

PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol U-47

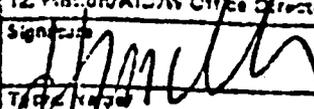
1. PROJECT TITLE Small Farmer Livestock and Poultry Development	2. PROJECT NUMBER 631-0015	3. MISSION/AID/AV OFFICE USAID/Cameroon
	4. EVALUATION NUMBER (Enter the number maintained by the reporting unit; e.g., Country or AID/AV Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) <u>631-85-2</u>	
<input type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION		

6. KEY PROJECT IMPLEMENTATION DATES			5. ESTIMATED PROJECT FUNDING A. Total \$ _____ B. U.S. \$ <u>1,285,000</u>	7. PERIOD COVERED BY EVALUATION	
A. First PRO-AG or Equivalent FY <u>3/80</u>	B. Final Obligation Expected FY <u>85</u>	C. Final Input Delivery FY <u>85</u>		From (month/yr.) <u>03/80</u>	To (month/yr.) <u>02/85</u>

E. ACTION DECISIONS APPROVED BY MISSION OR AID/AV OFFICE DIRECTOR

A. Key decisions and/or unresolved issues; cite those items needing further study. (NOTE: Action decisions which anticipate AID/AV or regional office action should specify type of document, e.g., program, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
<p>This is an end-of-project evaluation and hence there are no action decisions.</p>		

8. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS			10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT		
<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify) _____	A. <input type="checkbox"/> Continue Project Without Change		
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	<input type="checkbox"/> Other (Specify) _____	B. <input type="checkbox"/> Change Project Design and/or		
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C		<input type="checkbox"/> Change Implementation Plan		
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P		C. <input type="checkbox"/> Discontinue Project		

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Name and Title)		12. Mission/AID/AV Office Director Approval	
Marcel Ngué, USAID/Cameroon	Fouday MacBailey, PAID/BUEA (Team Leader)	Signature: 	
Samuel Scott, USAID/Cameroon	Jean C. Tchadjet, MINPAT	Title: <u>Herbert N. Miller, Acting Director</u>	
Lowell Watts, HPI		Date: <u>6/3/85</u>	
Emanuel Tebong, MESRES/IRZ			
Ben Agborbesong, MINEPIA			

EXECUTIVE SUMMARYPROJECT TITLE

Small Farmer Livestock and Poultry Development

PROJECT NUMBER

631-0015

PROJECT DESCRIPTION AND DEVELOPMENT PROBLEM

The Small Farmer Livestock and Poultry Development Project was developed to increase the availability of improved breeds of livestock and poultry that are adapted to the Cameroonian small farmer's environment. To accomplish this objective the project was designed to focus its resources on increasing the capability of the Institute of Animal Research (IRZ) and the Ministry of Livestock, Fisheries and Animal Industries (MINEPIA) to provide and demonstrate relevant animal production technology to small farmers; to provide increased numbers of improved livestock and poultry; to improve levels of income of cooperating farmers; and to provide relevant training opportunities for Ministry researchers, Peace Corps Volunteers and most importantly the target farmer group.

PURPOSE OF EVALUATION

The purpose of this end-of-project evaluation was to assess all activities carried out during the life of the project and judge the impact of project resources (adaptive research, training, livestock and milk distribution) on the small limited-resource farmers in the target areas.

EVALUATION METHODOLOGY

The evaluation team was composed of representatives from IRZ, MINEPIA, MINPAT, USAID and R-PAID/Buea (team leader). Collectively the group decided to obtain field data through the question/interview process with emphasis on as much direct contact with the on-station researchers and small farmer target group as possible. Once this data was collected, the evaluation team would again collectively and collaboratively analyze the project's resource utilization/application to determine a realistic picture of the end-of-project status.

FINDINGS

The evaluation team concluded that although both the Grantee (HPI) and participating GRC entities made valid efforts at achieving project objectives. However, the evaluation clearly revealed that the technology transfer successes were limited by the fact that two different implementation approaches to achieving targeted objectives existed throughout the life of the project. The research (IRZ) - extension (HPI) dichotomy made it obvious that organizational orientations were not carefully considered at the initial negotiation, planning and project development stages of the project.

LESSONS LEARNED

The most critical lesson learned from this project experience is that careful attention must be given to the specific orientations of participating implementation entities at the project identification stage. In the case of the Small Farmer Livestock and Poultry Development, the mid-term evaluation focused on some critical areas of concern, but implementation continued with these key constraints growing rather than diminishing.

RECOMMENDATIONS

The evaluation team recommended the continuation of on-station research on exotic breeds and controlled cross breeding. Also, efforts must continue to improve the extension/distribution and follow-up system to ensure increased availability of domestically produced dairy products, eggs and meat with a resultant increase in the incomes of small limited-resource farmers. With the end of USAID grant funding to HPI for this activity, the technology applications and production/distribution operations will be carried out in the future by IRZ and MINEPIA (on-station and off-station) professional staff. However, USAID clearly recognizes the continued need for development resources in the areas of animal extension and livestock farming systems. The option for continued USAID investment of development resources in these areas definitely remains open for further discussion with appropriate GRC ministries.

ATTACHMENT:
EVALUATION RPT.

P R E F A C E

This end-of-project (EOP) evaluation was conducted between February 4th-24th, 1985. The evaluation team had as its mandate. to assess all activities of a 5 year Small Farmers' Livestock and Poultry Development Project in the project areas - Mankon, Bambui and Wakwa stations.

Special attention was focused on project accomplishments in (1) Adaptive Research, (2) Training, (3) Livestock Distribution and (4) Milk Distribution in relation to their impact on the general population and to its target beneficiaries - the small limited-resource farmer.

The evaluation team was composed of representatives of IRZ, USAID, HPI, MINPAT and MINEPIA. Recommendations for continued operations without major outside funding were made.

A C K N O W L E D G E M E N T S

The evaluation team wishes to thank the representatives of IRZ, MINEPIA, USAID and HPI who participated in this evaluation effort.

Special thanks are accorded to Chiefs of Station and their staffs at the Mankon, Bambui and Wakwa research centers; to the Provincial Delegate, (MINEPIA) Bamenda; and to the Chief of Party and resident HPI staff in Bamenda for their cooperation in this evaluation exercise. The team leader also wants to thank the USAID Project Development and Evaluation Officer and his clerical staff for their conscientious efforts in getting the final document produced, and to the general population of small limited-resource farmers in the project target area for whom this evaluation is all about.

A C R O N Y M S

ONAREST	National Office for Scientific and Technical Research
DGRST	General Delegation for Scientific and Technical Research
MESRES	Ministry of Higher Education and Scientific Research
HPI	Heifer Project International
MINEPIA	Ministry of Livestock, Fisheries and Animal Industries
MINPAT	Ministry of Plan and Regional Development
IRZ	Institute of Zootechnical Research
AI	Artificial Insemination
USAID	United States Agency for International Development
EOP	End-Of-Project
R-PAID-WA	Regional Pan African Institute for Development, West Africa
FY	Fiscal Year
ENSA	Ecole Nationale Supérieure Agronomique (National Advanced School of Agriculture.)

1. IRZ - Research and Station Management

Bambui Station, Bamenda

- Dairy Research
- Dairy Herd Production
- Milk Processing
- Milk Marketing
- Dairy Cross Breeding
- Dairy Training
 - Staff
 - Farmers
 - Other
- Dairy Cattle Distribution

2. Mankon Station, Bamenda

- Research and Station Management
- Swine
- Poultry
- Sheep
- Goats
- Rabbits

Hatching Egg Distribution

Small Animal Distribution

Training

- Staff
- Farmers
- Other

3. Wakwa Station, Ngaoundere

- Dairy Research and Management
- HPI - Project Coordination, Training, Livestock Distribution

4. A. Advisors Provided

- Project - Chief of Party
- Bambui - Dairy
- Mankon - Small Animal
- Bamenda Area - Agricultural Economist

B. Dairy Extension

- Bamenda Dairy Cooperative - 17 members
- Hero Expansion Program - 5 centres
- RTC, Missions, Hospitals, etc

C. Small Animal Extension

- Bamenda Rabbit Producers Network - 150 producers

Young Farmers' Club
Presbyterian Rural Training Centre (RTC)
Other

D. Provision of Commodities and Assistance for Mankon and Bambui

5. MINEPIA
Support of Extension Activity
6. USAID
Partial funding of total project

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- A. Evaluation Planning and Scheduling Exhibits - (Reports from planning and scheduling meetings and other related correspondence)
- B. Guidelines for Data Collection
- C. Evaluation Summary of the Dairy Components (IRZ/MINEPIA) and HPI Comments.
- D. Personnel at Mankon Station (Qualifications and Experience)
- E. Sheep and Goats Component (Comments by IRZ/MINEPIA)
- F. Sheep and Goats in the IRZ/HPI/USAID Cooperative Small Farmer Project (Joseph Howell, HPI)
- G. Research Documentation (Mankon - IRZ Station)
- H. The HPI Rabbit Program and Related Extension Activities (S. Lukefahr, HPI)
- I. Summary Statement of Overall Views - Project Implementation (Director, IRZ)
- J. Summary Statement - Response to IRZ Overall Views of the Project's Implementation (HPI, Chief of Party)
- K. Minutes from Final Evaluation Review Meeting, 2/28/85.
- L. Financial Exhibits

Note: In addition to the above referenced annexes and supporting documentation, the following material is available, on request, from the USAID/Cameroon Project Development and Evaluation Office:

1. The Current Potential of Rabbit Farming in Cameroon (S. Lukefahr, Ph.D, July, 1983)
2. A Technical Assessment of Production and Economic Aspects of Small-Scale Rabbit Farming in Cameroon (S. Lukefahr and M. Goldman, February, 1985)
3. Rabbit Training - Short Course Syllabus (HPI, IRZ and MINEPIA, 1984)
4. Small Scale Rabbit Farming (HPI/IRZ, 1982)
5. Report on the Identification and Distribution of Breeds of Rabbits in Cameroon (S. Lukefahr, 1984)
6. Case Study: Small Farmer Swine Production - Commercial Mosh Versus Local Feedstuff Utilization (M. Goldman, January 1985)
7. Case Study: Small Scale Dairy Farming in the North West Province of Cameroon (M. Goldman, December 1984)
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I N T R O D U C T I O N

PROJECT DESCRIPTION

The Small Farmer Livestock and Poultry Development Project (631-0015) is built upon the initial (1974-80) successful experiences of HPI and ONAREST* in dairy and livestock production/management.

The program seeks to maximize distribution of improved livestock and poultry breeds in collaboration with the Ministry of Animal Breeding through:

1. Adaptive Research

- a) The nutritional value of local agricultural by-products such as maize, rice bran, and brewers dried grains for use in foodstuffs for livestock and poultry. It is expected that no imported feedstuffs, except for trace minerals will be required.
- b) The prevention and control of diseases and pests.

2. Training

During the 5-year period, the following types of training programs were undertaken:

- a) In-country short-term practical training
- b) Graduate level academic training (Long-Term)

3. Livestock Distribution

The responsibility for distribution of livestock and poultry has been given to MESRES (IRZ/HPI) and MINEPIA. The designated MESRES/IRZ research stations act as reservoirs of improved genetic material. Farmers attending short-term training courses were to obtain animals upon completion of their courses. A total of 355,000 poultry, 3,400 rabbits, 2,200 pigs, 360 cattle, 210 goats and 110 sheep are expected to have been distributed during the life of the project. The target population for this distribution will be the small limited-resource farmer.

* ONAREST (National Office for Scientific and Technical Research) was later to be reorganised and re-named DGRST (General Delegation for Scientific and Technical Research). Again, in 1984 DGRST was converted into the present Ministry of Higher Education and Scientific Research (MESRES).

PROJECT PURPOSE

The purpose of this project was to provide a system through which small, limited-resource farmers can benefit from the development of improved breeds of livestock and poultry that are adapted to the Cameroonian environment.

A secondary objective of the project was to increase the availability - at a reasonable cost - of dairy products, eggs and meat.

PROJECT GOALS AND OUTPUT

Primary goal was to increase availability of domestically produced animal protein from dairy products, eggs and meat and to increase incomes of small farmers, in the project area.

Project output was to increase the capability of the Ministry of Livestock, Fisheries and Animal Industries (MINEPIA) and IRZ personnel to provide and demonstrate relevant animal production technology to farmers, increased numbers of improved livestock and poultry, improved levels of income of cooperating farmers and improved training facilities.

END OF PROJECT STATUS

(From 3/31/1980 Grant Letter, ref. REDSO/WA 80-199, Norman P Skow to Charles Burwell)

1. There will be an established, though nascent, dairy cattle, small farmers livestock, and poultry industry in Cameroon which will involve a distribution system to provide improved livestock and poultry to small limited-resource farmers and cooperative groups.
2. There will be a functioning livestock and poultry research unit with an ongoing program of research in breeding, nutrition, and disease and pest control.
3. There will be an increased number of small farmers raising improved breeds of livestock and poultry for subsistence needs and for sale.
4. There will be greater availability of meat, eggs, and dairy products to the people at a reasonable cost.
5. The small farmer will have access to formulated rations (locally produced), breeding services, and marketing systems.

MEASUREMENT OF PROJECT ACHIEVEMENTS (HPI Mid-Term Evaluation Report. p.13)

HPI proposed several objectively verifiable indicators to measure the achievements of their project. These include:

1. Distribution targets for animals (see p.4)
2. Training: 375 persons will have received training in dairy cattle

management and small animal husbandry. These persons will include researchers, extension workers, and farmers. Seven persons will have received long-term graduate level training.

3. 4.5 million liters of cow's milk will be processed during the project life.*
4. There will be an increase in the consumption and sales of livestock, poultry, and eggs, and goats milk.
5. Three feed mills will be in operation, and research and training in pasture management will be underway.

PROJECT BENEFICIARIES

There are direct as well as indirect beneficiaries of this project. The direct beneficiaries are:

1. The small limited-resource farmers in the project area who will benefit from training in improved farming skills and develop for themselves milk, egg and meat production capabilities.
2. The IRZ is also a key beneficiary in that the project will help its staff to develop their skills in scientific inquiry, and competence in performing their research assignments.

The indirect beneficiaries are:

1. The general Cameroon population who will be afforded easy access to more protein in their diets.
2. MINEPIA personnel who will improve on their extension capabilities to small limited-resource farmers.

The validity or origin of the 4.5 million figure was challenged by IRZ on the grounds that it is an arbitrary figure since it does not appear anywhere in the documents. The HPI Chief of Party agreed that the observation is valid.

1.1 SUMMARY CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This evaluation reveals that the collaborative efforts by IRZ/HPI/USAID in developing a Small Farmer Livestock and Poultry Project in Cameroon have been successful in most areas:

- (1) The promotion of improved breeds of livestock and poultry (cattle, goats, hogs, sheep and rabbits) has greatly improved the protein content of participating farmers' families as well as the general population.
- (2) Livestock and poultry production are not new to small farmers in Cameroon although production of milk, eggs and poultry has traditionally been at less than optimal levels. The Livestock and Poultry Development Project has increased production, especially with poultry and rabbits. The concept of the "Multiplier Herd" in this project, if sustained, will significantly improve and increase levels of dairy production in Cameroon.
- (3) This evaluation revealed that the Cameroonian livestock and/or poultry farmer (associated with the project) has an adequate working knowledge of his/her farming activities. Indeed, most of the farmers are highly motivated and can invest their finances appropriately. Farmers' management capabilities are still inadequate but they are eager and willing to learn. In reality quantities required by farmers seeking to benefit from improved livestock breeds has exceeded resources available from the project.
- (4) The project has certainly improved the research capabilities of IRZ and has assisted the extension component of MINEPIA. Continued improvements in these important areas will be critical in sustaining the Livestock Industry in Cameroon.
- (5) The impact of HPI/IRZ training (including in-service, long and short-term courses and workshops) will continue to provide positive results for a long time to come. Specifically, it is felt that participants who have been sent by HPI/IRZ to study in various livestock and poultry areas of concentration will enhance and contribute positively to the Cameroonian farmers' capabilities in Livestock and Poultry production for a long time to come.

Summary of The Evaluation Findings

(1) Adaptive Research

During the period 1980-1985, IRZ has hired competent technical advisory staff (though still inadequate in absolute numbers), in an attempt to assist and advise in conducting valid adaptive research at IRZ stations in Cameroon.. The research laboratory as well as the swine facilities at Mankon Station, and the milk technology department in Bambui are in place and are working efficiently.

However, continued progress in adaptive research will be guaranteed in the long-run, if the following constraints are care improved upon, namely:

- (2) Management Level of Station Herds
Management of dairy cattle in Bambui and Wakwa is still inadequate. In order to maintain good health and reproduction among the herd, management must be improved
- (3) Health Care of Station Herd
High mortality rates in the herds of Bambui, Mankon and Wakwa, tend to demonstrate that health management was inadequate.
- (4) Research Animals
Though in absolute terms there seems to be adequate animals on station, the diversity of the groups tend to interfere with the selection of balanced groups for research purposes.
- (5) Research Staff
It is obvious that IRZ has expanded its staff but there is still the need for specialization of staff with respect to the ambitions of IRZ's planned research projects. In Bambui, for example only three persons have graduate training in nutrition, dairy technology and animal science but during the period 1980-1985, 14 research projects, 2 in nutrition, 8 in genetics and 4 in milk technology were planned. Thus it is obvious that the planned research protocols with respect to specialized research staff available are rather unrealistic.
- (6) Experimental Design and Statistical Analysis
Although there are qualified staff in experimental design and statistical analysis, young researchers did not seek the assistance of these people.
- (7) On-Station Record Keeping
Record keeping in IRZ stations is poor. This was reflected in the evaluation team's efforts to retrieve figures on mortalities, calvings and evolution of herds. Records should be standardized in all stations to make comparisons easier.
- (8) Training:
HPI/IRZ training activities have had significant successes within the framework of project targets.

- (1) Training
34 farmers have received training in dairy cattle farming. Two received training in Wakwa and 32 in Bambui of whom one was a woman. The Wakwa trainees specialized in AI while the Bambui trainees specialized in dairy management principles. Course duration was 3 months.
- (2) Station Personnel - DAIRY
Nineteen station personnel received 3 weeks training courses in AI. Of these, 7 were trained in Wakwa, 3 of whom were MINEPIA personnel and 4 IRZ personnel. Twelve were trained in Bambui station.
- (3) Technicians/Researchers
51 technicians and IRZ researchers received training on Livestock Production and health at Mankon Station and the Presbyterian Church Center. Duration of training was one month. Training was conducted by ENSA/HPI/GERDAT/IRZ.
- (4) Short-Term Training
Out of 7 positions planned by the project of which 5 are for IRZ and 2 for MINEPIA, 6 are undergoing training for IRZ. MINEPIA's positions have not been filled.
- (5) Long-Term Training (HPI sponsored)
Six persons from IRZ received graduate training and are still undergoing training in the U.S.A in animal science, dairy science, range management and poultry science.
- (6) Sheep and Goats Training
A total of 50 students, 2 IRZ staff, 24 PCV's and 25 farmers have received On-Station training by HPI personnel summing up to a grand total of 101 persons who received On-Station training by HPI.
- (7) Sheep and Goats Training (Off-Station)
During 1980-1985, HPI/IRZ personnel have trained 66 students, 24 farmers (RTC) and 8 IRZ staff in sheep and goats.
- (8) Sheep and Goats Training
18 students, 2 IRZ staff and 2 PCV's received training on multispecies at Bambui station.
- (9) Poultry Training
28 farmers and 15 students received training in poultry farming. 14 on-station personnel received training in multi-disciplinary courses on the station.
- (10) Pigs
98 farmers were trained by station HPI/IRZ personnel for 3 weeks multidisciplinary course in animal husbandry, nutrition and animal health between 1981-1982 prior to the outbreak of African swine fever.

22 students from Jakiri Vet. school spent 2 months at Mankon station studying animal health related fields.

Livestock Management/Production

14 station personnel (livestock attendants) were taught for four hours a day for 3 weeks in livestock management and production by station personnel. One student from the University of Mali spent one year at the Mankon station working on a thesis for a diploma in pig science.

(1) Rabbit Training

156 farmers, 68 women, 152 extension workers and 29 volunteers received off-station rabbit training. This indicates a total of 405 individuals given training of this type.

(2) Livestock Distribution

The targets for various species of Livestock and Poultry to be met by the EOP in the OPG documents are as follows.

<u>Species</u>	<u>Planned</u>
Poultry	350,000
Rabbit	3,400
Swine	2,200
Cattle	360
Goats	210
Sheep	110

Actual distribution figures to-date are as follows:

<u>Livestock</u>	<u>1980-1985 Planned</u>	<u>1980-1985 Actual</u>	<u>Percentage Realisation</u>
Poultry	350,000	254,533	13
Rabbits	3,400	366	11
Swine	2,200	758	34.4
Cattle	360	119	33
Goats	210	16	8
Sheep	110	2	0.02

Reasons for failure to meet distribution targets (selected species)

- (1) Poultry: Most farmers did not like white leghorn day old chicks, consequently eggs had to be retained by the station or the hatching of the eggs from this species was subsequently used for research purposes only. Frequent lack of drugs at OPV (Veterinary Pharmaceutic Office) scared most farmers out of business.
- (2) Rabbits: Apparent non-adaptability of exotic strains have resulted in these not going out to farmers. However, the distribution of other rabbit stock was a positive move toward realisation of project targets. The evaluation also revealed that the lack of a full time counterpart to work with HPI rabbit advisors made follow-ups difficult.
- (3) Pigs: Quarantine of swine due to outbreak of African Swine Fever adversely affected distribution of pigs.

- (4) Dairy: There was less mutual cooperation between HPI/IRZ in this Project Component due to different approaches and orientations in meeting project targets. IRZ wanted to use the animals for production of cross-bred heifers and wanted them to stay on station for adaptation and performance studies. HPI on the other hand wanted the animals to go to the eligible farmers quickly. This situation obviously created implementation problems with regard to distribution.

Milk Distribution and Milk Marketing

No specific volume of milk was planned for distribution by the EOP in the OPG documents. However, by the EOP, it was hoped that a milk marketing system would be established in the North West and Adamawa Provinces of Cameroon. While there exists a chain of milk distribution i.e. farmers sell their milk through IRZ, who processes the milk and retails it to various depots in Bamenda area, certain factors continue to impinge upon the establishment of a milk marketing system. These include:-

- (1) The vans for picking up the raw milk and the distribution of pasteurized milk are constantly breaking down.
- (2) Private farmers lack adequate cooling facilities for milk storage and protection from contamination. Evening milk is usually consumed by farm families or fed to the calves.
- (3) The milk van does not reach a large number of farmers because of cost constraints.
- (4) Milk production and marketing is heavily subsidized.

Organizational Considerations

Generally, most development assisted projects involving the host country, outside consultants, technical advisors and donor agencies must have a basic organizational frame work in order to facilitate the effective and efficient utilization of inputs (both human and financial), for achievement of project goals and objectives.

- (1) HPI/IRZ somewhat differed in their approaches to achieve project targets. This obviously created some serious organizational and administrative problems with regard to project implementation.
- (2) The evaluation also revealed that there were inadequate efforts made to have a clear perspective of organizational as well as development goals at the negotiation, planning and programming stages in this project. Issues related to accountability and roles within the framework of project implementation should have been clearly spelled out in advance, in order to enhance team work.
- (3) MINEPIA's extension role has been minimal due to the fact that it was not an official partner to the project.

- (4) The evaluation team therefore concludes that HPI/IRZ/MINEPIA did not succeed in establishing the most effective working relationships during the project, caused, to some extent, to the absence of personnel and gaps in accountability between technical staff and Chief of Stations.

RECOMMENDATIONS

Based on the evaluation findings, the following recommendations are made:

- (1) Bambui Station

That research be continued on-station with the exotic purebred Holsteins and Jerseys and the local Zebu (white and Red Fulani).

That cross-breeding the exotics with the locals be continued as currently planned but serious consideration be given to cross-breeding the best exotic dairy breed (Holstein) with the best local during breed (white Fulani) and elimination of Holstein - Gudali cross-breeding.

That the dairy data base be expanded to include on-farm data where possible.

That multiplier herds (Local Zebu) be used to produce desired cross-breeds stock (primarily Heifers) for farmer's use. IRZ/MINEPIA should consider the establishment of multiplier herds different from farmer's herds

That more pasture land be made available to the project.

- (2) Wakwa Station

That cross-breeding be continued (Holsteins with Gudali) as currently planned.

- (3) For both stations, AI (with imported frozen semen) should be preferred over natural service (which may involve importation of live animals).

