November 1985. Eight of the bucks, 4 Nubian and 4 Alpine, were for the second breeding farm at Gonaives. A record of the importations and the present status of the exotic germplasm is summarized in table 13.9.

Forty-one percent of the imported goats have died due to bloat, chronic illnesses, abscesses, wounds, and screwworms. The physical adaptability of the initial parent stock of exotic breeds to a tropical environment continues to plague and slow the improvement process of native livestock breeds.

The intent of the exotic germplasm, Nubian and Alpine breeds, is to develop and stabilize a genotype that contains no more than 75% exotic genes. Experience has shown that an exotic breed concentration of 50-75% combined with 25-50% of native and(or) creole genes tend to produce a more functional and productive animal for the Caribbean and tropical environment.

It is too early in the project to determine the precise concentration of exotic and creole genes that will prove to be the most appropriate for the Haitian environment. However, the breeding plan is geared towards this end.

A summary of the breeding program is presented below, while figure 14.1a shows a graphic representation of the mating plan. The following steps are included in the breeding plan:

- Step 1. Form a foundation herd of about 300 local Haitian breeding does.
- Step 2. Begin mating the foundation does to purebred Nubian and Alpine bucks, producing two kinds of halfbred offspring.
- Step 3. Mate halfbred females to exotic bucks of these same two breeds, producing either backcross or 3-way cross offspring. Both kinds of offspring contain 75% exotic germplasm.
- Step 4. Mate the 3/4-breds inter se and apply significant selection pressure so as to develop a meritorious composite. The specific matings to be implemented will depend upon the relative merit of the four 3/4-bred genetic groups.

Under this system, the development of a dual-purpose goat would be completed 5 to 10 years after initiation of the breeding program at the Goat Farm or Breeding Center. By the end of the project, May 1987, step four of the above breeding program would be reached and would place the mating program (figure 14.1a) in Phase IV.2. While Phase III.3 can be reached by the end of the project, May 1987, the project numbers of the 3/4 crossbred goats will be small and need to be tested for their dual-purpose merit. Phase IV.2 and IV.3 could be reached within the ensuing years provided that the supporting infrastructures and management remain uninterrupted. However, the population of the appropriate crossbred strains would continue to be small and have to be tested for their productivity before determining which crossbred strain and(or) strains will be the most adapted.

6.5 Actual Status of the Breeding Program at Ferme de Papaye Breeding Center

The breeding program at Papaye breeding center has continued as planned in spite of having started 12 months (February 1983) after the initial project was approved and has produced to date (February 1983 to April 1986) a total of 895 live kids (table 13.8) Since breeding is conducted throughout the year, the kids are different ages. A substantial number 189 and 126 of immature and unweaned kids respectively are in the pipeline at Ferme de Papaye. To date 57 bucks (19 1/2 Alpine x 1/2 Haitian, and 38 1/2 Nubian x 1/2 Haitian) have been distributed to small farmers, community groups, and development organizations in the following districts:

Hinche
Jeremie
Les Cayes
St. Marc
Gonaives
Jacmel
Port-au-Prince (North & South)
Belladere

The first improved 25% exotic germplasm offspring from the 1/2 bred bucks distributed to the above farmers was born in May 1985. While it was not possible to visit all the recipients of an improved buck due to their dispersal, limited data was collected from the 25% crossbred offsprings in the Hinche area. This information shows a positive trend in favor of the crossbred kids which had an adjusted average daily gain (ADG) in grams at 16 weeks of 94.2 grams for the females and 96.3 grams for the males. In comparison, the straight bred Haitian kids at the Papaye Farm averaged for both male and female kids and average daily gain (ADG) in grams at 16 weeks of 50.3 grams (Goat Production Improvement Program 2nd Status and Technical Report, December 1985, Table 12, p. 56). This data is summarized in table 13.10. Limited baseline data and feedback information from the farmer level is the major constraint of the project. Closer observation and accurate record keeping is required to measure the effects of the crossbreeding program at the farm level more accurately. The performance data on the crossbred versus the straightbred kids at the Papaye Farm do show a significant improvement on overall weight gains. The Alpine 1/2 bloods responded with higher weight gains over the straightbred Haitian kids and the 1/2 Nubain kids at: birth, 38; and 50 weeks respectively. However, the 1/2 Nubain kids responded with an increased weight gain over the Alpine 1/2 bloods at 16 to 26 weeks. The 3/4 Alpine kids showed superior percentage weight gains over the Haitian straightbred kids and the 3/4 Nubian kids at: birth, 16, 26, and 38 weeks, respectively.

While these data are incomplete, the indications are that both these dairy goat breeds show a positive improvement in meat production. However, further testing is warranted to identify the percentage of genotype concentration that will prove to be more adaptable and productive in the Haitian environment. Table 13.11 summarizes this information.

Milk Production

Milk production is the second major objective of this project. However, the utilization of dairy products is not a well developed industry and will require time to transfer dairy technology to the farmer. The dairy technology would include the use of fresh milk and the manufacturing of dairy products such as butter, cheese, and sweets. To date, the project has collected preliminary data on daily milk yields from 7 straightbred Haitian does, 4 Alpine halfbreds, and 4 Nubian halfbreds over a 2-week period which suggest significant differences among the genotypes. The halfbred does produced from 73% to 93% more milk per day than the straightbred Haitian does. The population of the halfbred producing does is small and exist only at Papaye Farm. Therefore, it will be the responsibility of the farm to continue testing and selecting the halfbred does for milk production. Milk production data from the 1/4 crossbred does at the farmer level is not available.

6.6 Goat Husbandry Extension

The transfer of technology has been the major impediment of this project. This has occurred due to the lack of adequate, consistent manpower and logistic support on the part of the Ministry of Agriculture. As a result the technological packages that were a major objective of the extension component have not been developed.

Training

The project was committed to train four categories of participants during the life of the project, these are:

- counterpart project managers
- project extension personnel
- small producers
- community/village members

Counterpart Training

The training activities per se for the Haitian counterpart, whose responsibility is to be the farm manager, are well planned and include 6 to 8 weeks training at Winrock International headquarters. However, the project has not been assigned a technician that could stay on the job long enough to take advantage of the prescribed training program. If this project is to continue, this position must be filled by a technician who is interested in goat husbandry and can implement the design of the project. This position is of primary importance to the project.

Project Extensionists

Training of extensionists has occurred but on a limited basis. This training has not been repeated enough so as to have an impact on the trainees and to learn from experience to adapt the course to the needs of the Haitian environment. This course should emphasize basic goat husbandry practices; be simple in content; and taught repeatedly so as to emphasize the importance of goat management. The beneficiaries of the training must transfer this basic technology to the small farmers.

Small Producers

The training conducted at this level has been the most popular one and has included a diversity of participants such as farmers, development personnel, and extensionists. Ninety-seven persons have received this training which included: soil and water conservation, forage production and utilization, enterprise development, animal breeding plans, animal health, and feeding practices. The subject content of this course is better suited for the project extensions than for small producers. The limited farm visits to small producers in the Hinche area by the evaluating team revealed that the relationship between the subject matter taught and its application by the farmers is only slightly evident, e.g., confinement corrals with a shaded area made of local material, limited cut-and-carry forage for feeding, and scarce watering

facilities. The training course may be too intensive in subject matter for the farmer to assimilate. Therefore, it is felt that the training courses need to be modified and simplified to be effective at the farmer level. It is fully understood by the evaluating team that to accomplish the training task, the project should be able to count on the support of MARNDR livestock technical staff. Expatriate technical assistance can and should be utilized to the maximum, but if the goat project is to continue the national technician with the support of MARNDR should bear the major responsibility.

Community/Village/Organization Awareness

Some 200 person days were devoted to visitor activities to the Papaye Farm. While these visits to the farm are welcomed, they are time consuming. Therefore, to improve the time-benefit ratio of goat husbandry awareness a structured visitor's program in goat management should be developed. This responsibility should be delegated, under the supervision of the farm manager, to one of the extension agents on a rotating basis. This will accomplish the following:

- relieve the farm manager of this task, at least part of time so as to concentrate on farm production activities
- provide the extension agents with the opportunity of familiarizing themselves with the farm production activities
- provide the extension agents with the opportunity to understand the farmer's goat production technology needs and how these needs can be addressed by the technology demonstrated on the farm. This interaction is beneficial to all parties concerned in an attempt to modify and adapt technological practices to the Haitian environment.

The project has not developed to the point where radio and television programs in goat production can be implemented.

6.7 Implementation of Breeding Schedule and Goat Husbandry Extension

The implementation of the breeding schedule should be viewed in two categories: on the Papaye Farm and off the farm (at the farmer level). The breeding program on the farm has been implemented according to the proposed schedule. The program has accomplished Phase I - steps 1, 2, and 3 which has produced 625 half blood crossbred does and bucks, and Phase II - steps 1, 2, and 3 which has produced 54, 3/4 blood crossbred and 10 three-way crossbreds consisting of 1/2 Alpine and(or) Nubians X 1/4 Alpine and(or) Nubians X 1/4 Native (figure 14.1(a) and table 13.8). This has been a positive accomplishment on the part of the implementing team, considering the constraints encountered. In the remaining 12 months of the project, the breeding program will have time to initiate Phase III - steps 1, 2, and 3 which will produce the 3/4 crossbreds. The principal objective of Phase III and beyond is to produce enough bucks for distribution and, secondly, to produce the does, with most of them remaining at the Papaye Farm, for perpetuation of the breeding program to achieve the most adapted crossbred for the Haitian environment.

The breeding program off the farm and at the farmer level has been limited with the placement of 57 half blood crossbred bucks of both Alpine and Nubian blood. The numbers distributed have been limited due to the delayed starting date of the program coupled with the age of the bucks (1 year old) before being ready for distribution. Forty-eight percent of these bucks have been distributed in the Hinche district and the remaining 52% have been distributed to other districts (table 13.12). This was the result of converting the project from a regional to a national goat project. As a result, information and(or) feedback data on the performance of these bucks has been limited and inadequate.

While some centers that had received a half crossbred buck were visited and their 1/4 blood crossbred kids were weighed, indicating a positive trend in weight gained, it is difficult to assess accurately the overall benefit of the improved bucks. The constraints impeding an accurate

assessment are varied and cumulative. The following are the most obvious:

- The level of technical assistance rendered to the small farmers by MARNDR extension agents varies from good to nonexistent.

- Adequate goat management practices are not well established or adapted to the area (tech packs).

- The traditional system of goat management is not conducive to maximize production.

- The level of record keeping is limited to determine the true level of performance.

- The level of nutrition varies from good to poor.

- The blood concentration of the improved breed (1/4 blood) in the kids is not enough to have a significant impact. This level is simply the base for further upgrading.

6.8 Gonaives Breeding Center

The general topography and ecological conditions of the site at the Gonaives breeding center is a natural one for goat raising. The total land area of the center is approximately 80 ha most of which consists of mountainous terrain. The center was developed with funds from a USAID/OPG to Winrock for a total cost of $66,900. The infrastructure, installations, and 160 head of goats (bucks, does, and kids) were in operation by December 1985. The Winrock implementing team, MARNDR personnel and workers merit recognition for their efforts in organizing and establishing the center.

Unfortunately the operation was short-lived when in January 1986 the entire center was destroyed as a result of the civil disturbances created by the present revolutionary movement.

Based on the remaining short life of the project (May 1987) coupled by the continuing civil unrest, it was agreed that the Gonaives breeding center would not be reconstructed. However, the technical activities that were planned for the center should be carried out and implemented at the Papaye Farm.

6.9 Recommendations

These recommendations are specifically in reference to the animal science component of the goat improvement project. They focus on improving the production of the breeding stock at the Papaye Farm which benefits will have a direct effect on the small farmers, the ultimate beneficiaries. The time remaining in the life of the project coupled with the lack of institutional support from MARNDR will be the major constraints towards the fulfillment of these recommendations. These limiting factors should be considered at the final evaluation of the project.

The following measures should be implemented to enhance the production performance of the goats to produce more and higher performing bucks and does.

1. Obtain a commitment from MARNDR to assign a counterpart farm manager for the Papaye Farm.

2. Determine and maintain the size of the foundation herd based on the carrying capacity of the farm. (300)

3. Determine the desired size of the native breed and select the native herd to the desired herd size via heavy culling pressure, such as:

- cull low producing does with long kidding intervals, poor milk production, mothering ability, etc.
- cull low weight gaining kids based on weaning weights at 16 weeks
- increase the size of the crossbred does in the foundation herd and apply heavy culling pressure based on production performance

4. Incorporate an additional mating scheme to the mating program, Phase II, steps 1 and 2, by mating the 1/2 bloods with 3/4 bloods to produce the 5/8 exotic and 3/8 native crossbreds (figure 14.1(b)).

5. Intensify the performance testing program to cull undesirable kids and test the performance of the does, native, and crossbred, at their first and second kidding.

6. Continue to improve the quality of the feed resources by expanding the cut-and-carry forages.

7. Improve the diet of the does by the use of ample improved cut-and-carry forage varieties in addition to pasture grazing. This will reflect on the overall performance of the does and kids.

8. Develop a system of supervision of the does after kidding so as to ensure that the kid receives the colostrum, reduce death losses, and reduce the number of kids lost to unknown causes (disappearances).

9. Improve the management and nutrition of the kids before weaning by the use of creep ration. This will reduce stress at weaning and enhance performance after weaning.

10. Improve the management and nutrition of the kids after weaning to improve their average daily gains. Strive for daily weight gains

of over 100 gms/day, use this data as selection criteria. (A faster gaining kid will reach maturity earlier.)

11. Selection criteria should be established separately for weaning weights of singles, twins, and triplets.

12. Selection criteria for replacement does and bucks should not only be from high performing goats but also from goats producing multiple births.

13. Establish a management system of the herd so as to treat the high performing does differently from the low performing ones, emphasizing nutrition to the latter.

14. Evaluate from the data obtained the advantages and(or) disadvantages of control breeding versus year-round breeding.
    - re-evaluate the remaining imported stud bucks at the Papaye Farm to determine the potential inbreeding problems that could occur by the end of the project and take corrective measures.
    - establish feeding trial of selected bucks and castrates under different feeding rations, such as all forage, half forage half concentrate, all concentrate

15. Determine the time and amount of feed required to finish a buck and(or) castrate under Haitian environment.

16. Determine dressing yield (%), feed conversion, and cost of production of the different feed trials.

17. Study the meat marketability of the finished (fattened) buck and(or) castrate.

7. FORAGE AND RANGE ASSESSMENT

7.1. Forage Plant Trials

7.1.1. Napier Grass (Pennisetum purpureum) Plantation at Papaye Farm.

A .5 hectare was established in April 1983 and a 3 hectare plantation of Napier or elephant grass was established at the Papaye Farm in April 1984. This plantation was intended to provide additional forage (either as green chop or silage) to complement the available pasture, and to provide a source for outplantings to other farmers in the locality. The harvested grass is used as manger feed, and a quantity was ensiled in January 1986 (see discussion below). Stem cuttings for vegetative propagation have been provided to farmers, and the evaluation team observed excellent growth at one site where the Napier grass was serving to stabilize a river bank. Further information on the year-round productivity/availability, recommended frequency for cutting, and production per hectare is not documented. Neither were there any specific recommendations for the use of this grass within small farmer agricultural systems. According to Geers, there is a variety of Napier at Damien which would be superior to that planted now at Papaye because of a better leaf-to-stem ratio, but cuttings have not yet been obtained. If Damien has the Merker variety, it can be further recommended because it is more resistant to fungal damage. ASSESSMENT: The planting of this grass appears to have been primarily directed towards providing an additional supply of feed for the goat herd, and any emphasis on a "forage species trial" seems to be on an ad hoc basis. This assessment is derived from the lack of data to support a species trial. The unavailability of manpower to carry out the data collection is noted, but the absence of a specific research/data collection plan, especially in view of consultations by both rangeland and pasture experts during 1985, seriously inhibits the performance of the project. Nor is there any technology transfer guidelines for the recipient farmer such as whether Napier is best suited for pasture or a cut-and-carry forage bank. Napier grass does not cure well in the field

(i.e., the nutrient content drops considerably if not regularly cut at a certain height or at 30- to 45-day intervals depending on the site). Information on cutting frequencies need to be transferred to the peasants. The dissemination of new plant or animal material, without prior analysis and accompanying guidelines, not only has typically led to a high rate of project failure elsewhere, but can even result in a significant disservice to the peasant farmer.

7.1.2 Guinea Grass (*Panicum maximum*) Pasture/Plantation at Papaye Farm

A 0.5 hectare area was transplanted to Guinea grass in June 1985. The grass appeared to be well-established at the time of the evaluation team visit, but the goats had gotten into the pasture previously and the regrowth had not yet reached a harvestable quantity. No further information was available. ASSESSMENT: The same "*ad hoc* species trial" comments made for Napier grass are applicable to this species planting. Additionally, the subspecific variety of the Guinea grass planted should be ascertained, because the "native" Caribbean rather than the Giant variety has been recommended by some experts, and a comparative trial should be made.

7.1.3 Leucaena (*Leucaena Leucocephala*) Plantation at Papaye Farm

Seven hundred seedlings of Leucaena were planted in May 1983. These plants are not performing as anticipated. This is, however, the typical response of this plant in the Central Plateau locality according to both Geers and Mathews (PADF-AFO Project). There is some indication that the variety planted was not innoculated. There has been no follow-up work. ASSESSMENT: Another *ad hoc* effort; contact should be made with the USAID Agroforestry Outreach Project to determine the most suited variety for the locality, and seeds from the plants in the trial plot should be collected, innoculated, and replanted for a comparative trial.

7.1.4 Pigeon Pea

Pigeon pea was intercropped in portions of the Napier grass plantation. This common crop was allowed to mature (farm worker collected the seed pods for food) and the leaves were collected immediately after the pod harvest and fed to the goats. It was reported that in the Central Plateau, the plant is a weak perennial. The training program teaches about the use of pigeon pea as fodder for goats.

7.1.5 Guinea Grass (Panicum maximum) Plantation at Morne Seyman Farm

Twelve hectares of the gently sloping land at the base of the mountain and adjacent to the farm facilities was cleared with a bulldozer and prepared for forage cultivation with plow and disc. Guinea grass from the locality was initially transplanted to 25 hectares of this land in January 1985. Because this was a dry season planting, it was assisted with irrigation from the well.

7.1.6 Forage Crop Production at Morne Seyman Farm

The following crops were planted after the first rains on the cultivated land area: 1.5 ha millet (Pennisetum typhoideum), 4.0 ha sorghum (Sorghum vulgare), and 0.5 ha maize (Zea mais). These crops were all intended as goat feed. Poor climatic conditions caused less than normal plant growth, but forage was produced and fed whether as green chop or was dried for future use (actual yields are not specified in the 1985 Status and Technical Report). ASSESSMENT: The need to provide adequate feed for the production herd is recognized, and although not so indicated in the report, it is assumed that another aspect of this crop production was to determine the optimal use of these typical dryland crops and by-products as goat feed. Once again, however, there appears to be no specific research agenda for this activity.

7.1.7 Seed and Other Plant Materials Available for Trials in 1986

The following seed/plant trials were made:

- Buffel grass seed was obtained for the agricultural faculty at Damien for trial at Morne Seyman, but did not germinate. This failure was attributed to the seed, rather than the site.

- Siratro seeds were acquired from the same source for trial at Morne Seyman once the Napier/Guinea grass become established.

- Seedlings of Manila Tamarind were obtained from ODH because it was noted the goats readily ate the leaves. Although planted at Morne Seyman, results were not obtained due to the destruction of the site. Two types of Leucaena from PADF were also tried.

- A local Burmuda grass was tried at Morne Seyman, and is performing well at this time.

- Apparently, neither consultant (Gonzales and Proverb) sent packages of the seeds they recommended.

- Winrock headquarters followed up to identify sources and prices of seeds, but no orders were placed.

ASSESSMENT: The majority of the recommendations were not implemented. The seed and other trials (e.g., Napier, Guinea grass) were made using inferior, local available seeds and stock. Even though lack of manpower and other delays can account for the lack of systematic trials, the fact that the recommended seeds are not now available for the last rainy season within the LOP indicates the low priority assigned to this project activity.

7.2. Experimentation on Feedstuffs Storage/Conservation Techniques

7.2.1 Harvest and Haystacking at Papaye Farm

Surplus grass from the goat pastures (predominantly Andropogon spp.) and other areas has been cut, cured, and stacked as hay for supplemental feeding, especially during the dry season. This technique was available for many of the trainees and other farm visitors to observe. ASSESSMENT: This is an important demonstration of a necessary and appropriate technology, and should receive additional focus and follow-up, particularly at the small farm level. Much of the stacked hay is of less than optimal quality, apparently because it was cut at a too mature stage. In the future, if on-farm manpower is limiting at the necessary time, the hiring of outside labor should be considered. The haystacks should be covered (using palm or banana leaves) to protect them which can maintain the quality. This is not only important for optimal on-farm nutrition, but should also be a part of the demonstration to the trainees if they are to gain the maximum returns for their labor investment in trying this "new" technology.

7.2.2 Cement silo construction at Papaye Farm

A well-designed cement block silo was constructed and filled by January 1986. Built into a hillside for easy filling and removal, the 9-feet diameter,14-feet tall silo has a capacity of 15 tons. Ensiled plants include Napier grass, green sorghum stalks, molasses and salt (in descending order of amounts in the mixture), and the silage will be fed out in the near future (end of the dry season). A sample of the silage was sent to Florida A&M University for nutrient quality testing. ASSESSMENT: The project should be commended for the work accomplished on this feedstuffs conservation technology. There is a critical need in Haiti for appropriate systems to store the abundant forage produced during the rainy seasons for improved animal nutrition during the dry seasons. It was a pleasant surprise to learn that at least one progres-

sive groupement have already expressed an interest in this system. Although benefit/cost data (including construction materials and labor, silage preparation labor, and animal rate-of-gain) is not yet available, it is probable that this system is not beyond the means of either groups or individuals with a hundred goats or more. The development of smaller scale techniques can also be encouraged. Along these lines, a method to chop the harvested plant materials to the proper size needs to be further investigated. A hand-crank chopper was tried, but required too much human energy to operate. The possible design of an appropriate mechanical advantage, or perhaps a small motor should be considered.

7.2.3 Pit or Trench Silo Experiment at Morne Seyman

A silage trench (3 m wide; 5 m long, 1 m deep) was excavated at the Morne Seyman Farm. Unfortunately, the farm was destroyed before the facility could be used. ASSESSMENT: This was a good idea towards scaling down the size of silage production to meet user needs, as well as a less costly design. An important aspect of this technology variation should be to instruct potential users to select a site with good drainage to prevent excessive spoilage; also to provide well proportioned design so that silage can be fed out rapidly enough to avoid spoilage.

7.3 Pasture and Range Management

7.3.1 Pasture Management at the Papaye Farm

The current stocking rate on the Papaye Goat Farm is 451 adult equivalent goats on approximately 50 ha of grass/brush pasture, or 9.02 goats per hectare. (341 adult Haitian, exotic and 1/2 blood replacement does; 15 breeding bucks; and 189 immature animals divided by 2 equals 95 adult goat equivalents. The 126 unweaned goats are considered to be still nursing and not consuming forage; these unweaned goats are normally included with their mothers as the same stocking unit.)

ASSESSMENT: Since there is not data available for pasture production on the farm (clipped and weighed sample plots), the suitability of the 9 goats per hectare stocking rate can only be assessed by (a) comparison with other recommended stocking rates in Haiti; and (b) general condition of the pasture itself. Assuming a year-long carrying capacity of 1 UBT (Tropical Bovine Unit) which is equivalent to 6 goats per hectare of native pasture in good condition, the 50 hectares could support approximately 300 goats, so the farm is overstocked by 150 animals. Under actual farm management practice, however, quantities of hay are cut and stacked, and this spring there will be 15 tons of silage available for supplemental feeding. Since the herd has been constantly expanding since the breeding program began, it appears that supplemental feed sources have kept pace with the stocking rate. Considering the condition of the pasture itself, a visit to the farm in late January revealed a substantial quantity of standing biomass (albeit mature, dry, and of minimal quality), but Geers reported to the evaluation team in mid-April that prior to the early rains this year, the pasture was essentially depleted. Thus, from both approaches to pasture assessment, it seems that the present farm pasture area is certainly stocked to its maximum carrying capacity, and is possibly even overstocked. Accordingly, conserving feedstuffs as either hay and(or) silage is now an essential part of the operation. If a quantitative assessment of these pastures, or other potential rangelands/pasture areas in Haiti, are to made, the figure of 2.0 kg dry matter/goat/day should be used (the 1 kg/day figure cited in the Gonzales report is considered too low), based on 50% utilization of the annual production of both herbaceous and woody plants within reach.

7.3.2 Range Management at Morne Seyman

Of the approximately 73 hectares within the entire farm, about 60 hectares of upland were fenced. The remaining 13 hectares were allotted to headquarter facilities, various holding and working pens, a farming area for forage crop production (see discussion above) and a small area of

improved pasture. Although the forage crop production areas were planted, and a Guinea grass trial established, there was not yet time to develop the improved pasture. It was observed that once the hillside pasture areas were fenced, there was a substantial increase in herbaceous biomass production. This suggests that the area was previously overstocked and the fencing essentially introduced a deferred utilization/pasture rest grazing system, with impressive results. Even though the hillsides appeared to be devoid of herbaceous plants during the visit last spring (end of the dry season) by the range management consultant, the summer rains produced an abundant crop of annual grasses, and the rest from grazing allowed the modes present of native Guinea grass to develop. There was also a 1.44 hectare exclosure established in the upland area to allow further expression of the natural plant succession for future comparison with the grazed areas. ASSESSMENT: It is a real pity that this site was lost, as it promised to provide important information on the potential of grazing lands in the drier regions of Haiti. Although only based on limited observations, the apparent rapid recovery of the grazing resource once under an improved management system is reason for some optimism. Efforts to regain at least some of this information (e.g., additional enclosures under the supervision of a local guardian) should be carefully considered.

The recognition by Sanchez of certain poisonous plants in the area further suggests that an assessment of these plants should also be included in the "technical package" involving open or large pasture grazing systems.

7.4 Crop Residues and Agro-Industrial By-Product Surveys

Reference is made in the 1985 Status and Technical Report to an analysis of the kinds, availability, and cost of major by-products and residues which might be appropriate for feedstuffs. A table (#5) lists 10 locations visited thus far. ASSESSMENT: This activity appears to be considerably behind a realistic schedule if substantive analyses and

ration formulation packages are to be developed, tested, and disseminated. Much more information than is present in table 5 is already available in a reports by S. Matter in 1983 on Livestock Production in Haiti (USAID), and in the USAID Targeted Watershed Management Project Design Team report submitted in August 1985. Even at a preliminary stage, table 5 should include more information such as the estimated quantities available at the locations visited, the seasonality of the products, current costs, and specific limitations identified (e.g., does the cottonseed meal contain high levels of toxic gossypol of aflatoxins a noted in previous studies?)

7.4.1 Nutritive Values of Feedstuffs

Reference is made to a collaborative effort between Winrock and Florida A&M University (funded by AID/W, but not directly incorporated as part of his project) to analyze the nutritive value of selected local forages and crop residues. A brief summary of related activities are included (such as the construction of drying racks, orientation of staff, identification of species, and arrangements for shipping) and a table (#6) in (1985 Status and Technical Report" presents some of the results of analyses on the first sample set. ASSESSMENT: In a technical report, appropriate information should include at least a brief description of the entire program (i.e., seasonal sampling schedule, target numbers of total samples -- species -- as well as number of subsamples per species, more complete methodology for field processing reasoning behind the chemical tests selected (e.g., why wasn't boron included since it has been reported as deficient and perhaps limiting to livestock production on the island or selenium as recommended in Proverbs' report). The table does not even indicate the dates or seasons of collection for the samples analysed.

7.5 Assessment of Two, Short-term Consultant Reports

7.5.1 Range Resources Assessment, M. H. Gonzalez

This report entitled a "Tentative Assessment of Range and Livestock Resources in the Northwest and Central Plateau Regions of Haiti" is a competent and thorough work, considering the length of time allocated in Haiti during the end of the dry season in 1985. It describes the two regions both in terms of the physical setting (i.e., topography and elevation, annual precipitation patterns and mean amounts, and soil suitabilities), and vegetation types insofar as reported in the literature and species could be identified in the field at the time of year. There is also an adequate differentiation between the two primary regions based on farming and land-use patterns and animal husbandry practices.

Concerning the dry, northwest region, the consultant notes that the area is so degraded from tree cutting, overgrazing, and burning that any livestock improvement program must start with the land base itself, emphasizing both soil conservation and forage production as complimentary activities. There is also no information available on carrying capacity in general, or productivity of plants in particular. A major recommendation is that the area must be reseeded with suitable, exotic perennial grasses. Six species are suggested for trials at all elevations (p. 18), and one of these, buffel grass (Cenchrus ciliaris) was observed growing vigorously in one area, apparently naturalized from a previous introduction.

Concerning the Central Plateau, the intensity of small farm holdings is noted, and the recommendations focus on developing a "model" farm which incorporates forage production as part of the cropping mix. Guinea grass, a formerly exotic species which is not widely naturalized in Haiti, is the initial choice as the forage addition, although a number of other candidate species are mentioned (pages 14, 30-31), most particularly Sorghum almum, Napier, and buffel grass. Ten herbaceous legumes

are also suggested, but the preferred genera for initial trials are Dolichos, Phaseolus, and Vicia.

An important point alluded to several times in the consultant report, which the evaluator strongly supports, is that the "best" species can not be definitively ascertained without suitable trials. These trials do not have to be grandiose events, and Gonzalez describes an example 1 hectare plot which could be replicated in a number of varied settings. In the case of mixed farming type settings, it is probable that more numerous, smaller trials would be equally effective, with the added bonus of serving as a demonstration of grass productivity to the small farmer. A further point which can be added by this evaluator, is that those aggressive grass species which spread rapidly would probably be of much less interest to the small, mixed-crop farmer who spends a considerable amount of his time weeding grass out from his crops, and should be avoided.

A number of other observations made in the Gonzalez report almost exactly one year ago are very pertinent to this evaluation. These are quoted as follows:

- (p.26) "Although we realize that the focus of the Winrock goat project is basically genetic improvement, we feel that the forage aspect has not received the attention it deserves. This not only applies to the centers of Papaye and Gonaives, but also to the farmers who will receive the improved stock. It seems that there has not been enough concern about the availability (quantity and quality) of forage at the farmer level. The feeding of goats at Papaye is completely different from the feeding (and type of feeds) that the animals will receive at a local farm."

- (p. 28) "We assume that the training at present is oriented exclusively to the animal aspect in practical goat husbandry, but little, if any, has been done in regard to the forage part."

EVALUATOR COMMENT: The above is an exaggeration in fact, but not in emphasis. Although feeding practices are included in the training course, TDY Consultant Ridenour (Educational Designer) noted in his report on page 10 that after visiting several small farms "little attempt is made to produce forage crops for the goats." Since the GPIP Training Handbook is still at Winrock, and no other specific training materials or course contents are included in the 1985 Status Report or presented to the evaluation team, the emphasis in Gonzales' statement seems accurate.

- (p. 28) "...the establishment of nurseries at the goat centers and in other selected locations would facilitate the collection of information about adaption of introduced grasses and legumes, principally, and about comparative forage production. These nurseries would help the farmers (and many technicians, too) to get acquainted with the different species; and to see the possibilities of including them in their farming operations."

- (p. 30) "The farm in Gonaives, with the area for farming, could very well be the main station for those nurseries and adaptation plots of many species, with and without irrigation." EVALUATOR COMMENT: With the loss of the Gonaives Center, it is imperative to identify other candidate locations for these trial plots. Certainly, some of the Papaye Farm (either within the existing goat farm or elsewhere) would be suitable for Central Plateau forge species trials. Additionally, several of the goat recipients in the vicinity could also be queried on this matter.

- (p. 31) "The including of a forage agronomist on the Winrock team is highly desirable. He could establish the nursery...and also train local agronomists..."

GENERAL ASSESSMENT: Gonzalez has accurately identified a number of specific needs of the GPIP, and made recommendations towards serving these needs. It appears a year later that little attention was paid to

these recommendations, and no alternative plan has been prepared since the loss of the Gonaives Center. Note also that an appendix to Gonzalez's original, separate report has been deleted from the 1985 Status Report version.

7.5.2 Recommendations for Pasture Improvement -- G. A. Proverbs

Proverbs visited the project during mid-summer 1985 and made a number of succinct recommendations (including such details as sources of seeds, quantities of seed per acre, and pasture establishment techniques) based on his experiences in other Caribbean settings. Pasture management at the Papaye Farm was emphasized, but a visit to the Gonaives site also yielded specific suggestions (omitted from this evaluation since the site was destroyed). The more salient recommendations, and the actions taken since his visit, are:

1. Every effort should be made to establish in the existing Andropogon pastures the following legumes: Siratro, Glycine, Teramnus. ASSESSMENT: Seeds not acquired. Recommendation was directed primarily at a mechanized harvesting operation at Papaye, and may not be applicable to small farmers, but a trial should be conducted.

2. The same 3 legumes should be established in the plantations of guinea and Napier grass on the Goat Farm. ASSESSMENT: Follow-up on this recommendation.

3. It was recognized that the Leucaena planted at the farm is not performing well; the reason could not be definitively ascertained. However, rather than struggling to maintain the existing trees, it was recommended to replace them with the Cunningham variety; further, if the trial is successful, then pure-stand protein banks (approximately 1/4 hectare) should be established in each pasture.

ASSESSMENT: No progress has been made on these recommendations. In addition, contrary to the experiences in Barbados where no minosine toxicity problems have been noted, there are at least two reports which suggests that this has occurred in Haiti.

Accordingly, it is essential to conduct feeding trials to ascertain if this problem exists, and if so, what is the maximum percentage contribution that Leucaena can provide to goat diets. The only known source of adequate Leucaena leaves for conducting such a trial are at Operation Double Harvest, near Port-au-Prince.

4. Coastal Burmuda grass, (coast cross #1) and Giant African Star grass should be introduced in nursery trials as better yielding and more nutritious replacements for the native Andropogon. ASSESSMENT: No progress on this recommendation, not even acquisition of seeds.

5. Recommended that haystack system should be re-introduced to conserve feed for the dry season. ASSESSMENT: This practice has been initiated on the Papaye Farm, but the Andropogon was cut too late to be of optimal nutritive value, and the stacks are not covered to protect the hay from rain and sum leaching.

6. Recommended that dwarf Elephant grass, which is apparently superior in yield and quality to the giant Elephant grass, be acquired and established immediately (i.e., summer 1985). ASSESSMENT: This has not been accomplished, even though it is possible that this variety is available at Damien. This variety should be acquired and tried immediately, before too many outplantings of a possibly inferior variety are made.

7. Recommended that the pastures be reduced in individual area to provide more, smaller pastures which results in more efficient utilization of available forage. ASSESSMENT: Work not initiated

due to lack of specification in consultants report and lack of money in construction/materials budget line.

8. Recommended that basic soil sampling be done to ascertain if there are any major nutrient deficiencies. ASSESSMENT: Although this activity is probably beyond the specific Terms of Reference of the project, it certainly relates to forage production and animal health and nutrition, and efforts should be made to collect some basic information; perhaps this could be accomplished through the Ministry, or perhaps the collaborative program with Florida A&M.

Proverbs specifically limited the number of improved forage species recommended so the activity would not become overburdening. He further stated that the only time to establish pastures in the tropics was during the rainy season. Judging by the project efforts to procure seeds and to be prepared for planting now 9 months after Proverbs visit, and the rains imminent, forage improvement activities within this project can only be assessed as a low priority. Even the limited work accomplished, did not seem to take advantage of the vast majority of the recommendations. This situation must be remedied, and this will require immediate major actions so that at least the most important trials suggested can be implemented during the oncoming rainy season.

Proverbs also did not see any immediate need to introduce any of the improved forages into the mixed farming operations he observed in the Hinche locality. He considered the current cropping too intense to allow any land to be allocated to forage production, and he also noted the large quantities of by-products wasted and other forage available along the roads and ravines. Although the second observation is absolutely true, this evaluator differs with his recommendation not to introduce the improved varieties of forage. Introduction of legumes can be used to augment the protein content of feedstuffs; judicious use of other plants can provide better year-round availability of nutritious

forage; many of these plants fit well into badly needed soil conservation programs; and lasty, if genetically better animals are being introduced, now is the time to initiate long process of providing better forage to support them.

Finally, it must be mentioned that a number of useful appendices from Proverbs' original report were not included in the 1985 Status and Technical Report, and page 11 of his text was also omitted. Documents need to be complete since they will be the only likely source of working information after the project is over. This should be the case no matter how voluminous the report.

7.6 Assessment of Adapted Technology Packages

The development of an adapted technology package which can accompany the improved goat to the primary beneficiaries (thus providing the opportunity for better animal husbandry so that the improved goat and his progeny can express their genetic potential) does not exist in any comprehensive format. This partially results from a lack of major emphasis on this critical component of the project, but also results from an inadequate conceptualizaion of exactly what an appropriate technological package should include.

A series of disjunct, gereric examples and demonstrations of a number of components of a "tech pack" (provide a shelter of rustic materials; provide clean water daily; construct an enclosure of fence from a variety of local materials; provide salt) does not constitute a comprehensive, transferrable technology package. Quite literally, the chain which connects one component of the package to the next to form an improved animal husbandry system, is only as strong as the weakest link. It has apparently not been realized that the adapted package must address the combinations of the available technological options for each component (shelter, confinement, feeding method, water source and method, feedstuffs and nutrition, health, breeding, marketing) which are

most appropriate for a particular set of ecological, social, and economical conditions.

Even had there been adequate, qualified extension personnel assigned, the status of the technology package would certainly have limited the overall success of the project, because the agents would have had limited materials to extend. This is a major deficiency of the project at this time. It is strongly recommended that this situation be mitigated, and to this end, based on the evaluation team's and project staff's composite experiences to date, a logical framework for the development of these "tech packs" is provided in Appendix 15.4.

8. INSTITUTIONAL DEVELOPMENT

8.1 Government Structure

The structure of the MARNDR is shown on figure 2. The ministry is divided in four technical directions, one administrative direction and one programming unit. The Direction for Animal Production provides technical services to Haitian farmers. On the other hand, extension and extension training resort under the Direction of Rural Development.

Operationally, the Ministry is subdivided in four regions in Haiti, respectively, the West, North, Transversal, and South regions. Each of these is headed by a regional director.

There are four regional offices within the MARNDR, North (Cap Haitian), South (Cayes), West (Port-au-Prince) and Transversal (Gonaives). The South and Transversal regional offices are each again subdivided in subregions, one of them being the Subregional Office of the Central Plateau of Hinche.

The responsibility of above offices is to provide technical and administrative support to local agricultural programs. The structure of the regional office resembles that of the national office (figure 2). Among others there are divisions for animal production as well as rural development.

An overview of regions, subregions, and agricultural districts is provided in table 13.13 and figure 14.3.

The directors of the regional offices are liaison for the cooperative projects between MARNDR and donor agencies. They are also encouraged to maintain good relations if not providing support to private nongovernment organizations (NGO). (La Regionalisation: Principe et procedures d'application au MARNDR, pp 20-21.)

Extension agents in the field report to the Agricultural District Director, with technical support for each of the relevant divisions at the national level. The focus and level of activities of governmental extension agents depend very much on the presence of government support projects in the districts as such projects generally contain enough budget for extension activities.

One of the implications of this strategy is that if a project does not implicitly include operational funds for extension activities, it is less likely that the MARNDR is able to conduct these. The National Goat Improvement project cost proposal only includes funds for the formal training courses, but not for follow-up visits by extension workers or funds to subsidize some inputs.