- (4) Management (All IRZ Stations)

- (5) In order to improve management capabilities in all IRZ stations, herd farm managers must be employed at once. Already, one each has been employed in Wakwa and Bambui.

Livestock Distribution

- (1) That the question of subsidies be reviewed and a definite policy adopted
- (2) Due to inadequate numbers of animals on station, IRZ should consider extending its research data base to include information from farmer recipients of project animals.
- (3) To minimize the probability of favoritism in animal distribution prospective beneficiaries should be informed through the media (radio, newspapers etc) and the distribution committee should control distribution of animals and the selection of trainees.
- (4) To maintain the confidence and effective interaction with the farmers, MINEPIA/IRZ follow-up activities and continued liaison with recipients of project livestock should be strengthened.
- (5) That maximum effort be made to distribute cross-breed cattle to eligible farmers.

Summary Recommendations/Training

It is obvious that HPI/IRZ training activities have produced results that are having a significant positive impact on limited-resource farmers in the target area. Increase in incomes occurs when an expanded information base exists and small farmers have the necessary training to prepare accurate reports on production activities, and carefully schedule to purchasing of feedstuffs and other essential inputs. It is in the light of these benefits, among others, that recommendations for sustaining the training component of this project are made:

- Technical Training and Follow-up

Establish in all Project Stations trained and qualified staff to run technical courses for livestock management which reflect the needs of limited-resource farmers. These units would:

- (1) run courses of one to two weeks duration for all participating farmers.
- (2) follow-up the training by visiting farmers at work and helping them to apply their learning.
- (3) seek out and collect examples of successful experiments and technical developments in projects and spread them to other areas
- (4) translate livestock research findings into practical management terms which can be understood by the small farmer
- (5) establish and develop in each station on-the-job farmer trainers who will fill posts with key training responsibilities in future projects
- (6) management training should always be adapted to fit existing social, cultural and environmental factors.
- (7) all recommendations in the mid-term report especially the development of an integrated approach in training should be implemented.
- (8) off-station training should be accorded serious attention

1.2 PRE-EVALUATION ACTIVITIES AND CONTACTS

- January 9, 1985: The first pre-evaluation meeting scheduled for February was held at the IRZ headquarters.
- January 10, 1985: The second pre-evaluation meeting was held at the USAID main conference room, Yaounde. A summary of proceedings of the meeting and the people present is as shown in attachment A to this report.
- January 15, 1985: Mr. Armin Schmidt, HPI/Little Rock, visited R-PAID-WA, Buea to discuss the possibility for the Institute to provide a consultant (Team Leader) for the End-of-Project impact evaluation for Project No. 631-0015 - Small Farmer Livestock and Poultry Development. Later, Dr. Foday E. MacBailey (an Agricultural Economist and Extension Specialist) and nominee for the consultancy, held talks with Mr. Schmidt. Dr. MacBailey accepted the offer as primary evaluation consultant. (Attachments B and C to this report).
- January 16, 1985: A third pre-evaluation meeting was held (see attachment D to this report).
- January 31, 1985: Dr. MacBailey (Team Leader) travelled to Yaounde to hold preliminary talks with IRZ, USAID and HPI officials.
- February 1, 1985: Team leader met with USAID, IRZ, MINEPIA and HPI officials at IRZ headquarters (Nkolbisson, Yaounde) to discuss contract evaluation strategy, and related matters (see attachment E).
- February 4, 1985: Team leader travelled to Bamenda.
- February 5, 1985: Team leader met with evaluation core group to finalize arrangement for scope of work and schedule of activities at Mankon Station. Evaluation team was divided into two groups A and B for data collection.
- February 6, 1985: On-site visit to Bambui Station. Reviewed relevant documents in dairy production. Interviewed dairy staff.
- February 7, 1985: Team leader met with group heads to discuss Wakwa trip (Mankon Station). Interviewed pig farmers in Bamenda Central.
- February 8, 1985: On-site visit to goats and sheep sites as well as poultry facilities at Mankon Station. Reviewed project documents. Interviewed research staff.
- February 9, 1985: Inspected research laboratory, Mankon Station. Interviewed staff.

- February 10, 1985: On-site visit, Bamenda Central. Interviewed rabbit farmers. Visited Mbingo Baptist Hospital. Interviewed dairy farmers.
- February 11, 1985: On-site visit to Bafut. Interviewed dairy and goat farmers.
- February 13, 1985: Reviewed goat and sheep files, records and reports (Mankon Station).
- February 14, 1985: Went to Wakwa Station, Ngaoundere. Interviewed staff. Inspected livestock feeding facilities.
- February 15, 1985: Reviewed Station files, records and reports on small livestock.
- February 16, 1985: Reviewed Bambui files, records on reports on dairy activities.
- February 17, 1985: Reviewed files, records and reports on rabbits, sheep and goats (Mankon Station).
- February 18 -
19, 1985: Started preliminary stages of construction of first draft.
- February 20 -
22, 1985: Preparation of 1st evaluation draft report.
- February 22 -
23, 1985: Team leader in Yaounde (USAID) for typing first draft
- February 24, 1985: Team leader returned to Buea.
- February 28, 1985: Final review session with MINPAT, MINEPIA, MESRES, HPI and USAID representatives.

1.3 STRUCTURE AND COMPOSITION OF EVALUATION TEAM

Team Leader: Foday E. MacBailey (Ph.D), Lecturer/Research Worker, Pan African Institute for Development (PAID), P.O. Box 133 Buea

Core Team: Information Gathering and Analysis

IRZ: Dr. Pomuyam, Chief of Station, Mankon, Bamenda
Dr. Mbah, Chief of Center, Wakwa, Ngaoundere

HPI: Dr. Watts, Chief of Project Design and Evaluation Office

MINEPIA: Mr. Atekwana (Delegate, N/W Province) Livestock Agriculturist)

MINPAT: Mr. Jean Claude Tchadjet, Economist - Division of Projects and Programs

USAID: Mr. S. Scott (Chief of Project Design and Evaluation Office)
Mr. Ngue (Project Officer/ARD)
Ms. Thompson (Evaluation Officer, USAID/Cameroon)

Policy Group: Reviews, Conclusions and Recommendations

IRZ: Dr. E. Tebong (Director)
Mr. Ndumbe (Head of Research Service)
Dr.L. Watts (Chief of Party/Bamenda)
Dr. James De Vries

MINEPIA: Mr. J. Atekwana* (Livestock Agriculturist)
Dr. Songue (Joachim)

MINPAT: Mr. Jean Claude Tchadjet, Economist - Division of Projects and Programs

USAID: Mr. S. Scott (Chief of Project Design and Evaluation Office)
Mr. W. Litwiller (Chief of Agriculture and Rural Development Office)

*Replaced (represented) by provincial Delegate of Livestock, Fisheries and Animal Industries (MINEPIA), Bamenda, Dr. Ben Ayuk Agborbesong

1.4 TERMS OF REFERENCE

Short Term Consultancy to Coordinate End of Project Evaluation in Cameroon

Purpose: The purpose of the consultancy is to provide coordination for an end of project evaluation of a 5 year livestock research and distribution program; to formulate conclusions regarding overall project design, organization and effectiveness in achieving its purposes and goal, and to assist in formulation of recommendations for continued effective operation without major outside funding.

Qualifications: Consultant must have broad experience in and understanding of agricultural development in the Cameroon. Such understanding includes knowledge of roles and relationships of government, private and outside agencies in agricultural development. Professional expertise in areas of agricultural economics or rural sociology is preferred. competence in, or familiarity with, livestock and poultry management as production at both commercial and subsistence levels is necessary. Ability to conduct cost/benefit and/or cost/effectiveness analysis of livestock projects is needed, as are skills in group process.

- Scope:
1. To lead and coordinate an Evaluation Team composed of representatives of IRZ, USAID, HPI and the MINEPIA.
 2. Coordinate the analysis of data and preparation of a final report assessing the following areas: project design, finances, organization, administration, research, milk production and marketing, assistance to small scale farmers training, and implementation and recommendations detailed in the scope of work.
 3. Conduct Evaluation Review and Planning session(s) involving all parties to discuss conclusions and recommendations and to plan for project continuance.
 4. Duration: Twenty man days
 5. Timing: Final review and planning sessions to be completed by 28 February, 1985.

1.5 METHODOLOGY

Prior to the field operations, the evaluation team agreed:

1. to collectively develop a survey instrument which will serve as a guide for field operations (Attachment B to this report)
2. that questions considered relevant during field operations but not initially included in the instrument be administered by the interviewer in the field;
3. that the interview team be divided into two groups to facilitate record review, data collection and field interviews in the Mankon, Bambui and Wakwa Stations. Each team consisted at least one representative from participating groups - HPI, IRZ, MINEPIA and USAID. The team leader participated alternately with each group in field interviews, record reviews and on-site visits;
4. that one representative each from HPI, IRZ, MINEPIA and USAID be selected for the Wakwa Station trip for data collection due to difficulties in transportation (by helicopter) to that Station.

Among those interviewed include: livestock farmers, project officers and staff, and extension workers randomly selected. Project files, records and reports were reviewed; individuals observations made and on-site visits conducted.

* Due to lack of space in the helicopter, only three persons: Dr. Agborbesong (MINEPIA), Dr. Mbah (Chief of Station, Wakwa) and Dr. MacBailey (team leader) made the trip. This arrangement was accepted by Dr. Watts (Chief of Party, HPI).

CHAPTER 2

PROJECT IMPLEMENTATION ACTIVITIES

2.1 Adaptive Research Activities To Date

- Purpose

The purpose of the Small Farmers' Livestock Project are described as follows:

- a) To provide a system through which small, limited-resource farmers can benefit from the improvement of improved breeds of livestock.
- b) To increase the availability of dairy products, eggs, and meat at a reasonable cost to the general population of Cameroon.

- Methodology for Adaptive Livestock Research

In this report, evaluation of adaptive research activities in livestock reflects the stated methods defined in the project with respect to the intended results at project termination. These include:

- a) The collection of local Cameroonian breeds of livestock at the research stations and used as a gene pool for cross-breeding of exotic breeds.
- b) Conducting adaption trials on the imported breeds and crosses.
- d) Continuation of the Ministry of Higher Education and Scientific Research (MESRES) to develop its livestock research capabilities.
- e) Monitoring the distribution of improved animals to area farmers by the MESRES in order to assess the costs and benefits of livestock production in farmer field trials.
- c) Development of nutritional research capabilities on the value of local agricultural by-products for use in livestock rations as well as on the prevention and control of livestock diseases and pests.

Results Expected at Project Termination

- a) There will be an established, though nascent, dairy and livestock industry in Cameroon with a distribution system to provide improved livestock to small farmers as well as cooperative groups.
- b) There will be a functioning livestock research unit in breeding, nutrition, and disease-pest control.

- c) The small farmer will have access to formulated rations (locally produced), breeding services and marketing systems.

- Time Frame for Research Activities

Activities scheduled for the last three years of operation¹ include the following:

(a) Third Year (1982-83):

- DGRST - Identify local training participants, develop a training program and identify participants for long-term overseas training.
- Establish research assignments for the first two returnees from long-term overseas training; plan and construct livestock buildings.
 - Distribute available animals.
- HPI - Arrange for shipment of livestock and drug supplies and recruit technicians for technical assistance positions.

(b) Fourth Year (FY 1983-84)

- DGRST - Identify participants for short-term and long-term overseas training and establish research assignments for second pair of returnees from long-term overseas training.

¹ The first and second years of operation have been evaluated (see Mid-Term Evaluation Report)

HPI - Recruit technicians for technical assistance positions

Fifth Year (FY. 1984 - 85)

DGRST - Establish research assignments for third pair of returnees from long-term overseas training.
- Undertake final project evaluation.

HPI - Arrange for shipment of drug supplies and
- undertake final project evaluation.

In this report, attention is focussed on research progress in Mankon, Bambui and Wakwa stations during the period under review in conjunction with the findings of the Mid-Term Evaluation Report. To accomplish this, project's official documents were reviewed on-site visits at research stations made, interviews with research staff conducted and research reports and publications reviewed.

This section explains the status of the research component of this project to-date. Recommendations for continuation of valid livestock research are suggested taking into consideration whether or not previous recommendations made in the mid-term report were carried out.

2.2 Prerequisites for Conducting Valid Livestock Research

For any institution to conduct valid scientific livestock research, certain conditions must be met. Among these are:

- a) qualified research personnel
- b) adequate livestock numbers
- c) appropriate facilities for conducting research (see Mid-Term Evaluation Report Kelso, p.3)

The evaluation team examined the above conditions with a view to access IRZ's capability to conduct valid livestock research in the Mankon, Bambui and Wakwa Stations. The findings are as follows:

Research Progress (1980-1985)

IRZ's mechanism for selecting research projects has been adequately documented (Kelso: P.7. Mid-Term Evaluation Report). In this report, three dimensions: - A) Livestock Numbers, B) Facilities and C) Research Personnel - were used as yard sticks to measure IRZ's capability to conduct valid livestock research. Below is a summary of the findings.

2.3 Livestock Numbers for Conducting Research

The significance for adequate and healthy livestock numbers with respect to: type of research, and statistical significance is clearly stated in Kelso pp. 4-5. In this evaluation, a review of available animals in Bambui, Wakwa and Mankon is presented.

- Bambui Station - Dairy Cattle Research

At Bambui Station, the number of cows in lactation remain comparably the same, averaging between 19 and 20 lactating cows out of nearly 60 adult cows. In addition, the increased genetic diversity combined with differences in age and in stages of lactation hampered somewhat, the selection of balanced groups for conducting valid nutrition research, though, in general, the experiments conducted at Bambui were based on designs suitable for small numbers (cross-over designs). Thus in the short term, the numbers could be said to be inadequate for making valid breed (genetic) comparisons, in the long term valid conclusions could be made when there is a greater accumulation of data. This explains why (during the last ten years), no performance analysis was made on the breeds until now.

It should be noted too, that the size of the cows at Bambui get reduced in an effort to meet distribution targets. Relatedly, the land area of 30 hectares available for the project is overstocked.

- Wakwa Station - Dairy Cattle Research

At the Wakwa Station the number of cows (Holsteins) has remained the same. However, the Holstein/Gudali crosses has doubled during the period under review. The Montbeliard operation being unrelated to this project was not considered. Though the mortality rate is still high, the dairy herd, including the Montbeliards, has increased from 94 in 1982 to 115 in 1985 mainly due to gains in cross-breeding. New members of staff - Messrs Nguipjo and Oubiony (trained AI technicians) - are expected to improve upon the reproduction problems associated with insemination. With improvement in feeding and management at the Wakwa Station valid livestock research can be expected in the near future.

- Mankon Station - Small Livestock Research

The inventory of the goat herd has made very little gains since the mid-term evaluation (Kelso P.4). The latest inventory showed 14 Toggenburgs, 30 Nubians, 33 Saanens and 117 indigenous dows of the Rouse and local dwarf breeds. Short lactations and abortions continue to pose serious problems and therefore continue to limit the number of does available for research purposes. According to available data, there was a decrease in the number of swine herd at the Mankon Station. Out of a total of 131 herd reported, the number of sows in each breed was 43 Berkshire, 32 Duroc, and 56 Landrace. These numbers however, appear to be adequate for Mankon Station's nascent research needs.

2.4 Facilities for Conducting Research

Contrary to the assertion in the mid-term report to the effect that adequate facilities for conducting valid livestock research were non-existent in Bambui station, cattle on nutrition trials are placed in individual stalls which have existed on the station for over twenty years (see attachment C, p.6 to this report).

- Wakwa Station

Facilities for milking the herd and for processing the milk have been completed but only partly operational because parts of the pasteurizer in Wakwa were removed to repair the pasteurizer in Bambui where the population is already sensitized and used to consuming pasteurized milk as opposed to Wakwa where milk is sold raw quite easily.

- Mankon Station

The completed multipurpose research complex and swine facilities provide excellent facilities and therefore opportunity for Mankon to conduct valid livestock research. (See Kelso P.6, Mid-Term Evaluation Report).

2.5 Credentials of IRZ's Research Personnel

The level of academic and/or professional training of research personnel was examined in relation to job responsibilities for each of the Stations - Bambui, Wakwa and Mankon.

- Bambui Station - Dairy Research

Among 14 research projects planned by IRZ during the period 1980-85, 2 were in animal nutrition, 8 were in genetics and 4 in milk technology. (A list of research personnel at Bambui Station is presented in Attachment "G", p. 3 to this report). Among the research personnel, Mr. Mbanya (Head of Research at the Station), has formal university training with an M.Sc in Human Nutrition and Biochemistry; Miss Tiku has a Master of Science degree in Food Technology; Mr. Likongo has a Masters in Dairy Technology; two other staff members, Ms Morfaw and Mr. Pingpoh, have Bachelor of Science degrees in Animal Science and Economics respectively. Thus with five staff members having formal graduate training in animal Science, Nutrition and related fields, it is fair to state that the personnel at Bambui constitute a potential base for conducting valid livestock research in the long run. However, a qualified reproductive physiologist staff should be hired to work on the reproduction problems obtaining at the Station.

Research personnel in the milk technology sector remain quite suitable for their responsibilities. While attention is focussed on IRZ personnel, mention should be made to the effect that 4 out of 5 HPI personnel at the Station have formal graduate training in Animal Science, dairy science and other related fields. No person at the Station has less than an advanced certificate diploma.

2.6 Comments - IRZ Livestock Research Capability

- Wakwa Station - Dairy

There has been no change in Wakwa with respect to research projects. Only 7 projects have been planned since the inception of the project (see Kelso). Dr. Mbah (Chief of Station) explained that all the research planned projects in genetics, and adaptations are medium to long-term. Thus while data has already been generated in all of them, results or conclusions cannot be known or made in the immediate future.

What has changed, however, is the joining of new staff members Mr. Onbionyo, with a D.E.A. in Animal Biology (with 2 months post-graduate training in A.I.) and Mr. Yonkeu with a Maitrise in Plant Ecology. A list of research personnel in Wakwa Station is presented in Attachment C, p.4 to this report.

For Wakwa Station, it is obvious the research personnel are needed if any significant results in this area are to be realised.

- Mankon Station - Small Livestock

Mankon Station had 13 protocols for the Swine Program, 1980-85. Three of these were for nutrition, 7 for genetic improvement and 3 for management. Twelve of the 13 protocols were attempted but only five completed. Five others were suspended due to the African Swine Fever. Two are still in progress. Five qualified researchers (see Attachment D to this report), have been assigned to these operations. However, for Mankon Station's swine program to develop to its full potential, more qualified staff in animal and related sciences must be hired immediately.

With regard to sheep and goats, 19 research protocols were planned at the Station. The hiring of Mr. Ndamukong (Ph.D candidate in sheep and goats) will certainly provide the leadership needed in this area. Comments are presented by MINEPIA/IRZ in response to HPI's report on Sheep and Goats Program in this evaluation. Please refer to attachment "D" to this report.

Concerning rabbits and poultry, 15 research protocols were planned for poultry and 8 for rabbits. Of these planned for poultry, 7 were for nutrition, 6 genetics and 1 management, cost and returns. Ten of the 15 protocols were attempted. Of those attempted, 7 were completed (5 in nutrition and 2 in genetics), three are in progress. The five unattempted involved local birds whose option has been temporarily suspended for health reasons.

In rabbits, 8 protocols were planned. All were attempted. Four have been completed and 4 are in progress. There were five researchers assigned to these protocols with four technicians as support staff. It is fair to note that Dr. Lukefahr's project development, training and extension activities have made the rabbit program a big success

story in the area. (See Attachment "H" to this report). According to Dr. Lukefahr's report approximately 506 rabbit farmers received training in production and management, stock selection, nutrition, disease control, housing and equipment, meat and fur processing. For research personnel at Mankon Station, see Attachment "D" to this report.

2.7 - Supporting Documentation on Research Results

The evaluation team believes that IRZ's development of a livestock research capability has markedly improved during the past five years. In all project areas, the credentials and capabilities of IRZ personnel for high quality analytical research coupled with improvements in management and construction of modern research facilities (Mankon Station laboratory) are in place and functioning effectively.

Research Results to Date

- a. Attachment "C" (pp. 6-7) to this report outlines research activities at Bambui and Mankon Stations.
- b. Attachment G provides a listing of research activities undertaken at Mankon Station.

2.8 Impact of Research Efforts on Target Population

- a. With regards to the impact of adaptive research to its target group - the small limited-resource farmer, results have been mixed. For livestock and poultry personal interviews with farmers reveal that much knowledge has been gained in the nutritional values of local agricultural by-products such as maize, rice bran, and brewer dried grains for use in feedstuffs. However, breakdowns at the hatching equipment and the drug scare created a delimiting effect on poultry farmers to purchase eggs and chicks. Comparably, there has been less importation of livestock and poultry feedstuffs.
- b. Economically, farmers' incomes have been increased due to their awareness about use of alternative energy sources for partial or complete replacement of corn in pig rations so as to compute low cost diets, especially during periods of hard crop and high corn prices. Furthermore, the chemical composition of local feeds and feedstuffs is now available to students, MINEPIA personnel, feedmill operators for compounding efficient or well-balanced diets.
- c. Currently, the composition of typical ration used on Station as basal control diets, are available to farmers and livestock feed compounders.

- d. The impact of research on goats and sheep to its impact groups has not been great since on-Station goat and sheep performances have been unsatisfactory. As opposed to the pig, poultry and rabbit programs, less interest has been shown by farmers in the exotic sheep and goats. This maybe due to the fact that neither wool is shorn from local sheep nor is milk consumed from local goats in Cameroon.

2.9 Research Constraints

While considerable progress has been made in dairy research with the construction of dairy facilities in Wakwa, the milk technology in Bambui and the multipurpose laboratory in Mankon, several constraints continue to pose problems for continued success. These include:

- Management level of Station Herds

Management provided to the Station herds of dairy cattle is not adequate to maintain good health and reproduction in Bambui and in Wakwa. In Mankon, sufficient numbers cannot be produced for either distribution or research purposes.

- Health Care of Station Herds

Lack of a full-time veterinarian at each Station to minimize mortalities due to minor animal health problems continue to pose serious animal health problems in all the stations.

- Research Animals

The competition between the major objectives of IRZ and HPI for animals tended to reduce the number of animals available for on-Station research purposes. HPI preferring to have more animals go to the farmers and IRZ Station for research purposes. Though in absolute terms there seems to be too many animals on the Station, the diversity of breed groups tend to interfere with the selection of balanced groups for conducting research.

Thus in Bambui Station, rather than have many breeds, it would be desirable to choose a few breed groups to retain on the Station, preferably the best exotic milk producer crossed with the best local milk producer, that is, the Holstein and the White Fulani.

On the other hand (based on available production and adaptation data) elimination of the Jersey/White Fulani crosses nor of the Holstein/Red Fulani crosses cannot be recommended at this time. The exotic pure breeds should be retained on the Station.

In Wakwa Station (and contrary to the recommendations in the mid-term evaluation report to encourage Holstein/Gudali cross-breeding and phase out the Montbeliard/Gudali cross-breeding), data at the team's disposal does not permit that judgment since the Holstein project is much younger than the Montbeliard project.

2.10 Experimental Design and Statistical Analysis

Though lack of a specialist in statistics and experimental design is apparent, the talent is available within the country. The real constraint in this area is that young researchers often do not seek the advice of these specialists.

2.11 On-Station Record Keeping

The current method of record keeping leaves much to be desired. Records should be standardized in all IRZ Stations in order to make comparisons easier. This deficiency was particularly experienced in obtaining data for this evaluation. For example, figures advanced here for mortalities, calvings and evaluation of the herd in general have been arrived at through approximation and extrapolation.

2.12 Dissemination of Research Results (Kelso p.12)

2.13 SUMMARY OF ADAPTIVE RESEARCH RESULTS BY SPECIES:

Adaptive Research (On-Station)

a. Protocols

Thirteen protocols, (3 Nutrition, 7 Genetics Improvement and 3 Management) were planned for swine programme. Of these 12 operations were attempted resulting in five completions, five suspensions (due to African Swine Fever as they have to do with the collection of pigs) and two are still in progress,

b. Researchers

To carry out these protocols five researchers were assigned to these operations. although two of the five are administrators, a third acted on behalf of the principal administrator for a while. The research staff for this section is qualified to do the job (see IRZ staff list).