On-farm demonstration activities seemingly were expected to be the full responsibility of the MARNDR.

Agricultural districts encompass several communes which again may or may not be divided in one or more rural sections. Each commune is headed by a mayor, while each rural section has a police officer who also functions as local judge. He has a number of other responsibilities, one of them being to provide "laissez-passer" for animals to be exported (sold) out of the section. Agricultural districts and government departments (provinces) do not necessarily coincide.

8.1.1 Agricultural Development Support II Project

This USAID funded project has a farming systems research/extension component and is hosted by the MARNDR. The University of Arkansas and Winrock International provide the technical assistance.

The project has now 2 years of experience working with new technologies and farmers. The activity levels in the districts are threefold: resident agronomist (salary, $250/month), enumerator/supervisor (salary, $170/month), and monitors (selected locally; salary, $100/month). The

project has been successful in mobilizing farmers participation, especially in the Jacmel area where consciously a groupement approach was chosen. In the other area, Les Cayes, a more individual approach was taken which led to misunderstanding and miscommunication between farmers and project staff as well as among farmers.

The extension activities are carried out by the Haitian staff while the Technical Consultants complement in areas of deficiencies, e.g., planning and sometimes reporting.

One problem the project encountered in the selection of counterparts was the lack of adequate extension teaching on the Faculty of Agronomy and Veterinarian Sciences.

The lesson learned by the ADS-II project is that it is probably more effective to deal with groups of farmers than with individuals.

8.2 Nongovernment Organizations (NGO)

A very large number of nongovernment organizations exist in Haiti. This is a reflection of a void of agricultural development activities by the previous Haitain Government, and the unwillingness of a large number of donor agencies to associate themselves with that government, as well as the severe needs perceived among the farming population, and the relative ease to raise money for the "poor" of Haiti because of its proximity to the United States.

AID has prepared an inventory list of private voluntary organizations (PVOs) in Haiti, Winrock International being one of them. Also, the activities are listed, and obviously, a large number of these organizations are aiming to conduct some livestock development activities -- small ruminants being one of them.

The team visited several of these organizations. Generally, their programs are providing a beneficial social structure to absorb and

demonstrate improved livestock management systems. Farmers are generally organized in group, and lines of communication are already established. However, in most cases, lack of technical livestock guidance is apparent. Partly, because of lack of training of key persons involved, partly because of the secondary nature of livestock activities in these projects which often have a major focus on other aspects of agricultural development such as crop production or irrigation.

The next section provides a short description of nongovernmental extension activities. One should note that the ADS-II project is hosted by the MARNDR but via the Faculty of Agronomy and Veterinarian Sciences.

Presently, there does not exist an association of livestock producers in Haiti. In aiming to mobilize private organizations or even firms into improving the genetic potential of the goat stock in Haiti, the launching of a private goat breeders association as a complementary activities of this project could be considered.

8.2.1 IICA Swine Project

The swine repopulation project is partly implemented by International Institute for Central America (IICA), partly by the MARNDR. The latter has received about 20% of the pigs and has distributed these via the farmers' community organizations (OCP). Apart from the efforts of the MARNDR, IICA has managed a tremendous extension effort. Presently, the organization is providing technical assistance to 320 multiplication centers around the country and claims to have distributed 9,000 animals to the above 320 Secondary Multiplication Centers (SMCs). These SMCs have just started to distribute pigs to farmers.

The extension activities by IICA are characterized by five features:

- a clearly defined technology package
- careful screening of recipient groups
- high quality technical follow-up after distribution of the animals

- signed agreement between IICA and recipient groups spelling out the intention of the program
- successive, fully sponsored training sessions for recipient groups on various topics of swine management

The technology package is a high input, labor intensive management system geared to have the farmers benefit maximally from the high genetic potential of the improved pigs. Only one packager is advocated.

Selection of recipient groups occurs after at least three visits to the recipient sites in order to evaluate the group or community candidate for managing the multiplication center, to inspect the facilities to be constructed before the animals are to be received and to sign the contract.

Technical guidance is provided by a well-trained staff of five livestock extensionists and five veterinarians which have at least a college degree and considerable experience. One man can visit about six centers per day depending on the logistics involved. Extensionists and veterinarians inspect the journals kept at the centers and transfer these data to the permanent files kept at the IICA office in Port-au-Prince. The follow-up process lasts for about 16 months per center. This extension and veterinarian staff generally only serve the centers at the exclusion of farmers receiving pigs from these centers: IICA considers the technical assistance to these farmers the responsibility of the multiplication centers of the GOH National Veterinarian Service.

The signed agreement between recipient groups and IICA is a letter of intention, rather than a contract. It spells out that IICA staff expect the centers to follow instructions and training(s) and that pigs will be distributed without profit. Feed is financed by the sale of male castrates by the centers.

Training sessions are hands-on, and last each for about 4 days. There have been no "no-shows" to date.

The extension effort by IICA apparently has minimized the involvement by the MARNDR. Local vet nurses, for example, do not participate in the follow-up visit. On one hand this seems a lost opportunity, on the other hand it is a reflection of the recognition that the MARNDR has already the technical capacity to execute their share of the swine repopulation program. IICA, however, takes pride in the effectiveness of their nontechnical services such as person to person contacts, responsiveness to farmers' needs and willingness of field staff to work extended work days.

8.2.2 Gros Morne Rural Development Project

This PVO project is aimed at establishing a social structure for farmers by organizing them in groups or associations. The purpose of these social organizations is the improvement of the welfare of the members.

Presently, there are two groups, each one generally consisting of 7-15 members. Decisions are taken by consensus (no chairman, only service positions within group).

The program has really taken off after introducing AL's (animation local), local animators. As communication between peasants is much better than between peasant and project staff, volunteer extensionists are recruited from existing groups who help in explaining the program to interested farmers. As a compensation, $10.00 per volunteer is paid to the group of which the volunteer is a member.

The whole approach of the Gros Morne Rural Development Project is bottoms up. This implies not any effort to reach targets and or maintain a schedule. The project management believes this is one of the keys to the success of the project.

The lesson learned by this project is to pay the utmost attention to the quality of the extension staff, rather than the quantity.

8.3 Delivery Systems

8.3.1 Technology Packages

The technology package(s) delivered by the GPIP is only loosely defined. The most pronounced elements of management recommendations are: a) confinement, b) water supplement, c) shelter, and d) salt supplement. A pasture component does not yet exist, although a course on forage production/soil conservation is conducted during the 2-day training for recipients of improved bucks. The destruction of the Gonaives program has also eliminated the first attempts in that direction.

Three major factors have contributed to the lack of recommendations. First, there are virtually no extension materials available within the project, despite the abundance of extension material at Winrock headquarters. Secondly, the profitability of simple management recommendations such as use of shelter, salt, and water (not to speak of the one of a crossbred buck) has not been measured, not even on the Papaye farm itself. Thirdly, the project has not yet implemented a monitoring system that would provide feedback from the field about crossbred buck recipients.

As the key of the project should be the transfer of knowledge to goat farmers (rather than the mechanical transfer of crossbred bucks), the success of the project will depend on the degree by which farmers' awareness of goat management opportunities can be increased.

The project has entered the phase where the technical knowledge and experience can be summarized, and coded in ways that will facilitate communications with farmers.

This implies a long-term effort of technology design and evaluation/adaptation through on-farm monitoring and regular group discussions with farmers, as well as demonstrations.

8.3.2 The Distribution System

The distribution program generally has been successful as far as number of bucks distributed. However, there is scope for improvement in the way the distributed process is conducted.

The goat distribution program of the GPIP start with the selection of recipients farmers by the monthly meeting of district directors. A list of farmers requesting bucks has been prepared, and a priority list is made. There are three main conditions: 1) recipient should be a farmers, 2) recipient should give a native buck in exchange for the crossbred buck or $10.00 fee for distant recipients, 3) the recipient should attend a 2-day course at the center. No formal contract between distributor and recipient is signed.

The present conditions of distribution of the bucks have the advantage that ownership of the goats are well defined (the person providing the native exchange buck as payment becomes obviously the owner of the crossbred one). However, apparently after the distribution there are limited incentives in place to encourage these recipients to share their bucks with other farmers, or to adopt some of the management practices advocated during the 2 days training. For example, many crossbred bucks have not been sheltered.

Follow-up after distribution is poor for three reasons: first of all because of lack of manpower (mainly the responsibility of the MARNDR), secondly, because of lack of recordkeeping, and thirdly, because of lack of identified responsible monitoring and(or) an extension agent in the district outside Hinche.

Possible improvements:

- Screening of recipient farmers by groupement. Each recipient farmer should be involved in a groupement. List of groupement farmers should be known and submitted at the same time with the

application for a crossbred buck. GPIP should require recipient farmer to have shelter ready before distribution. When improved grasses/forages become available, recipient farmers should be required to plant a minimum area for demonstration. On the other hand, the payment of a native buck should be waivered. Contract specifying minimum numbers of successful matings needs to be signed.

- Recordkeeping should be done by local persons who might be paid a minimal fee per doe and(or) buck monitored. Because of the rapid multiplication of crossbreds genetic material, the monitoring of crossbred goats is likely to become an enormous task, surpassing the capacity of the MARNDR to deal with directly.

- Extension agents, MARNDR or PVO, should be identified outside of the Hinche district. If travel cost is the main problem for their training, the GPIP should reconsider its travel policy. In addition, the GPIP has been slow in having extension material ready. It is recommended that the technical guidance for the GPIP will be under the supervision of Dr. Sanchez with a counterpart still to be identified. Dr. Sanchez could be responsible for monitoring all bucks outside the Hinche districts, preparation of training materials, and the launching of a pasture improvement program at the Papaye farm, which is obviously lacking.

- Extension without supporting data is difficult. Serious considerations should be given to a limited number of adaptive trials at the Papaye farm. MARNDR agronomes might be in charge of these trials with assistance by Dr. Sanchez concerning trial design and data processing/analysis.

- Extension is a process of transferring of knowledge over time. One 2-day training is not enough, nor has the MARNDR presently the capacity for a goat outreach program. Field visits by Winrock

personnel accompanied by counterparts to recipients farmers in an organized way will remain necessary.

- To facilitate these visits, as well as to facilitate the replacement of crossbred bucks, an attempt should be made to develop recipient "clusters."

- The maintenance of technical and organization guidance cannot yet be transferred to the MARNDR, and the presence of consultants who are committed to the goals of the project will be necessary for at least 3 more years. As the project is expanding, the quantity of work will rapidly become so enormous that the task of the consultant(s) as percentage of the total program activities will become small, and the organizational and technical responsibility of the MARNDR will become more pronounced. The team is concerned about the commitment and capacity of the MARNDR to deal with these responsibilities. For example, within the MARNDR to date resources have not yet been mobilized to send extensionists for training to the Papaye farm.

- Within the MARNDR extension reporting concerning the distributed crossbred goats should be formalized in all districts. The present system of reporting by extensionist to the districts agent in charge of animal production with copy to the GPIP project leader should be maintained and possibly improved.

- Serious considerations should be given to concentrate the future activities of the GPIP to the Hinche district. If goats are distributed outside Hinche district, recipients should be further screened on the local availability of technical and organizational assistance.

- There is an abundance of goat extension material in the English language. Winrock has been too slow in having these translated

into French. Once available in French, the MARNDR staff can adapt and summarize these materials in Creole.

- Presently, an extension plan or program is lacking. Such a plan should have a built-in feedback mechanism such as documented rate of adaptation of simple goat and pasture management practices, such as water and salt provisions, regular cleaning of shelter area, heat detection, etc.

- Demonstrations are necessary elements in such programs. First step is a unit farm at Hinche. Something that could be duplicated. The key element in the delivery system is the understanding that a) the genetic potential of the crossbred animals will only be expressed under improved management practices and b) the distribution of crossbred animals is only a means to get access to farmers. Once with help of the crossbred bucks the channels of communication are established, extension agents (MARNDR and private persons alike) should exploit these as effective as possible. These two principles imply a long-term dialogue with farmers that go many years beyond the duration of the project as presently envisaged.

8.4 The Feedback Mechanism

Present elements of feedback information consist of voluntary recording of buck matings by recipients, and kid performance at selected locations, and incidental records of irregular (sometimes frequent) visits of the extensionists to recipient farmers. Main constraints to feedback are an effective monitoring system, manpower and transport constraints and lack of job description concerning extension activities for MARNDR and Winrock personnel alike. These constraints are compounded by the fact that the technical proposal gave limited attention to the extension component at the project: formal training of producers and(or) extensionist is a too narrow a vision of extension activities.

Reporting by Winrock has been comprehensive, and of high technical level. However, the analysis of treating data at Winrock headquarters, and the time lag between data collection and reporting, as well as the time between visits of consultants and reporting is reason for concern. On the other hand, the Winrock Chief of Party in Haiti should be complimented for his contribution to the good communication between MARNDR district level and national level (Damien) concerning project activities. Consideration should be given to process all data within country. This would imply provision of a microcomputer at the Papaye Farm and training of the agronomist counterparts in the use of the statistical software.

9. ECONOMIC ASSESSMENT

9.1 Introduction

The objectives of this section of the report are to evaluate the economic benefits of GPIP at the end of the second year of the project. An evaluation of the economic benefits received from improved bucks is analyzed at the household level and for the larger general population.

To conduct the analysis, information was obtained from the project proposal and interim project reports. Field visits were made to the Gonaives and Hinche project sites, markets in the project areas and visits to recipients of improved bucks.

Extensive data were available from the multiplication center farm at Hinche. However, comparable data has not been collected from the field to accurately determine what has been the increase in production efficiency from introduction of an improved buck. Assumptions had to be made based on a limited number of visits to farmers and estimates provided from the project proposal documents.

9.2 Economic Analysis at the Household Level

Very little economic information has been collected from household which have received improved bucks. Discussions with professionals familiar with Haiti, as well as livestock keepers, clarified assumptions on the role of goats in the Central Plateau area of Hinche. Goats are not generally milked because of a lack of preference by adults for the product. Possibly the reason could be of low milk yields. It seems that it is mainly because of taste. Some respondents mentioned that when they did milk, the product was given to the children.

Goat meat and probably red meat in general has a limited role as a source of protein for the family. Goats are primarily held for generating cash in times of need, i.e., farm supplies or school fees.

Goats will be slaughtered for festivities, but not on a regular basis as a source of protein for the family. If animals are sick and likely to die, they may be slaughtered for home consumption. It is uncertain to what extent the goat manure is utilized as a natural fertilizer because of difficulty in collected large quantities for distribution on fields. Goat hides are not currently being tanned for sale by the household. Skills in tanning are limited, and the rural market is limited. Leather products cannot be exported because of the presence of antrax in Haiti.

The above assumptions about the role of goats in the Central Plateau area indicate that the additional value from having an improved buck will not be immediately felt without additional efforts not currently being done in the project. Field data is not available to indicate where second and third generation does will benefit from increased milk production. The first distribution of bucks have 1/2 exotic blood producing offspring with 1/4 exotic and 3/4 Haitian. It is not clear from field observations that these animals are performing better than straight Haitian under traditional management systems. No additional value is forthcoming from manure that would not be available under the system before the improved bucks. The value of additional meat is unknown until field data can substantiate that improved crosses will perform better under traditional systems. The value of the hides is estimated at near zero.

During the field visits with the animal scientists, goats were weighed in selected households where an improved buck was placed. Analysis of data by Dr. M. Sanchez indicated higher weaning weight than animals on the farm at Papaye. The results are confusing when trying to measure economic impact.

The farm-level survey conducted by Sara Guthrie indicated in round numbers that average household size of the goat herd is 5 head: 2 does, 2 kids, and 1 buck. Preliminary information provided by project staff and a livestock marketing broker in Hinche indicated that bucks with exotic blood may sell for twice the price of Haitian bucks. The present

value of the additional benefit from selling the male offspring would be $37.00 at the end of year 1 and $34.29 for year 2. If the average household income is $200 per year, then the increased benefits would be approximately 20% of annual income.

The perceived demand for improved bucks indicate a value based on phenotypic characteristics rather than genotypic. The Alpine x Haitian cross does not reveal dominant characteristics and it may not receive the same quoted high price as the Nubians x Haitians. Because not many animals have been sold, the benefits cannot be measured. Certainly, producers who are in need of cash will likely take less for their crossbred animals.

Difficult to quantify is the amount of social status and prestige received for having an improved buck. An example of perceived value for the bucks is the increase in membership of a groupement at Los Palis where membership went from approximately 50 to 72 members. Recipients of bucks said they were not charging for mating other peoples' does, but it is likely that a form of social reciprocity is established that carries an indebtedness to the recipient.

9.3 Social Benefits to the Haitian Economy

The technical proposal for the project estimates the number of primary, secondary, tertiary, and quaternary beneficiaries who will receive benefits of improved bucks (table 13.14). The actual conditions of all bucks which have been distributed are not apparent because no feedback is required on their state of health or performance.

The actual number of bucks distributed is 57, and the first bucks were distributed in November 1984. Reports have been received that at least four have died and one was stolen and conditions of the other animals are not known. At the end of year 2 of the project, approximately 39% of the targeted primary beneficiaries have been impacted. The diffusion of benefits is lower because of the loss of bucks distributed. Delay in

the breeding program has been a major reason for shortfall in beneficiaries.

Accurate information is not available on the number of matings by the bucks distributed. Visits to recipients' farms found a wide variation in number of matings, both in the individual's household herd and in secondary beneficiaries' herds. In visits to sites where bucks were placed, six recipients said their bucks had not bred does outside the pen. The average number of does bred was 12.8 does per buck.

At the community of Los Palis, 52 does have been bred; with approximately 83 kids born and 25 does are believed to be pregnant. This groupement has been successful in exceeding the targets set for the multiplication of offspring. Another groupement, Kosmike Papaye, received a buck in November 1984 and since that time has bred approximately 11 does with only one kid produced. Poor nutrition resulted in extremely high mortality in kids born. The variation in matings and reproductions is highly variable among sites visited. Two recipients of bucks visited in Hinche District said that they notified neighbors of having a buck for their use, but no one came to see them about breeding a doe. Extension of information needs closer scouting by project staff to ascertain amount of benefits, and the resultant impact on herd dynamics.

9.3.1 Benefit/Cost Analysis of Project

An economic analysis was done of the GPIP project and found in the "Cost Proposal" for the project. Difficulty exists in measuring economic impact of the project to date because of the lack of field data on herds which have an improved buck. The team concurred that increased benefits to recipients who have received a buck are questionable for several reasons: 1) lack of a significant sample to judge performance, 2) length of time bucks have been in the herds, 3) offspring have only 1/4 exotic blood, and 4) no feedback on bucks which have been distributed as to their fertility.

The team found in several field visits that other mature native bucks were still in the herd which reduces the conception rate. In other cases, the buck was allowed a free roam, and no information was available on matings. If effort is not made to systematically sample and determine performance of the bucks on herd productivity, then no determination will ever be available. The project can only report that a certain number of bucks have been distributed -- impact unknown.

Since the start of the initial project in 1982, approximately $872,000 has been spent on the project up until December 1985. (This amount does not include MARNDR's contributions which was difficult to ascertain.) (See table 13.15). As of the team's visit, April 1, 1986, 57 bucks have been distributed of which approximately 10% have died or were stolen. The only observable benefits at this time is the assumed higher sale price for males for breeding purposes. Several reasons exist for the very low ratio:

1. No value can be given for the milk since recipients are not milking the goats -- too early because animals are too young and no extension program is in place to encourage milking.

2. Recipients have placed a greater importance on the kids for breeding, and it is unlikely that the milk has a value at this time.

3. Slow progress made in building herd numbers because of biological constraints as well as high losses in the foundation herds, 37%.

9.4 Conclusions From Micro and Macro Analyses of Project

Several conclusions are drawn from examination of the goat production project:

1. Efforts have centered on establishment of the production farms at Hinche and Gonaives. Breeding programs have been established at

the Hinche site, and supplies of crossbred bucks have been distributed.

Economic information is not available to definitely determine whether producers are better off with an improved buck (1/2 Nubian or 1/2 Alpine) under the traditional management system. In very few cases are offspring of bucks being allowed to express their genetic potential with improved management systems.

2. Lack of follow-up and recordkeeping in the village does not allow determination of an accurate number of secondary beneficiaries using the buck. Projected spread of benefits cannot be estimated with confidence since very limited follow-up of bucks have been done.

3. The cost per unit of buck currently distributed is high, and efforts are needed to provide the necessary technical and extension programs to complete the impact. The distribution of bucks makes it very difficult to follow-up on bucks because of the desire to make this a national program.

4. The perceived value of a crossbred buck is in the breeding aspect of improving a farmer's herd. Presently, no direct value can be attributed to the increased milk production since goats typically are not milked for home consumption and improved female numbers are small. Generally, goats are not slaughtered specially for home consumption because of the high opportunity cost for generating cash in times of need. The perceived value is that the animal looks different and is therefore wanted. Although there are positive findings on the Papaye Farm, data is limited to show that the buck produces superior offspring in villages (see chapter 6).

5. Since no technical packages have been fully designed, the actual cost in either money or amount of labor are not known. The gross

benefits from the breeding value are likely lower since some costs are incurred.

6. Goat owners rely on goats mainly as a source of cash, and therefore bucks particularly are sold at an eary age. Animals are marketed through traditional channels which have high transaction costs in selling animals, e.g., treking to market and return home. High percentage of shrinkage and animal stress is clearly evident which increases marketing costs. Benefits from improved breeding will be reduced because of these costs.

7. No incentives presently exist for commercial management practices, and sales volume from any particular family is small because herd sizes are small. The breeding program could expand herd size but feed restrictions will likely impede increased numbers. Innovative marketing plans will be difficult because of high cost per unit of accumulating marketable quantities in the short term. Project should further emphasize faster turnover and not increased herd size.

8. No market strategies are in place that could increase the value of goats within the array of household activities. Because of this, incentives for improved management will be difficult for the individual small-scale producer. Larger production units need to be targeted for introduction of bucks and cost effective extension delivery systems. Greater utilization of by-products may be hindered from increased marketing costs if markets are not developed.

9.5 Technical and Extension Packages for Improving Goat Production and Marketing

The GPIP is in the second year of the project. The emphasis on the project has focused on establishment of a foundation breeding herd as a source for distribution of bucks to farmers. The replication of animals

is successfully being done at Hinche center and was accomplished at the Gonaives site before its destruction. Goat breeding has been the major focus of the project so far.

Consideration needs to be given to focusing on increasing productivity of goats of the small farmers and greater utilization of their livestock. Improving productivity without increasing utilization will work counter to USAID's Action Plan.

The objectives of the Action Plan are:

1. reverse natural resource degradation and stimulate agricultural production
2. increase employment by expanding industry
3. upgrade Haiti's human resources through reduced population growth, better health, and basic education reform

Successful attainment of these goals requires that appropriate tech packs be developed to assist small-farmers to achieve greater livestock productivity. Introduction of improved breeds by themselves will not significantly improve productivity. Transmission of technical and necessary extension material must be predicated upon having a core package of information to delivery and a strategy for utilization of the increased production.

The small farmer must see an incentive for increasing utilization of the products: otherwise, degradation of resources may occur (continued overgrazing) and opportunities to increase employment and improve nutrition (food consumption) will be lost.

A conceptual model for progressing towards the "best" appropriate technical and extension approach is presented in figure 14.4. There is no "best" approach because of resource differences, but each strategy must fit existing conditions. The underpinning of the "best" approach is

that market forces propel the rate of technology adoption as well as the rate of resource exploitation.

If the GPIP project will be successful in attaining the three objectives in the Action Plan, then a "market oriented" approach will be necessary to satisfy the needs of at least one level of the market: household, local, regional, national or the export market. The more market riches satisfied the better.

Technical packages will need to be based on targeted market niches. An array of tech packages are possible and depend on available resources. A key determinant will be how the by-products of the goat herd will be used. Two broad classifications in segmentation of the market will be: 1) household consumption or 2) traded or sold (commercial). Goats are primarily used as a source of cash and therefore are seen as a "bank" and a liquid asset. If this assumption is correct, then a strategy would be to design technical and extension activities to achieve this objective for the farmer and allow for the inherent qualities of the improved breeds to be expressed.

The current distribution pattern for the improved bucks does not maximize this objective because of the lack of an appropriate tech pack and marketing plan. The milk and meat for home consumption are longer term impacts that will require major extension and education programs that are not in place. Key components need to be developed targeted to this commercial orientation.

9.5.1 Targeting Recipients of Improved Bucks

As mentioned in chapter 8, the crossbred goat can be seen as a vehicle not only for livestock extension, but also for rural development in the broader context. Introducing improved bucks without attempts at modernization creates false expectations on the part of the farmer. It is proposed that as soon as possible a new set of criteria be used in placing bucks. The criteria needs to include:

1. Priority given to groupements that have a minimum number of families committed to new management techniques for goats. Individuals may be serviced but guarantees and follow-ups must ensure that abuses do not occur as seen in our visit to St. Marc where a buck was used solely by a wealthy land owner and not members of the groupement.

2. Requirements be placed on recipients to meet certain standards before receiving buck, e.g., build shelter, fence area, confine goats if appropriate. Criteria based on suitable tech pak.

3. Besides removal of Haitian bucks, farmers be obligated to a future stream of costs or in-kind remuneration for buck and services. Anything free means the project is less likely to be implemented effectively.

4. A contract be negotiated that obligates the farmers to be oriented to an improved system of management and increased utilization of their animals. A feedback mechanism be used to enforce contract.

To confidently extend new concepts, the GPIP will need to do baseline applied research and be prepared to remove excessive production and market risks.

10. IMPLICATIONS OF THE GOAT PROJECT FOR HILLSIDE CONSERVATION FARMING

10.1 Synopsis of the Place of Improved Goats in Hillside Farming Systems

Lack of erosion control and sustainable land management practices are the major constraint to upland farming system in Haiti. The deterioration of soil quality due to over-population and poor management is well documented (targeted watershed PID and other AID documents). Although goats have been blamed for some of the denuding of the landscape and therefore erosion, goats are common elements in upland farming systems. Preliminary ADS-II data for the Cayes region shows that goat density in upland areas is about twice that in the plains when measured per 1,000 inhabitants. More significantly, goats, like the peasant farmer, will continue to be a main feature of the uplands, and any agricultural strategy for these hillsides in Haiti must deal directly with this situation. Even the return of the swine cannot be expected to alter this situation substantially, because goats will continue to be kept as part of the peasant's fundamental strategy of diversification.

Goats, and other ruminant animals, constitute a primary payoff (and therefore a motivation) for hillside conservation farming practices. Two principle objectives of conservation farming can be achieved through improvements in goat husbandry: increases in tree survival as a result of confining goats; incentives to plant erosion control contour vegetative strips because the ruminant animal can convert these plant materials into a salable commodity.

Indeed, it is important that presently free-roaming goats are placed in confinement. At many farms this is already the case, but a greater effort should be in place. Goat confinement implies a greater input by the farmer. This is only an attractive proposition for him if the proposed change to a more labor intensive management will result in a higher reward, i.e., higher goat performance.

Confined systems have been shown elsewhere in the world to be more labor intensive and -- at the same time -- more rewarding. As such, livestock in upland areas is a relevant employment opportunity, especially for cash generation. As meat tends to be consumed by the more affluent buyer of the society, in effect the smallholder livestock industry is a means by which income (purchasing power) is transferred from the urban rich to the rural poor.

Similarly, the incentive to plant grasses or shrubs for erosion control will only be successful if the planting of these species is associated with increased revenue. The higher the productivity of the animals using the grasses the more incentive for the farmers to plant and maintain these grasses and the greater the probability for successful implementation of the project. Therefore, the success of grass management is measured on terms of animal (ruminants) performances.

A corollary benefit of livestock is their manure. Organic matter is a most essential input for farming marginal lands. Limited application of manure around young tree accelerates their growth and makes successful tree planting more likely. Besides for trees, manure can be used for other high value crop (such as vegetables). A confinement system facilitates the collection of manure (or a mixture of manure and feed left-overs) for fertilizer.

The project has shown that crossbred goats, especially the Nubian crosses, are popular. There are also indications that the genetic potential of these animals is superior to that of local bucks. This popularity provides an ideal vehicle for the extension of new goat management system which happens to include a number of salient aspects of conservation farming.

A technological package of crossbred animal distribution, high yielding grasses (as forage), cut-and-carry feeding to confined animals, and use of manure constitute essential elements for improved upland farming. Experience in Indonesia (Small Ruminant Collaborative Research

Support Program) has shown that cut-and-carry systems -- even without cash input -- yield at least a 50% offtake rate (measured in kg live weight) as opposed to 40% now under the Haitian free-roaming/tethering system. Limited technical guidance (animal health care, minerals) make a 60% offtake rate a reasonable and reachable goal.

Compared with the more traditional scavenging goat management, the cut-and-carry system requires the following additional (marginal) inputs: additional labor (grass planting/cutting/carrying/watering of animals); shelter and corral construction; crossbred animals; high yielding grasses/forages; possibly limited quantity of materials, minerals, and drugs for most common diseases.

Additional benefits: higher conception rate resulting in a shorter kidding interval, faster growth rate, increased dressing percentage, faster growth rate of fruit trees, fewer young trees damaged and decreased soil erosion.

An important consideration will be available market outlets for increased offtake of goats. Increased productivity alone will not be sustained without increasing demand for the product. Price transmission signals to encourage increased extraction of goats from both side areas is necessary. Market facilities and infrastructure will be necessary so that efficiency can be achieved and marketing costs kept to a minimum.

10.2 Summary and Recommendations of Extension Methodologies Relevant to Hillside Programs

Extension has been recognized as one of the major deficiencies of the GPIP. This results from both a lack of manpower since the full personnel cadre was not assigned by MARDR, and a lack of priority emphasis in Winrock's implementation. Future programs should consider alternatives to GOH extension service. This should also be considered by the GPIP to complement whatever extension personnel are assigned to the project. Indeed, the argument can be made that the role of a government is to

provide those services which the private sector cannot adequately perform.

There are a considerable number of PVOs operating in Haiti. As would be expected, these have widely differing levels of infrastructure and rural animation capabilities. This is especially true regarding animal husbandry activities. Even within a single organization, it can be expected that only one or two of their perhaps multiple facilities throughout the country would have both the infrastructure and personnel to handle a local goat improvement program without extensive training and support. Accordingly, it is recommended that a systematic review of these organizations be made as soon as possible to identify those with suitable capabilities.

An outstanding example of the capabilities of these organizations is the extension network established by IICA to service the 320 Secondary Multiplication Centers for the new swine (see section 8.1.3 for additional details). The success of this effort warrants a reiteration of the key aspects of their extension program: 1) a clearly defined technology package; 2) careful screening of recipients; 3) high quality technical support after distribution of the animals; 4) a signed letter of intent between the two parties; and 5) successive, fully sponsored training sessions on various management components. Although the "package" will be more varied with goats, and geared towards lower input levels (except perhaps for the nuclei breeding centers) certainly the follow-up visits and repetitive training should be adopted by the goat project and similar hillside outreach programs. The possibility of an arrangement to actually use the existing IICA network should also be explored. The AID funded Local Resource Development projects (currently in Maissade and forthcoming to the upper Courejolles watershed), which are implemented by PVOs and will have an active rural animation capability, should also be exploited.

Besides the PVOs, there are a number of private sector enterprises (both large and small operations) which currently have some experience in goat

husbandry and could be considered for some of the goat breeding nuclei stations, and similar activities relevant to other hillside agricultural interventions (e.g., seed multiplication).

An important requisite for extension, however, is the technology package, supporting extension documents and training. The development of the "tech packs" is discussed in Appendix IV. At this time, much of the thinking and recommendations are more academic than field tested. Thus, it is imperative to establish a number of "model farms" and to monitor these trials to acquire the feedback so essential for refining the methodology. Once this experience is gained, and the extension handbook materials are delivered by Winrock, the goat project will be able to revise their training programs (including field follow-up sessions) and produce an operational technology extension training program which should be directly applicable to other hillside efforts.

The complete delivery system, including the improved buck, the supporting tech pack, training and extension service therefore should be reviewed and restructured based on the lessons learned during this evaluation. Section 8.3 presents a series of specific recommendations. Winrock, MARNDR, and USAID should collaborate on this redefinition of the delivery system. The revised delivery system will have wide applicability for hillside interventions throughout Haiti.

10.2.1 Forage Outplanting

It is imperative that sufficient data be available on the locality specific suitability of forage plants before they are "extended" to the peasant farmer as part of an appropriate tech pack. This is imperative for two reasons: 1) it is morally wrong for a technical assistance agency to falsely motivate a Haitian peasant to place himself at risk (i.e., reduce his crop yield by converting part of his limited land holding to grass; or expend labor which might otherwise earn him direct income) when the T.A. has been negligent in its homework; and 2) failures of recommended plants to perform as promised will negatively

affect the credibility of other elements of the technical package. This will require field trials and demonstrations to both determine the suitability, and allow the peasant to see the likely results of his investment prior to taking the risk. Even with the two front runner grass types, Napier and Guinea, there is a preponderance of expert opinion that a better variety than that currently being outplanted in Haiti is available. This should be confirmed. There is also an opinion that Guinea grass is such a prolific seeder that it can spread into adjacent crop plots as weed. It must be realized that Haitian farmers spend a considerable amount of time weeding grass out of their fields. For the same reason, aggressive vegetatively spreading grasses such as Burmuda should also be avoided.

When initiating planting of grasses for forage two different strategies might be evaluated. The first, when the primary intention is erosion control (e.g., stabilization of contour canals already dug), the grass must be outplanted as required. This will likely result in a surplus of forage, of which all is unlikely to be harvested at the nutritionally optimal time. The second approach, when the primary intention is the establishment of a forge reserve and proper utilization procedures, might first begin with planting a limited amount. This might facilitate an understanding that it is easier and less labor intensive (i.e., time consuming) to be able to go to one location, preferably associated with the corral, and harvest feed, rather than searching various roadsides and fallow fields in competition with neighbors also gathering forage. This concept might be reinforced when the limited, convenient supply runs out. At such time, additional plantings can be made to provide sufficient feed, and instructions given as to proper utilization intervals (i.e., number of days, or height of growth, between cuttings). One ideal system to strive for would be the cutting of a regular portion of a row each day, progressing along the row cutting consecutive portions for 30-40 days, and when one cycle of row(s) has been completed, the first cut portion will have attained sufficient regrowth to begin the pattern again (obviously this will have some seasonal variations).

10.2.2 Pastureland Versus Forage Banks or Grass Strips

Dialogues with potential peasant farmer recipients in nonextensive land use areas should emphasize the concept that pasture can be either a horizontal expanse of land supporting a low to moderate productivity native grass, or vertical whereby a smaller area of land produces the same amount of forage because the species selected grows taller, or more rapidly. In areas where land holdings are small, this might be an appropriate extension technique. A parallel concept is the fact that grasses and other forage, like crops and fruits, are "ripe" at a certain time. Perhaps some palatability demonstrations might be helpful, although changes in nutrient content at different stages of maturity can only be approximated from limited sample analyses.

10.2.3. Placement of Facilities

To the extent possible, and based on the duly activity patterns of the farmer and his family, corrals, shelters, forage banks, and similar components of the "Tech Pack" should be arranged in a complementary pattern. Components requiring major changes in routines will be less likely to be accepted, or at least require longer time.

10.2.4 Demonstrations and "Model" Farms

Although numerous appropriate technologies are in place at the central farm to serve as demonstrations to the trainees (e.g., shelters of rustic materials; examples of various fence materials and types), the team has the impression that the overall concept is not being well comprehended by the farmer. Perhaps the central farm, with its 700 some goats and preponderance of large shelters and large wire fenced pastures, is too overwhelming. Rather than spend time or funds altering this situation on the central farm, it is recommended to start immediately with assistance to selected local farmers to put in place "model farm tech packs." This will serve three purposes: 1) directly benefit the recipient farmer or groupement; 2) function as a better scaled model

to show and discuss with trainees and other visitors; and 3) provide feedback and testing of various "tech pack" components at the user level. These models should be approached in a systematic manner, as per the provisional logical framework presented in Appendix 15.4 and should be designed so necessary evaluation data can be collected.

Based on the limited visits of the tech, two possible sites can be suggested at this time: the Dorcan-Gonzalez farm; and the Los Pilos groupement. A more thorough review of other possibilities should be made prior to final selection, but this should be accomplished soon enough to take advantage of the pending rainy season if forage is to be planted. Photo-documentation, as well as costs and labor requirements should be included in the development of these model farm tech packs.

11. RESPONSE TO ADDITIONAL TERMS OF REFERENCE SUBMITTED BY DIRECTOR OF ANIMAL PRODUCTION OF MARNDR

The Winrock evaluation team was asked on April 8, 1986 by the Directorate of Animal Production (DAP) of MARNDR to review, in addition to the terms of reference proposed by USAID, seven specific points within the basic framework of the project implementation.

The evaluation team visited the project sites and had conversations with both national and expatriate technicians committed to its implementation.

These facts will be underlined in the text with each of the terms of reference.

11.1 Terms of Reference No. 1 - Integration of Counterparts into Project

"The degree of integration of the national counterparts to the activities of the project taking into account the relative facilities of communications the nationals have with the target groups of the project."

Important Facts: The activities of the project are of two sorts: activities within the project farms of multiplication and those to be executed with and for the beneficiaries (small farmers and eventual other persons or groups of persons interested in goat production.)

These two activities should be carried out by both national counterparts and expatriates with a definite role of the national counterparts because of their relative facilities of communication with target groups of the project.

However, it is easy to understand that to do so the interested parties, that is to say: Ministry of Department de l'Agriculture, des Ressources Naturelles et du Developpement Rural, MARNDR or DARNDR and Winrock International had agreed to assign on time qualified personnel.

To this effect, the appropriate provisions were specially stated in the following documents:

- The National Goat Production Improvement Program -- Haiti -- Technical proposals, page 23
- The Cost Proposal, table 3, DARNDR, Budget in US$, page 9
- The First Amendment to contractual agreement, Article III, Contribution of MARNDR to the National Production Improvement Program, page 3

As stated in the first document mentioned above, the nationals were to be 100% integrated in all the project's activities, and <u>should be assigned to the project on a full-time basis and for the duration of the project</u>.

The group of nationals to be assigned since the beginning of the project should include:

1. Two counterpart managers
2. Six project extensionists
3. One project secretary
4. Two herdsmen
5. Five skilled workers
6. Three unskilled/semi-skilled workers
7. Plus some part-time personnel

These personnel were to be divided into two equal teams one for the Central Farm in Papaye and the other for the Gonaives Farm.

A full team of counterparts for the Central Farm have not been put in place as was planned.

a) <u>Activities to be conducted on the Farm</u>

MARNDR was to provide at the beginning of the project: the two counterparts (agronomes), at least three extensionists, the two herdsmen, some

skilled workers so as to start their training without any delay and a secretary to work in the office.

Counterparts. Only one counterpart (agronome Mr. Serge Pierre-Louis) was assigned. He was not willing to work on a full-time basis and usually spent only 3 to 4 days per week of participation in the execution of the project activities -- Mr. Pierre-Louis was in place from April 1982 up to July 1984. During his period of appointment, he was well integrated to the project activities.

During 11 months in 1984-1985 the project did not have any counterparts. It was only in June 1985 that MARNDR assigned Agronome Dejean to the project. During the 2-month sick leave of the Chief of Party, Mr. E. Geers, Dejean kept the project going without any problems. According to unofficial sources, Mr. Dejean will be transferred to the District of Bel-Anse.

Herdsmen. Two herdsmen should have been assigned to the project since 1984-1985. But up to now, only one has been hired for the project.