Below is a summary of adaptive research results by species:

2.13.1 Sheep and Goats (HPI Evaluation Assessment)

Adaptive Research

- a. On-Station: According to the mid-term evaluation report, the number and types of research projects approved by the statutory programs committee far exceeds the present research capability of the IRZ Stations. During the 2 1/2 years time the situation remains unchanged; a total of 19 research protocols have been designed with no IRZ personnel holding specialized degrees in the area of sheep and goat production to carry out these investigations. Furthermore, the appropriateness of performing valid research at Mankon Station could be criticized from the point of view that physical facilities, fencing and equipment used and the management level practiced in the sheep and goat sections neither simulates traditional production systems used nor is affordable for most farmers to adopt. It would be fair to state that the on-Station environment imposed upon the livestock is not typical of Cameroon conditions, which IRZ claims its stations are representing. (please refer to Mr. Joseph Howell's report on Research Strategies Training and Distribution, Attachment "P" to this report).
- b. Off-Station: There is no mandate for IRZ to perform on-farm research in the form of extension. Any form of livestock extension is said to be the official responsibility of MINEPIA, not IRZ. Hence, researchers are not permitted to develop direct farm collaboration to efficiently bridge the flow of farmer problems with research solutions. In actuality, results of research progress are documented in the IRZ Annual Reports. These reports are then sent to MINEPIA which serves as the intermediary link in making the research information available to farmers. Thus, at best, IRZ plays an indirect role in servicing farmers through its on-Station research activities.

*The views of MINEPIA/IRZ on th sheep and goats adaptive research issue is as presented in attachment "H" to this report.

- c. Research initiatives: Of the 14 planned research protocols approved by the Statutory Programs Committee from 1980-1984, only eight have been reported upon in the IRZ Annual Reports. It has not been possible to determine the number of protocols undertaken or accomplished but not reported since this information is not clearly known. Funding support is obviously available (32 200 000 FCFA were allotted during the present fiscal year), yet number of qualified research personnel, administrative support and animal resources are inadequate to achieve the ambitious research goals set.
- d. Constraints
- No mandate for IRZ to perform on-farm research - in the form of extension.
 - Lack of qualified IRZ personnel to carry out sheep and goat research. It should be noted that the former HPI sheep and goat specialist was at Mankon Station for a period of three years without an assigned IRZ counterpart. Also, no Cameroonian staff personnel were selected for graduate training in sheep and goat production through the IRZ/HPI/USAID project.
 - Poor management has been an ever-continual problem in the sheep and goat sections, resulting on unsatisfactory levels of breeding success and survival (please refer to Mr. Joseph Howell's paper on "Areas of Management Failure). In short, considering the general unthriftiness of the stock sufficient numbers of animals cannot be produced for either distribution or research purposes. (Refer to Josheph Howell's report Attachment "F" to this report).
- e. Comments: The exotic breeds of sheep and goats have experienced much mortality, due particularly to tick-born diseases and Blue Tongue. However, across years even the local strains have shown unreasonably high death levels. Overall, the former HPI sheep and goat specialist credited these problems as being a reflection of the poor and inconsistent management provided at the Station. The special daily care which the imported sheep and goats require was essentially lacking. (See Table 1 "Mortality Observed Within the Sheep and Goats Section at Mankon Station).

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TABLE 1

Mortality Rates Observed Within the Sheep and Goat Sections at Mankon Station
From 1980 to 1985^a

	1980-81		1981-82		1982-83		1983-84		1984-85											
	Local	Exotic	Local	Exotic	Local	Exotic	Local	Exotic	Local	Exotic										
	%	n	%	n	%	n	%	n	%	n										
<u>Goats</u>																				
- Kids	121.2	(40)	40.7	(14)	8.7	(4)	40.0	(14)	55.0	(22)	13.6	(16)	31.9	(15)	75.6	(62)	69.6	(16)	23.7	(9)
- Adults	122.2	(11)	60.0	(21)	2.8	(1)	24.7	(20)	14.3	(7)	17.7	(11)	8.1	(3)	54.4	(31)	13.1	(8)	5.8	(4)
<u>Sheep</u>																				
- Lambs	Sheep introduced to		40.0	(8)	50.0	(9)	33.3	(4)	11.1	(2)	14.3	(8)	157.1	(11)	29.4	(15)	128.6	(9)		
- Adults	the Station at the		6.7	(1)	35.8	(19)	11.9	(5)	21.2	(7)	33.3	(14)	42.4	(14)	2.7	(2)	11.1	(3)		

^a Kid/lamb mortality expressed as the number of deaths divided by the number of births during the given year, times 100. Adult mortality was expressed as the number of deaths divided by the number present at the start of the year period, times 100.

Sales accounted for those given farmers or sold for food. Births accounted for 952 of total herd size, 33.5% mortality which is on the high side and 17.1% of the total of pigs were sold.

The swine herd consists (January 1985) of 136 exotic pigs, 43 Berkshire, 22 Duroc and 56 Landrace female pigs. There are also present 77 exotic cross female pigs. Research is conducted in two grower pig houses with individual pig feeding facilities. Each house holds 28 of such pigs. The floors are cemented for easy cleaning. Four semi-intensive study houses exist and paddock area exists for extensive management studies. A farrowing house within which 20 sows can farrow simultaneously does exist.

ADAPTIVE RESEARCH (Off-Station)

One study was carried out on small farmer swine production. The researcher is an agricultural economist who evaluated the profit-making of this study on a small farmer from using four Landrace gilts.

a. Impact

Farmers income knowledgeable about alternative energy sources for partial or complete replacement of corn in pig rations; so as to compute low cost diets especially during periods of hard crop and high corn prices. Furthermore, the chemical composition of local feeds and feedstuffs is available to students, MINEPIA personnel, feedmill operators, for compounding efficient or well-balanced diets. Finally, the composition of typical ration, used on Station as basal control diets, are available to farmers and livestock feed compounders.

b. Constraints

African Swine Fever interrupted research work, especially work that had to do with local pigs, e.g. genetic and collection studies.

Animals arrived late, June 1981, thus reducing the amount of time needed to do adaptation studies and distribution to farmers. The absence of long term breeding expertise resulted in few pigs than would have otherwise been obtained. Young researchers need to consult more on design and analysis of research than is done now.

c. Comments

Station herd was free of African Swine Fever, and serves as source of breeding stock for farmers who wish to restock. Completed station trials of movement of pigs will be tried at farmers' feedmills and herds in 1985/86

2.13.2 Pig Section

On Station

Operations

Thirteen operations, (3 on Nutrition, 7 on Genetics Improvement and 3 on Management) were planned for Swine Programme. Of these 12 operations were attempted resulting in five completions, five suspensions (due to African Swine Fever as they have to do with the collection of pigs) and two are still in progress

Researchers

To carry out these protocols five researchers were assigned to these operations. Although two of the five are administrators, a third acted on behalf of the principal administrator for a while. The research staff for this section is qualified to do the job (see end of this report).

Animals and Research Facilities

The variation of the swine herd from July 1981 to January 1985 is shown below (exotic and exotic crosses only).

TABLE 2 Variations of the Swine Herd (July 1981-January 1985)

	JULY 1981	BIRTHS	DEATHS	SALES	JAN. 1985
Exotic:	97	1190	446	641	196
Exotic Crosses:	<u>3</u>	<u>712</u>	<u>225</u>	<u>311</u>	<u>147 - 3*</u>
TOTAL	100	1902	671	952	343 - 3*

* Locals used in cross breeding with exotics

Sales accounted for those given to farmers or sold for food. Births accounted for 95.2% of total herd size, 33.5% mortality was observed which is on the high side and 17.1% of the total of pigs were sold.

The swine herd consists (January 1985) of 425 pigs of which there are 43 Berkshire, 22 Duroc and 56 Landrace female pigs. There are also present 77 exotic cross and 10 indigenous female pigs. Research is conducted in two grower pig houses with individual pig feeding facilities. Each house holds 28 of such pens. The floors are cemented for easy cleaning. Four semi-intensive study houses exist and paddock area exists for extensive management studies. A farrowing house within which 20 sows can farrow simultaneously does exist.

Off Station

One study was carried out on small farmer swine production. The researcher is an agricultural economist who evaluated the profit-making of this study on a small farmer using four Landrace gilts. However the experiment was poorly designed and poorly conducted. The conclusions are therefore invalid and misleading.

Results

Results can be obtained in the following sources:

- Annual Reports, Mankon Station, 1980-85
- Memoire on Rice Bran in Sow Diet: University of Mali (copy in library)
- Science and Technology Review, 1980-85
- Case Study: Small Farmer Production: Commercial Mash Vs local Feedstuffs Utilization.

Impact

Farmers have been knowledgeable about alternative energy sources for partial or complete replacement of corn in pig rations; so as to compute low cost diets especially during periods of hard crop and high corn prices. Furthermore, the chemical composition of local feeds and feedstuffs is available to students, MINEPIA personnel, feedmill operators, for compounding efficient or well-balanced diets. Finally, the composition of typical ration, used on Station as basal control diets, are available to farmers and livestock feed compounders.

Constraints

African Swine Fever interrupted research work, especially work that had to do with local pigs, e.g. genetic and collection studies.

Animal arrived late, June 1981, thus reducing the amount of time needed to do adaptation studies and distribution to farmers. The absence of long-term breeding expertise resulted in few pigs than would have otherwise been obtained. Young researchers need to consult more on design and analysis of experiments than is done now.

Comments

Station herd was free of African Swine Fever, and serves as source of breeding stock for farmers who wish to restock.

Results obtained from trials on the Station will be tested on farmers' herds and feedmills in 1985/86.

2.13.3 Poultry

ADAPTIVE RESEARCH

On Station

a. Research Operations

There were 15 operations assigned to this program as follows: 7 Genetics, 6 Management, 1 Cost and Returns, 1. Ten were attempted. Of these, seven were completed (5 Nutrition and 2 in Genetics) and three are still in progress. The five unattempted had to do with collection of local fowls.

b. Personnel facilities

There are six researchers assigned to this section (see Attachment D) with 3 technicians as support staff. In addition, the poultry unit has four layer houses, 2 brooding houses and a broiler house. A hatchery which holds five incubators and two hatchers is also available. There are two feedmills, to back the supply of research feed preparations. A well equipped laboratory with facilities for complete feed analysis and animal health related problems supports research.

4,400 day old chicks arrived in Cameroon from the USA in June 1981. 330 chicks were given out to farmers due to lack of space in the poultry unit. The variation in terms of growth, egg production is as follows: From July to October, 1981, 4,108 starter/grower chickens were raised. 390 were culled and 99 died. Thus 3,619 birds came to lay and laid a total of 565,570 eggs (fertile and non-fertile). The eggs of 4,999 replacement stock from original parent stock are included in the above mentioned figure. From the parent stock, 2,286 hens were culled and 639 died.

A total of 13,349 day-old chicks and 89,182 hatching eggs were produced. Flock mortality ranged from 17 to 25%.

Off Station

No off-station research was carried out.

Results

These are found in the Institute's and Station's annual reports. The principal areas studied utilisation of agro-industrial by-products such as rice bran, cottonseed cake, rumen contents and cattle manure. Management systems studies were on types of housing and flooring material for raising poultry. The efficiency of utilisation of these feeds and systems of management were evaluated.

Constraints

Parts for hatchery machines were difficult to obtain from abroad. Health risk of local fowl prevented their collection and thus interrupted the successful study of these operations. Animals arrived late in June 1981.

Impact:

- Information on suitability of locally available housing material is available to all Cameroonians.
- From annual reports given out to farmers and from farmers visits to the station, access to information on alternative feed sources and formulae of diets is available.

Comments

The non availability of spare parts of some incubators at the Station greatly reduced the number of day old chicks produced. There has been very little input from HPI advisory staff for about 2 1/2 years. Contrary to HPI comments that there were 26 operations from 1982-83 to 83-84, IRZ wishes to state that there were 18 operations in 1982/83 and 21 operations in 1983/84 for poultry and rabbits. These on-station successes by IRZ in poultry research operations during the last 2 1/2 years was realized with minimum direct input from HPI advisory staff.

2.13.4 Rabbits Program

On Station

a. Protocols

There were eight operations assigned on this species of animal. Eight were attempted, 4 were completed and 4 are on going.

b. Researchers

There were six researchers assigned to these operations with four technicians as support staff.

c. Animals and Facilities

There are two rabbit houses that can hold a maximum of 2,000 rabbits. These buildings contain cages made of local and imported materials. In July 1981 there were 405 rabbits; 3,104 young born, 2,214 deaths and 640 sales were recorded between 1981 and December 1984.

a. Results

Several trials on local herbage species such as Aspelia Africana, Bidens pilosa, banana/plantain leaves and stems, sweet potato leaves and cabbage leaves have been tried to ascertain the palatability and optimum intake values. These trials are also taking into consideration ease of acquisition and seasonality of these feedstuffs. Processing of these feedstuffs was also studied, i.e. sundried banana leaves and stems and cabbage leaves using the effect of black body radiation. Silage of crop residues and brewers wet grains has been made and studies are to begin soon.

In terms of management, trials on various cage systems as well as various nest box materials are still in progress.

b. Impact

Nutritive value of these local feedstuffs are available to former students and MINEPIA personnel.

Optimum levels of these feedstuffs have been identified, taking into consideration seasonal and labour effects of rabbit keeping.

c. Constraint

Competition between distribution and research objectives for animal resources, tended to reduce the number of rabbits available for other farmers and for research purposes.

d. Comments

Research in rabbits is new the world over and, in addition, rabbit keeping is labour intensive. Therefore, transfer of technology in this area should be very cautious. Research in rabbit production stresses areas that would greatly disrupt the socio-economic base of the farmers, be he full-time or part-time.

2.13.5 Dairy

Full coverage of Adaptive Research for dairy is presented in attachment "C" to this report*

* HPI's Reaction to the Evaluation of Dairy activities is as also shown in Attachment "C" to this report.

2.13.6 DAIRY CATTLE RESEARCH - RECOMMENDATIONS

ADAPTIVE RESEARCH

a. Bambui Station

That research be continued on-Station on the exotic purebred Holsteins and Jerseys and the local Zebu (White Fulani and Red Fulani).

That crossbreeding the exotics with the locals be continued as currently planned but serious consideration be given to crossbreeding the best exotic dairy breed (holstein) with the best local dairy breed (White Fulani) and elimination of Holstein-Gudali crossbreeding.

That the dairy data base be expanded to include on-farm data where possible.

That multiplier herds (Local Zebu) be used to produce desired crossbred stock (primarily Heifers) for farmers' use. IRZ/MINEPIA should seriously consider the establishment of multiplier herds different from farmer(s)' herd(s).

That more pasture land be made available to the project.

b. Wakwa Station

That crossbreeding be continued (Holsteins with Gudali's) as currently planned.

For both Stations, artificial insemination (with imported frozen semen) should be preferred over natural service (which may involve importation of live animals).

c. Management - All IRZ Stations

In order to improve management levels in all IRZ Stations, herd managers must be employed at once. (Note: one each has been employed in Wakwa and Bambui).

DISTRIBUTION OF ANIMALS

- That the question of subsidies be reviewed and a definite policy be adopted.
- Due to inadequate numbers of animals on Station, IRZ should strongly consider extending its research data base to include information from farmer recipients of project animals.
- Instead of depending on Station animals being distributed to the farmers, the project could tilt more to the multiplier herd in order to obtain animals for distribution to farmers.

- That, to eliminate the suspicion of favoritism in animal distribution, prospective beneficiaries for distribution be informed through the media (radio, television newspapers, etc).
- That, to maintain the confidence and effective interaction with the farmers, MINEPIA/IRZ follow-up activities be greatly strengthened.
- That, only crossbred dairy cattle be given out to farmers.

The present population size of rabbits in Cameroon is very small. Based on this fact, and on the breeding success of the three genotypes maintained at IRZ Mankon and on favorable reports from scientific literature on import breed adaptation to tropical regions, it is recommended that all present breed farm of rabbits at IRZ Mankon be considered suitable for distribution to rural farmers, following training or previous successful experience in raising rabbits for meat production. If, however, this recommendation is not considered favorable, it is then recommended that efforts be made to expedite the availability and distribution of local rabbits presently at IRZ Mankon to meet the demand for breeding stock by trained rural farmers.

CHAPTER III

LIVESTOCK DISTRIBUTION

3.1 PURPOSE

The purpose of this section is to:

- a) examine the distribution process and to determine whether the project has reached livestock distribution targets
- b) determine the extent to which the intended farmers are receiving livestock
- c) the impact of livestock distribution to its target audience, and
- d) constraints in the distribution process.

Recommendations for continued successful distribution will be made. The history and objectives of the project's livestock distribution is as described in (Kelso, p 2-3 Mid-Term Evaluation Report)

3.2 PROJECT'S DISTRIBUTION TARGETS

Livestock distribution targets to be reached by February 28, 1985 are:

Poultry	=	350,000
Rabbits	=	3,400
Swine	=	2,200
Cattle	=	360
Goats	=	210
Sheep	=	110

In order to implement these targets it was necessary for MESRES, MINEPIA and HPI to effectively collaborate and coordinate their strategies. MINEPIA staff was mainly responsible for this role assisted by the other two agencies. Thus agreements were reached and ratified by HPI and IRZ stating that all decisions regarding the distribution of livestock are to be made by the Livestock Distribution Committee composed of the Director of IRZ or his representative, Chiefs of Stations, HPI Chief of Party and Technicians, Chief of Center and the area representative of MINEPIA.

3.3 DISTRIBUTION PROCEDURE

Please refer to attachment "C", C 11 - C 16 to this report

3.4 DISTRIBUTION ACCOMPLISHMENTS TO-DATE

Table 3 shows planned distribution targets and actual distributions to-date:

TABLE 3 Planned Distribution Targets and Actual Distribution of Livestock (1980-1985)

Livestock	1980-1985 Planned	1980-1985 Actual	% Realisation
Poultry	350,000	254,533	73%
Rabbits	3,400	366	11%
Swine	2,200	758	34.4%
Cattle	360	119	33%
Goats	210	16	8%
Sheep	110	2	0.02%

A summary of livestock distribution by species is presented below

Sheep and Goats

Background: (see descriptive background information and history already provided in detail in the mid-term evaluation report). (1977: 41 goats; 0 sheep; and 1981: 63 goats, 57 sheep)

<u>Distribution Results:</u>	<u>1980-85</u> <u>Planned</u>	<u>1980-85</u> <u>Actual</u>
Goats:	210	16
Sheep:	<u>110</u>	<u>2</u>
	320	18

NOTE: Full coverage of the distribution implementation schedule was provided in the mid-term evaluation report.

Poultry

a Distribution

3,619 parent layers and 4,999 replacement stock layers produced 565,570 eggs (fertile and non-fertile). 13,349 day old chicks (from 15,704 hatching eggs) were sold as was 89,172 hatching eggs sold as such. Thus 460,694 eggs were sold as table eggs. If a fertility figure of 85% is used, 391,590 fertile eggs would have been produced or 254,533 day old chicks, almost meeting the HPI requested target (assuring a hatchability of 65% as in mid term evaluation report). However, these were sold for food.

b. Constraints

Most farmers did not like white leghorn day old chicks, consequently eggs had to be retained by the Station or the hatching of the eggs from this breed were subsequently used for research purpose only. Frequent lack of drugs at OPV (Veterinary Pharmaceutic Office) scared most farmers out of business.

c. Impact

Farmers increased poultry farming due to ease of obtaining day old chicks and ease of building poultry houses. Farmers increased their income, and meat and egg domestic consumption.

d. Comments

HPI personnel have not assisted in this Section since the early 1982. HPI has complained that IRZ sells table eggs below market price. Egg prices at IRZ Mankon are established taking into consideration the following factors (a) distance of station (about 13 km) from town. Consumers consider it irrational to drive this distance just to buy eggs at market prices (b) the purchase of feed items and diet formulation. Feedstuffs are bought when they are cheapest and an effort is made to formulate low cost diets.

It was observed that most small scale farmers stopped because of lack of necessary drugs and due to the fact that the only OPV is in town and far away from most farmers (often based in the outskirts). The marketing outlet for eggs is good.

Pigs

a. Method of Distribution

Method of Distribution

The distribution was by a committee consisting of MINEPIA, IRZ and HPI personnel. This was preceded by farmer training and inspection of animal facilities. Information for both training and distribution was communicated by a radio announcement and MINEPIA extension services. Number distributed: 130 Berkshire, 217 Landrace, 118 Duroc and 233 Crosses. A total of 758 pigs were given to farmers.

22 pigs (14 Berkshire, 10 Landrace and 1 Duroc) were sent to Nkolbisson research station for the beginning of a research and distribution unit in the Centre and South Provinces. Target realisation was about 34.5%. This realisation is considered adequate given that African Swine Fever struck barely one year after arrival of pigs.

b. Impact

Farmers have increased protein consumption due to increased production. Thus there is more meat for consumption without any strain or competition with sale for income.

c. Comments

The pig programme progressed well but for the African Swine Fever which scared farmers as ban on movement of pigs from production centres to consumption areas held sway. Farmers lost most of their pigs due to the disease, while others lost capital from purchase of feed for pigs that could not be moved to market. Most farmers wish to restock and need the financial base to do so. Suggestion was made to various farmers to seek funding from groups such as the Credit Unions, FONADER, etc.

d. Personnel of this unit

- | | |
|------------------|---|
| - E.D. TEBONG, | Ph.D, Animal Physiology, University of Tennessee |
| - R.T. POMUNYAM, | Ph.D, Animal Science, Univ. of Ife, B.Sc., M.Sc.,
Animal Science, Univ. of Tennessee |
| - R.B. POMBAD, | B.Sc., Biochemistry. M.Sc. Animal Science, Univ.
of Ibadan |
| - M. GOLDMAN, | B.Sc, Agricultural Econs, Brandeis University |
| - MEFPEJA, | Ing. Agronome, ENSA Yaounde |
| - NYUME T.M., | B.Sc., Agriculture, Ahmadu Bello University |
| -TEKOM E/, | A Level, (Science Option) |
| -Awemo Joseph, | Agric. Assistant. |

3.5 MILK MARKETING AND DISTRIBUTION

Size of Dairy Herd

Most of the farmers started with about two animals and excluding institutions, the individual farmer interviewed now has an average of six animals of all ages on his farm.

Production

Milk production has been measured in the Station as follows:

- White Fulani	:497 l/lact. of 170 days or 2.92 l/day
- Red Fulani	:329.95 l/lact. of 113 days of 2.90 l/day
- Jersey/White Fulani	:978.53 l/lact. of 188.9 days or 5.1 l/day
- Holstein/Red Fulani	:1500.8 l/lact. of 220.5 days or 6.8 l/day
- Jersey	:2595 l/lact. of 315 days of 8.2 l/day
Holstein	:3431 l/lact. of 283 days or 12.1 l/day (Wakwa)
	:3360 l/lact of 319 days or 10.5 l/day (Bambui)
- Holstein/Gudali	:1524 l/lact. of 256 days or 5.9 l/day
- Gudali	:483 l/lact. of 168 days or 2.9 l/day

Milk fed to the calf is about 10% of body weight of the calf on the Station. Off-Station, many farmers give about 1-4 litres of milk/day to their calves.

All the evening milk goes to feed the family and the calves. All the morning milk is sold at the farms at 120 francs/litre to IRZ Bambui - for raw milk and the Bambui Station sells pasteurized milk at 180 francs/litre in Bamenda

Currently all milk is sold by farmers to IRZ for 140 francs per litre.

Milk Quality

Bacterial content of farmers hand-milk raw milk is generally higher than IRZ machine-milked raw milk.

Chain of Milk Distribution

Raw milk is sold to IRZ in Bambui by most farmers living near Bambui. IRZ then pasteurizes the milk along with its own, packages and retails it in Bamenda in various depots. A few farmers, especially those distant to Bambui, sell their milk raw or transform it into dairy products which they consider more profitable than raw milk.

In Wakwa, all the Station milk is sold raw in Ngaoundere. No farmer delivers milk to the Station.

Milk Spoilage

Occasionally milk spoils due to either power failures, poor quality of farmer's supply or breakdown of equipment. Spoilage accounts for about 10% of the milk produced. It is noteworthy to add

here that there was more spoilage in the first two or three years of the project due to inadequate management practices; but in the last couple of years this has reduced.

Transformation

Some private farmers to transform their milk because it fetches them more money. The Station, too, practices this when there is increased production in the rainy season.

Economics of Dairy Production

Milk is heavily subsidized and is sold at under production cost.

Results and Impact

Locally produced milk is more available and accepted by the population. Some people now feel that their children are much healthier than before.

A new breed to cattle farmers has been born in Cameroon. He is enlightened and very dedicated. The newly created Dairy Farmers Cooperative will soon receive official recognition by Government.

Constraints

The vans for picking up raw milk and the distribution of pasteurized milk are constantly breaking down. all this applies to Bambui. The private farmers lack cooling facilities and consequently all the evening milk is consumed by the family and/or fed to calves. The van does not reach every farmer because of cost constraints.