Skilled workers. Thanks to the expatriate Chief of Party, five well-trained and devoted workers are operating now on Papaye Farm. Unfortunately, they are not well-paid. They generally receive their monthly wage after a long delay (often between an interval of 4 to 5 months) that now they start showing signs of discouragement. It would be unfortunate to loose the well-appreciated services of these skilled laborers who might be considered as the most important grass-root level supporters of the project particularly during these days when thieves and troublemakers are ready to destroy everything.

Unskilled workers. They are none actually assigned to the project.

Secretary. No secretary has up to now been assigned to the project.

b) Activities to be conducted off the Farm

These activities are extension work. MARNDR should assign to the project six (6) extensionists to conduct these activities. After their training in Papaye farm and in the District of Hinche, each center should have received three (3) of them.

Up to now only two extensionists were assigned: one to the Central farm and one to Gonaives. M. Damus has served as the extensionist for Hinche District and has done a good job with limited support. He could not reach all the individual small farmers and groups of farmers of the District of Hinche interested in having a buck to improve their goat herds.

Conclusion. The degree of integration of national counterparts is limited because few have yet to be assigned on a full-time basis for the duration of the project.

At the Gonaives Center the assigned counterpart, Agronome Joseph Namphy, did have a chance to take advantage of that part of implementation which was already made but this farm was completely destroyed by political manifestants.

11.2 Term of Reference No. 2 - Role of Counterparts in Financial Administration of Project

"The effective participation of the national co-responsibles should have in the administration of the finance and goods so as to permit them to follow well the evolution of the project and to appreciate as well as can be the ratio of cost/benefit."

Important facts. The document titled "Technical Proposal" indicates in the second paragraph of the page 65 the following:

"The project will be administered jointly by the Winrock International and the Livestock Division of the Department of Agriculture (DARNDR). Specific responsibilities of each organization and overall terms of reference will be developed during contract negotiations. Management of the project itself and of the Operational Program Grant, however, will be the responsibility of Winrock International. A Chief of Party will be responsibility for all financial, administrative and technical aspects of the project, and will serve as Winrock International's field representative and will act as liaison to DARNDR and USAID/Haiti."

However, in the seventh line of the third paragraph of page 65, it is mentioned the following:

"Two Haitian professionals will make up the counterpart management team. These individuals, after receiving training in the USA, will be assigned to the multiplication centers and eventually take over management and technical activities as the project begins to phase out after year three...."

Participation in the administration of the finance and goods

- Up to now these Haitian professionals are not assigned to the project on a full-time basis.
- The first one (agronome S. Pierre-Louis) who started with the project is no longer a member of the project team.
- One agronome, Maurice Dejean, was assigned to the project in June 1985, but he has not been sent to the USA to receive the proposed training. Mr. Dejean's status in the project is uncertain at this time.
- Finally, the handing over of management to Haitian professionals must take place only as the project begins to phase out after year three.

Conclusion and suggestion. It would be necessary to activate the process of assigning two Haitian professionals as soon as possible on a full-time basis so as to have the time to allow them to receive a good

training on the ongoing operations in the Central farm at Papaye and the proposed training in the USA and eventually to take over management and technical activities of the project before it ends out.

Actually the Haitian counterparts could be responsible for financial management of the MARNDR project budget which counts a total amount of US$268,203.

Anyway there is no difficulty to let them know the monthly or quarterly or semiannual expenditures accounted by Winrock International for the implementation of the project if this exercise is really necessary to them to appreciate the evolution of the project and to study the actual value of the cost/benefit ratio.

11.3 Terms of Reference No. 3 - Assessment of Equipment

"The effective availability of the logistic equipment for the execution of the project activities."

Important facts. The project equipment now in the Papaye farm:

- One 4-WD Ford pick-up type vehicle
- One motorcycle

The 4-WD Ford pick-up vehicle is at the disposal of the Chief of Party who will use it for the project services. The Haitian counterpart may utilize this vehicle with the Chief of Party during work hours keeping in mind that the COP is solely responsible for the proper operation and utilization of the vehicles until Winrock International hands them over to the Haitian Government. The motorcycle is only used by the extension agents for extension work.

The project equipment for the Gonaives farm is listed in Table 13.16. This equipment except for the vehicles are at the District Director's office in Gonaives. Equipment which can be used at the Papaye Farm

should be moved there immediately, and the rest should be sold and monies returned to the project.

Conclusion and suggestion. As the Haitian Government did not put any vehicle at the disposal of counterparts, a compromise be reached with the COP of the project to share the vehicles to carry out project related activities.

11.4 Term of Reference No. 4 - Assessment of Improved Breeds

"The comparative value of the hybrids (Nubian x Indigenous and Alpine x Indigenous) which are proposed for the beneficiaries (farmers) taking into account the preferences of the farmers."

The comparative value of these animals is being studied. So far one can say that recipients prefer the Nubian to the Alpine crossbreds.

It seems that this preference is only justified by the different look of the Nubian with respect to the Alpine which has a great resemblance to the native goats. Consequently, the Nubian appears to be in greater demand than the Alpine.

11.5 Term of Reference No. 5 - Assessment of Project to Meet Objectives

"The time of effective realization of specific objectives or outputs of the project keeping in mind the objectives of the execution in particular, e.g., training of superior technicians (cadres), technical agents and farmers and number of farmers families touched - "

The specific objectives of the project were not attained because of the delay in the assignment of the national personnel to the project. As mentioned above the professional counterparts were not assigned on time. The ones who came to work in the project were not assigned on a full-time basis. Those that were trained on the Papaye farm were not sent to the USA for more training.

For the technical agents only one has up to now been assigned to the project and is well-trained and performance is good (Yves Damus).

For the other extension agents who have come from time to time for short courses or seminars, the objectives were attained satisfactorily. The part of this evaluation report on training will mention the number of trainees who attended these sessions at Papaye.

Concerning the number of families touched, we might as well say that the objectives were attained up to approximately 40% though the project did not have the team of extension agents proposed in the plan of operation by DARNDR.

11.6 Terms of Reference No. 6 - Condition of the Equipment

"The actual condition of the material and equipment already purchased by the project and the working condition they will be transferred at the end of the project to the Haitian Government to continue the activities."

The material and equipment of the project are well kept. Vehicle, automobiles, motorcycles, tractor and implements; farm facilities, office material and machines are in good working shape.

The normal schedule of vehicle replacement in Haitian conditions is 3 to 3.5 years. Project equipment at this time is in good shape and will likely be so at the end of the project.

If the project should be extended for a long period after June 1987, some of these vehicles should be repaired or sold and be replaced by new ones. It must be kept in mind that equipment and material at the end of the project should be in good condition to allow without difficulty the continuation of the operations.

11.7 Term of Reference No. 7 - Reaching Objectives with the Chronogram

"The possibility of realizing the activities proposed in the plan of operation within the established chronogram-"

The project could not meet the operation chronogram because of the reasons mentioned above (see answers to terms of references 1, 2, 3).

Many objectives for the Papaye Farm are well-advanced. However, objectives such as technical packages, training of personnel and grass-root level beneficiaries, distribution of improved animals, and organization of an extension network must still be done and the time left is definitely too short.

The reason for that is that some operations took much more time than planned. An example is lack of support in assigning national counterparts and the extension agents, which slowed down the project. Because of the lack of a secretary for the COP, this clerical work interfered with other responsibilities. Because some of the professional counterparts not being assigned on a full-time basis and not receiving a promised per diem as mentioned in the DARNDR project budget, the execution of the operations was adversely affected, and therefore the objectives planned for year two could not be attained at 100%. In addition, one must consider the complete destruction of the Gonaives multiplication farm.

11.8 Strategies for Activities of the Project

Two strategies are possible for the GPIP project:

1. Reduce the number of objectives to allow current resource persons to attain these objectives during the 12-month period left focusing only on the multiplication farm at Papaye Farm.
2. Extend the time left on the project another 18 months and to concentrate the activities in the District of Hinche. The distribu-

tion of improved animals (halfbred and three-quarter bucks) could continue but under the strict conditions of:

- Preparing stand and(or) shelter; feed (and the know-how for feeding the bucks and its offspring)
- Good knowledge of care and sanitation to keep the animal healthy
- Extension follow-up
- Periodic reports (feedback) to the main office of the Goat Production Improvement Program Project at Papaye Farm.

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13. TABLES

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Table 13.1a. Evaluation matrix of Goat Production Improvement Project -- goals.

GOALS	ACTUAL STATUS	EXPLANATORY NOTES	TEAM'S ASSESSMENT
1. increase availability of meat and milk (PII - technical report)	- unknown off the farm.	- no empirical data available. - field interviews during evaluation suggests objectives not being met.	- project's goals unrealistic within time of project's funding. - lack of GOH support.
2. improve the socio-economic well being of some 7,085 family farmers at the end of third year.	- only 39 percent of 148 primary beneficiaries have been reached as of 12/85.	- livestock development under tropical conditions is a long term project.	- total number of project's targeted beneficiaries cannot be reached in the remaining period of the project.
3. increase producer's income.	- cross- bred bucks sell for more; quantitative assessment not available and overall income minimal; Value is only in perceived phenotypic characteristics of animal.	- Haitian peasant not marketing animals to maximize net revenues; animals held mainly as a savings account. - not enough cross-bred animals available for sale. - not enough production of cross-bred goats off the farm to measure income.	- need to introduce innovative outlets and reorient peasants' marketing strategies.

Table 13.1b. Evaluation matrix of Goat Production Improvement Project -- objectives as per Grant Agreement.

OBJECTIVES AS PER GRANT AGREEMENT	ACTUAL STATUS	EXPLANATORY NOTES	TEAM ASSESSMENT
1. multiply superior animals.	895 kids born 23% mortalities.	- goals exceeded only at central farm - Papaye within time frame.	- foundation native herd in place before USAID contract. - 128 improved does added to herd; 353 does in breeding herd.
2. adapt technology to local conditions and improve traditional production system.	- planted napier grass, lucaena and guinea grass on farm. Napier cuttings distributed to 6 farmers. - feedstuff preservation (silage) and hay stack of local grass - (Andropago) on the farm. - goat shelter - off farm from local material. - mangers on the farm. - waters facilities on farm. - off farm water carried by buckets. - use of live fences posts on farm and off farm. - local feed stuff ration utilized (p. 21).	- consultants' reports prepared but not entirely implemented because of lack of manpower on the farm.	- extremely limited dissemination of techniques off-farm. - technical package not complete and not always appropriate e.g. (wire fences.)

Table 13.1b. Evaluation matrix of Goat Production Improvement Project -- objectives as per Grant Agreement (cont.).

OBJECTIVES AS PER GRANT AGREEMENT	ACTUAL STATUS	EXPLANATORY NOTES	TEAM'S ASSESSMENT
3. Train Technicians and Producers	- project extensionists total 54 person months until March 31, 1986; 25 p.m. since USAID grant-June 1984.		- more training of extensionists, follow-up of off-farm demo facilities.
	- counterparts?. 10 p.m. under USAID	- counterparts not continuously assigned 6/84-6/85; no counterparts after 6/85 - one assigned.	- question quality of training and actual transfer of knowledge ✓
	- small producers + PVO 237 p.d. thru 3/31/86		- all staff need definitive scope of work. ✓
	- community outreach over 200 p.d.		- no appropriate off-farm demonstration. ✓
	- miscellaneous		
	- national 193 p.d.		
	- international 154 p.d.		
4a. deliver technical assistance.	- 50 percent of the farmers receiving bucks in Hinche visited at least once.	- no GOH support.	- impact of delivery system extremely limited. ✓
			- must become major emphasis.
			- not all farmers that received bucks were visited.

Table 13.1b. Evaluation matrix of Goat Production Improvement Project -- objectives as per Grant Agreement (cont.).

OBJECTIVES AS PER GRANT AGREEMENT	ACTUAL STATUS	EXPLANATORY NOTES	TEAM'S ASSESSMENT
4b. Deliver Improved Animals.	- 57 bucks plus 25 available as of April 1st.	- 39 percent of the target primary beneficiaries (148) have been distributed. - approximately 10 percent of bucks have died or were stolen.	- benefits are only through the secondary level of beneficiaries as of 19 months (12/85) since start of project.
5. promote and assist nuclei of family farmers that will breed improved animals.	- not developed.	- project staff unclear about concept. - lack of manpower and assistance.	- there are potential sites for nuclei stud centers. - should be emphasized in the future. - establish the criteria for a stud nucleus breeding center.
6. identify and assist in establishment of producer credit and marketing mechanisms.	- preliminary report of small farmer survey in Hinche. - marketing survey started but not completed (Hinche District only).	- on farm demands and lack of GOH support have limited time for marketing.	- must be started ASAP to design strategies for commercialization and modenization of herd; live, meat and milk. - data not available on the following: growth rates; carcass weights by breeds; and feeding rations, to develop marketing strategies.

Table 13.1b. Evaluation matrix of Goat Production Improvement Project -- objectives as per Grant Agreement (cont.).

OBJECTIVES	ACTUAL STATUS	EXPLANATORY NOTES	TEAM'S ASSESSMENT
7: EMPHASIS ON EXTENSION ACTIVITIES			
a. adequate year round nutrition.	- Preliminary evaluation of conditions.	- lack of manpower.	- essential to feed the animals before beginning to breed if genetic potential is to be expressed.
	- extension of information on limited basis.		- no extension program for farmers.
b. adequate year round water.	- emphasized in training program.		- many people do not have enough water, need appropriate tech. pack for water storage.
	- no assessment of effectiveness of watering.		
c. confinement system to negate ecological damage.	- tradition prevails.	- limited extension of new technology.	- more work needs to be done on economics of cut and carry versus tethering
- health aspect of confinement.	- training program considers health aspect.	- no support to veterinary nurses by National Vet. Service.	- effectiveness of extension is limited and questionable.
d. methods of marketing to promote economic incentives at the farmer level.	- unorganized and lacking incentives.	- lack of GOH infrastructure	- need for experimental marketing system.
	- no government grades and standards for selling.	- overlap of responsibilities by GOH ministeries involved in supervising marketing systems.	- new product development.
	- no carcass yield information.		- stratification and specialization of production systems (pasture/feed lot system).
	- confusing marketing fees.		- lower the marketing costs through economies of scale in selling.

Table 13.1b. Evaluation matrix of Goat Production Improvement Project -- objectives as per Grant Agreement (cont.).

OBJECTIVES	ACTUAL STATUS	EXPLANATORY NOTES	TEAM'S ASSESSMENT
e. Winrock's reporting system on project's development.	- reporting requirements met but do not identify problem areas.	- USAID has opportunity to evaluate progress and suggest changes.	- the interval between consultant's work and final report excessive and not conducive to additional quality. - better communication is needed between GOH/ Winrock/USAID.
8. Role of the government of Haiti.	- staffing not provided at all levels as committed to in agreement (refer to # 7). - payment schedules for GOH employees irregular to and not according to agreement - motivation and incentives are low for technical staff.	- no documents available from government staff as to their performance. - see cost proposal for amounts committed.	- the lack of technical staff and financial supports from GOH have been the major constraint to the timely and complete implementation of the project.

Table 13.1c. Evaluation matrix of Goat Production Improvement Project -- outputs per Project Proposal.

PROJECT OUTPUTS	ACTUAL STATUS	EXPLANATORY NOTES	TEAM'S ASSESSMENT
1. Train Personnel			
- two counterparts	- 6 to 8 weeks U.S. training not accomplished, on-site training only.	- lack of interest by counterpart	- guidelines and job description unclear.
- two herdsmen	- central farm person not assigned. - western farm - on job training.		- job description needed and understood by GOH.
- six project extensionists	- 50 person-months of informal on the job training.	- number of individuals not clear. - full staffing not assigned.	- lack of GOH support has limited implementation of this project output.
- extension agents	- no training provided.	- no travel funds.	
- small-scale producers.	- 97 persons for a total of 145.5 person days.	- target training days differ between the technical proposal (p21) and the cost proposal (p/15).	- substantial amount of training but does not coincide with high number of training projections (p. 21).
- community awareness	- more than 200 training days.	- additional training of 145 days of other interested groups.	- within target projections.

Table 13.1c. Evaluation matrix of Goat Production Improvement Project -- outputs per Project Proposal (cont.).

PROJECT OUTPUTS	ACTUAL STATUS	EXPLANATORY NOTES	TEAM'S ASSESSMENT
2. - training Syllabi/Program	- syllabus prepared.		- lack of timely delivery of training materials in french and creole have impeded tech. transfer.
	- other training materials reported completed in English at Winrock as of April 1st.		- materials are necessary immediately for improvement of training.
3. Facilities/Commodities			
- construction materials	- satisfied commitment	- see appendix (Ed) look at commodities.	
- vehicles		- Gonaive construction damage estimated at $60,000.	- equipment at Gonaive be transported to Papaye.
- furniture and fixtures			
4. Breeding herd objectives			
herd size	- on target		- breeding program well-established
offtake	- on target		
production.			
5. Stud Breeder Nuclei	- don't exist	- not enough bucks in the community to start a buck center.	- to realize rapid dissemination of bucks, semi-commercial centers must be developed.
			- sites are necessary to maintain quality breeding program.

Table 13.1c. Evaluation matrix of Goat Production Improvement Project -- outputs per Project Proposal (cont.).

PROJECT OUTPUTS	ACTUAL STATUS	EXPLANATORY NOTES	TEAM'S ASSESSMENT
6. Adapted Tech Packs	- see p.1, no. 2		
a. identify improved technology and production package.			
b. select most appropriate tech package (pg. 19 - tech proposal).	- little development		- all ad hoc, no systematic tech pack plan; therefore will severely limit success of project.
c. test tech pack under field conditions.	- making of shelter and fence from local materials.		
	- others?		
	- frequency of watering	- results unknown off the farm water frequency on goats.	
d. develop simple technology packs at producer level.	- not done		- systematic development as per proposal essential for project success.
e. assist in delivery of tech packs.	- limited delivery of items in 6c.		- give highest priority to off-farm demonstration. ✓
7. Delivery System of Technology and Animals.			
a. identify and survey potential producers.	- preliminary report on small farmer survey completed.		- good baseline data; could be used as basis for integrated livestock development with farming systems. ✓
b. train 6 extensionists			
c. train DARNDR extension and PVO agricultural developers.	- see p.5 no. 1		
d. exchange improved animals.			

Table 13.1c. Evaluation matrix of Goat Production Improvement Project -- outputs per Project Proposal (cont.).

PROJECT OUTPUTS	ACTUAL STATUS	EXPLANATORY NOTES	TEAM'S ASSESSMENT
8. Develop Marketing Strategies:			
a. conduct market survey	- see objective section.	- farm needs to test milk cottage industry i.e. milk, cheese, butter and candy.	- identify potential opportunities both with Hinche, other districts and PAP.
b. develop marketing strategies for small-scale holders that increase benefits.	- not done yet	- high marketing costs in shrinkage and mortalities.	- design alternative marketing system for goats from Hinche. - evaluate price system - conduct market research on demand for goat meat and milk. - new product development for meat and milk products.
c. large-scale marketing strategies that require government actions.	- nothing exist	- Haiti has lost its meat export permits. - must obtain production data on forage feeding trials to obtain the optimum finished weight.	- government must take first step in reestablishing export requirements of U.S. farm bill 1981. - investigate an integrated weaning, stocker and finishing system for improved goats.

Table 13.2. Manpower and financial support from GOH/MARNDR for GPIP project in Hinche (1986-87).

No.	Job description		Costs
1	Counterpart ($450 x 13 mo) for farm manager		$ 5,850
1	Extension outreach and trainer ($400 x 13 mo)		5,200
3	Extensionists ($180 x 13 mo x 3)		7,020
1	Herdsman ($100 x 13 mo)		1,300
7	Unskilled laborers (5 currently on project) ($100 x 13 mo x 7)		9,100
1	Secretary		1,800
		Subtotal	$30,270
Expenses for Operation:			
	Pick-up	$5,000	
	Motorcycle	5,000	
	Tractor	5,000	15,000
Travel and per diem - project staff			5,000
Travel and per diem - MARNDR			3,000
Grand Total			$53,270

Table 13.3. Livestock population in the South Province, 1985

Species	Heads	Heads (per ha)	Heads (per farm)	Heads (per 1,000 inhabitants)
Cattle	127,000	0.95	0.97	192
Horses	21,000	0.15	0.16	31
Mules	17,000	0.13	0.13	26
Donkeys	32,000	0.24	0.25	49
Sheep	75,000	0.56	0.57	114
Goats	245,000	1.83	1.87	372
Pigs	3,000	0.03	0.03	5
Poultry	609,000	4.55	4.64	924
Rabbits	11,200	0.08	0.09	17

Source: ADS-II -- preliminary data (later slightly revised downward).

Table 13.4. Goat population by ecological zone in the South Province, 1985.

	Area (ha)	Farms	Total inhabitants	Total goats	Goats per ha	Goats per 1,000 inhabitant
Lowland-intensive	20,472	22,183	134,597	44,330	2.17	329
Lowland-rice	1,953	2,503	21,403	2,503	1.28	117
Lowland-extensive	411	750	3,840	2,250	5.47	585
Upland-intensive	81,932	68,962	372,427	147,479	1.80	396
Upland-extensive	24,351	13,783	86,523	42,507	1.75	491
Rural villages	4,724	23,008	40,566	6,204	1.31	153

Source: ADS-II Preliminary data (later slightly revised downward).

Table 13.5. Prices of selected meats at FAMEPAK processing plant in Port-au-Prince.

Meat products	Price 5-1-85	Price 4-2-86
	--------($/lb)--------	
Beef filet	3.40	3.50
Beef ground meat	1.55	1.65
Goat (cuts)	2.00	2.20
Chicken (whole)	1.35	1.45
Pork (cotelet)	2.70	2.80
Lamb	2.50	N/A

Discount 5% for large customers (restaurants, hotels, cafeteria's, etc.).

Table 13.6. Acquisition record of the foundation herd.

Type of animal	1982	1983				1984			
	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.
Native does	-	54	79	99	?	168	167	183	225

Table 13.7. Status of breeding herd and replacements (April 1986).

Genotype	Imported	Local purchase	Culls	Deaths	Total
Haitian	-	225	16	-	209
Alpine	5	-	-	3	2
Nubian	5	-	-	3	2
Subtotal	10	225	16	6	213
Replacement Females					
Haitian	-	-	-	-	-
Alpine	-	-	-	-	14
Nubian	-	-	-	-	3
1/2 Alpine	-	-	-	-	54
1/2 Nubian	-	-	-	-	43
3/4 Alpine	-	-	-	-	8
3/4 Nubian	-	-	-	-	6
3 way cross	-	-	-	-	-
Total	-	-	-	-	341

Table 13.8. Production status of females in breeding herd (April 1986).

Genotype	Born	Immature	Unweaned	Culls	Died	Lost	Replaced in-herd	Distributed
Haitian	171	31	20	58	40	22	-	-
Alpine	22	2	3	-	3	-	14	-
Nubian	13	-	-	-	10	-	3	-
1/2 Alpine	301	60	25	4	69	70	54	19
1/2 Nubian	324	81	52	3	75	32	43	38
3/4 Alpine	31	8	8	-	7	-	8	-
3/4 Nubian	23	4	11	-	2	-	6	-
3-way crosses	10	3	7	-	-	-	-	-
Total	895	189	126	65	206	124	128	57
%	-	21	14	7	23	14	14	6

Table 13.9. Importation of exotic germplasm and their present status (April 1986).

		Breeds				Breeding Centers	
Date	Sex	Nubian	Alpine	Total	Died	Gonaives	Hinche
1/83	M	10	10				
11/85	M	8	8	36	13	8*	15
1/83	F	5	5	10	6	--	4
				46	19	0	19

*Bucks lost during the destruction of the Gonaives Center.

Table 13.10. Growth performance of 1/4 exotic breed offspring in Haitian farmers' herds.

Sex	N[1]	Age[2]	Kg[3]	Birth wt[4]	ADG[5]
F	20	42.8	6.08	2.0	94.2
M	9	48.8	6.70	2.0	96.3

1 Number of samples.
2 Mean age days.
3 Mean weight kgs at mean age days.
4 Mean weight kgs at birth for 1/4 bred kids (assumed).
5 Average daily gains (#3 - #4 ÷ #2) gm/day.

Table 13.11. Weight improvement comparison of crossbred kids over staightbred kids in percent.

Kid genotype	Birth wt, %	16 wks wt, %	26 wks wt, %	38 wks wt, %	50 wks wt, %
1/2 Alpine	26.8	14.6	14.8	20.1	25.0
1/2 Nubian	20.8	18.5	19.1	18.0	14.3
3/4 Alpine	62.3	63.3	67.8	51.8	--
3/4 Nubian	40.0	49.8	35.6	28.07	--

Table 13.12. Distribution of halfblood crossbred Alpine-Haitian and Nubian-Haitian bucks by districts, numbers, and percentages.

District	Number	Percentage
Hinche	25	43.8
Jeremie	5	8.8
Les Cayes	6	10.5
St. Marc	4	7.0
Gonaives	4	7.0
Jacmel	1	1.7
Port-au-Prince (North & South)	10	17.5
Belladere	2	3.5
Total	57	

Table 13.13. Agricultural regions and districts.

Region	Subregion	Agricultural districts
Region 1 North		Cap-Haitian
Region 2 Transversal		Gonaives
		St. Marc
	Plateau-Central	Hinche
		Mirebalais
	Nord'Quest	Port-de-Paix
Region 3 West		Port-au-Prince, Nord
		Port-au-Prince, Sud
		Jacmel
		Belle-Anse
Region 4 South		Petit-Goave
		Fond-des-Negres
		Cayes
	Grande Anse	Jeremie

Table 13.14. Estimation of projected beneficiaries receiving improved bucks at the end of year two.

Beneficiaries	Project estimate, No.	Actual, No.	Actual as % of projected, %
Primary	148	52[a]	35[c]
Secondary	1,332	-[b]	-
Tertiary	0	0	-
Quaternary	0	0	-
Total	1,580	665[b]	42

[1]Total number of bucks distributed at the time of project evaluation is 57. At least four deaths are know, which makes the actual estimate a ceiling for total beneficiaries reached. No follow-up on bucks outside the Hinche District has been done.

[2]Secondary beneficiaries are not estimated because of time period in which bucks have been in field. Average conceptions by does in sites visited by team was 12.8 does/buck.

[3]Approximately 34 bucks on the farm are or will be ready for distribution which are not included in analysis. If these bucks are distributed by the end of May 1986, then actual number of bucks distributed would be 86. However, bucks will not have mated any does which may still take 3-4 months.

Table 13.15. Source and amount of funds expended as of December 1985.

Source	Amount
Arkansas Area United Methodist Church	$292,377
USAID	409,657
Winrock International	170,346
MARNDR-GOH[1]	--
Total	$872,380

Source: Status reports - 1984 and 1985. Goat Production Improvement Project.
[1]Figure was unavailable.

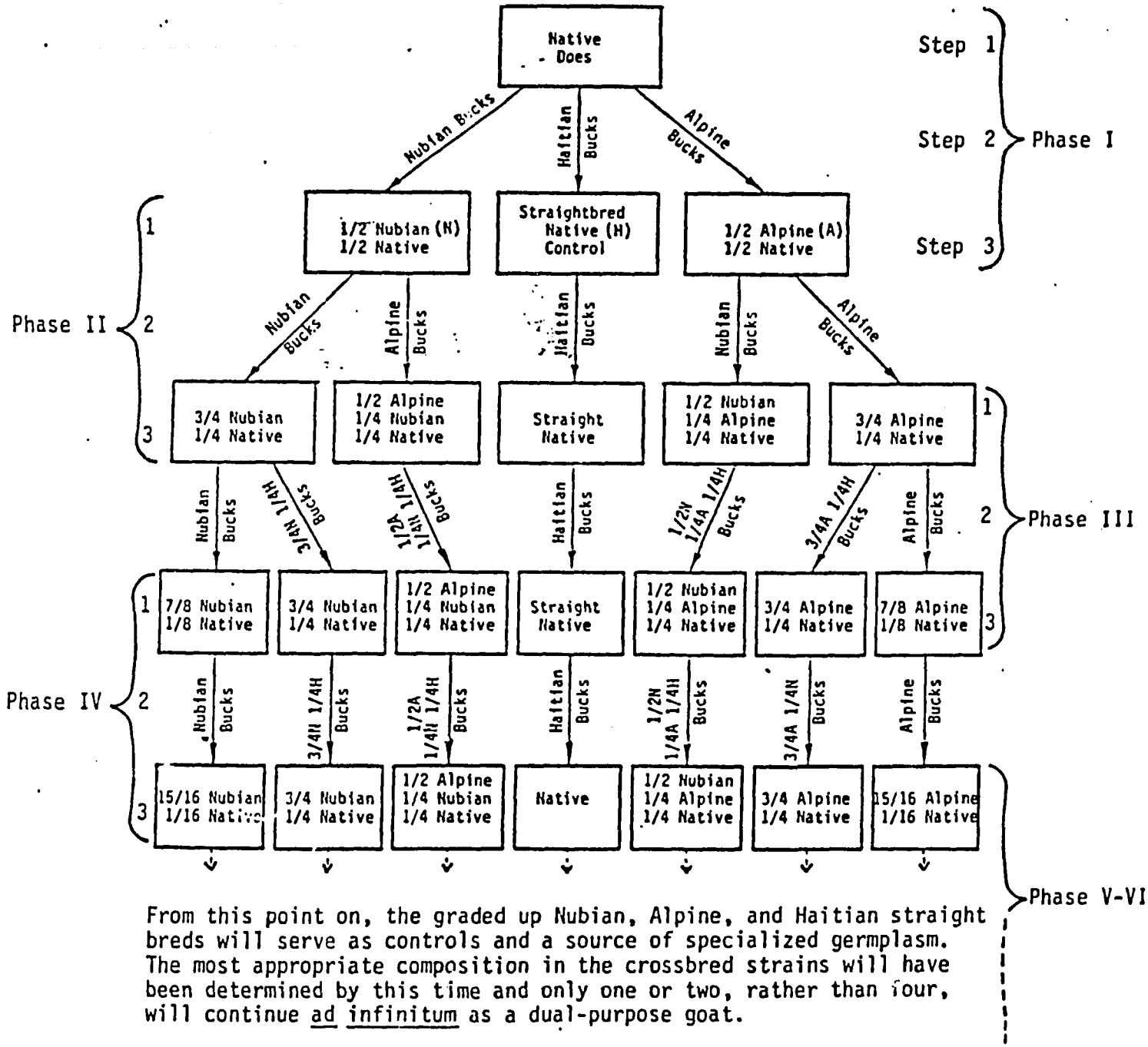
Table 13.16. List of equipment salvaged from Gonaives project site.

-	John Deer 2040
	W front end loader (minus hydraulics)
	Disc plow
	Disc harrow
-	Mitsubishi trailer
-	Generator
-	Water pump
-	12 PVC pipes 2" and 20'
-	3 iron mangers
-	7-1 panel 1.8 M gates
-	2-1 panel .8 M gates
-	6 doors mahogany
-	4 bicycles, 8627 RM
-	1 185 Honda dirt bike CT
-	3 piles salvages posts approx. 200 6-8' long
-	1 4-WD suburban type vehicle
-	1 4-WD pick-up truck

14. FIGURES

14.1ab. Breeding plans for developing a dual-purpose composite.
14.2. The structure of MARNDR.
14.3. Map of regions and agricultural districts.
14.4. Flow diagram of products flows and market transmission signals.

MATING PROGRAM



From this point on, the graded up Nubian, Alpine, and Haitian straight breds will serve as controls and a source of specialized germplasm. The most appropriate composition in the crossbred strains will have been determined by this time and only one or two, rather than four, will continue ad infinitum as a dual-purpose goat.

Figure 14.1a. Breeding plans for developing a dual-purpose composite.

MATING PROGRAM

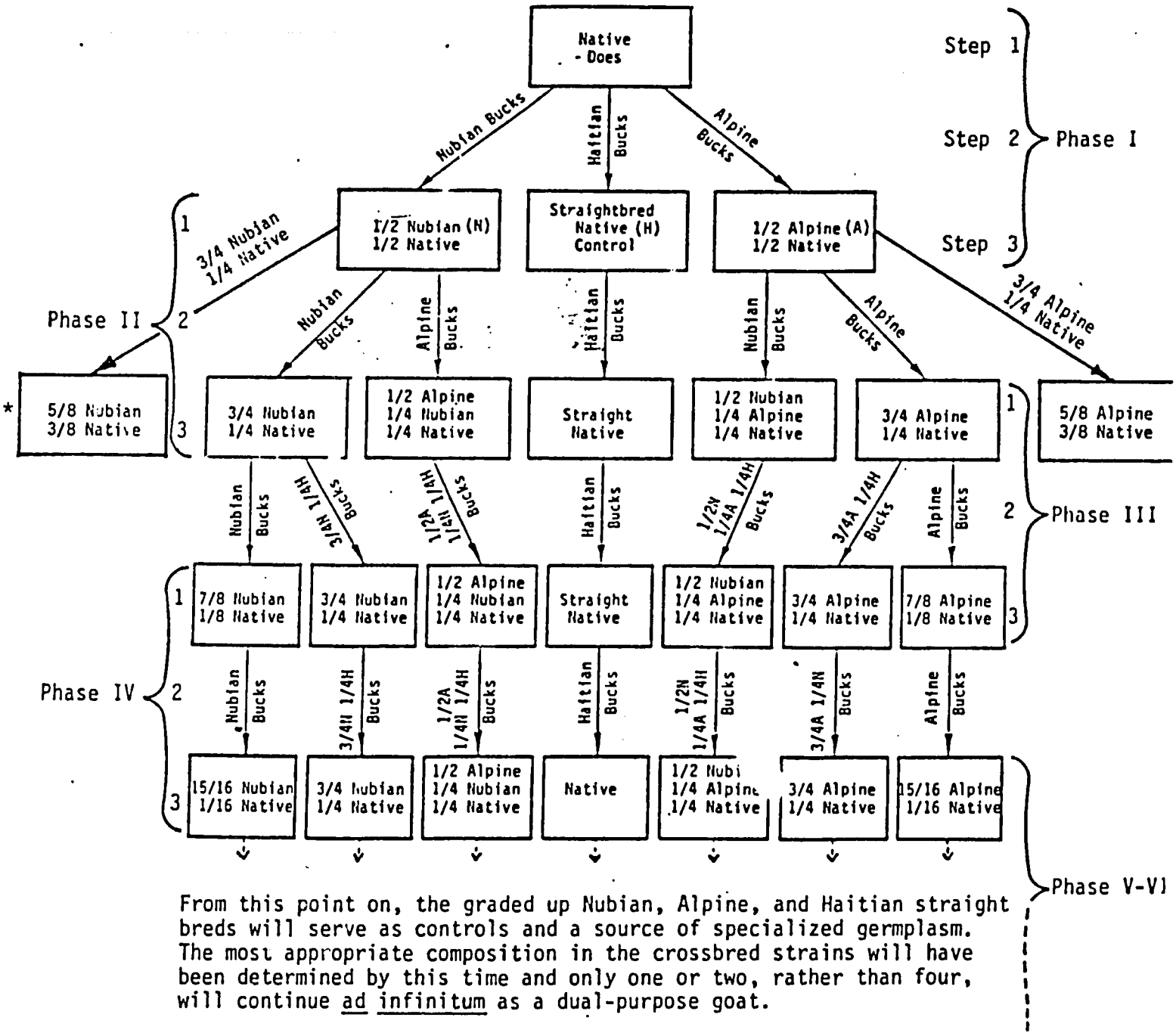


Figure 14.1b. Breeding plans for developing a dual-purpose composite
*with additional mating scheme.

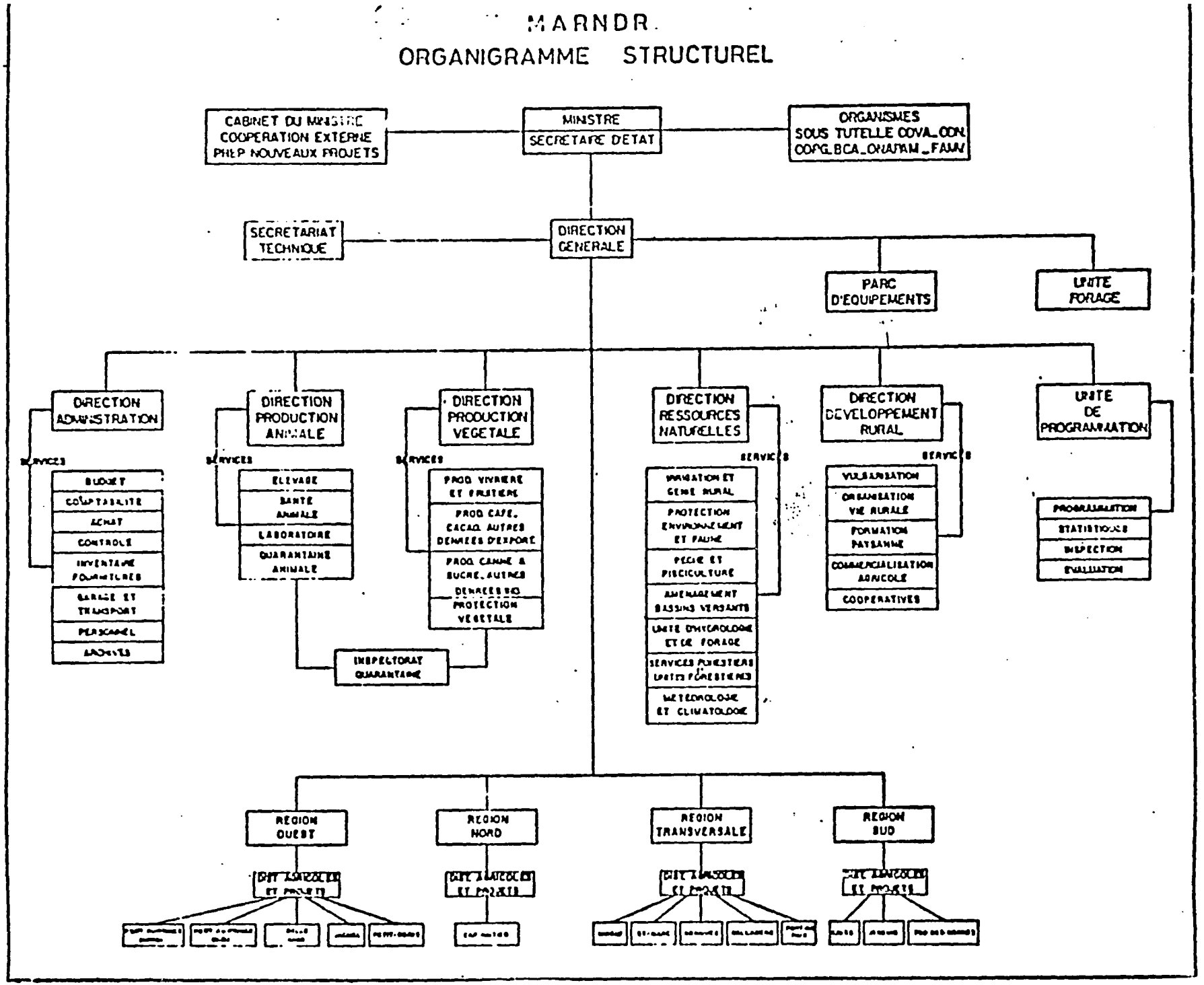


Figure 14.2. The structure of MARNDR.