Comments

If the production of milk is increased, the Dairy Farmers Cooperative could be in a position to replace their van. And unless the herd size per farmer increases, it would not be economical to invest on cooling equipment at the farms to preserve evening milk.

CHAPTER IV

TRAINING

4.1 Conclusions & Recommendations

It is obvious that HPI/IRZ training activities have produced results that have significant impact on limited-resource farmers in the area; increases in small farmers' incomes, occurs to farming information, annual reports on poultry activities, information on the purchasing schedule of feedstuffs etc. It is in the light of these benefits, among others, that recommendations for sustaining the training component of this project are made:

- Technical Training and Follow-up

Establish in all Project Stations Project Stations trained and qualified staff to run technical courses for livestock management which reflect the needs of limited-resource farmers. These units would:

- (a). run courses of one to two weeks duration for all participating farmers.
- (b). Follow-up the training by visiting farmers at work and helping them to apply their learning
- (c). seek out and collect examples of successful experiments and technical developments in projects and spread them to other areas
- (d). translate livestock research findings into practical management terms which can be understood by the small farmer
- (e). establish and develop in each station on-the-job farmer trainers who will fill posts with key training responsibilities in future projects
- (f). management training should always be adapted to fit existing social, cultural and environmental factors.
- (g). Off-station training should be accorded serious attention

Training is the acquisition of knowledge and skills relevant to the tasks to be performed by its beneficiaries. Recipients of new knowledge and skills are expected to perform better at their immediate jobs and become more aware of their responsibilities.

4.2 Training Programs

Training is one of the major components in the IRZ/USAID/HPI Small Farmers Livestock Program, which involves milk cows, milk goats, sheep, hogs, rabbits and chickens. Beneficiaries include IRZ workers, extension workers, farmers and groups such as missions, schools and cooperatives.

Training is the responsibility of HPI/IRZ with cooperation and assistance from MINEPIA. If IRZ staff is not available, HPI will do the training in cooperation with MINEPIA. Beneficiaries and their areas of training according to project descriptions are as shown below:

- (a) Research workers will receive training in the breeding of improved livestock species adaptable to the Cameroonian environment, optimal feeding rates and disease control.
- (b) Extension workers will receive training in livestock management.
- (c) Farmers (small limited-resource) will receive training at the research stations by extension workers, to ensure that researchers become aware of producers' attitudes and problems. In addition, the program will also:
 - i. develop cooperative groups
 - ii. distribute improved livestock breeds and crosses
 - iii. sponsor at least seven persons for training at the Masters level in the animal sciences in the USA or African countries
 - iv. offer in-country training to farmers extension workers and station personnel.

In this report, the evaluation team assessed whether or not:

- (a) the varieties and targets of training programs within the framework of the project are met;
- (b) there is an impact (spread effect) to general population as a result of the training activities.

4.3 Summary of IRZ/HPI Training accomplishments (1982-1985)*

4.3.1 On-Station Training (HPI) (Sheep and Goats)

Sheep and Goat: (Mankon Station)

Training in sheep and goats was done both on - and off-station. Table 4 shows number of students, IRZ staff and PVO's trained on-station on sheep and goats (1982-1985)

TABLE 4

Distribution and Category of Trainees in Multiple Species On-Station (1980-85), Sheep and Goats

(MANKON STATION)

CATEGORY	1980	1981	1982	1983	1984	1985
Students	-	7	8+9 (17)	8	18	
RZ Staff			2	-	-	
PCV's			16	8		
Farmers		<u>25</u>				
TOTAL		<u>32</u>	<u>35</u>	<u>16</u>	<u>18</u>	

Grand Total of Trainees on-Station = 101

As Table 4 indicates, 101 persons received On-Station Training during 1982-1985. More persons were trained in 1982 than in 1983 or 1985.

*MINEPIA/IRZ reaction to the goat and sheep training component is as presented in Attachment "E" to this report.

4.3.2 Off-Station Training (HPI) - Sheep and Goats

As shown in Table 5 a total of 98 persons received off-station training from HPI personnel on sheep and goats in 1982. No farmers received off-station training during 1980-81 and 1983-85.

TABLE 5

Distribution and Category of Trainees in Multiple Species Off-Station (1980-85) (HPI Personnel) Sheep and Goats (MANKON STATION)

CATEGORY	1980	1981	1982	1983	1984	1.85	
Students(Ndu) -	-	-	66	-	-	-	
Farmers (RTC) -	-	-	24	-	-	-	
IRZ Staff	-	-	8	-	-	-	
TOTALS			98				
Grand Total of Trainees Off-Station						=	<u>98</u>

Impact: Unfortunately the impact has not been great since on-Station goat and sheep performances have been unsatisfactory to begin with. As opposed to the pig, poultry and rabbit programs, less interest has been shown by farmers in the exotic sheep and goats. This may be due to the fact that neither wool is shorn from local sheep nor is milk consumed from local goats in Cameroon.

Constraints: Since farmer training has not occurred on the Station since 1982, due to the African Swine Fever Quarantine, this certainly has been one constraint. The inability of IRZ staff to perform direct post-training follow-up, due to present IRZ policy, further discourages conducting training courses on the Station. (See Mr Joseph Howell's paper on Research Strategies, Training and Distribution Attachment "P")

4.3.3 Poultry Training

Twenty eight (28) farmers and 15 students were trained in poultry farming; 14 on Station personnel were trained in multidisciplinary course on the Station. Fifty one (51) researchers and technicians were given a month course in general animal production (multidisciplinary) by ENSA/GERDAT/HPI/IRZ staff.

Results

It was agreed by HPI/IRZ that poultry has a short turn-over rate and low investment cost. Thus farmers could receive day old chicks without undergoing the standard procedure of training, inspection of poultry house and distribution by committee.

Constraints

There were no constraints to training since most Cameroonians were successful poultry raisers and hatchery operators. It is fair to say that some farmers progressed and some did not. However, those trained were very knowledgeable and can effectively diagnose poultry diseases.

Comments

Poultry is easy to manage as seen by the increase of poultry population. Of course, the fact that most of the poultry farmers are part time, gives us an idea on how many people are involved in this activity. Its main attractive point is that of short turn-over, which simply means that farmers can deal with many batches per year. Thus it is easy to justify the exception of poultry to regular procedure of training and distribution methods.

4.3.4 Rabbits (HPI Personnel)

Over 135 farmers received off-station training during 1982/83 at Bambui (Four Corners) by HPI/IRZ personnel as shown in Table 6.

TABLE 6

Off-Station Rabbit Training (1983-85)

<u>Date</u>	<u>Site</u>	<u>Trainees</u>	<u>No.</u>	<u>Host Organization</u>
1982	Bamenda	Farmers	40	-
Aug. 1983	Bafut	Farmers	21	VCP Village Community Project
Aug-Sept, 1983	Mfonta	Farmers	21	R.T.C
Sept., 1983	Bamendjinda	Farmers	23	Peace Corps
Sept., 1983	Nso	Farmers	15	Col Valentine
Oct., 1983	Njinikom	Farmers	15	Peace Corps
Oct., 1983	Ndop	Women	45	Catholic Mission
Oct., 1983	Bambili	Extensionists	45	MIDENO/MINAGRI
April, 1984	Bamenda	Volunteers	2	Peace Corps
May, 1984	Mbengwi	Farmer/extensionists	13	MINEPIA
May-June, 1984	Mfonta	Farmers	21	RTC
May-June, 1984	Bambili	Extensionists	47	MIDENO/MLNAGRI
May-Sept., 1984	Bambili	Extensionists	47	MIDENO/MINAGRI
Sept., 1984	Bamenda	Volunteers	12	Peace Corps
Nov., 1984	Bamenda	Volunteers	15	Peace Corps
Jan-Feb., 1985	Ndop	Women	23	Catholic Mission
			<u>365</u>	
			40	
			<u>405</u>	

Results

Farmer visits show well organised rabbit groups and farmers were quite enthusiastic.

Constraints

Off-Station training was done without use of counterparts.* Thus IRZ/MINEPIA cannot deny or confirm results nor testify to numbers

* HPI claims that the working counterpart (chief of station) never expressed a willing interest to participate in the rabbit extension/training program. Off-station distribution of rabbits was done because of the great difficulty and prolonged time involved to release rabbits from the station.

referred to in HPI village documents. Team leaders within each group have assumed the training role of HPI/IRZ personnel contrary to the text of the project.

Impact

There is an increased number of rabbit farmers

Comments

The criteria of team leaders to train others requires non-technical staff to give technical information which might (or might not) be properly given and so increases risk to farmers in terms of improper information dissemination to other farmers, e.g. one farmer during the farmer visits stated that concentrates kill rabbits, which is not true. Rather, the present off-Station training is not very practical. Secondly, the criteria for choosing this team leaders and their actual function as team leader were not clearly defined. This should be clearly studied in terms of social implications.

1. On-station training has been offered in combination with species training and for poultry production. No on-station rabbit training was documented or at least brought to the attention of the evaluation team.
2. Off-station rabbit training, (1983-1985) however has been extensive. Totals indicate that 198 farmers, 68 women, 139 extension workers, and 29 volunteers received off-station rabbit training. This indicates a total of 405 individuals given training of this type, as shown in Table 6.

4.3.5 Pigs (Mankon Station)

In Country

On Station

Ninety eight farmers were trained by Station IRZ/HPI personnel for a three weeks multidisciplinary course on general animal husbandry, nutrition and animal health between 1981-82 prior to the outbreak of African Swine Fever. Twenty two students from the Jakiri Veterinary School spent two months on the Station studying animal health related studies with the Station veterinary team. Fourteen Station personnel (livestock attendants) were taught for four hours/day for a three-week course of livestock management and production by Station staff. One student from the University of Mali spent one year at the Station working on a thesis for a diploma in pig science from that university.

Off Station

Fifty one researchers and technicians were taught a general course in animal production and health by a team of teachers from ENSA (National Advanced School of Agronomy, Yaounde), HPI, GERDAT (French Technical Assistance) and IRZ.

Comments

The African Swine Fever has suggested that intensive studies on meat processing or storage be carried out so as to avoid the burden of farmers having to feed animals in the case of this or other epidemics that have arisen. It should also be noted that there has been no HPI advisor in this area since 1982.

4.3.6 Dairy Farming (Wakwa)

On-Station Dairy Training

- 2 farmers were trained in AI in Wakwa.

BAMBUI

- 32 farmers (including one woman) were trained in dairy farming and dairy management principles in Bambui. Duration of training was 3 months.

Station Personnel

- 18 students, 2 IRZ staff and 2 PCV's received training on multispecies which include sheep and goats.

Extension workers: None was reported trained in dairy.

PCV's

None was reported trained in dairy.

4.3.7 Off-Station Dairy Training

1. With respect to off-Station training, none was conducted on dairy. The only off-Station training was in the form of follow-up of the farmers, who were trained in the Stations by extension workers of IRZ/MINEPIA in general, and HPI in particular through monthly and bi-monthly meetings of the Dairy Farmers Cooperative.
2. Fifty one researchers and technicians were taught a general course in animal production and health by a team of teachers from ENSA (Higher School of Agronomy Studies, Yaounde), HPI/GERDAT/IRZ personnel.
3. About 66 students from Ndu Baptist Training College and 24 farmers from (RTC) were trained by HPI personnel.

4.3.8 External Training

1. (See Attachment C, p. 10 to this report).
2. Long Term Training: HPI Sponsored:
(See Attachment C, C 10 - C 11 to this report).

4.3.9 Impact of Training Activities

The training program has had tremendous impact to the general population and to its target audience as well. Farmers have become more knowledgeable about their farming operations.

4.3.10 Impact on Dairy Farmers of External Trainees

In dairy farming, no immediate results are visible until the trainees (particularly those on long-term training) return and assume responsibilities. Those who went for short courses, on the other hand, are presently making significant contributions in various aspects of project implementation efforts.

2. Poultry Farmers

Poultry farmers now have:

- a) annual documents for information on the buying schedule of feedstuffs which is necessary to keep livestock feed costs low
- b) documentation of alternative feed sources
- c) access to formulae for several possible diets for farmers and feedmill operators.

In addition, training manuals have been developed for dairy, goat, poultry, rabbit and swine production. Thus all aspects of the training component of this project have met with tremendous success.

The impact to farmers of poultry training has been beneficial to farmers and the general population.

Farmers now have:

- annual reports on poultry activities
- information on the purchasing schedule of feedstuffs which is necessary to keep livestock feed costs low
- documentation of alternative feed sources
- access to formulae for several possible diets for feedmill operators
- information on suitability of locally available housing material.

Extension Training: This is done jointly by IRZ/HPI staff. Small Livestock extension is largely done by HPI's small animal advisor and the HPI's Agricultural Economist.

In order to sustain the successes such visits have achieved a government agency with orientation in extension should be linked with on-going extension activities to provide leadership among limited-resource farmers.

Graduate Level Training:

Under the sponsorship of HPI, six Cameroonians are today benefiting from graduate level training in animal husbandry and related fields.

4.4 Rabbits and Poultry (HPI)

a. General Observation of On Station Research

The commitment of the government of Cameroon to rabbit and poultry research was significant in terms of budgetary increase. During the two year 1981,82 to 83-84 period the budget for this research increased almost 80%. Of 26 research protocols in poultry and rabbits budgeted in the 1983-84 year, only half or 13 were reported on in the annual station report. (MINEPIA/IRZ report says there were 23 protocols but implies above statement on reports is inaccurate. That paper however does not state that all protocols were reported thus condemning above without refuting it).

Attention given to nutrition and physio-genetics seems appropriate; however it is suggested that specific studies on various management techniques could be a valuable area for future research. For example protocol 04/05/02/05/01 carries the notation that... "Following six months of data collection it became clearly apparent that all strains under investigation were expressing poor overall performance. Since this study involved local as well as exotic rabbits, improper or careless feeding, watering or general care can be suspected as a cause of the poor performance. This observation is strengthened by farmer attitudes which have been critical of the performance of station rabbits in local farm operations.

Research which has been reported on has not been placed into a form for distribution to farmers. Coordination with IRZ and MINEPIA extension appears to need strengthening.

Distribution of rabbits seems very inadequate. During the field studies, one rabbit producer (Mionta RTC) pleaded for at least two exotic bucks for crossing with rabbits at the RTC, but was told research had not clearly indicated the adaptability of the exotic rabbits. The last distribution meeting in April, did not approve any exotic bucks for distribution, even though the inventory of exotic bucks at the time of evaluation showed 124 at the Mankon station. Off-station research should be undertaken to determine whether the perception of poor adaptability is truly a genetic, environmental problem or simply one of poor management of the station rabbits indicated in the above referenced protocol.

b. Off Station Adaptive Research and Farmer Adoption

Field observations did not indicate a significant or well organized poultry industry although one producer who first started under the project was observed to have developed a significant operation, producing both layers and fryers for the Bamenda market. He is now relatively self sufficient, using texts and other materials provided to him by project personnel. While chickens may be observed on almost every farm, they are usually in small numbers, running loose and treated in a lackadaisical manner.

Rabbits, on the other hand, seem to be increasing rapidly in popularity. We found excellent spread effect as well as strong indications of effective training. Many rabbit producers were first introduced to the business by off-station training programs and followed up with personalized on farm visits and support. A key phase of this effort has been the identification and training of lead rabbit farmers who have then trained their neighbors in the essentials for rabbit production, have helped them acquire animals and taught the methods of hutch construction and general management. This program indicates that it can sustain and even grow if project activity ceases. A descriptive comment from one farmer is offered to illustrate this point. When informed that the HPI rabbit specialist, Steven Lukefahr would soon be leaving Cameroon and asked if he would then be able to continue, he responded with the words, "...What Steven has brought to us, he cannot now withdraw."

If the rabbit program is to be criticized in terms of basic project intent, it would be on the basis that exotic breeds have not been made available in significant numbers in recent years and when used, have been found to be in such poor physical condition that they fail to perform adequately.

An important aspect of the rabbit program is the fact that offers a meat animal potential to very low income farmers who have almost no cash reserves to invest and who can enter rabbit production with extremely low initial cost and maintain operations with little or no feed concentrate and with relatively little medicinal expense as compared to poultry or other livestock species. Lead farmers trained in the IRZ/HPI program have demonstrated a willingness to assist their neighbors in entering rabbit production by teaching them about rabbit management and by providing an initial start with the animals used as foundation stock for the effort. While it must be admitted that overenthusiastic response might, over time, present a market glut, there seems to be a strong market demand that is far below saturation at this point in time. Since rabbit meat offers a tasty and protein-rich food, the individual small farmer can benefit from limited rabbit production if only to help feed his family --- one of the underlying goals of the project.

(1) Training

On-station training has been offered in combination species training and for poultry production. No on-station rabbit training was documented or at least brought to the attention of the writer.

Off-station rabbit training, however has been extensive. Totals indicate that 156 farmers, 68 women, 152 extension workers, and 29 volunteers received off-station rabbit training. This indicates a total of 405 individuals given training of this type.

(2) Distribution

From 1983 to 1985, 178 rabbits were distributed to farmers (125), missions (32) and expatriate field workers (21). The breeding stock was obtained from private sources. (See attachment "H" for details)

CHAPTER 5
RELATED ISSUES

5.1 COLLABORATION

5.1.1 The Evaluation Team's View Point

Generally, most development assisted projects involving the host country officials, outside consultants, technical advisors and donor agencies must have a basic framework of understanding in order to facilitate the efficient utilization of inputs (both human and financial), for achievement of project goals and objectives.

Concerning HPI/IRZ collaboration for implementation of the Small Farmer Livestock and Poultry Development Project, this means that advanced efforts should have been made to have a clear perspective of organizational as well as development goals at the negotiation, planning and programming stages. Issues related to accountability and roles within the framework of project implementation should have been clearly spelled out in advance. This would have obviously enhanced team work.

In view of the above, the evaluation team concluded that:

- Collaboration between HPI/IRZ was weak and as a result the successful implementation of project goals suffered considerably. HPI technicians felt they were not accountable to IRZ chief of station since this was not reflected in their job descriptions nor was this defined in a formal protocol understanding agreement between IRZ, HPI and MINEPIA as called for as a condition precedent in the original AID grant agreement.
- Relatedly, both IRZ/HPI had different objectives in the approach to project implementation. IRZ wants to develop its livestock research capabilities and would like to keep the animals. On the other hand, HPI wants the animals given out to the farmers in order to meet its project targets. Consequently, this affected the achievement of planned livestock distribution targets.

In conclusion, the evaluation team suggests that future project agreements should accord special attention to organisational as well as to the developmental goals at the negotiation, planning and programming stages precedent to project implementation. View points concerning the collaboration issue involving IRZ/HPI/MINEPIA are as shown in attachments to this report.

5.1.2 IRZ View Point (from the desk of the Chief of Station, IRZ Mankon)

As Chief of Station, Mankon, I feel proud and grateful to HPI/USAID for several things in terms of collaboration. Let me just mention one: the office building from which this report is written. The Laboratory (although its equipment and floor tiles were supplied by the government of Cameroon), is one of its kind in the country and, being personally in charge of it, I feel grateful. On behalf of my staff here, who have the unique opportunity to work directly in it, I extend our heartfelt gratitude for the collaboration of the two parties who saw to it that the building was put up. I am made to understand that the budget was over-used. I am sorry, and apologize, if the Cameroon counterpart had failed to see that the necessary payments were made according to the terms drawn up by the Office of Contracts as are the regulations for all other government houses built on this Station.

Collaboration for the supply of animals was good. The animals are here and, though late incoming, we still are grateful to the Chief of Party for all his efforts. He came to my office from his door down the hall from time to time to ask if I needed help in any way - a gesture very good and quite encouraging. His wife assisted us to set up the Library, for which as researchers, we are very very grateful.

If IRZ is accused of not publishing results, it is probably because our discussions of results are slow in writing as there is lack of material, although the Directorate of IRZ is rapidly acquiring journals. However, the Mankon Station, through HPI/USAID did get the lion's share of items.

My staff and I apologize for the Chief of Party's wife's illness: we tried in our own small way to see that she was evacuated home for proper care. We pray and wish her a speedy recovery. The present Chief of Party has helped us as was the case with his predecessor, although he was caught in the end of the project. His wife too has assisted us with the Library even though she has not herself been quite well. We at this Station thank USAID/HPI a million times over.

If you will permit me, I will, on the other hand, point out a few problems from this desk, not from a critical point of view but just so we all can, hopefully, learn something. There has been accusations and counteraccusations of indiscipline on the Station. How does a Chief of Station maintain discipline when typists, radio operators and livestock attendants are subsidized to work on the Station? It can be quite rough when work given for typing by the Chief of Station is set aside in order to type a job for ready cash! On the other hand, it is not a good idea to reveal personalities in a project like this. However, people not competent ordered material, trained farmers, distributed animals and saw to milk marketing. Thus when imported tags are placed on one group of goats and sheep and wooden pieces on the other group of animals, a message is driven home to the workers on the Station. It is a pity that some of these workers were not interviewed for, they are the ones who saw the day-to-day operation

of this project, in contrast to the Director of the Institute of Animal Research who is in Yaounde, the Chief of Party, HPI, who lives down town, etc etc. Even to obtain milk from the goats, to get workers acquainted to milk, as was the case with rabbits, became almost a fight. To maintain peace, "American goats", as they were called, were viewed from a distance from this office, the Station and, next, the farmers. How can I describe or talk of milk from goats when I myself would not vouch for it? One therefore asks questions as to whether these gifts were given willingly or were given with the "back of the Hand". Did we try to increase milk, meat and eggs with a frown? Some did; others did not. There is property being given to me now: Why? Has all been given? What do I do with a box of swine 1981 calendars? Why were these not given out back then? Why were no records left behind by the sheep and goats adviser? Is this training on Station?

If I read the text of this Agreement, well, it was supposed to operate within rules and regulations of Cameroon. How do I account for missions here and there without Mission Warrants, refusal to write reports, refusal to attend to government officials (Technical Adviser from MESRES shortly after appointment of the Minister of State in charge of Higher Education and Scientific Research) or refusal to teach in a course organized by the Director of, IRZ? Is it acceptable to just tell me you are going to Douala and leave? No, for the Chief of Station can always approve or object to the mission, for one reason or other. But, a job description was held up where it is stated that one is accountable to that Chief of that person across the seas. Are loop holes in the Agreement supposed to be exploited as one personally thinks best? How does a Chief of Station explain to the other younger staff on the Station when he/she is all too often baraged with "Why, Why, Why?" questions; how do I convince other young researchers who have to be told to wait on odd days like Sundays for some US official who wants to see the Station at 4 pm? In such instances, should these researchers hold up and brandish their contracts of employment? Thus, somewhere, somehow, the American hand-shake was unfastened, or did we lose the faith and goodwill behind this whole project?

How does a Chief of Station explain the use of a 15-million FCFA living house being converted into a place for rearing guinea pigs, and grass cutters? In staff meetings (which are, quite often than not, not attended) texts and regulations (our form of government) are explained on behaviour, etc etc. How is collaboration supposed to be seen in this respect, as well as in the training we give Cameroonians wherein, for example, they are asked, in principle, to use raphia, etc, but the reverse is practised. Does the saying not go that "action speaks louder than words"? Since staff meetings are not regularly attended, behaviour contrary to given texts and regulations sometimes is displayed and friction arises; this is termed personality clashes or living according to job descriptions.

I would like to note too that probably the problems were not so much personalities, but a lack of orientation to working under Cameroon conditions, and that Cameroonians may be undernourished, but see a lot and are intelligent enough to read between the lines. Their good sense of hospitality should not have been taken for stupidity, e.g. at one time IRZ is accused of no counterparts in sheep and goats; next it is fault in the management, and then, that counterparts were transferred. How can this be explained?

5.1.3 HPI VIEW POINT (as expressed by the HPI/Bamenda Chief of Party)

A basic requirement of the OPG effort is close collaboration between the parties involved, especially IRZ and HPI. Evolution of any program of the nature of the project under review can be expected to generate the need for modifications, new directions, or simply shifts in operational procedures brought about as project experience provides new needs or new insights.

A disappointing aspect of the project is the admitted friction which was apparent in execution of some project activity. Much of the problem can be placed with a conflict in roles between IRZ as a research unit and HPI as an on-farm, technology application organization. It serves no productive purpose to blame these problems on personality clashes. While personalities are always a factor in any collaborative effort and may be exacerbated in multi-cultural situations, differences in goals and methods of achieving them can usually be found as even greater problems than differences in individuals.