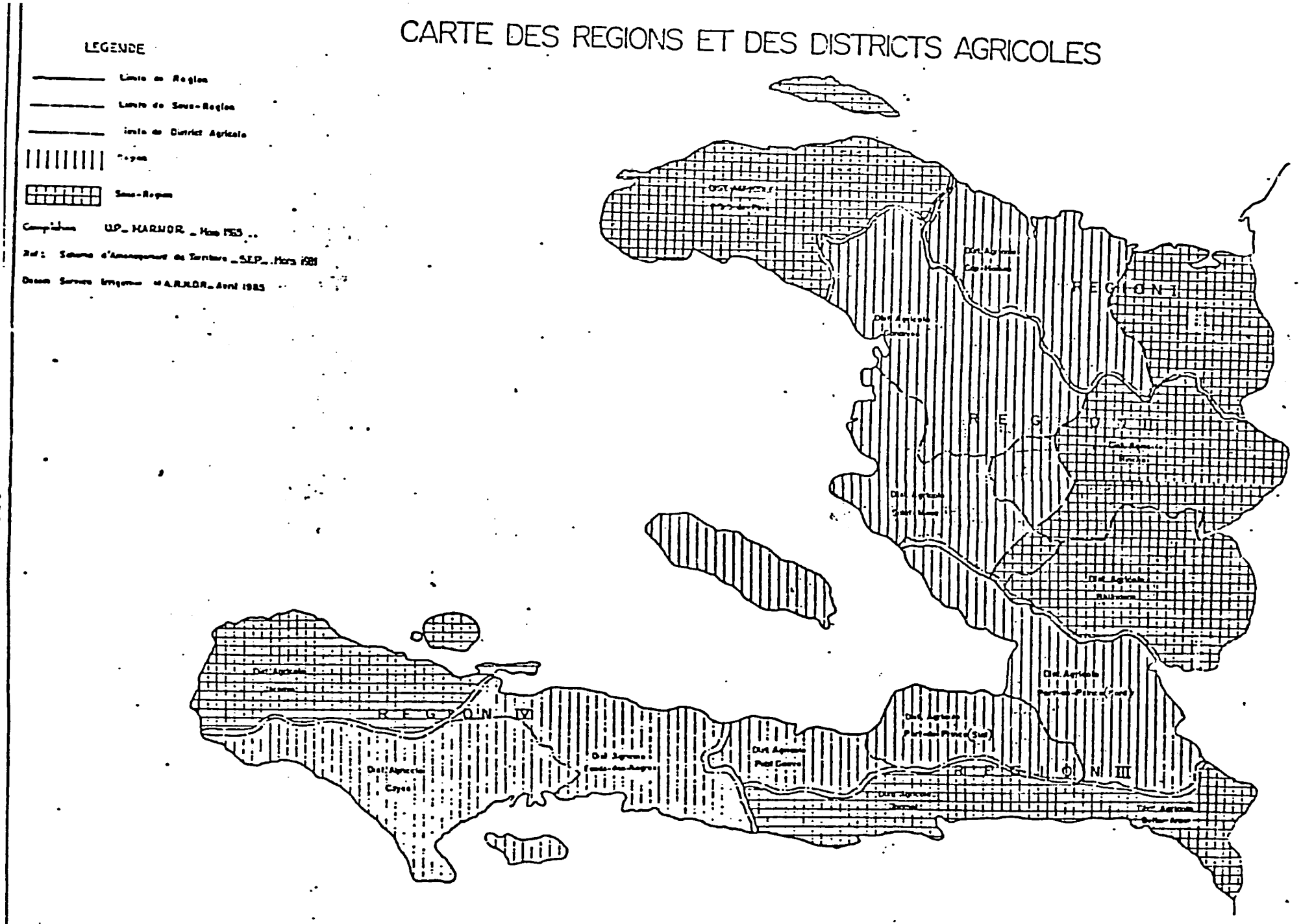


Figure 14.3. Map of regions and agricultural districts.

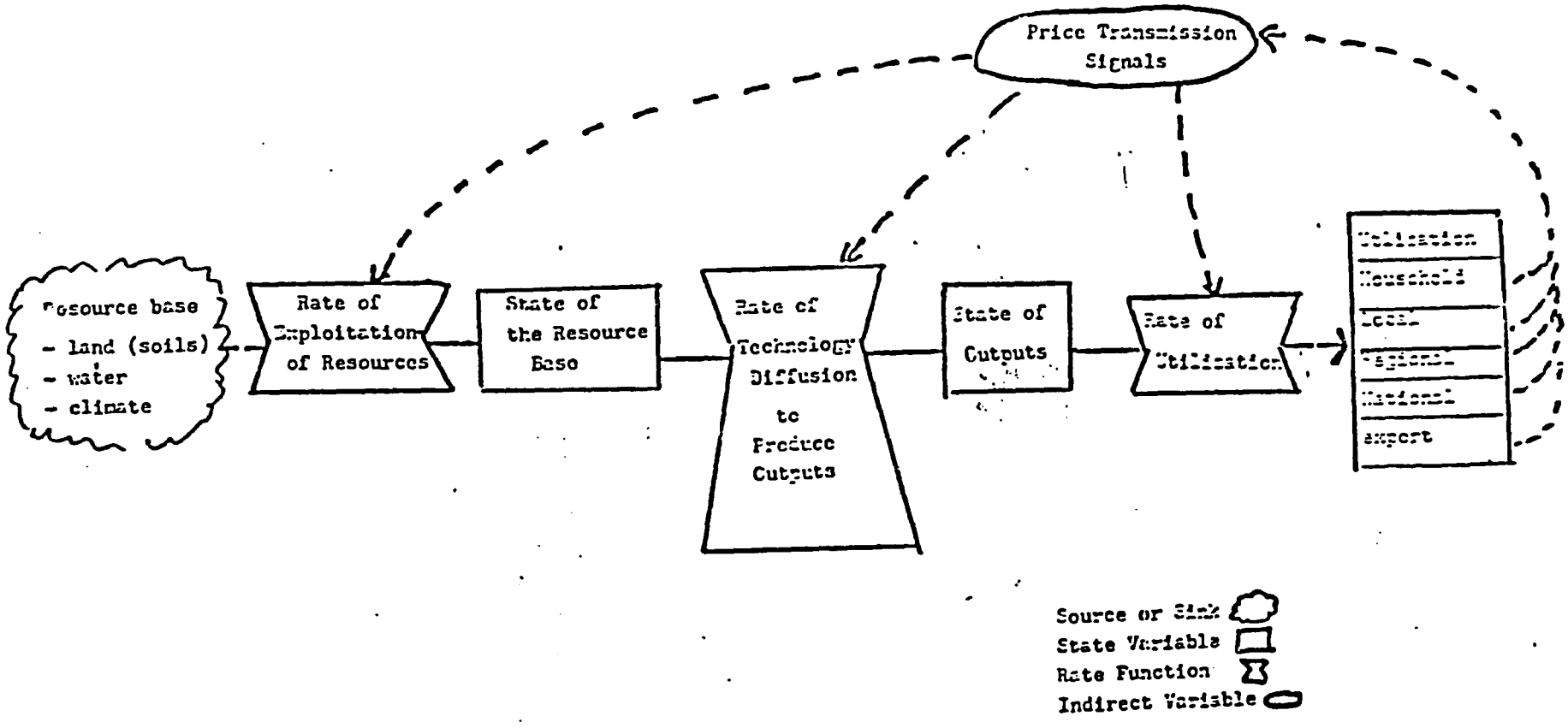


Figure 14.4. Flow diagram of products flows and market transmission signals.

15. APPENDIX

15.1. Consultant's Scope of Work

15.2. Terms of Reference from Directorate of Animal Production (MARNDR) (English version).

15.3 Terms of Reference from Directorate of Animal Production (MARNDR) (French version).

15.4. Logical Framework for Identifying Goat Husbandry "Tech Pack" Options.

15.5. Debriefing Materials for MARNDR/GOH, Winrock International, and USAID/Haiti.

15.6. Work Schedule for Consultants

15.7. Logical Framework.

15.8. Workplan for Meeting Evaluation Reports.

15.9. Example Brochure for Off-farm Extension Program.

APPENDIX 15.1

CONSULTANT'S SCOPE OF WORK

The team will spend at least two weeks in the field visiting, the ferme Papaye, the Gonaives Center, and a representative of sites that have received the project's crossbred goats (bucks).

At least another week, if not two in the case of the team leader, will be spent doing analysis and write-up. USAID will provide transportation and logistical support when possible and only in those instances when Winrock cannot.

Winrock should request that MARNDR/Elevage also assign a technician to work with this evaluation team. The team will coordinate its day-by-day work plan with USAID's Rural Development Office, headed by Vincent Cusumano, and with the office's Livestock and Institutional Development (LID) Cluster under John Lewis. Debriefings should be scheduled wit USAID and MARNDR.

The draft evaluation report should be submitted for USAID review before the Winrock-funded consultants leave Haiti. In content and format, it should conform to standard AID project evaluation guidelines.

SCOPE OF THE ANALYSIS

1. The team leader/agricultural economist should review the rationale for this project by:

    a. attempting to calculate, based on the existing literature, project documents, and some representative interviews, the marginal return to the Haitian farmer of having one of project's crossbred goats as opposed to indigenous stock (this comparison should weigh the costs and benefits, to the farmer,

of managing each kind of animal unit, Alpine, Nubian, Haitian).

b. attempting to calculate, based both on the project's aggregate implementation targets and attainments, and using existing information on small farm production costs in Haiti, the social benefits, to the Haitian economy, of this project.

Based on these calculations, this specialist should provide a general assessment of:

a. the best technical and extension approach to improving small farmer livestock productivity in Haiti's major ecological zones.

b. the scope for using such animal husbandry extension for improving the income and the land use management practices of Haiti's hillside farmers.

As team leader, this specialist should also draft a concluding section to the evaluation report recommending how the technical content of the Winrock's goat improvement project might be redirected in future project(s) so as to help USAID attain more of the hillside management objectives of their Action Plan.

2. The animal scientist/agronomist should review: (a) the breeding schedule of the project for its technical quality; (b) the goat husbandry extension methodology of the project for its appropriateness; and (c) the implementation history of both of these initiatives.

This specialist should also provide a summary statement about goat husbandry and improvement technical options that should be added to, or substituted for, those in the project. The ranking of these

technical options should be done with the hillside land improvement objectives of USAID's Action Plan in mind.

3. The range scientist should provide technical assessment of the project's species investigations and range management recommendations for the two ecological zones of the project. He should suggest additional technical options that might merit increased attention by the project.

   Finally he should review the extension recommendations of the other team members to see where range improvement and other forage outplanting technologies might be reasonable adopted by Haiti's hillside livestock producers.

4. The extension specialist should review the literature on and experience of agricultural extension approaches in Haiti, including that of this project, to see how appropriate goat husbandry improvements, including better forage management, might be more effectively spread throughout Haiti's hillside areas. This analysis should build on the recommendations of other specialists. It should also include illustrative examples of farmers actually contacted by this project. These examples should be chosen to represent, as adequately as possible, a maximum number of small farmer types and ecological settings.

CONCLUSION

Hopefully, combined with the internal swine project evaluation and redesign, this goat study will enable another specialist, called for in step four (see introduction), to fully situate our livestock development options within the larger context of the Hillside Strategy in our Action Plan.

APPENDIX 15.2

TERMS OF REFERENCE FROM DIRECTORATE OF ANIMAL PRODUCTION (MARNDR)

To: Winrock International
From: Direcorate of Animal Production (MARNDR)
Object: Terms of reference to be considered during the evaluation of the goat project.

The terms of reference proposed by THE MINISTERE DE L'AGRICULTURE, des RESSOURCES NATURELLES et du DEVELOPPEMENT RURAL (MARNDR) are the following:

1. The degree of integration of the national counterparts to the activities of the project taking into account the relative facilities of communication the nationals have with the target groups of the project.

2. The effective participation of the national co-responsables should have in the gestion of the finance and goods so as to permit them to follow well the evolution of the project and to appreciate as well as can be the ratio cost/benefit.

3. The effective availability the logistic means for the execution of the project activities.

4. The comparative value of the hybrids (Nubian x indigenous; Alpine x indigenous) which are actually profused to the beneficiaries (peasants) taking account their mentality.

5. The time of effective realisation of specific objectives or outputs of the project keeping in mind the objective of the execution plan in particular training of superior technicians (cadres), technical agents, and peasants and number of families touched.

6. Actual condition of the material and equipment already purchased by the project and the working condition they will be transferred at the end of the project to the Haitian Government to continue the activities.

7. The possibilities of realising the activities proposed in the plan of operation within the established chronogram.

APPENDIX 15.3
TERMS OF REFERENCE FROM DIRECTORATE OF ANIMAL PRODUCTION (MARNDR)

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

DIRECTION PRODUCTION ANIMALE
No. 28

PORT-AU-PRINCE, LE 8 AVRIL 1986.

A : WINROCK INTERNATIONAL

DE : Direction de Production Animale (MARNDR)

OBJET : Eléments de travail à considérer dans le Cadre de l'Evaluation du Projet Caprin.

Dans le cadre de l'évaluation du Projet d'Elevage Caprin: MARNDR/WINROCK INTERNATIOANL/USAID, le Ministère de l'Agriculture, des Ressources Naturelles et du Développement Rural souhaitèrait qu'entre autres, les points suivants soient considérés:

1. Le degré d'intégration des nationaux aux activités du projet compte tenu de leurs facilités relatives de communication avec les groupes cibles du projet.

2. La participation effective du Co-Responsable National à la gestion des avoirs du projet de façon à lui permettre de mieux suivre l'évolution du projet et à mieux apprécier le rapport coût/bénéfice.

3. La disponibilité effective des moyens logistiques pour l'exécution des activités du projet.

./

4. La valeur comparative des hybrides (Nubien x Indigène, Alpine x Indigène) offerts au petit paysan bénéficiaire tenant compte de sa mentalité.

5. Le degré de réalisation effective des objectifs spécifiques ou extrants du projet en se basant sur le plan d'exécution en particulier: formation des cadres supérieurs, moyens et des paysans, nombre de familles atteintes.

6. Etat du matériel et des équipements acquis dans le cadre du projet et les conditions dans lesquelles ils seront transférés au Gouvernement Haitien à la fin du projet en vue de la poursuite des activités.

7. Les possibilités de réaliser les objectifs prévus dans le plan d'opération dans les limites du chronogramme établi.

Docteur Fred A. CALIXTE
Vétérinaire - Agronome
Epidémiologiste
Directeur Production Animale.

/mtd.

APPENDIX 15.4

LOGICAL FRAMEWORK FOR IDENTIFYING GOAT HUSBANDRY TECH PACK OPTIONS

In order to maximize the expression of the genetic potential of the improved goats and their progeny, the prevailing system(s) of goat husbandry also need to be improved. This can best be accomplished by developing a technical support package which can accompany the distributed bucks to their new home. Since husbandry entails all aspects of the animal production operation (food, water, shelter, health, and breeding, and to stimulate incentives, marketing) the tech pack needs to be as comprehensive (although not complicated) as possible.

It is recognized that there is no typical or average peasant farm in Haiti. The various combinations of land base and farming system, economic status, capability of tapping into assistance beyond the immediate household, the current level of husbandry sophistication and marketing opportunities are really quite numerous. Two examples can be used to illustrate an extreme case, and a more typical case.

Example 1: A very poor family (sharecropper) living and working in an irrigated agricultural zone; not directly associated with any organized group; but having a few goats because his limited cash has been invested in animals since he has no land base to farm. Feed is gathered from along roadways.

Example 2: A number of family farmers, each having reasonable size land holdings (1 to 3 ha) in an intensively cropped upland setting; some of the soils are suitable for cropping, but much of the land is unsuitable due to shallow soils and steep slopes. Annual rainfall is over 1,500 mm. Most of the families have 2 to 3 goats, a few have more than 10. There is an organization in the area promoting groupment formation and providing limited technical assistance.

It can be seen from the above examples that the circumstances, and therefore certain components of the appropriate tech pack are different. In the first case, there is adequate water, but ration formulations can be improved by utilizing cane tops and perhaps other available crop residues. Confinement and shelter design must be restricted to lowest cost, local materials. Since the farmer is poor as well as having limited opportunity for expansion, an appropriate breeding system might be to produce and market improved buck kids which seem to be commanding a higher price. Doe kids should also be sold to prevent backbreeding, but by selling the kids soon after weaning rather than carrying them to maturity, he might be able not only to expand his herd by one or two does, but produce 3 kiddings every two years. Doe selection should emphasize multiple births and mothering capabilities. In the second case, there is a capacity to expand animal husbandry and improve agricultural production via alley cropping techniques. Feedstuffs storage techniques will have to be introduced to maximize efficiency of forage utilization. Due to the intensity of farming, confinement systems (e.g., tethering and possibly pens) are already in place, but could be directed towards institutionalizing corrals with shelters for more efficient cut-and-carry system as well as animal health. The presence of an organization promoting groupments and other technical assistance might facilitate accessing credit (possibly for pasture improvement on the marginal crop lands) and assist in marketing offtake. In this case, a regimented breeding program, with the exception of preventing backbreeding, might be best addressed once the support system is well established.

But suppose the second example lived in a setting where there was a regular water shortage for 2 to 3 months each year, and water had to be carried in buckets 2 or 3 km each day. This would constitute a major limitation on goat husbandry unless an affordable water catchment/storage system could be devised.

Thus the tech pack must be tailored to each setting if goat production is to be optimized. The ability to recognize important variations between one recipient group and another is critical.

Since this field assessment will have to be accomplished by extension agents, it is important that they have a systematic framework for guidance. The Baseline Information flowchart provides this framework. Although the various combinations are quite numerous, many of the factors can be expected to cluster in actual practice, but the comprehensive, systematic approach will allow recognition of important differences. Once the baseline information is gathered, the most appropriate Tech Pack Options can be readily derived from the Matrix. (The Matrix is not yet complete in all respects). At the time of assembling the initial tech pack recommendation (which is based on current conditions) notes should be made as to which improved options might be suitable for introduction into the operation a year later.

It is important to recognize that technology package transfer, just like training, is not a one-time activity. Follow-up involvement on-site is essential to encourage implementation. The minimal schedule for follow-up assistance is 2 to 3 months after the initial distribution, and 6-month intervals thereafter. Progress, however, will be directly related to the level of extension and encouragement. These visits should concentrate on refresher training in the most needed subject area (which will vary from recipient to recipient); recognition of specific problems (particularly nutrition, health, and breeding); and identifying those specific components for which the recipient is almost ready to move into the next level of management sophistication. (This will also vary from site to site, in one case it may be regimented castration; in another, simply construction of a feeding manger.)

Prior to the end of the first year, a visit should be scheduled to locate, eartag, and weigh the new crossbred kids, and discuss general

herd management, breeding schedules, and marketing options for the specific recipient(s).

As soon as sufficient forage is outplanted, or in areas where there is an overproduction of natural forage during the rainy season, feedstuffs conservation and storage techniques should be introduced as part of the tech pack. The simple haystack will predominate, but this is not suitable for Napier grass and residual grain stalks, which must be either stacked separately, or ensiled. Some effort should be directed toward experimental design of appropriate ensiling techniques. Silage will probably only be suitable to groups or individuals with a large number of goats. Feedstuffs conservation, and appropriate ration formulation is an important component of the tech pack to mitigate dry season nutritional deficiencies.

APPENDIX 15.5

DEBRIEFING MATERIALS FOR MARNDR/GOH, WINROCK INTERNATIONAL, AND USAID/HAITI

FINDINGS

✓ 1. Livestock projects are long-term development efforts, not a quick fix. Project proposal not realistic.

✓ 2. Increasing meat plus milk consumption will be difficult without extended program.

✓ 3. Project has reached optimum foundation herd size in Phase I. Need to start Phase II which is to breed to a composite breed. Will take 8 to 10 years.

✓ 4. Only 40% of target primary beneficiaries have been reached.

✓ 5. Distribution system of bucks inadequate to allow follow-up.

6. Increased benefits of crossbred bucks too early to measure genetic improved is diluted in the traditional herd.

✓ 7. Goat numbers could increase without increased demand for by-products, meat and milk.