In my judgment, HPI has made serious blunder by developing the excellent concept of multiplier herds and distribution of AI progeny but doing so without full preliminary knowledge of IRZ. While IRZ was aware of the AI work at the multiplier herds, it appears that many details of the activity had not been developed by HPI in concert with IRZ. Thus we find an excellent concept developed with poor procedural methodology.

The anxiety of HPI to see improved animals actually placed on the farm conflicted with IRZ reluctance to release animals until research had been thoroughly conducted...which in the case of rabbits seems still to be under way.

In the IRZ review of the sheep and goat program, poor management was attributed to HPI because the advisor ... "was in charge of the program". From HPI's standpoint, management was frustrated by reluctance of the Chief of Station to permit authority to be exercised by the HPI advisor.

Efforts by the dairy advisor to demonstrate value of silage for the Bambui dairy program were frustrated by action of the Mankon Chief of Station withdrawing machinery in the middle of the operation, thus introducing delays which had deleterious effects on the final silage product. That these actions were taken unilaterally by IRZ at one station and negatively affected operations at another undoubtedly increased friction and destroyed the needed collaborative spirit.

Efforts of the small livestock specialist to introduce improved management at the rabbitry were unsuccessful because of lack of administrative support; yet the specialist was held responsible for the results.

The HPI rabbit program has been the area most severely criticized by IRZ. This effort has probably had more direct impact on area farmers than any other, but it was done unilaterally by HPI because of lack of IRZ interest in the on-farm components. The antagonisms which have resulted

demonstrate most clearly the need for collaboration if parties to a program are to both be satisfied with results.

The above are but a few examples of poor collaboration. These problems were increased by the departure of the Chief of Party and an interim period when administrative coordination was at a minimum. Arrival of the current Chief of Party at a time when the project was in its final few months provided no real opportunity for firm corrective action which would have been appropriate had the project had a longer period to run.

In the aggregate, this project must provide a lesson in more careful advance consideration of organizational goals (or conflict in goals), more attention to human relationships as well as administrative inter-actions, and more consistent monitoring of problems by headquarters personnel, both in country and in the U.S.

Rabbits and Poultry (HPI) General Observation of On-Station Research

General Observation of On-Station research

The commitment of the government of Cameroon to rabbit and poultry research was significant in terms of budgetary increase. During the two years 1981-82 to 83-84 period the budget for this research increased almost 80%. Of 26 research protocols in poultry and rabbits budgeted in the 1983-84 year, only half or 13 were reported on in the annual station report. (MINEPIA/IRZ report says there were 23 protocols but implies above statement on reports is inaccurate. That paper however does not state that all protocols were reported thus condemning above without refuting it).

Attention given to nutrition and physio-genetics seems appropriate; however it is suggested that specific studies on various management techniques could be a valuable area for future research. For example protocol 04/05/02/05/01 carries the notation that... "Following six months of data collection it became clearly apparent that all strains under investigation were expressing poor overall performance. Since this study involved local as well as exotic rabbits, improper or careless feeding, watering or general care can be suspected as a cause of the poor performance. This observation is strengthened by farmer attitudes which have been critical of the performance of station rabbits in local farm operations.

Research which has been reported or has not been placed into a form for distribution to farmers. Coordination with IRZ and MINEPIA extension appears to need strengthening.

Distribution of rabbits seems very inadequate. During the field studies, one rabbit producer (Mfonta RTC) pleaded for at least two exotic bucks for crossing with rabbits at the RTC, but was told research had not clearly indicated the adaptability of the exotic rabbits. The last distribution meeting in April, did not approve any exotic bucks for distribution, even though the inventory of exotic bucks at the time of evaluation showed 124 at the Mankon Station. Off-Station research should be undertaken to determine whether the perception of poor adaptability is truly a genetic, environmental problem or simply one of poor management of the station rabbits indicated in the above referenced protocol.

5.2 RABBIT AND POULTRY PROGRAMME

Comments by MINEPIA/IRZ

This HPI report does not state anything on the On-Station research component but goes on to make observations only on the Off-Station activities of the programme.

There were 21 operations (23 protocols) divided such that there were 15 protocols for poultry and 8 for rabbits, contrary to paragraph 1 of the general observations of On-Station research (see attached report for details).

The researcher in charge of the experiment, who is an HPI personnel, failed to take care of the management component of his experiment. It would appear the management component was not included in the design of the experiment. If it is a fact that rabbits from the Station do not perform well on farms, it suggests that the rabbits are not adapted. For, as implied, management on the farm is better and rabbits ought to perform better but it is not the case. MINEPIA/IRZ and report left behind by USAID cannot confirm the statement that during farmer visits farmer said that Station rabbits were not performing better on his or her farm.

Work done by IRZ (see 1982-83 Annual Report) suggests that the exotic rabbits were not better than the local rabbits in adaptability. The work cited above which was alleged to have stopped because of poor management confirmed the previous preceding conclusion. Thus IRZ feels that it is fair to reduce the risk to which the rabbit farmer is exposed by distributing only local breeds of rabbits.

OFF STATION ADAPTIVE RESEARCH

Farmers visits show that birds were usually in enclosures but it was also observed that there were some chickens running around which might or might not have belonged to poultry farmers in the project. It should be noted that since 1982 day-old chicks were given to "untrained" farmers who were not seen by the team. The case referred to here is a particularly subsidized one by HPI.*

For rabbits, the Off-Station work was good except that non-technical staff should give technical information, e.g. a farmer team leader told team that concentrates, if fed rabbits, killed them, which is not true. The Off-Station training in nutrition does not associate the problems of the dry season. The advice to plant Gwatamala Grass (Tripsacum Laxum) for this purpose should also take note of plant disease problems as was shown on Station for Stylosanthes.

See comments above on non-adaptability of rabbits. The rabbit statistics on training and distribution cannot be denied or confirmed as the counterpart was not used.

*HPI claims it has never subsidized a rabbit farmer/project and sought to use the most qualified rabbit person IRZ had to offer, whom is a livestock attendant with vast practical experience.

Comments by MINEPIA/IRZ

Adaptive Research

ON-STATION

During the 2 1/2 years the personnel has changed as follows: Dr. A. Awah has been added to the team of Cameroonian staff. Other researchers who are programming work in this section are Messrs J. Njoya and Meffeja on "Studies on the Response of Lactating Nannies to Open Floor and Individual Stall Milking (04/03/04/01/01). An IRZ personnel, a Ph.D candidate in sheep and goats is working in that unit now carrying out on-and-off station experiments.

As for facilities for other livestock species and the laboratory (built by monies from this project) consideration is given to permanent structures and adaptations thereof for all classes of Cameroon farmers. The small ruminant houses are simply a modernisation of what exists in the traditional sector with permanent characteristics.

The environment provided livestock on a research station may or may not simulate traditional environment. The difference depends on the question under investigation. Cameroon conditions also include climatic and human factors which exist on this Station. Mr Howell's (HPI personnel 1981-83) report is a series of uncoordinated ideas and do not represent any coherent proposals as suggested by the title referred to in this report. It should be pointed out that he (Mr. Howell) was the head of this unit and programme from the arrival of the animals (sheep and goats) in 1981 and did not practise nor show enlightened leadership in this area (ref. 'Areas of Management Failures' of the same report).

NOTE: HPI protests condemnation of Mr. Howell who was denied administrative support required to exhibit the above referenced "enlightened leadership".

OFF-STATION

IRZ's research operations are farmer related problems which can be investigated on-Station or off-Station depending on the risk factors. Thus IRZ does some on-farm trials, e.g. "Effect of Artificial Insemination in Breeders Herds" (04/01/02/01/03) and "Background Studies on Traditionally Managed Sheep and Goats" Just to name a few. (04/03/03/02/02).

Research Initiatives

Of the six protocols that have not been reported upon, four are new for 1984/85, thus their not being reported upon in any annual report. The two not done are protocols proposed by HPI staff who apparently did nothing to execute them. One of the new protocols for 1984/85 has been completed and data is being analysed: The Value of Rice and Maize By-Products in Sheep and Goat Feeding (04/03/01/01/01/).

For research personnel available, see above in contrast to what is stated. Thus there are about three protocols per person. The quality and quantity of research results is improving, indicating improvement in administrative support and that animal resources are increasing.

Results

Collection and identification of local sheep and goats, growth, reproductive and milk characteristics of dairy goats as well as the feeding of cottonseed in the dry season to goats are among the results obtained in this unit.

Constraints

Not true. See above for IRZ Research Mandate. Research is being carried by present IRZ personnel unlike HPI personnel who spent three years but was unable to manage the section (see his own report) nor carry out any quality research despite claims of specialisation in sheep and goats research, nor was he able to use counterparts assigned to him, e.g. Asanji Thomas (Licence), Pauline Motseho (Licence), Jean Nbog (Licence) and Irene Jokwi (B.Sc) - See Belgian Sheep Project's efficient use of counterparts like Luc Obonou (Licence), Killanga (Licence) in the same programme - Small Ruminant unit). Mr Joseph Howells paper is recurrently referred to in this paper and reflects his inability to manage.

Comments

Of the four sections supported by this Grant on this Station, Sheep, Goats, Rabbits and Poultry and Pigs, the sheep and goat section has been managed from its inception till 1983 and appears the Station least capable of meeting the research goals of this project despite claims of expertise as specialist/advisor. This technical advisory role has been very weak as shown by the poorly kept records left behind and the incoherent report used as a document in this report.

Training/Constraints

IRZ/MINEPIA have no comments to make except to say that there have been several off-Station training courses, (see Poultry, Pigs) since the onset of African Swine Fever and there is no reason why training on sheep and goats should be the exception.

Impact

Farmers have shown an interest in these goats but the poor performance of these animals from the beginning have discouraged farmers who must wait long for them. However, goats were given to missions (Ndu Baptist Missions who later returned them to HPI who rerouted them to another religious body - St Bedes College, Kom).

Constraints

There has been no HPI personnel in this section since 1983, thus no one to do follow-up. Apparently the present small animal advisor does not see this as his job.

Overall Comments

The 1984/85 application list shows that farmers are interested and IRZ intends to keep the fire burning.

UNITED STATES GOVERNMENT
 memorandum

DATE: January 10, 1985
 REPLY TO
 ATTN OF: Marcel Ngué, ARD *MAR*
 SUBJECT: Small Farmer Livestock and Poultry Development (631-0015)-
 End of Project Evaluation Meeting 1/9/85
 TO: ARD Files

As a follow-up to the first evaluation meeting which took place on January 7, 1985 at the IRZ headquarters, a second meeting was held two days after at the USAID main conference room. The purpose of this second meeting was to have the input of all parties in the preparation of the scope of work and the development of the strategy and the methodology for the end-of-project evaluation.

Participation in the meeting included representatives of IRZ, MINEPIA, HPI and USAID as indicated in the attached list (see attachment 1).

A. Summary of the meeting

After a two and a half hour dialogue on the evaluation purpose, general areas of concerns over the past years, issues and progress made towards implementing project mid-term evaluation recommendations; the composition of the evaluation team and the revision of the evaluation schedule, participants reached the consensus (1) that the evaluation of the project be considered as a collaborative effort between IRZ/MESRES, MINEPIA, HPI and USAID, and that this effort be continued; (2) that all the components of the project including research, extension and training be evaluated; (3) that an outside consultant be included in the evaluation team in order to develop a "neutral" and "unbiased" report; and (4) that project evaluation start by mid-February and a final review of the recommendations be conducted before the PACD which expires on February 28, 1985.

B. Details

I. Introductory remarks

After commenting on the purpose of the evaluation, Mr. Sam Scott gave the floor to participants to express their expectations for the up-coming evaluation.

Mr. Litwiller said that the Small Farmer Livestock and Poultry Development Project was an interesting and productive project, and that its evaluation was a stepping stone towards a better understanding of its stated goals and a better awareness of the contribution of all parties involved in the implementation of the project.

Dr. Tebong commented on GRC's strong support to the project in terms of budget allocations, livestock buildings and human resources. He also indicated that the project has made considerable progress towards achieving research goals, reaching farmers and training participants. His expectation was that the evaluation identifies areas of success and areas of failure, and that appropriate recommendations be made to correct mistakes and strengthen weak points.

Mr. Atekwana informed the participants that the project was initiated by him in 1974, and that preliminary negotiations with HPI Littlerock were handled by him. The size and the scope of the project have changed, Mr. Atekwana observed. Although there has been good progress made in reference to stated goals, Mr. Atekwana emphasized, it should be kept in mind that this project is basically extension oriented and MINEPIA would like to see it in its right context after this evaluation.

Mr. Schmidt expressed HPI gratitude for exceptional cooperation from IRZ, MINEPIA, and USAID. He also expressed the wish that a commonly agreed upon scope of work and an acceptable implementation plan be worked out for this evaluation.

II. Evaluation Strategy and Methodology

After these introductory remarks, Mr. Schmidt oriented the discussions towards HPI evaluation approach and invited participants to review a proposed agenda which includes key elements of project evaluation. Participants came up with an acceptable evaluation approach which defines the purpose of the evaluation, project priorities, areas of concerns and related issues. They also agreed upon key questions to be asked and information gathering methodology as indicated in attachment 2.

The discussion focussed on following major points: (a) the composition of the evaluation team, (b) the role of the evaluation team, (c) the timing of the evaluation.

a. The composition of the evaluation team

Dr. Tebong suggested that the evaluation team should not only include representatives of parties involved in the implementation of the project, but also an outside consultant to make sure that no vested interest will be built in the final report. Mr. Atekwana spoke along the same lines emphasizing that such a neutral evaluator should not necessarily be a foreigner. There are

possibilities, he said, to involve local expertise in addition to/or in place of outsiders by contacting institutions such as the University Center of Dschang, the Panafrican Institute for Development in Douala or SEDA in Yaounde. Such institutions, Mr. Atekwana said, have livestock specialists whose qualifications could be appropriate for subject evaluation. This idea was well taken. Mr. Atekwana was requested to send a supplementary memo to PDE on subject matter for possible action.

Mr. Scott did not have any objection to including a local consultant in the evaluation team, but he was concerned about finding someone with appropriate profile. He was also concerned about the quality of the report that should be produced by such a consultant.

Dr. Tebong suggested that the consultant should be a generalist with strong evaluation experience. Mr. Watts indicated that administrative experience was also necessary.

It was agreed, as summarized by Mr. Litwiller, that PDE should locate such a consultant, looking locally first, to work in conjunction with the evaluation team the composition of which should be as follows:

- 1 outside consultant (team leader)
- 1 HPI representative
- 1 IRZ representative
- 1 USAID representative
- 1 MINEPIA representative

b. The role of the evaluation team

Participants agreed that the main role of the evaluation team should be to review the evaluation scope of work and the composition of the evaluation team, and to finalize the evaluation agenda and methodology.

c. The timing of the evaluation

Mr. Atekwana expressed some concern about the evaluation implementation delay. He commented that arrangements related to the recruitment of an outside evaluator are time-consuming and may go beyond the PACD which is 2/28/85. He inquired what will happen to the project after its PACD has expired.

In answer to this point, Mr. Scott said that the outside evaluator will be hired as soon as possible so that data collection starts at the earliest possible date and that enough time be left to conduct a final review of evaluation recommendations before the PACD expires.

III. Follow-up meeting

In order to follow-up discussions on agenda points which were not covered during the meeting, participants agreed that another working session be held Thursday, January 10, 1985 at 1500, in the USAID main conference.

cc: A/DIR
PRM
IRZ
MINSPIA
HPI
ARD FILES

Attachments

1. List of participants
2. Evaluation agenda (part 1)

PARTICIPANTSIRZ/MESRES

1. Dr. Emmanuel Teborg, Director
2. Dr. J.D. Ngou Ngoupayou, Deputy Director
3. Mr. R. Dia Ndumbe, Head of Research Service
4. Mr. Wirya Philip Nyuysemo, Assistance Chief of Service
for administration and finance
5. Dr. D.A. Mbah, Chief of Centre, Wakwa

MINEPIA

6. Mr. Joseph Atekwana, Livestock Agriculturalist

HPI

7. Mr. Amin L. Schmidt, Program Director/Littlerock
8. Mr. Lowell Watts, Chief-of-Party/Bamenda

USAID

9. Mr. Samuel Scott, Chief of Project Design and Evaluation Office
10. Mr. William Litwiller, Chief of Agriculture and Rural Development Office.
11. Mr. Larry Dominessy, Deputy Chief of Agriculture and Rural Development Office
12. Mr. Marcel Ngué, Project Officer/ARD.

EVALUATION AGENDA (Part 1)

I. Purpose (why evaluate ?)

- Assessing strengths and weaknesses
- Determining the value and contribution
- fulfill mandate/carry out assignment

II. General areas of concerns

- Project components:
- Training
 - Extension
 - Research
 - Administration and organization
 - Absence of reporting and communication
 - Relationships - implementing agency p. and host country p.
 - Lack of clarity on basic policy issues and goals (HPI-IRZ-MINEPIA-USAID)

III. Issues

- policy clarification
- organizational goal differences
- Role of each individual (project description): to be better clarified than in the mid-term evaluation: role expectations
- communication.
- technical package exists or not?
- flexibility about the concept of small farmer (definition; flexibility and adaptability of the project to various circumstances).
- project location: Bamenda/Wakwa
- research + extension (dialectic between)
- employment policy of HPI to recruit local staff etc.

IV. -Focus

1. Progress made towards issue resolution
2. Goal achievement (EOPS)
3. Research
 - a) on-station
 - b) on-farm
4. Training
5. Livestock distribution
6. Milk production and marketing.
7. Implementation of mid-term recommendations

V. Key questions

- Composition of the evaluation team
- Role of the evaluation team
- Interim measures after PACD

VI. Information gathering

Question	Who is responsible	What sources	What methodology	Start date	Completion date
Goal achievement					
-research					
-training					
-extension					

Recommendation implementation

UNITED STATES GOVERNMENT

memorandum

DATE: January 16, 1985

REPLY TO
ATTN OF: Mr. Marcel Ngué, ARD*M.N.*SUBJECT: Small Farmer Livestock and Poultry Development
(631-0015)- End of Project Evaluation Meeting, 1/10/85

TO: The ARD Files

A. Summary of the meeting

The purpose of the meeting was to resume talks about pending evaluation issues. A step forward has been taken in the evaluation process as follows: (1) Major concerns raised by participants have been incorporated in the draft evaluation agenda; (2) Decision has been made that PDE should contact the Regional Panafrikan Institute for Development (PAID) in Buea at the earliest possible date to explore the possibility of PAID participation as the evaluation consultant with overall coordination responsibility (see my memo of 1/10/85); (3) The first draft of the terms of reference for the consultant has been prepared (see Attachment 1); (4) Evaluation responsibilities have been broadly defined (see Attachment 2); (5) Projected start date for data collection is January 24, 1985; (6) USAID Project Officer will act as evaluation coordinator during the interim period.

B. Details

The meeting took place on January 10, 1985, in the USAID main conference room. Participation in the meeting included some representatives from IRZ, MESRES, MINEPIA, HPI and USAID (see my memo of 1/10/85, Attachment 1)

I. Mission Acting Director's announcement

Before the beginning of the session, Mr. Miller joined the working group to make a brief announcement about the future of the project. He informed participants that the U.S. Government is concerned about its serious budget deficit and it has taken concrete measures to alleviate the situation. These measures include budget cuts for domestic programs, defence programs, and foreign assistance programs. Accordingly, Mr. Miller said, USAID/Cameroon has been instructed to cut \$500,000 from its FY84-85 budget and \$3 million from FY85-86. Mr. Miller explained that as part of the FY84-85 money was reserved for the continuation of the HPI project, the project will terminate at its currently scheduled completion date of 2/28/85, with the exception of training activities.



To alleviate Dr. Tebong's concern about such an unexpected decision, Mr. Miller assured him that USAID was not totally abandoning the project as HPI's assistance to continue livestock activities will be requested after the U.S. budgetary problem is resolved (probably during FY85-86).

Questions about the activities that should be conducted during the interim phase were raised by Dr. Tebong. In answer to these questions Mr. Watts indicated that HPI's option was to maintain presence in Cameroon. He then reviewed main activities that HPI would like to follow up during the interim phase. These include: (1) discussions with IRZ about the continuity of the project. These discussions should lead to the establishment of basic protocols and the development of a new project proposal by the end of February 1985. (2) the maintenance of one HPI field technician whose position can be totally supported by HPI and whose activities are more easily justifiable during the transitional period.

Mr. Atekwana's later contribution to this point was to invite all parties involved in the implementation of this project to coordinate their efforts to keep interim activities moving:

Before leaving the room, Mr. Miller drew the attention of the working group on the fact that as USAID is interested in following-up the project later, it is crucial that a reliable and accurate end-of-project evaluation be conducted.

II. Follow-up discussions on project evaluation

Discussions which followed Mr. Miller's announcement focussed on the evaluation agenda points which were not fully covered during the last meeting. These include: (a) the composition of the evaluation team; (b) Data collection; (c) the terms of reference for the evaluation coordinator.

(a) The composition of the evaluation team

Mr. Schmidt's suggested evaluation team composition was discussed and adopted with minor changes (see attachment 2). Participants emphasized that MINPAT be invited to participate in the evaluation effort especially in terms of reviewing final evaluation recommendations, and in the replanning process.

(b) Data collection1. Evaluation responsibilities

Evaluation responsibilities of the core group and the policy group were discussed at length. Mr. Schmidt's suggestion that the division of labor for data collection be based on specific areas of work (e.g. HPI - dairy activities; IRZ - research activities; MINEPIA-background on recent involvement) was strongly rejected by IRZ delegation. Both Dr. Tebong and Mr. Ndumbe emphasized that all activities concerning data collection and analysis be conducted, to the extent possible, by a mixed IRZ-HPI-MINEPIA-USAID team to make sure that no aspect is overlooked.

It was agreed that bringing in any additional resource persons or delegating authority was left at the discretion of the core group.

2. Logistics

Talking about the logistic support that should be provided to conduct field work, Mr. Atekwana commented that two possible sources of funding could be used: MINEPIA and MESRES. However, he indicated that as the scope of the project has changed in favor of research activities, MINEPIA was no longer a full member of the implementing body and has made no provision for subject evaluation. Mr. Atekwana's suggestion was that MESRES use project evaluation funds to cover both the transportation and the travel allowance for MINEPIA staff.

Dr. Tebong rejected this idea as MESRES could not commit funds for staff not working for MESRES. He made the point that, as MINEPIA representative has been officially invited as a member of the evaluation team, its Ministry should find travel funds for him. Each ministry, Dr. Tebong said, has travel funds for its staff. These funds are not necessarily project related.

Mr. Scott informed the participants that USAID could provide transportation during field work. However, the concern of MINEPIA's representative about his travel allowance was not resolved. It is the responsibility of MINEPIA and MESRES to resolve the issue.

3. Evaluation coordination

Mr. Atekwana indicated that the limiting factor for this evaluation was the hiring of an outside consultant. This position should be filled up so that data collection start as early as possible. The delay in hiring the consultant will make field work more difficult, Mr. Atekwana said, because of the up-coming CNU Party Congress in Bamenda. People and protocol activities will be so tight that field data collection may not be easily conducted at that time.

Dr. Tebong suggested that if no outside consultant is found by the end of January, PDE's responsibility will be to put up an evaluation team and have the work done under its supervision. Mr. Scott commented about PDE's limited availability of staff to conduct and coordinate individual project evaluations on a full-time basis. For this reason, he said, USAID Missions all over the world usually hire technical specialists or evaluation consultants to conduct evaluation activities. He assured Dr. Tebong that PDE will speed up the process for getting a consultant on board and guide the consultant through the standard AID evaluation rules and procedures.

Names of possible candidates currently associated with PAID were suggested by Dr. Tebong. These include: Dr. Nikoume and Mr. Jacob Ngwa. It was understood that Mr. Schmidt will check the field of experience and the availability of these candidates, during his TDY visit to meet with key PAID/Buea staff on 1/15/85, and he will immediately inform PDE about the results of his investigation. Preference was given to a rural sociologist or an agricultural economist as key disciplines for the PAID evaluation consultancy.

To keep things moving while the investigation is going on, Mr. Schmidt advised that USAID Project Officer should be the interim coordinator for the evaluation. Mr. Litwiller accepted the idea, adding that this coordination will be done with PDE assistance.

4. The timing of the evaluation

Discussions on the timing of the evaluation resulted to the conclusion that data collection should start on January 24, 1985. It was assumed that the evaluation consultant will be hired at that time. The duration covers twenty man days. Projected target completion date for final review and planning sessions is February 28, 1985.

(c) The terms of reference for the evaluation coordinator

The first draft of the terms of reference for the evaluation coordinator as prepared by Mr. Schmidt were reviewed by the working group (see Attachment 1). There were few comments about these terms of reference as it was understood that they could be expanded as we were now dealing with an Institution (PAID) with a broad resource base, and not with an individual as initially planned.

- Attachments:
1. The terms of reference of the evaluation coordinator
 2. Suggested evaluation team composition.

cc: A/DIR
PRM
MINEPIA
IRZ
EPI

TERMS OF REFERENCE

Short Term Consultancy to Coordinate End of Project Evaluation in Cameroon.

Purpose: The purpose of the consultancy is to provide coordination for an end of Project Evaluation of a 5 year livestock research and distribution program; to formulate conclusions regarding overall Project Design, Organization and Effectiveness in achieving its purposes and goal, and to assist in formulation of recommendations for continued effective operation without major outside funding.

Qualifications: Consultant must have broad experience in and understanding of Agricultural development in the Cameroon. Such understanding includes knowledge of Roles and relationships of government, private and outside agencies in Agricultural development. Professional expertise in areas of agricultural economics or rural sociology is preferred. Competence in, or familiarity with, livestock and poultry management as production at both commercial and subsistence levels is necessary. Ability to conduct cost/benefit and/or cost/effectiveness analysis of livestock projects is needed, as are skills in group process.

Scope:

1. To lead and coordinate an Evaluation Team composed of representatives of IRZ, USAID, HPI and the MINEPIA.
2. Coordinate the analysis of data and preparation of a final report assessing the following areas: project design, finances, organisation, administration, research, milk production and marketing, assistance to small scale farmers training, and implementation & recommendations detailed in the scope of work.
3. Conduct Evaluation Review and Planning session(s) involving all parties to discuss conclusions & recommendations and to plan for project continuance.
4. Duration: Twenty man days
5. Timing: Final Review and Planning sessions to be completed by 28 February, 1985.

Further Details: Contact Mr. Samuel Scott, USAID Yaounde.

MEMORANDUM OF CONVERSATION

Date: January 15, 1985

Participants: Mr. Armin Schmidt, HPI/Little Rock
Samuel Scott, PDE - USAID/CAMEROON

At 10:00 p.m. Mr. Armin Schmidt was contacted at his hotel in Douala. Earlier in the day Mr. Schmidt visited the PAID offices in Buea to discuss the possibility of PAID providing an evaluation consultancy for the end of project impact evaluation for Project No. 631-0015 - Small Farmer Livestock and Poultry Development.

After a brief introductory meeting with the PAID/Buea Acting Director, Dr. Luther Banga, Mr. Schmidt was asked to meet Dr. Poday MacBailley, an Agricultural Economist and PAID nominee to serve as their primary evaluation consultant for the HPI/IRZ/MINEPIA/USAID evaluation effort.

Dr. MacBailley is a native of Sierra Leone and holds three agricultural degrees from U.S. universities (Univ. of Oklahoma, Univ. of Michigan and the Univ. of Maryland-PhD-Ag Extension). Mr. Schmidt was extremely impressed with Dr. MacBailley's practical and teaching experience. He made particular reference to Dr. MacBailley's strong orientation towards small farmer agricultural extension problems. To paraphrase Mr. Schmidt, Dr. MacBailley had all the right answers to extremely difficult (small farmer livestock) questions posed during the interview session in Buea. A copy of Dr. MacBailley's C.V. is being forwarded to Yaounde for review and appraisal by the IRZ/USAID/MINEPIA/HPI evaluation team "core group".

Based upon Mr. Schmidt's interview we do appear to have a "winner" in PAID, and especially Dr. MacBailley. Also, the big advantage of dealing with an institution like PAID is that they can readily call upon other staff disciplines (e.g. management, financial administration, rural/agro-sociology etc.). At this point, all signals appear to be "go", and it's just a matter of contacting the PAID Registrar to work out the compensation/financial details. Dr. MacBailley is completely available to contribute to the evaluation effort on a full-time basis until mid-March because the PAID students are currently off campus doing their field investigative studies.

Immediately after we come to terms with PAID for payment, Dr. MacBailley will be requested to visit Yaounde and receive detailed instructions from the evaluation team's core group.

CC: ARD
PRM
SMD
CONT
A/DDIR
A/DIR
IRZ
MINEPIA
HPI

Drafter: ST Scott: PDE: January 15, 1985



January 16, 1985

Dr. Poday MacBailley
PAID/Buea

Dear Dr. MacBailley

I have enclosed for your personal information a copy of the memorandum of conversation I prepared after receiving a telephone report on the meeting you held with Mr. Armin Schmidt of Heifer Project International in Buea on January 15, 1985. Please forgive any inaccuracies in the substance of the memorandum. The main point is that we are delighted to have your services as an evaluation consultant for the end of project evaluation of our USAID Small Farmer Livestock and Poultry Development project.

This morning I spoke to your Registrar, Mr. Ernest Mangesho, and we hopefully have all the contractual and administrative details worked out in a day or two. As mentioned in my memorandum, it will be extremely important for you to meet with the core members of the evaluation team here in Yaounde as soon as possible.

Again, let me express our satisfaction with having PAID resources available to assist us in this evaluation effort.

I have also enclosed a photo copy of chapter 12 (Project Evaluation) from our AID Project Assistance Handbook. Please review this material along with the project specific documentation passed to you by Mr. Schmidt, and feel free to contact me directly if you have any questions or need clarification.

Sincerely yours,


Samuel Scott
Chief, Project Development
and Evaluation Division

Enclosures: as stated

CC: ARD:WLitwiller
ARD:MNgue
HPI/Bamenda: LWatts

Drafter:PDE:STScott:jm:1/16/85

Evaluation Team Meeting
(Project 631-0015)
Dr. Tebong's Office,
IRZ - Nkolbisson
1st February 1985 - 9 A.M.

A G E N D A
=====

1. Introduction - Mr. Jean Claude Tchadjet
Evaluation Team designee from the
Ministry of Plan and Regional Development
(Division of Projects and Programs)

2. Introduction - Dr. Foday MacBailley
Evaluation Consultant/Team Leader
R-PAID/Buea

3. Review Contractual Agreement Terms and
Conditions - Evaluation consultant
(Mr. Lowell Watts, HPI)

4. Open Discussion

5. Evaluation Resource Planning and Methodology
(Dr. MacBailley)

GUIDELINES FOR DATA COLLECTION

ADAPTIVE RESEARCH

1. What type of research has been done in the following areas:

a) Nutrition Research Done

Type of feeds

..... etc

Rations

..... etc

b) Conclusions:

2. Management

i) Was there adequate housing for animals? YES.... NO.....

ii) How often are the animals fed? State number of times:....

iii) How often are the animal houses cleaned? State frequency:.....

iv) Is the housing equipment adequate for you? YES..... NO.....

3. Mortality

i) How many mortalities have you had since you acquired the animals?

Number of Mortalities

- 1) At Birth -
- 2) At Weaning -
- 3) For Adults -

4. Breeding

i) Which breeds are more adaptable in this environment with respect to:

Type of Breed

- i) Resistance to disease
- ii) Weather

ii) What are your reasons for your answer above?

iii) What is the breeding design of the herd in this area: Describe breeding

design.....
.....

iv) What breeding methods are used? Describe breeding methods.....

5. Cross-Breeding (CB)

What is the performance of the CB compared to the Pure Breed (PB)?

CB

PB

- i) Growth
- ii) Production (offspring, milk, eggs, meat)
- iii) Disease resistance
- iv) Mortality

6. Cost of Production and Returns

- i) How much did you pay for your: Cost
- Animals
 - Housing
 - Equipment
 - Feeding
 - Family labour
 - Hired labour
 - Health
 - Breeding stock

7. Returns and Profitability

- i) Indicate selling price(s) for your animals.

ii) What percentage of your animals is used for family consumption?

State Percentage:.....

iii) Do you want to continue with your present activities?...YES...NO...

iv) If 'Yes', ask: Why? State reasons:.....

.....

v) If 'No', ask: Why? State reasons:.....

.....

8. Are you a full-time or part-time farmer? a) Full-time?...YES....NO

b) Part-time?...YES....NO

9. Health

i) What protective treatment was given to animals before they arrived?

Type of Treatment

a) To Station

b) To farmer

ii) Are these any routine and periodic treatments given to animals?

a) Routine treatment:.....YES.....NO

b) Periodic treatment:.....YES.....NO

iii) What types of diseases affect animals?

<u>Diseases</u>	<u>Type of animal affected</u>
a)	
b)	
c)	
d)	
e)	

iv. Of the animals you have mentioned above, please indicate:

	<u>Rate</u>	<u>Type of Animal</u>
a) Morbidity		
b) Mortality		
c) Susceptibility		
d) Treatment and its effects		

v) When your animals are sick, can you easily get service and

41)

appropriate drugs?YESNO

vi) Who handles treatment of your animals. Specify who:.....
.....

10. Training

These questions are for Research Trainees.

i) What is the level of your training? Indicate level:.....

ii) What number has been trained? Specify number.....

iii) What is the duration of training? Indicate: From.....To.....

iv) How many researchers have been trained?

Indicate:	<u>Proposed</u>	<u>Actual</u>	<u>Area of Training</u>
-----------	-----------------	---------------	-------------------------

v) Where are researchers trained?

vi) Where have researchers been posted? Specify Stations(s):.....

11. Extension Workers

i) What was your level of education before joining the training

program?

ii) How many extension workers have been trained and in what areas?

<u>Number of Extension Workers</u>	<u>Area of Training</u>
.....
.....

iii) What is the duration of training?

<u>No of Ext. Workers</u>	<u>Area of Training</u>	<u>Duration</u>	
		<u>From</u>	<u>To</u>

iv) Where were the extension workers trained?

v) Where are extension workers currently posted?

vi) How many extension workers received: a) On-Station Training?.....

b) Off-Station Training?.....

12. Methods of Selection

i) How did you know about the training program?

ii) How were you selected?

iii) Was the training adequate for the job you performed?

NB: Comment on why external training for extension workers was not done in the mid-term evaluation report.

13. These questions are Farmer's.

i) What is the level of your training? Indicate level:.....

ii) How many farmers have been trained? No of Farmers Area of Training

Specify
.....

iii) What is the duration of farmers training? Specify: From.... To....

iv) Where are farmers trained? Proposed Actual

a) On-farm
.....

b) Off-farm
.....

v) What are farmers' educational requirements for training?.....
.....

vi)

vii) Have you been "followed-up" or supervised in your farming

activities after your training?YESNO

14. Distribution of Animals

i) How many animals per specie were received at the Station during the HPI program? Specify: Number of Animals Species

ii) How many calves were produced by insemination during the HPI program?

	<u>Number of Animals</u>
a) On-Station
b) Off-Station

iii) How many were distributed by species during the HPI program and to whom? Number of Animals Distributed Specie Beneficiary

.....
.....
.....

iv) How many animals were distributed from the Station herd?

Specify number:.....

v) What was the form of payment for animals by farmers?

Specify form of payment:.....

vi) How many animals were distributed from onr-station?

Specify number:.....

vii) Who took final decisions for distribution of animals?

Specify.....

viii) Did every trained farmer receive animals?.....YES.....NO

ix) If 'NO', Ask: Why?.....
.....

15. Milk Marketing

i) What is the average daily production of milk per cow?

a) On Station:.....

b) Farmers:.....

NB: Size of the dairy herd (Mikes' Report)

ii) How many milking cows are there? Specify:.....

iii) How much milk is fed to calves? Specify:.....

iv) How much milk is consumed by the family? Specify:.....

v) How much milk is sold? Specify:.....

vi What is the quality of the milk collected?

Raw milk per liter?.....

Pasturized milk per liter?.....

vii)

viii) Where is raw and pasturized milk sold?

Raw milk: Where sold:.....

Pasturized milk: Where sold:.....

ix) How is unsold milk used?

x) What are the causes, frequency and quantity of spoilage of milk?

Indicate: Causes Frequency Quantity of Spoilage

.....

.....

PROJECT INPUTS

1. Technical Assistance

- What technical assistance has been provided by HPI in:

a) Training.....

b) Research.....

c) Management.....

What is the educational as well as professional backgrounds of the
trainers? Specify: Name of Trainer Educational and Professional
Background

2. Does HPI produce quarterly or annual reports?YESNO

3. Training

- How many people were sent for training under HPI?

Specify:	<u>Proposed</u>	<u>Actual</u>

- Of those sent for training, how many returned?

Specify:	<u>Number Sent</u>	<u>Number Returned</u>

4. Are the trained people appropriately employed in jobs that relate to their training?YESNO

5. If 'No', Ask: Why:
.....

Commodities

6. Were equipment for projects purchased as initially planned?...YES...NO

7. If 'No', ask: Why:.....

.....

8. Were commodities delivered on time?YESNO

9. If 'No', ask: Why:.....

.....

Inputs

10. How much money was pumped into the project? Specify:.....

11. How much of it has been spent? Specify:.....

EVALUATION REPORT OF THE DAIRY ACTIVITIES OF THE SMALL FARMER
LIVESTOCK AND POULTRY DEVELOPMENT PROJECT (631-0015)
(GROUP A)

This group was charged with the evaluation of the activities of the dairy programme from March 1980 through February 28th, 1985 of the Small Farmer Livestock and Poultry Development Project No. 631-0015. Though the intent of this end-of-project evaluation is to determine the progress made since the mid-term evaluation, the group was sometimes obliged to examine records available since the inception of the project.

PURPOSE OF SMALL FARMER LIVESTOCK PROJECT

The stated purposes of the dairy programme as taken from the programme description were:

- a) To have a nascent dairy cattle industry in Cameroon which will have a distribution system to provide livestock to small limited resource farmers and cooperative groups.
- b) to have a functioning livestock research unit with an on-going programme of research in nutrition, breeding, disease and pest control.
- c) To have an increased number of small farmers raising improved breeds of livestock (dairy cattle) for subsistence needs and for sale.
- d) to have a greater availability of dairy products at a reasonable cost to the people.
- e) The small dairy farmer will have access to formulated rations (locally produced), breeding services and marketing systems.

This evaluation was supposed to cover the major components of the programme, namely:

- a) Adaptive Research
- b) Training
- c) Distribution of Livestock
- d) Milk Marketing and Distribution

ADAPTIVE RESEARCH

Evaluation of the Adaptive Research component of the Dairy Programme focussed on the stated project methods used to carry out the programme. These include:

- a) Local Cameroonian breeds of cattle were collected at Bambui and Wakwa IRZ Stations and used as a gene pool for cross-breeding with Holstein and Jersey exotic breeds.
- b) Adaptation trials were conducted on the imported breeds and crosses.
- c) Additional research was conducted on the nutritional value of local agricultural by-products for use in livestock rations as well as on the prevention and control of cattle diseases and pests.
- d) IRZ/HPI and, to a lesser degree, MINEPIA in general monitored the distribution of improved cattle to area farmers and assessed the cost benefits of dairy production in farmer field trials.

RESULTS EXPECTED BY THE END OF THE PROJECT

At the end of the project, the following results have been achieved:

- a) There is a nascent dairy cattle industry in Cameroon, in general and the North West Province in particular, which though only at about a third the expected results expected at this moment, has a distribution system which has provided and still provides improved livestock to small limited resource farmers and cooperative groups or institutions.
- b) The research units in the IRZ Bambui and Wakwa Stations, though not completely built and completely functional, has had an on-going programme of research in nutrition, breeding, disease and pest control which research is still going on.
- c) There is a small number of small farmers around Bamenda raising improved breeds of dairy cattle for subsistence needs and for sale and more farmers have applied for and are expecting to receive animals.
- d) Locally produced dairy products are now more available than before at a reasonable, though subsidized, cost to the people.
- e) The small dairy farmer not only has improved pastures but is supplementing the feeding of his animals with purchase of locally formulated feeds, has breeding services offered by HPI mostly and in the case of Bamenda, markets his milk through the newly formed production Dairy Farmers Cooperative.
- f) The project has sensitized both public/government on the potential for developing a dairy industry. From this point the project is a success.

TIME SCHEDULE FOR RESEARCH ACTIVITIES

To be able to carry out this project, an elaborate research programme was drawn up. though, in general, it could be said that less was accomplished than perceived and trials carried out did not necessarily follow the initial yearly programming, it is evident that some research was conducted during the period in consideration. Some trials are still going on. Others that could not be started because of delays mainly in the acquisition of equipment are expected to commence when the said equipment is received.

RESEARCH PROGRESS TO DATE

See page 3 - "Evaluation of Adaptive Research Component of the Cameroon Small Farmer Livestock Project" by Dr. B.F. Kelso.

A) PROGRESS TOWARD DEVELOPMENT OF A LIVESTOCK RESEARCH CAPABILITY

- See same report

1. CREDENTIALS OF PROJECT RESEARCH PERSONNEL

a) Personnel at Bambui Station

i) IRZ Personnel

1. Mr. Mbanya J.N., M.Sc. in Nutrition and Biochemistry, University of London.
2. Ms Tiku P.B., M.Sc. Food Technology, University of Reading.
3. Mr. Kamga P. Ingenieur Agronome, ENSA Yaounde.
4. Mr. Libouga D., Masters in Dairy Technoloy, France - left
5. Mr. Maximuangu J.C., Higher National Diploma in Animal Industries, United Kingdom.
6. Ms Morfaw Mary, B.Sc. Animal Science, Louisiana State University
7. Mr. Pingpoh David Puewoh, B.Sc. Economics, Lagos
8. Mr. Awa Richard, Ingenieur des Travaux Agricoles, CU entre Universitaire de Dschang
9. Mr. Djume Denis, Bac. D and HPI Certificate
10. Ms Enowkenwa E. E., "A" Levels
11. Mr. Saidou Haman, "A" Levels
12. Mr. Njong, "A" Levels - left

ii) HPI Personnel

1. Mr. Needham Tom, M.Sc. Animal Science - left
2. Mr. Goldman Michael, M.Sc. Agric. Economics, Brander's, USA
3. Mr. Talbott C.W., M.Sc. Dairy Science, Virginia Polytech. Institute
4. Mr. Leo Challoux, M.Sc. - left
5. Mr. Charles Bowel - left

b) Personnel at the Wakwa Stationi) IRZ Personnel

1. Mbah D.A., Ph.D, Anim. Genetics, Penn State University
2. Mr. Messina Onbiony, D.E.A., Anim. Biology, Yaounde, 2 mo. A.I. Spain
3. Yonkeu Samuel, Maitrise in Plant Ecology, Yaounde
4. Ms Ntungia Regine, Ingenieur de Txv Agricoles, CU Dschang
5. Mr. Mbakwa J, "O" Levels + HPI Certificate
6. Mr. Nguipjo E, Maitrise d'Elevage, E.I. France
7. Mr. Tasseu J, "O" Levels + HPI Certificate

ii) HPI Personnel

There are no resident HPI personnel on the Wakwa Station but Messrs Michael Goldman and C.W. Talbott of the Bambui Station pay occasional working visits to Wakwa.

BAMBUI STATION - DAIRY RESEARCH

There were 14 projects in nutrition (2), genetics (8) and milk technology (4) listed in the IRZ programmes of research. (See page 3, Kelso)

WAKWA STATION - DAIRY RESEARCH

There were 7 projects listed by IRZ at Wakwa directed mainly to studies on genetics and adaptation.

LIVESTOCK NUMBERS FOR CONDUCTING RESEARCH

A review of animals available at the Bambui and Wakwa Stations is presented as follows:

a) Bambui Station - Dairy Cattle Research

Findings with respect to availability of livestock numbers for research purposes lend support to the mid-term evaluation report. The number of cows in lactation during each month continues to be relatively the same as in the 1981-82 period, averaging between 19 and 20 lactating cows out of nearly 60 adult cows.

Furthermore, there are currently 8 breed groups of exotics and crosses, three of which are accidental crosses which do not belong to the plan. A total of 206 animals are currently on the farm at Bambui Station. The breakdown by breed or breed group is as follows:

Holstein	28
Jersey	19
Holstein/Red Fulani	5
Holstein/White Fulani	1
Holstein/Gudali	27
Jersey/Red Fulani	3
Jersey/White Fulani	59
Jersey/Gudali	2
White Fulani	32
Red Fulani	30
TOTAL	<u>206</u>

According to the project purpose of cross-breeding exotics with the locals the Station must have 6 breed groups, two pure-bred exotics and two pure-bred locals and two cross-breeds.

As in the mid-term report, this genetic diversity, combined with differences in age and in stage of lactation hampered, somewhat, the selection of balanced groups for conducting adequate nutrition research, though, in general, the experiments conducted were based on designs suitable for small numbers.

It should be noted, too, that the herd size at Bambui Station get reduced in an effort to meet distribution targets. Relatedly, the land area of 30 hectares available for the project is overstocked.

It is observed that pastures on the 150 Ha have to be developed to meet the needs of the available animal population on the station.

b) Wakwa Station - Dairy Cattle Research

In the Wakwa Station the numbers of cows with respect to Holsteins has remained the same like in the mid-term evaluation report but has about doubled for the Holstein/Gudali crosses. The Montbeliard operation being unrelated to this project has been left out of consideration. Though the mortality of Holsteins is still high, the dairy herd, including the montbeliard, has increased from 94 in 1982 to about 115 mainly due to gains in cross-breeding.

FACILITIES FOR CONDUCTING DAIRY RESEARCH.

a) Bambui Station

Contrary to the assertion in the mid-term report to the effect that adequate facilities are non-existent at the Bambui Station to carry out nutrition trials, yet cattle on nutrition trials are placed in individual stalls which have existed on the Station for more than twenty years.

Furthermore, lactating cows on nutrition trials are milked and fed measured quantities of feed in their stalls rather than in the milking parlour where feeding may not be as desired.

Of the 4 operations listed on milk technology, 3 are 50% completed while the fourth is still to start due to delays in arrival of ordered equipment. The testing laboratory, on the other hand, is now ready and has already conducted some tests.

b) Wakwa Station

Facilities for milking the herd and for processing the milk have been completed but only partly operational because parts of the pasteurizer in Wakwa were removed to repair the pasteurizer in Bambui where the population is already sensitized and used to consuming pasteurized milk as opposed to Wakwa where milk is sold raw quite easily.

RESEARCH RESULTS TO DATE

a) Bambui Station

As of date, the results that have been obtained from trials that have been conducted during the period under review are as follows:

1. C.W. Talbott. Influence of season on mean monthly Milk Production and 305 day lactation records at Bambui. sc. and Tech. Review, 1984 - Accepted.
2. C.W. Talbott. The influence of Calving Interval on Annual Total Milk Produced at Bambui. Sc. and Techn. Review, 1984 - Submitted.
3. M. Godman and C.W. Talbott. Comparison of the Performance of Exotic and Cross-breed Dairy Cattle under Small Holder in the North-West Province. Sc. and Tech. Review, 1984 - Submitted.
4. M. Goldman and Pingpoh David Puewoh. The cost of Producing Fresh and Pasteurized Milk Sold in Bamenda, North West Province, Cameroon - Manuscript.
5. M. Goldman. Case Study: Small Scale Dairy Farming in the North West Province of Cameroon, 1984 - Manuscript.

6. D.A. Mbah, J. C. Mbanya and Messina. Performance of Holsteins, Jerseys and their Zebu Crosses in Cameroon. First Results. Sc. and Tech. Review - Manuscript in preparation.

In addition, trials listed below have been completed but not yet analysed.

7. Mbanya, Talbott and Mbah. Value of Cereal By-products in Milk Production Rations.
8. Mbanya and Talbott. Comparative Values of Guatemala Grass and Elephant Grass Silages. 50% completed.
9. Forage chopper (silage) bicycle driven, designed and manufactured by C. Talbott (with GENEEMA) in 1984.

b) Wakwa Station

During the period under review dairy research publications at the Wakwa Station are summarized as follows:

1. D.A. Mbah, 1982. Note on the Influence of Season on Milk Yield at Wakwa. Sc. and Tech. Review 2(1) pp 145-148.
2. D.A. Mbah, 1982. Mortality due to Rickettsia, Trypanosomiasis, Piroplasmosis and Streptothricosis Among Six Genetic Groups of Cattle at Wakwa. Sc. and Tech. Review 2(2/3) pp 81-88
3. D.A. Mbah, 1982. Adaptation of Dairy Cattle at Wakwa. 1. Resistance to Cattle Ticks. Sc. and Tech. Review 2(2/3) pp 101-106.
4. D.A. Mbah, 1984. Adaptation of Dairy Cattle to Wakwa (Adamawa Environment). 2. Susceptibility to Heat-Stress. Sc. and Tech. Review - Accepted
5. D.A. Mbah, Mbanya and Messina. Performance of Holsteins, Jerseys and their Zebu Crosses in Cameroon. First Results. Sc. and Tech. Review - Manuscript in preparation.
6. M. Goldman, m Vabi and D. A. Mbah, 1984. A Case Study. Semi - Intensive Commercial Dairy Farming in the Adamawa Province, Republic of Cameroon. Sc. and Tech. Review - Manuscript.