✓ 8. MARNDR's commitment to project is very limited. Major impediment to the project.

9. Results of training program on off-farm management of goats are limited.

10. Extension of appropriate technology off the farm is very limited.

11. No progress made on establishment of nuclei breeding centers.

12. The focus to a national program has overextended government and Winrock infrastructure. Information is available on only 25% of bucks.
    - Pressures from GOH have extended buck distribution outside Hinche.
    - Over 50% of bucks outside Hinche area.

RECOMMENDATIONS

Papaye Farm:

- requires a Haitian full-time farm manager
- limit size of foundation herd to 300 does
- continue breeding plan and add 5/8 x 3/8 cross
- start testing 1/2 and 3/4 exotic mix and Haitian control breeds for feed efficiency on pasture straight cut forage only (cut forage plus grain), and grain/concentrate rations.

Training Program:

- training materials in French and Creole needed immediately
- assign extension outreach coordinator full-time (Haitian national)
- focus on training trainers for goat husbandry first (extension agents), specialized trainers
- streamline course, focus in-depth on goat management, course should be simple and repetitive
- stress extensive use of hands-on training with local equipment and materials
- refresher practical courses for recipients in the field, minimum of 2 times per year

Development of Tech Packs

- design, test, and implement tech packs
- develop logical framework for identifying locally appropriate tech packs
- forage production demonstrations on small-scale farmers' plots -- improved seeds needed immediately for planting in this rainy season
- tech packs should be easy to apply and particularly emphasize the following: confinement management systems, feed and feeding in confinement, health, forage crop production, local equipment and materials

Development of Marketing Programs

- design and implement market mechanism for opening alternative market channels, involve Haitians
- market study and identification of needs for new product development
- develop market pilot programs for testing -- focus on collection, distribution, and processing of live and processed products

Distribution of Improved Goats

- major rethinking and restructuring of goat distribution system
- establish criteria for predistribution (facilities in place, sign performance contract, remuneration for buck or doe)
- focus on Hinche District for future distributions
- distribution outside Hinche District on a case-by-case basis -- target groupements and PVOs
- establish nuclei study breeding centers

Performance Criteria for Continuation of Project

- MARNDR provide timely qualified staff and funds (Approx. $60,000/year) -- farm manager, extension coordinator, 3 field herdsmen, 1 secretary, and 2 additional workers

APPENDIX 15.6. Work Schedule for Consultants.

Date (day)	Time	Activity
3/31 (Monday)	p.m.	Arrival Knipscheer, met by Sanchez
4/1 (Tuesday)	a.m.	Knipscheer at USAID with Wahab, Treadwill, Geers, and Guthrie
	p.m.	MARNDR with ADS-II (Swanson, Bertelsen)
4/2 (Wednesday)	a.m.	AID (Knipscheer and Treadwell)
	p.m.	ADS-II (Beaulieu), Mennonites (Waterfield), MARNDR (Calixte)
4/3 (Thursday)	a.m.	HAMID, FAMEPAK (Knipscheer and Guthrie)
	p.m.	Knipscheer and Treadwell visiting two farms in Croix des Bougnettes
4/4 (Friday)	a.m. & p.m.	Visit to Gonaive, visit livestock market, 2 recipients, 1 other farmer by Knipscheer
4/5 (Saturday)	a.m. & p.m.	Knipscheer with Geers, Guthrie, and Sanchez
4/6 (Sunday)	p.m.	Greg Sullivan arrives in Haiti and met by E. Geers at the airport. Met with Treadwell, Philippe-Auguste, and Knipscheer
4/7 (Monday)	a.m.	Evaluation team members (Auguste, Knipscheer, Sullivan, and Treadwell), Winrock and USAID representative (A. Wahat) met with Minister G. Menage of MARNDR
	a.m.	Team members (Auguste, Knipscheer, and Sullivan) and Winrock representatives met with officers in Directorate of Animal Production
	p.m.	Informal meetings with staff members in USAID
4/8 (Tuesday)	a.m.	Team convened at USAID office, then traveled to Damien and met with Directorate of Animal Production staff to pick up Terms of Reference

Date (day)	Time	Activity
4/8 (Tuesday)	p.m.	Team traveled to Hinche to begin site visits (except Treadwell who was waiting on Hinojosa, animal scientist)
	p.m.	Team visited two sites in Hinche town where bucks were placed
	p.m.	A livestock broker was visited in the evening
4/9 (Wednesday)	a.m.	Team divided into two groups and was joined by staff from regional office; four sites were visited
	p.m.	Team members (Hinojosa and Treadwell) arrive from Port-au-Prince and team meeting is convened with Geers, Sanchez, and Haitian staff to review activities of the Farm
4/10 (Thursday)	a.m.	Team traveled to Los Palis, a groupement, which has received three bucks; group meeting held with village members, kids weighed, and informal interviews held
	p.m.	Knipscheer leaves for Port-au-Prince and rest of team remains and visits sites where bucks have been distributed
4/11 (Friday)	a.m.	Evaluation team members (Auguste, Hinojosa, Sullivan, and Treadwell) E. Geers and Damien staff visit market in Thomasic
	p.m.	Team debriefs with regional and Damien staff; after meeting, team visits a site along a river for a pilot test for a "tech pack" demo
4/12 (Saturday)	a.m.	Evaluation team travels to Port-au-Prince and visits on the way, Hinche market and site of buck placement near dam
	p.m.	Knipscheer leaves Haiti

Date (day)	Time	Activity
4/13 (Sunday)	a.m. & p.m.	Off duty
4/14 (Monday)	a.m.	Team meeting with Auguste, Hinojosa, Sullivan, and Treadwell to assess status of project
	p.m.	Meetings at USAID
4/15 (Tuesday)	a.m.	Team members leave for Gonaives and St. Marc
	p.m.	Two sites of buck placements visited in Verrete
4/16 (Wednesday)	a.m.	Two sites visited around Verrete
	p.m.	Return to Port-au-Prince
4/17 (Thursday)	a.m.	Two sites visited near Leogones; team also visited sugar factory
4/18 (Friday)	a.m.	Team members (Augusto, Hinojosa, and Sullivan) and Geers visited Port-au-Prince livestock market, HAMPCO, and FAMEPAK
4/19 (Saturday)	a.m.	Team members met with Geers and Sanchez to review findings of team in the evaluation matrix
4/20 (Sunday)	a.m.	Day spent writing
4/21 (Monday)	a.m.	Day spent in Port-au-Prince writing
4/22 (Tuesday)	a.m.	Day spent writing
	p.m.	Evening team meeting of Hinojosa, Sullivan, and Treadwell with USAID officials (Wahab and Cusomono) to debrief
4/23 (Wednesday)	a.m.	Team debriefing with USAID officials
	p.m.	Team debriefing with MARNDR and Directorate of Animal Production staff

Date (day)	Time	Activity
4/24 (Thursday)	a.m.	Sullivan departs
4/25 (Friday)	a.m.	Hinojosa departs
5/4 (Sunday)	p.m.	Sullivan travels to Winrock International
5/5 to 5/9		Sullivan and Knipscheer edit report
5/8 (Thursday)	p.m.	Debriefing of evaluation team findings to Winrock International staff
5/9 (Friday)		Sullivan departs Winrock International

1. Trained personnel
2. Training and educational programs/materials
3. Facilities
4. Breeding Animals
5. Nuclei of stud breeders
6. Adapted technology packages
7. Systems for delivery of technology and animals
8. Marketing strategies for animals and animal products

1. Training on livestock production
   a. Practical - 8 person weeks in the U.S.
   b. Practical training in-country
      - 6 project extensionists
      - 2 herdsmen
      - DARNDR extensionists totalling 200 person days/year
      - Volunteers total of 150 person days/year
      - Producers - 800 person days/year
2. Types of materials include illustrated pamphlets, leaflets, audiovisual and other media materials in livestock production practices. Syllabi for all training courses.
3. Two multiplication/demonstration centers with associated livestock facilities, water systems, equipment, tools and animals.
4. Improved animals for producers
   - improved bucks and does
5. Goat stud breeders nuclei including 180 producers.
6. Technology packages for goats on
   a. feeding programs
   b. health and sanitation
   c. management/husbandry
   d. simplified record keeping
   e. milk and milk handling
7. Technical services delivered include
   a. consultations
   b. demonstrations
   c. follow-up
8. Establishment of small-scale mechanisms for producers to market their livestock or livestock products more efficiently. Recommendations to DARNDR of national regional marketing strategies for livestock.

2. Lists of personnel, small producers and communities (villages) that participated in the training program.
3. Copies of materials prepared.
4. Lists of recipient small producers. Records of numbers of animals produced and distributed by the goat multiplication farm.
5. Documentation on production performance of animals under the proposed system vs. the traditional system.
6. Documentation and records of small producers on the program plus on-site visits.
7. Project surveys, lists of persons receiving animals and credit.

1. That the necessary [illegible] oped and supported as an integral part of the project and operate within the framework of DARNDR.
2. That DARNDR supports qualified and dedicated individuals to be trained and subsequently assigned to the jobs for which they were trained. That DARNDR generates a climate of confidence, necessity and acceptability for the need of training of small producers in improved goat production practices.
3. That training materials can be prepared in a manner that the target populations can be effectively reached and drawn into the program.
4. That performance of improved goats is sufficiently high to stimulate small producer participation.
5. That no unforeseen biological and/or economic constraints hamper the execution of the project.
6. The project assumes that:
   a. Extension personnel can be acquired and retained by DARNDR
   b. That project personnel can be trained successfully and subsequently commit themselves to the project goals
   c. That improved livestock can be made available at a cost that is attractive to small producers
7. The project assumes that IDAI or other institutions will allocate financial resources to establish a credit system (revolving fund) for producers.

Inputs

1. USAID funding will provide:
   a. Technical assistance personnel
   b. Practical training in USA, practical training in-country (all centers)
   c. Commodities including materials, goods, vehicles equipment and expenditures required for project implementation
   d. Other miscellaneous costs including allowances, travel, operating costs, communications, evaluations and administrative support
2. DARNDR
   a. Cadre and support personnel
   b. In-country transportation of trainees
   c. Livestock (100 goats)
   d. Multiplication center farmlands, facilities and operating costs
3. Winrock International
   a. Expatriate project personnel for the central center for year one
   b. A portion of overhead/administrative costs
   c. Animals, facilities, and vehicles/equipment at the central center

Implementation Target

1. Project structuring phase completion by late July 1983.
2. Project negotiations and approval: August to September 1983.
3. Project initiation: late 1983.
4. Facility development: December 1983 to February 1984.
5. Training of cadre personnel:
   - January to February 1984 - Central technical personnel
   - April 1984 on - Practical training of mgr. counterpart in U.S.
   - April 1984 on - Extension personnel
6. Start small producer-identification, selection and training phase: February 1984.
7. Start distribution of improved animals: April 1984.

1. Internal annual evaluations.
2. One formal evaluation, at end of project.
3. Annual progress reports.

Assumptions for Providing Inputs

1. That DARNDR, USAID and Winrock International provide continuous support for the first three years of the project and DARNDR continues support of the project thereafter.

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APPENDIX I
PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

PROJECT TITLE AND NUMBER: NATIONAL DUAL PURPOSE LIVESTOCK PRODUCTION IMPROVEMENT PROGRAM -- Haiti

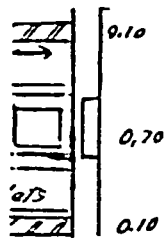
NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Goal To increase the availability of domestically produced meat and milk to the local population and to directly improve the socioeconomic well-being of some 12,000 family farmers through the overall improvement of the goat production subsector.	Measures of Achievement 1. Measurable increase in production and consumption of meat and milk by family members. 2. Measurable increase in cash receipts from sale of animals by participating small producers/farmers.	1. Project surveys of area families.	Assumptions for Achieving Goal 1. That improvement of the livestock production sector remains a priority of DARNDR. 2. That GOH establishes policies to encourage local production of meat and milk from livestock. 3. That small producers can be motivated to adopt improvement techniques for raising livestock efficiently and to consume milk or milk products (cheese, sweets). 4. That the project catalyses the expansion of improved livestock production systems.
Purpose The project will establish the necessary structure within DARNDR's framework to: 1. Multiply superior animals 2. Adapt technology to local conditions and improve the traditional production system 3. Train technicians and producers 4. Deliver technical assistance and improved animals 5. Promote and assist in the formation of nuclei of family farmers that will breed improved animals 6. Identify and assist in the establishment of producer credit and marketing mechanisms	End of Project Status 1. Two fully operative livestock multiplication centers 2. Trained personnel including project administrators, extension personnel, centers' labor force and producers 3. Effective and viable stud breeders nuclei comprising some 180 progressive family farmers 4. Proven, adapted production technology packages in the areas of animal nutrition, breeding and selection, sanitation and livestock management 5. Established delivery mechanisms for technical services and improved animals to family farmers 6. An established structure within DARNDR's framework to continue the improvement of the livestock sector 7. Small-scale marketing systems for animals and/or animal products that maximize benefits to farmers 8. Directly delivered training, technical services and improved animals.	1. Farm records of numbers of breeding animals, animals produced and delivered. 2. Lists of personnel, small producers and communities (villages) that participated in the training program. 3. Copies of materials prepared. 4. Lists of recipient small producers. Records of numbers of animals produced and distributed by the goat multiplication farm.	Assumptions for Achieving Purpose 1. That significant improvement of native goats can be successfully accomplished under prevailing environmental conditions. 2. That DARNDR supports qualified and dedicated individuals to be trained and subsequently assigned to the jobs for which they were trained. That DARNDR generates a climate of confidence, necessity and acceptability for the need of training of small producers in improved goat production practices. 3. That training materials can be prepared in a manner that the target populations can be effectively reached and drawn into the program. 4. That performance of improved goats is sufficiently high to stimulate small producer participation.

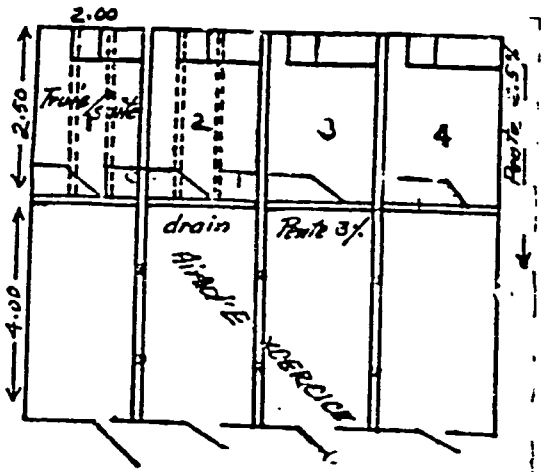
APPENDIX 15.8. Workplan for meeting evaluation report's recommendations: activities, technical assistance, and the time frame.

Activities	Technical assistance[1]	Time frame
Strategy for shifting activities to off the Papaye Farm and the role of M. Sanchez	A. Martinez E. Geers M. Sanchez W. Getz D. Treadwell	May 1986
MARNDR, Winrock International, and USAID representatives determine levels of support and means to fulfill evaluation report's recommendations	A. Martinez E. Geers D. Treadwell M. Sanchez	Complete by June 1, 1986
Develop and test "tech packs": forge species, management, health, water, confinement, and feeding trials; economic analysis of tech packs and feeding trials	M. Sanchez D. Treadwell S. Guthrie	May 1996-May 1987
Develop field methodologies for collection of baseline village data for assessing animal performance and economic impact on household	W. Getz E. Geers S. Guthrie Outside consultant(s)	Methodologies designed by July 1, 1986; activity conducted throughout the remaining year
Assessment of market alternatives and development strategies for product marketings	S. Guthrie USAID/W Outside consultant(s)	Finish by August 1, 1986
Implement pilot program for marketing goats	S. Guthrie Extensionists USAID/W HAMPCO or FAMEPAK rep. Outside consultant(s)	Start August 1986 and complete by December 1986; submit written evaluation of the test
Develop a marketing plan for future use by the project	Same participants as above	Finish by February 1986
Establishment of at least four nuclei breeding centers -- at least one groupement, PVO, or private individual -- in the Hinche District	E. Geers W. Getz D. Treadwell M. Sanchez	During the period of May 1986-May 1987

Activities	Technical assistance[1]	Time frame
Provide training materials in English	A. Martinez	May 1986
Translate training materials to French (do in Haiti)	M. Sanchez	Completed by September 1, 1986
Develop pamphlets and brochures from training manual for farmers and write in Creole; 5 to 10 brochures need to be published by May 1987	M. Sanchez D. Treadwell	First brochure by September 1, 1986 complete the rest through the remaining LOP
Conduct off-farm training for recipients of bucks; this is a follow-up to the on-farm short course; at least one per month of training courses in next year	E. Geers M. Sanchez D. Treadwell	Start August 1986
Set up in-country data collection and analysis in MARNDR on the Papaye Farm	M. Sanchez S. Guthrie W. Getz A. Martinez	May 1986-May 1987

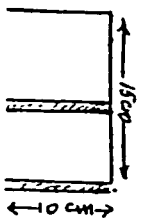
[1]Allocation of Haitian personnel to each of the activities will be specified by the Ministry during planning discussions between MARNDR, Winrock International, and USAID.

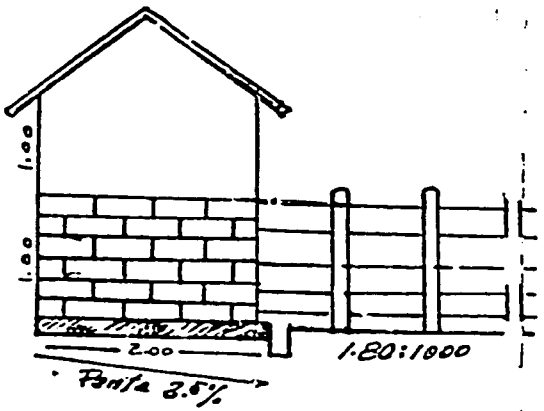




PLan No. 1

Porcherie pour élevage deux trues et engraissement de dix porcs





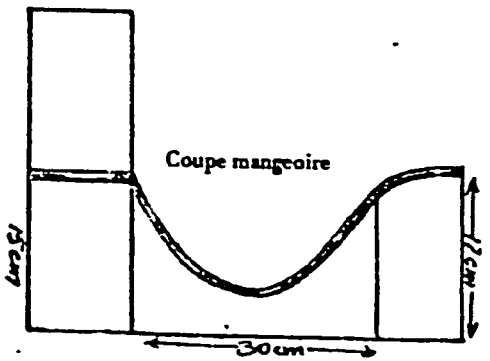
4b— Mangeoire : En forme d'U, coins arrondis pour meilleur nettoyage.

Largeur utile	=	0,30m
Profondeur utile		0,10m
Hauteur intérieure		0,17m

4c — Abreuvoir mêmes dimensions que les mangeoires.

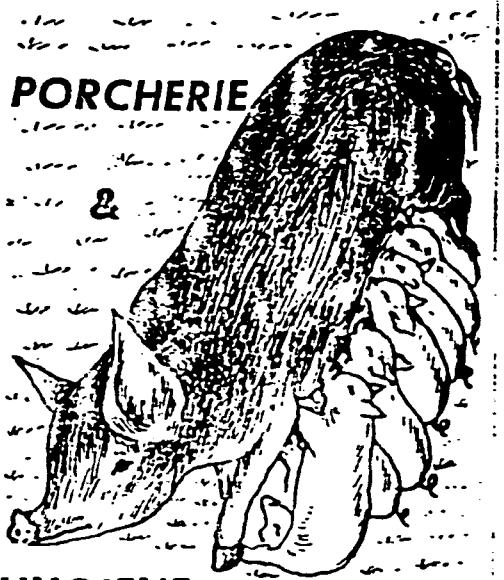
4d — Longueur mangeoire / porc

poids (lb)	longueur/porc (cm)
44	17
88	31
132	25
198	30
264	35
Truie — Verrat — adulte	50



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

PROJET REPEUPLEMENT PORCIN



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