MAJOR RESEARCH CONSTRAINTS

During the period in consideration major progress was made in dairy research with the construction of the dairy facilities in Wakwa and the milk technology section at Bambui. Nevertheless, constraints to the continued execution of this project could be cited as follows:

a) Management Level of Station Herds

As in the mid-term evaluation report, it could be repeated here that management provided to the Station herds of dairy cattle is not the highest possible to maintain good health and reproduction in Bambui though in Wakwa the reproduction rate exceeds 95%.

b) Health Care of Station Herds

While poor management might contribute to high mortality rates among livestock, it is apparent that health care could have been of greater negative effect, especially in Wakwa where mortalities have reduced drastically during the last two years due to the stationing of a full-time and devoted veterinarian on the Station.

c) The competition between the major objectives of IRZ and HPI for animals tended to reduce the number of animals available for on-Station research purposes. HPI preferring to have more animals go to the farmers and IRZ preferring to keep more animals on the Station.

Though in absolute numbers there seemed to be too many animals on the station, yet the diversity of breed groups tended to interfere with the selection of balanced groups for conducting adequate research.

1. Bambui Station. Rather than have many breeds, it would be desirable to choose a few breed groups to retain on the Station, preferably the best exotic milk producer crossed with the best local milk producer, i.e. the Holstein and the White Fulani.

On the other hand, based on available production or adaptation data, the evaluation team cannot at this time recommend elimination of the Jersey/White Fulani crosses nor of the Holstein/Red Fulani crosses. The exotic pure breeds should, however, be retained in the Station.

2. Wakwa Station Contrary to the recommendation in the mid-term report to encourage Holstein/Gudali cross-breeding and phase out the Montbeliard/Gudali cross-breeding, data at our disposal does not permit us to pass that judgment since the Holstein project is much younger (by seven years) than the Montbeliard project.

d) Research Staff

- See Kelso, page 11.

e) Experimental Design and Statistical Analyses

Though the lack of a specialist in statistics and experimental design is apparent, the talent is available within the country. The real constraint in this area is that young researchers often do not seek the advice of these specialists.

f) Priority of Research Projectsg) On- Farm Research Data
- See Kelso, page 12h) On-Station Record Keeping

The present method of keeping records leaves a lot to be desired. Records should be standardized on both Stations making comparison easier. It would be appropriate to mention here that to obtain data for this evaluation has not been an easy task. Figures advanced here for mortalities, calvings and the evolution of the herd in general have been arrived at through mathematical gymnastics involving approximation and extrapolations.

i) Dissemination of Research Results
Kelso, page 12COMMENTS

1. To improve on the management level at both stations, herd managers have been employed - in Bambui the herd managers has a B.Sc. in animal Science and an Ingenieur des Travaux Agricoles on the premises.
2. To take greater care of the health of the animals, each Station should have a resident and dedicated Veterinarian on the premises.
3. Instead of depending on Station animals being distributed to the farmers, the project could till more to the multiplier herd aspect in order to obtain animals for distribution to farmers.
4. Due to inadequate numbers of animals on station, IRZ should seriously consider extending its research data base to include information from farmer recipients of project animals.

TRAININGa) ON-STATION TRAINING1. Farmers

The number of farmers trained in various aspects of dairy tallies up to 34. Two were trained in Wakwa and 32 in Bambui, one of whom was a woman. The two in Wakwa were trained in Artificial Insemination (AI) while the 32 in Bambui were trained in two groups, each course of three months duration, on dairy management principles. The trainees were of various educational levels who had only motivation in common. Not all the people trained have

had animals so far because of insufficient stock.

2. Extension Workers

There was no training of extension workers in any of the Stations.

3. Peace Corps Volunteers

Peace Corps Volunteers were not trained in dairying.

4. Station Personnel

Eighteen or nineteen persons who received 3-week courses in Artificial Insemination added to the numbers of persons trained in the country. Of these, seven were trained in Wakwa, three belonging to MINEPIA and four to IRZ Wakwa. Twelve were trained in the Bambui Station - all Station personnel.

A workshop on Livestock Production was organized which trained 51 technicians and some researchers of IRZ, in the Mankon Station and the Presbyterian Church Centre. Lectures were provided by IRZ, CU Dschang and HPI staff. This workshop lasted one month.

B) OFF-STATION TRAINING

Off-station training was in the form of formal seminars of monthly cooperative meetings and extensive follow-up of farmers as a one-to-one basis. This training was primarily provided by HPI staff with some assistance from IRZ. Routine monthly visits by HPI extension agent to weigh milk, tape cattle, discuss forage and feeding program, observe milking techniques, etc. were also carried out.

EXTERNAL TRAINING

Short-Term Training: The following persons were sponsored by HPI to receive six months training in the USA in Dairy:

- Nkwenti Joseph (farmer) who later on became an HPI worker
- Engelengwele Adolph: AI technician
- Djime Denis: Dairy technician
- Mbakwa Jacob: Dairy technician and AI
- Tasseu Joseph: (Feedmill Operator) - Dairy technician.
- Ngantcha John: MINEPIA - Dairy
- Ambomu Sammy: MINEPIA - Dairy
- Tembi John: Swine management.

Long-Term Training: Six persons from IRZ received training or are still undergoing training in the USA, also sponsored by HPI. These include:

- Tawah Lawrence M.Sc. Animal Sc., Louisiana State University.
- Maximuangu Joseph B.Sc. Dairy Sc., University of Maryland.
- Assah Henry M.Sc. Range Management, Texas A&I University
- Njoya Aboubakar M.Sc. animal Sc., Iowa State University
- Pone Kamdem M.Sc. Poultry Sc., University of Arkansas (Mankon)
- Mafeni Joseph m.Sc. Poultry Sc., Tuskegee.

Of these, only one has returned, i.e. Pone Kamdem. Mr. Tawah has stayed on to do a Ph.d on the University's Assistantship. Mr Taximuangu has switched to Business Administration. MINEPIA's two places were not filled.

Impact: Cannot be noticed until most of the trainees come back home. For the short-term trainees, all have returned and are carrying on assignments related to their appropriate training. The training programme was, in general, behind schedule.

Constraints: Identification of candidates was not easy and tended to slow down the training programme.

Comments: The change of course by one of the trainees removes one useful person from the core of the plan.

DISTRIBUTION OF ANIMALS

According to the project target, 360 cattle were supposed to have been distributed to farmers during this period.

In all, 136 animals were received from the USA during this period - 75 Holsteins and 61 Jerseys.

Of the 75 Holsteins, 24 went to the Wakwa Station and 51 were retained in the Bambui Station. All the 61 Jerseys stayed on in Bambui. Wakwa also received another seven purebred Holstein Heifers and one purebred Holstein Bull, all produced in the Bambui Station.

It would be worthwhile to reiterate here that the data advanced below have not been easy to obtain. Figures advanced here for mortalities, selection, calvings and the evolution of the herd in general have been arrived at through mathematical gymnastics involving approximations and extrapolations.

Bambui Station

From the 51 purebred Holsteins, 98 purebred calves and 51 Holstein crosses were born. The 61 Jerseys in turn gave 70 purebred Jersey calves and 107 Jersey crosses.

Of the 149 Holsteins received and reproduced on the Station, 37 were distributed to various farmers, 8 were given to the Wakwa Station and there are 28 purebreds still remaining in the dairy herd. The difference (149-37-8-28-76) can be attributed to mortality, culling and selection over the years.

Of the 51 Holstein crosses, only 3 were given out to farmers and 33 are presently in the dairy herd. The difference (51-3-33-15) being attributed to mortality, selection and culling.

As for the 131 Jerseys received and reproduced on the Stations, 52 were distributed to farmers and 19 are presently in the dairy herd. The difference (131-51-19-60) could be attributed to mortality, selection and culling.

And finally, out of about 107 Jersey crosses produced on the Station, 18 have been distributed, 64 are remaining in the present herd, the difference (107-18-64-25) being attributed to mortality, culling and selection.

Wakwa Station

So far, Wakwa received 32 purebred Holsteins of which 24 were directly from the USA and 8 were produced at the Bambui Station. Fifty-three purebred Holsteins were reproduced on the Station. Of these, 1 bull was given to one farmer who immediately castrated it; 5 were culled for various seasons and 64 could be attributed to mortality and selection. There are over 15 purebred Holsteins remaining in the herd.

As far as cross-breeding was concerned, 75 crosses were born. Of these, 8 were given to farmers, 15 were culled for various reasons and 14 were recorded dead. There are presently 38 Holstein crosses on the farm.

Considering the date of the first arrival of purebreds from the USA, any of the first animals to arrive would be about 12 years old today. Mortality was referred to in this document includes death which could have occurred as a result of old age. Nevertheless, all animals in production have been allowed to continue lactating.

Breed	Received	Born	Distributed	Dead Culling	Present Stock	Other
Holstein: Bambui	51	98	37	76	28	
Wakwa	24 + 8	53	1	64	15	
Holstein: Bambui		51	3	15	33	
Crosses Wakwa		75	8	29	38	
Jerseys : Bambui	61	70	52	60	19	
Jersey : Bambui		107	18	25	64	
Crosses						
TOTAL	136 + 8*	454	111+8*119	269	197	

*Eight were interchanged between Bambui and Wakwa

Actual Distribution

Concerning actual distribution of animals, the Wakwa Station gave out only nine animals - one purebred bull and 8 crosses - to the following farmers:

1. Alhadji Ismaila Nana - 1 Holstein bull
2. Alhadji Dewa - 5 Holstein cross bull and 2 Holstein cross heifers
3. Bakari Baba - 1 Holstein cross bull

The animals distributed by the Bambui Station went to 37 different persons in the locality as per the following list:

1. Sebastian Ngufor - 4 Jerseys
2. Maximuangu - 2 Holsteins, 1 Jersey, 3 Crosses
3. Mambu Health Centre, Bafut - 8 Jersey Cows + 1 Bull
4. Tamutana Foba - 1 Jersey Cow, 1 Cross
5. Emmanuel Sisterhood of Bafut - 3 Jersey Cows, 1 Jersey male, and 1 Cross
6. RTC Fonta - 7 Holstein Cows, 1 Holstein Bull, 1 Jersey Bull
7. Tarh Evaristus - 3 Holstein Cows, 1 Jersey Cow
8. Monastery, Mbengwi - 2 Holstein bulls
9. Nkwenti Joseph - 3 Holstein cows, 1 Jersey cow
10. Haman, IRZ - 2 Jersey cows, 1 Jersey Cross bull, 2 Holstein bulls, 1 Jersey male.
11. Catholic Mission, Njinikom - 2 Jersey females
12. Mussi, Mfonta - 2 Holstein females
13. Doi anugu - 1 Jersey male
14. Mbingo Hospital - 2 Holstein males
15. Mrs Anna Tita - 1 Holstein female, 1 Jersey Cross female
16. Ndu Baptist College - 4 Jersey females, 1 Jersey male
17. Paul Njoke - 2 Jersey females
18. Dr. Foncha - 2 Holstein females, 1 Holstein Cross male
19. Paul Tengoh - 2 Jersey females
20. Clement Ako - 1 Jersey female, 2 Jersey Cross females, 1 Jersey male
21. Philip Nju - 2 Jersey females, 1 Jersey Cross female
22. Atia Stephen - 1 Holstein Cross female, 1 Jersey Cross male, and 1 Holstein Cross male
23. Simon Bijingsi - 2 Holstein females, 1 Jersey Cross female and 1 Holstein Cross male
24. Joseph Muma - 2 Jersey females, 1 Jersey Cross female
25. Christopher Tamabang - 2 Jersey females
26. Gambo Jiji - 2 Jersey Cross females

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27. Joseph Niba - 3 Holstein females, 1 Jersey female
28. Mbuno-Bambui - 1 Holstein female, 1 Jersey Cross female
29. Christopher Mbah - 1 Jersey male
30. Metoh Ngani Jacob - 2 Jersey females, 1 Jersey Cross female
31. Aladji Joroboro - 1 Holstein male
32. Thomas Ndong - 1 Jersey female, 1 Jersey male
33. Achidi Achu - 1 Holstein female, 1 Jersey female
34. Christopher Ndikum - 1 Jersey female, 1 Jersey Cross female
35. Shisong Hospital - 2 Holstein females
36. Mungang Thaddeus - 1 Jersey female, 1 Jersey Cross female
37. Mbom, Bambui, - 1 Holstein female.

Distribution Methods

In Wakwa, until 1983 there was no distribution committee. Animals were given to farmers on the recommendation of the Wakwa, MINEPIA Station which carried out the exercise without any feedback to the IRZ Station. Only in 1983 after a joint agreement between the Ministers in charge of Livestock and Scientific Research were distribution criteria established. Since then only one animal has been given out to one farmer.

In principle, at Bambui a commission comprising MINEPIA/IRZ/HPI was supposed to have sat and decided on recipients of animals. This was occasionally the case but often animals were given out on the decision of the HPI Dairy Advisor alone or with the acquiescence of the IRZ Chief of Station and Chief of Centre.

It was in this area that non-collaboration between the participating agencies was most evident - one not knowing what the other was doing. In order to meet the distribution target an approved operation (Artificial Insemination in Breeders Herds) was used as a mechanism of increasing the number of animals available for distribution to farmers. This concept of "Multiplier Herds" was done by HPI and Herd Owner without the consultation of the other parties involved. Contracts were drawn by HPI alone and the "Multiplier Herd" owner as the Mbingo Baptist Hospital case, to cite just one example.

Nevertheless, if information supplied to the evaluation team is correct, this process is supposed to yield about 300 calves between now and June 30, 1985. This should make available at least 100 heifer calves for distribution to farmers.

The initial animals on the Station were supposed to be sold to the farmer at a cost of 250 francs/kg live weight for purebreds and at 200 francs/kg live weight for cross-breeds.

For farmers who could not pay all at once, they paid an advance of 25% and a repayment schedule was supposed to be made on the rest. In fact, nobody ever took the pains to see that the farmers honoured their engagements. These repayments were supposed to be deducted from the farmer's monthly income on milk sales. This non-payment resulted in a form of subsidy. Other subsidies were to follow in the form of reduction in the cost of feed, free Veterinary drugs and purchase at 50% the actual cost of calves from "Multiplier Herds."

Most of the farmers interviewed were introduced to the programme by an HPI Extension Agent, himself a dairy farmer. This man was entrusted with the duties of initiating farmer participation into programme.

As much as this programme was supposed to reach small limited resource farmers, while a majority of farmers reached might well fit this category, but a great majority of those interviewed were either members of the above-mentioned Extension Agent's family or his closest friends and collaborators - a fact hitherto unknown to IRZ/HPI and even the Commission charged with the distribution. HPI tended to favour mission bodies in animal distribution - an apparent contradiction of the contract.

Constraints

Non-collaboration of all the parties concerned created distrust. The heavy subsidies given by HPI at various levels have created a situation which neither IRZ nor MINEPIA are presently financially capable of satisfying. This had led to almost complete dependence on HPI. The element of favouritism in the farmers attracted and initiated into the programme has caused the distribution of animals not to reach a wider cross-section of the population of the area covered by the project.

Impact

All participating farmers interviewed think that the business is great and are hopeful for a better future. Though some are doing dairy farming on a part-time basis, others have only dairying as a means of livelihood. Some people are already making a steady monthly income and most farmers think that their families are better fed and they enjoy better health by spending less on drugs and reduced out-patient or in-patient visits to the hospital.

Even the few who have dropped out of the programme would be willing to come back if the initial causes of their departure were reversed - better veterinary attention by IRZ/MINEPIA personnel, more consciousness on the part of Cameroonians in comparison to the quality of service and degree of attention exhibited by HPI personnel.

Comments

Along with the distribution of animals, HPI also undertook the distribution and administration of veterinary drugs and equipment including syringes and needles. Farmers do their own treatment and only go to see HPI when they do not obtain good results of their treatment. HPI also introduces vaccines into the country without checking up with MINEPIA and contrary to regulations in force, does not declare diseases of which declaration is mandatory. Surfactant to note here that there is no veterinarian on the HPI staff.

The facilities - means of locomotion, drugs and even monies - for subsidies ought to be common to all the parties concerned with the programme rather than being limited to HPI alone making even simple movement impossible for the other parties.

The Cameroonian parties, be it MINEPIA, do not as yet enjoy the confidence of the farmers and are likely to get cold receptions were a take-over to be carried out suddenly. This lack of confidence stems from the attitude which many Cameroonians have exhibited so far in the execution of their tasks.

MILK MARKETING

Size of the Dairy Herd

Most of the farmers started with about two animals and excluding institutions, the individual farmer interviewed now has an average of six animals of all ages on his farm.

Production

Milk production as has been measured in the Station is as follows:

- White Fulani	497	1/lact. of 170 days or 2.92 l/day
- Red Fulani	329.95	1/lact. of 113 days or 2.90 l/day
- Jersey/White Fulani	978.53	1/lact. of 188.9 days or 5.1 l/day
- Holstein/Red Fulani	1500.8	1/lact. of 220.5 days or 6.8 l/day
- Jersey	2595	1/lact. of 315 days or 8.2 l/day
- Holstein - (Wakwa)	3431	1/lact. of 283 days or 12.1 l/day
(Bambui)	3360	1/lact. of 319 days or 10.5 l/day
- Gudali --	483	1/lact. of 168 days or 2.9 l/day
Holstein/Gudali	1524	1/lact. of 256 days or 5.9 l/day

Milk fed to the calf is about 10% of body weight of the calf on the Stations. Off-Station, many farmers give about 1 litre of milk/day to their calves. All the evening milk goes to feed the family and the calves.

All the morning milk is sold at the farms at 120 francs/litre to IRZ Bambui - for raw milk and the Bambui Station sells pasteurized milk at 180 francs/litre in Bamenda.

At Wakwa all milk is sold raw at 150 francs/litre in Ngaoundere.

Milk Quality

Bacterial content of farmers hand-milked raw milk is generally higher than IRZ machine-milked raw milk.

Occasionally some farmers add water to increase the quantity of milk produced.

Chain of Milk Distribution

Most members of the Bamenda Dairy Farmers Cooperative Society sell raw milk to IRZ for pasteurization. IRZ then pasteurizes the milk along with its own, packages and retails it in Bamenda in various depots. A few farmers, especially those distant to Bambui, sell their milk raw or transform it into dairy products which they consider more profitable than raw milk.

In Wakwa, all the Station milk is sold raw in Ngaoundere. No farmer delivers milk to the station

Milk Spoilage

Occasionally milk spoils due to power failures and the lack of an operational stand-by generator [breakdown of other equipment] poor quality of milk of former origin, and poor sanitation in the dairy plant. Spoilage accounts for about 10% of the milk produced. It is noteworthy to add here that there was more spoilage in the first two or three years of the project but in the last couple of years this has reduced.

Transformation

Some private farmers do transform their milk because it fetches them more money. The Station, too, practices this when there is increased production in the rainy season.

Economics of Dairy Production

Locally produced milk is more available and accepted by the population. Some people now feel that their children are much healthier than before.

A new breed of cattle farmers has been born in Cameroon. He is enlightened and very dedicated. The newly created Dairy Farmers Cooperative will soon receive official recognition by Government.

Constraints

The vans for picking up raw milk and the distribution of pasteurized milk are constantly breaking down. All this applies to Bambui. The private farmers lack cooling facilities and consequently all the evening milk is consumed by the family and/or fed to calves. The van does not reach every farmer because of cost constraints.

Comments

If the production of milk is increased, the Dairy Farmers Cooperative could be in a position to replace their van. And unless the herd size per farmer increases, it would not be economical to invest on cooling equipment at the farms to preserve evening milk.

HPI'S COMMENTS ON EVALUATION REPORT OF DAIRY ACTIVITIES
by Michael Goldman
For Lowell Watts

Page C.4 (ii) Goldman, University of Connecticut
 Mr. Charles Burwell

Page C.8 (c) Research Animals

This section mention the pressures of animal distribution as being a cause of inadequate numbers of animals for research. The real reason for shortages of animals, primarily purebreds, is on station mortality. This is evident if one looks at the number of purebreds received or born at the station minus those distributed to farmers at Wakwa[and compares this to the present size of the purebred herd.

No. received or born (H & J)	Distributed Farmers & Wakwa	Size of Present Herd
280	97	47

This leaves 136 animals died or culled (selection is same as culling). Since it is known that very little culling is actually done at Bambui, it is clear that mortality has been high.

Page C.8 Major Research Constraints

- B) This makes no sense. Just say that poor management does (not might) contributed to mortality. The stationing of a veterinarian at Wakwa has helped reduce mortality.
- C) Already commented as above.

Page C.11 (B) Off-Station Training

Off Station training was in the form of formal seminars at monthly cooperative meetings and extensive follow up of farmers on a one to one basis. This training was primarily provided by HPI staff with some assistance from IRZ. Routine monthly visits by HPI extension agent to weigh milk/tape cattle, discuss forage and feeding program/observe milking techniques, etc. were also carried out.

Page C.15 Distribution Methods

This section is inaccurate. A committee of HPI/MINEPIA personnel did (not "in principle") approve distribution of a minimum of 85% of the animals distributed. (See Tom Needam's report of July, 1982 to Chief of Center/Bambui, listing the recipients of 87 animals distributed. Subsequent to that report, 6 animals were distributed to new trainees Tita, Foba and Jiji and one to Ngufor. All the animals were approved by a properly constituted distribution committee).

Some animals (small percentage of total, were distributed upon joint action of the HPI advisor, the Chief of Center/Bambui and Chief of Station/Bambui. Joint action is different from acquiescence. HPI advisors do not take animals off the station without approval of IRTZ authorities.

Mr. Mbanya has insinuated to the evaluation committee that animals have been distributed in the earlier days of the program "under the table". Unless he can document this assertion, it is merely heresy, and has no place in an evaluation report based on facts. (Note that Mr. Mbanya only came to Bambui Station in 1981).

Page C.16 "The concept of Multiplier Herds was not done by HPI alone", but was carried out with the full knowledge of the IRZ director and his staff. AI was performed by IRZ and HPI personnel. HPI did unilaterally draw a contract with multiplier herd owners.

Farmers' repayment of the loan of 75% of the purchase price of animals was never a responsibility of HPI. The animals were sold to farmers by IRZ, who received the money. The collection of the 75% was an arrangement between IRZ and the farmers. This did not constitute an HPI subsidy.

The point should be unequivocally made that the program did do a good job of reaching limited resource farmers. This should not be subordinated to other facts (opinion ?) the way it is in paragraph 6. The implication of favoritism and the statement "The element of favoritism in the farmers attracted.... caused the distribution of animals not to reach... covered by the project area" is false. Of the people and institutions receiving animals from this program, approximately 10 came from Nkwen, 16 from Bambui and Bambili, and 7 from other areas. Of the active farmers presently in the cooperative, 8 were from Nkwen, 7 from Bambui and Bambili and 2 from Bafut.

If one looks at the 7 Nkwen farmers (excluding Nkwenti) a minimum of 2 (Foncha & Zambu Jiji) have no relationship to Nkwenti. Anyone who was born or has been in this country knows that the term brother means anything from a full, blood brother to a distant cousin to a friend. The evaluation team made no effort to ascertain in what context the five farmers interviewed were using "brother".

The ascertainment of favoritism having "... causes the distribution of animals not to reach a wider cross section of the population of the area of the project" is unsupported by fact. The reason more farmers were not able to enter the program was because of a lack of animals to distribute. This could be attributed to too few animals being shipped or the inability of IRZ to reproduce either purebreds or crossbreds at the Bambui Station. The reason farmers are concentrated in the Nkwen, Bambui, Bambili area is due to the economics of milk collection.

Page C.17 (Comments)

HPI and farmers performing their own veterinary work has been necessitated by the total unavailability of MINEPIA personnel and the general unavailability of the IRZ vet. for farm calls. This is not to say

that the lab work and the consultations provided by the IRZ vet. and staff were not good. IRZ was quite unaware of morbidity and mortality data from farm herds. Since this project was a joint effort by HPI and IRZ, blame for not reporting this data to MINEPIA would have to be jointly shared.

Page C.18 Chain of Milk Distribution

. 1st sentence should read: Most members of the Bamenda Dairy Farmers Cooperative Society sell raw milk to IRZ for pasteurization.

Page C.18 Milk Spoilage

1st sentence should read: Occasionally milk spoils due to power failures and the lack of an operational standby generator[breakdown of other equipment[poor quality milk of IRZ or farmer origin[and poor sanitation in the dairy plant.

PERSONNEL AT MANKON STATION

R T Fomunyan (Chief of Station)	B.Sc., M.Sc. University of Minesota, USA Ph.D, Animal Science, Univ. of Ife, Nigeria	3 Years experience (Multidisciplinary)
S D Lukefahr (Replaced Howell)	Ph.D, Animal Science, Oregon State University USA	
J K Ndamukong	B.Sc, M.Sc, Zoology, University of Ife, Nigeria Ph.D Candidate, Sheep and Goats, Univ. of Edinburgh, England	5 years experience (Animal Health, Sheep and goats)
R B Fombad (i/c Pigs)	B.Sc, Biochemistry, M.Sc Animal Science, Univer- sity of Ibadan, Nigeria	3 years (pigs, poultry, sheep and goats)
D K Pone (new HPI-trained)	Ing. Agronome, Yaounde University, M.Sc, Poultry Science, University of Arkansas, USA	2 years (poultry)
J Njoya (new Assistant Chief of Station)	Ingenieur Agronome, University of Yaounde	2 years experience (poultry)
T Dongmo (new)	Ingenieur Agronome, University of Yaounde	1 year experience (pigs)
Meffeja (new)	Ingenieur Agronome, University of Yaounde	1 year experience (pigs)
A N Nfi (Head Veterinary, Sheep and Goats)	DVM, University of Ibadan, Nigeria	3 years (animal health, sheep and goats)
Chantal Symoens	DVM, Belgium	2 years experience (animal health, sheep)
D Awah (new)	DVM, Ahmadou Bello University, Nigeria	1 year experience (animal health, goats)

TECHNICIANS

I N Jowki (Technician)	B.Sc. Chemistry, University of Ife, Nigeria	Laboratory
C C Edosse (Technician) HPI counterpart	Higher National Diploma (HND), Ibadan Polytechnic, Nigeria	Rabbits
J Mbog (Technician)	Licence, University of Yaounde	Sheep
L B Evini (Technician)	Licence, University of Yaounde	Goats
K Killanga (Technician) BSP counterpart	Licence, University of Yaounde	Sheep (Belgian Sheep Project - BSP)
J Mafeni (Student, USA, HPI sponsor)	B.Sc. Agriculture, Ahmadou Bello University, Nigeria	Poultry
J M T Fotso (Technician)	Licence, University of Yaounde	Rabbits
R Seino (Technician)	B.Sc., Zoology, University of Lagos, Nigeria	Laboratory
G Ndjomegni (Technician)	Licence, University of Yaounde	Laboratory
S Nganwa (Technician)	Ingenieur de Travaux Germany	Poultry
J Nyume (Technician)	B.Sc, Agriculture, Ahmadou Bello University, Nigeria	Pigs

SHEEP AND GOATS PROGRAMMEAdaptive Research on Station1) Protocols

A maximum number of 19 protocols in 1984-85 (for other year this number has been less) were programmed in the sheep and goat unit. Six of these were new with one suspended for the year 1984-85. 12 have been attempted for the year 1984-85 and three will be completed by the end of this first year.

2) Researchers

There are five researchers assigned to carry out these protocols. Of these five, two have degrees in animal science, one is a PhD candidate in sheep and goats and two are veterinary doctors (see list at the end of the report.

3) Facilities

There are nine sheep and goats barns attached to this unit, several paddocks and about 200 hectares of land for grazing. The nutrition and Biochemistry laboratory supports this unit in analysis of forages and milk from the goats.

B. Off-Station

IRZ according to decree No.79/495 has a mandate to do off-station research and extension presently work on off-station research in area is going on.

C. Results

Work on the collection and identification of local goats and sheep is in progress. Adaptabilities studies in exotic sheep and goats would have been completed if the data for analysis were available. In the area, studies on high quality and indigenous forages as well as agro-industrial by-products based diets are in progress. The control of reproductive performance is also in progress as well as the chemical composition of dairy goat milk. These results can be obtained in the Annual Report for 1980-84. However, the studies would be prolonged.

Impact

The impact is negligible since work is still in progress. However, preliminary show that the crossbreed sheep (Green Valley forms Limbe), John Wayi (Bambili) are doing very better.

Constraints

High mortality. Poor management (Section was managed by Mr. Joe Howell, HPI expert and head of section from 1981-83). HPI Advisor did not use his counterparts namely Asanji (Licence), Pauline Motseho (Licence) Mbog John

(Licence) Andoseh Irene (B.Sc). The inability of HPI personnel to do on-station or off-station research showed negative effect on the impact of research.

Comments

The technical advisory role has been very weak as shown by the poorly kept records left behind and incoherent report (sheep and goats in the IRZ/HPI/USAID cooperative small farmer Project of Cameroon. Atherthoghts.) used as a document in this report.

Training

In country

See Poultry and Pigs section

Out country

Two candidates Mr. Luc OBONOU and ABBA DALIL are about to leave for Belgium for graduate training in sheep and goats.

Impact

Impact has been negligible given that people on long term training are just about to leave. However increased interest of farmers in the goats show that training sensitized them in goat husbandry.

Constraints

- It was not easy to get people into American Universities to study sheep and goat.
- Scholarship proposals from Belgium came late.

DISTRIBUTION

Target was 320 but 8 animals were given out. Target realization 1.7%

Impact

Very little. However farmers have shown a great interest in these goats.

Constraints

There has been no HPI personnel in this unit since 1983, thus there has been no follow-up. Apparently the present small animal advisor does not see this as his job.

SHEEP AND GOATS
IN THE I.R.Z./H.P.I./U.S.A.I.D.
COOPERATIVE SMALL FARMER PROJECT
OF CAMEROON ---
atherthoughts

Joseph M. Howell
IFI Small Animal Advisor
September, 1980 to November, 1983

INTRODUCTION

Before I went to Cameroon to work with I.R.Z., it was agreed that the primary goal was to improve the management of the dairy goats. The I.R.Z. staff that had been responsible for goats had concluded that the poor performance of the goats had been the result of poor management. Mr. Ron Tempest (sic?) provided some recommendations to improve the management after his August, 1980, visit to Mankon. When meeting with U.S.A.I.D. and I.R.Z. personnel, the word "management" was used in many situations. Livestock management is the combination and interaction of human skills and technical inputs to produce animals and animal products. Within a few weeks of my arrival at Mankon, it became apparent that most of the persons at every level of the station (from the chief of station to the livestock attendants) lacked both the experience and training in livestock production that is necessary to have management skills. They did not have a fundamental understanding of livestock productivity and the management that is required to raise animals.

The primary challenge was to train I.R.Z. personnel to manage the herds by using imported inputs and technical information from other countries and to work with them so that they could get enough experience on the job to be able to raise enough sheep and goats for research and for distribution to farmers/livestock raisers and so that they would be able to train other Camerounians to raise sheep and goats.

Since I.R.Z. is by name a research organization, research was talked about in meetings and in discussions. However, the word "research" was not any better understood than the word "management." If the Institute of Animal Research (I.R.Z.) is to provide a public service, it will be necessary to develop and to carry out research strategies which can evaluate existing/ imported technical inputs and which can make technical innovations that improve livestock productivity. Small farmers and herders have been raising livestock for generations. When are they going to benefit from the investment in science?

THE FIRST MONTHS - AN OVERVIEW

The first goats to be raised at I.R.2.-Mankon Station were dairy goats from the H.P.I. shipment of September, 1976. There was a new building for the dairy goats and they were provided with hay from the Rural Training Centre of the Presbyterian Church at Mfonta. A year later in 1977, the International Foundation for Science of Sweden provided funds for the purchase of fifty local dwarf goats from Ndop (50 km from Mankon) and for the construction of another goat building. When I arrived at Mankon in early October, 1980, there were not yet any fences to control animals.

The local goats were wandering over the station's land and onto neighboring farms. There was not any control of breeding. Many animals had been lost to theft, to straying, and to disease. There was not any feeding programme for them. They were free to come and to go from their building to graze year round.

The dairy goats were confined indoors most of the time. The station's veterinary doctor, Dr. Ekue, did not want them to eat wet grass in the morning. In an attempt to control breeding, the bucks and the does were not allowed to graze outdoors at the same time. After 9 a. m. the does were sent outside, but there was no herder to watch over them. The bucks were sent out to graze after the does were sent back inside their building. Sometimes the dairy goats were provided with hand cut grass indoors. But since the grass feeders were small and poorly designed, the grass was consumed and wasted within a few minutes. There was no

forage programme to produce a supply of harvested (hand cut) grass/ forage for confined animals or for supplemental feeding during the dry season.

The dairy goats were fed concentrate feed, but no effort was made to divide the animals into feeding groups according to age, size, and requirements for growth, pregnancy, and milk production. The feed troughs were inside the pens. . Much of the feed was wasted by animals walking in the troughs. Feed that was contaminated with feces and urine was not eaten. Soiled feeders became a source of coccidiosis. Salt/minerals were not provided on a regular basis. Twenty litre water buckets were put in the pens and the water became contaminated. Fresh water was not provided regularly. The number of water buckets was inadequate and they were not always filled with clean water. Drinking water ^{was} insufficient. Animals that were confined indoors for treatment were often neglected without feed and water. When there was a feed shortage at the station, the dairy goats were the first animals to be without concentrate feed because they did not generate funds for the station the way eggs, poultry, and swine did.

The dairy kids were kept with their mothers for their first three or four days. There were no kidding pens. They were separated from their mothers to be bottle fed three times a day for a total of 0.75 litre of milk per day. After a month or so the feeding was reduced to two times a day for a total of about 0.50 litre of milk per kid/day. The remainder of the milk was sold to workers of the station. The kids were being under fed.

During the long rainy season, afternoon showers and downpours kept the animals indoors. Since there was little (if any) monitoring and no supervision of the livestock attendants in the afternoons, afternoon attendance was not good and, as a result, the animals were neglected indoors at this time daily. During holidays and on Sundays, there was an attendance/neglect problem all day long. The animals were forced to rely too heavily upon unreliable livestock attendants for feed and water.

None of the goat buildings were being washed and disinfected. The livestock attendants swept the wooden floors inside the doe barn and the local goat house daily. Water had to be carried by hand to clean the buildings, if cleaning was to be done. Manure accumulated under the wooden floors for weeks and sometimes for months before it was removed. The cement/concrete floor of the exotic buck house was covered with hand cut grass which became urine soaked. Hoof rot was a chronic problem for the bucks. The wind blew up through the slatted floors of the other buildings and chilled the dairy does and kids that were forced to spend most of the time indoors. The local goats slept outdoors on the ground whenever they chose to sleep there.

The goats experienced many health problems. Ticks were on the animals most of the time. While the local goats were not sprayed regularly because they were not being controlled, the dairy goats were sprayed one a month. Ticks re-appeared on them within a few days of spraying. The dairy goats were usually dewormed monthly with the same wormer. The local goats were not dewormed because they could not be caught. Scour was a serious condition

in the young dairy goats. Since fecal samples were not being taken, it was not known whether coccidiosis or internal parasites were the cause of the scours. Animals of all classes would go off feed and the livestock attendants would not identify them as being sick. High temperatures came to be observed and death usually followed within a few hours or overnight. No antibiotics or treatment for scours was kept on stock in the goat buildings because the livestock attendants were not permitted to treat sick animals.

Since the local goats were not being controlled, they were not visited regularly by the station's veterinary doctor, Dr. Ekue. When he did visit them, he did not usually take any veterinary supplies with him to provide treatment for sick animals. Mange and ear mite infestation were common, but these conditions were neglected.

When a goat died, it was left inside the goat buildings until the veterinary doctor returned (usually the next day). He did not want any dead animal removed until he saw it. There was no vaccination programme. Larvae were found in the brains of several exotic goats that died and nose bots were the suspected cause of death. When the veterinary doctor made his 1980-1981 annual report, he decided that scours was the most serious "disease" because it was observed when five dairy goats died. He did not care to report that twenty-nine other dairy goats died of undetermined causes.

After each milking the livestock attendants recorded the milk yield for each doe that was milked. Some breedings and other observations such as births and deaths were recorded in notebooks

in a haphazard fashion. Individual records were not being kept.

Many of the difficulties that the goat programme faced were easy to see. The buildings were not well designed and were not being properly cleaned. As long as the dairy goats were confined indoors without harvested grass/forage to eat, nutrition was inadequate. The herd did not have a health care programme to prevent and/or to control many diseases. No one of authority who had the ability to train, to supervise, and to monitor the livestock attendants was present in the goat section most of the time.

While in the short run it was not possible to re-design the buildings, great effort was made to properly clean them. Cleaning required lots of water and lots of hard work on a regular basis provided by the livestock attendants. The carrying of water buckets by hand from the stream did not get the job done. In May, 1981, rain barrels were bought to catch rain off the roof during the rainy season. These barrels had to be used to haul water in the pickup during the dry season. (Since the rest of the farm was provided with water by the water pump, there was little interest in the water problems of the sheep and goats.) The livestock attendants had to be haranged to get them to wash the floors once a week and to remove the manure from under the building on a frequent, regular basis (two or more times a week), because for four years they had not been required to do these chores. (In July, 1981, bamboo supports were put in the buck house to allow the bucks to get of the urine soaked cement/concrete floors.) Having the water buckets kept full of drinking water was a year round request because all drinking water for the goats had to be carried by hand

from the stream. Given the problem with water in the dry season and the high absenteeism of the livestock attendants, the cleaning of the buildings was not done as often and as well as it should have been.

Providing the dairy goats and sheep with grass/forage was a much more difficult challenge. There had not been a forage programme at I.R.Z.-Mankon probably because there was not anyone trained or with experience in forage management and production. (The people of the Northwest Province do not have a tradition of producing fodder for feeding confined animals or for supplemental feeding in the dry season.) I.R.Z. relied almost completely upon two French agronomists at other research stations who limited their work to the narrow research goals of those stations. Hindsight said to build fences to control animals, to control grazing, and to protect fodder produced for confinement feeding before animals are obtained. Hundreds of meters of woven/web wire was used in 1979 to make a boundary fence near the local goats' building. But since it did not form an enclosure, the small goats were not controlled. Some grasses were planted near the dairy goat buildings in the early part of the rainy season of 1981. Most did not become established because the free ranging dairy goats ate them when they started growing.

The first sheep to be raised at I.R.Z.-Mankon arrived in February, 1981. Thirty sheep of the Fulani breed from northern Cameroon were purchased by I.R.Z. at the National Agriculture Fair in the East Province at Bertoua. They were kept temporarily in a small poultry house with an enclosed yard (chicken wire) and

were herded for a few hours/day outside of the chicken yard by a livestock attendant. The June, 1981, livestock shipment from H.P.I. brought fifty exotic American sheep to the station. Upon the arrival of the shipment, all the new dairy goats and the new sheep were put in the newly completed sheep barn about one mile from the rest of the farm. All the new animals were confined indoors and fed hand cut grass (primarily elephant grass) and concentrate feed at a rate of 1/2 pound per animal per day. During June the new goats were transferred a few at a time to dairy goat buildings. At the end of June the Fulani sheep joined the exotic sheep at the sheep barn.

Since spraying could not control ticks on the wool sheep, they were kept inside the barn until a dipping vat was completed in late October. Four to five workers spent 2 to 4 hours a day six days a week for more than four months hand cutting grass to be fed indoors to the wool sheep. The Fulani sheep were allowed outdoors to graze under the control of a livestock attendant and were sprayed weekly to control ticks. All the sheep were fed up to 1/2 pound of concentrate feed daily.

The health problems that affected the goats also affected the sheep. Some of the Fulani lambs developed chronic diarrhoea and died within a few days. Since fecal samples were not taken, the cause of diarrhoea was not identified. No veterinary supplies were kept at the sheep barn because the veterinary doctor did not allow the livestock attendants to treat sick animals. Considering the sheep that died, most died of unidentified causes.

FENCES AND FORAGE PRODUCTION

The first fences for the goats were put up with four hundred meters of woven/web wire provided by I.R.Z. shortly after my arrival at Mankon. Steve Steinberg bought locally the wooden fence posts. The station's "general pool" workers painted them with solignum to prevent termite and ant damage, dug the post holes, and working together we put up the fences. By the end of October, 1980, five small paddocks with a total area of 1/4 hectare were enclosed using 200 meters of wire at the dairy goat buildings. Seeds for Desmodium intortum and Stylosanthes scabra were planted and cuttings of Bracharia ruziziensis were transplanted in the enclosures to initiate pasture improvement. These paddocks were large enough to provide rainy season grazing areas only for the dairy kids and for a few bucks. Three months later in January, 1981, another 1/4 hectare was enclosed to form two paddocks for the local goat herd. The area was not large enough to provide it with grazing, but the enclosures did help control the animals for some management practices.

Fence construction, pasture improvement, and forage production for confinement feeding were perennial problems. Since there was only marginal control of the dairy doe herd and the ewe herd because of unreliable herders and no control of the local goats, and since cattle were grazing around the sheep barn, all newly planted forages had to be fenced to provide protection from grazing animals. It was a dual problem of getting forages planted and weeded on time and of getting them enclosed. The establish-

ment of most forages required protection against grazing during the seven to eight month rainy season and protection against uncontrolled bush fires in the dry season.

After the livestock shipment of June, 1981, the fencing of grazing areas for the bucks and rams was given immediate priority. Within a few months (July for the bucks and September for the rams), they had free access to unimproved grazing areas 24 hours a day. Since it was another year before additional grazing areas were enclosed, overgrazing and high infestations of internal parasites became problems. However, the overall mortality, especially of the exotic bucks, was greatly reduced. The delays in fence construction during most of 1982 that were caused by a lack of materials prevented forage improvement in areas that had already been enclosed and prevented increased forage production for confinement feeding. Most of the limited areas already enclosed had to be used to control animals outdoors. Rolls of sheep and goat wire arrived from the U.S.A. in early March, 1982, but fence posts were not provided by I.R.Z. from Yaoundé until October. The chief of station refused to have sand, cement, and broken stone purchased so that the corners could be reinforced adequately. In late June, 1983, funds were provided by the director of I.R.Z. for gates to be constructed, for the purchase of reinforcing materials, and for additional workers to be hired to put up the fences. Five workers had been hired specifically for this job a year earlier, but they were too often reassigned to unload feed trucks, to work in the feed mill, to repair the roads, to clear the boundary lines of surveyors, etc. Considering the difficulties that were encountered

with having workers build fences, it should not have been surprising that requests for workers from the "general pool" to help plant and to manage forages and to do fire tracing for dry season fire protection were turned down. Since the administration did not understand the importance of grass/forage to the nutrition of ruminants, other assignments (such as unloading expensive feedstuffs at the feedmill) were considered to be more important for them to do.

During the three years, the feeding of the sheep and goats was a daily problem. Herding the does and ewes outdoors was limited to about six hours per day when the livestock attendants were on duty. I needed to be in the livestock sections twice each morning and twice each afternoon to be sure that the animals were not sent out to graze too late and returned too early. The dairy goats that were being milked often had no more than four hours of grazing time per day. At first the veterinary doctor was against letting the animals graze before 9 a.m. because there was dew on the grass. In August, 1981, the chief of station, Dr. Ekue, and I had to meet to discuss this situation. Afternoon grazing time was being reduced by the daily rainy season downpours, so Dr. Ekue very reluctantly agreed to permit early morning grazing. When there was enough area enclosed to permit the bucks and rams free access to grazing year round and their mortality was greatly reduced, Dr. Ekue no longer questioned the necessity to limit morning grazing. Confining the animals inside the buildings would not have posed any serious difficulties if there had been a year round supply of harvested grass/forage for free choice

feeding and if the buildings had been kept clean. The nutrition programme for the small ruminants was required to rely heavily upon expensive concentrate feeds to fill the grazing gap. Funds were provided by the research station to buy locally expensive feedstuffs, to send an expensive five ton lorry to Douala to buy other expensive feedstuffs, and to hire three workers to work full time in the feedmill. The station's administration justified millions of francs CFA in budget overruns to keep the feedmill stocked, but would not allocate a hundred thousand francs for fodder production. (Harvested grass/forage was not locally available for purchase.)

By October, 1983, enough forage had been established to demonstrate pasture improvement and to provide a few animals with hand cut grass/forage for confinement feeding year round. Most of the grazing areas that were enclosed during the year from November, 1982, through October, 1983, needed improvement by planting and seeding of more productive and nutritious grasses and legumes. Enough area had been fenced to supply the bucks and the rams with additional grazing land and to allow the does and ewes to graze (to self feed themselves with growing grass) when the herders are on break. There was not enough fodder being produced for dry season supplemental feeding. Since there was no one at Mankon trained in forage production and management and since the station's administration had not recognized the need to construct fences for the small ruminants so that they could feed themselves, it is doubtful that there will be support for pasture

improvement and for the production of enough harvested fodder for confinement feeding and for dry season supplemental feeding. Too often fences were seen only as a means of defining the station's boundry and of keeping the animals from straying on to private land.

If the herders of the ewes and does are not supervised, there will be the temptation to leave the animals in the paddocks which are too small for sustained grazing, rather than to take them out to graze unfenced land. Overgrazing could become a serious problem because the areas that are enclosed are too limited for the existing animal numbers and because additional fences to expand the areas for controlled grazing probably will not be built without much difficulty. All the steel fence posts that had been supplied by I.R.Z. from Yaoundé had been used (including many posts for other stations). There was only enough sheep wire remaining from the U.S.A. shipment of March, 1982, to replace the barbed wire fences that were put up for the sheep during 1981. Since the fences at I.R.Z.-Mankon are made of expensive imported materials, their use should be questioned. They have been difficult to construct because they are very expensive and because many of the materials are not available locally. Both of these reasons make them inappropriate as fence models for the local small farmers/livestock raisers who want to improve their small ruminant production.

A CHRONOLOGY OF FENCE BUILDING, PASTURE
IMPROVEMENT, & FORAGE PRODUCTION

- 10/80 - Five paddocks ($\frac{1}{4}$ hectare) were enclosed for the dairy goats using locally purchased woven wire and labor provided by I.R.Z. and posts and bamboos purchased with U.S.A.I.D. funds.
- Seeds of Desmodium intortum and Stylosanthes scabra and cuttings of Bracharia ruziziensis were planted to improve the pasture.
- 1/81 - Two paddocks ($\frac{1}{2}$ hectare) were enclosed for the local goats using locally purchased woven wire and labor provided by I.R.Z. and posts and bamboos purchased with U.S.A.I.D. funds.
- 6/81 - Six small enclosures (20 m. X 4 m.) were put up at the new sheep barn with wire from I.R.Z. and with posts, bamboos, and labor purchased with U.S.A.I.D. funds.
- One enclosure ($\frac{1}{8}$ hectare) was put up to protect Guatemala grass, Desmodium intortum, and Stylosanthes that were planted for the dairy goats. Some of the barbed wire was provided by I.R.Z. All the posts, the wire nails, bamboos, and labor to put up the fence and to plant the forages were paid for with funds from U.S.A.I.D. (This was the situation for the fences that were put up during the rest of 1981.)
- 7/81 - One paddock ($\frac{1}{2}$ hectare) was put up for the bucks.
- Four pick-up loads of Guatemala grass cuttings, three pick-up loads of Bracharia cuttings, 20 kg. of Setaria seeds, 3 kg. of Desmodium seeds, and 3 kg. of star grass cuttings were planted near the new sheep barn. The labor was paid with funds from U.S.A.I.D.
- 9/81 - One paddock ($1\frac{1}{2}$ hectare) was enclosed for the rams and one paddock ($\frac{1}{4}$ hectare) was enclosed for the ewes.
- 10/81 - One paddock ($\frac{1}{3}$ hectare) was enclosed for the dairy doe herd. In 12/81 the fence was torn out on one side by workers who put in the station's new water system. It was not restored until 5/83.
- The dipping vat for the sheep was completed. Finally, the exotic sheep were allowed to graze outdoors.
- 11/81 - One enclosure (0.9) was put up to protect the forages that were planted near the sheep barn in 7/81.
- 12/81 - The dipping vat for the goats was completed.

- 12/81 - One enclosure (1 hectare) was put up to protect the new garden from free ranging goats. The area was planted in forages for the dairy goats during 1983.
- 3/82 - Containers arrived from the U.S.A. with rolls of barbed wire, rolls of sheep wire (90 cm), rolls of goat wire (115 cm), staples, etc. This wire was used to put up fences during 1982 and 1983.
- 5/82 - Seeds of Stylosanthes guiensis (sic?), Stylosanthes scabra, and Desmodium heterocarpon were planted in rows inside the forage enclosure near the sheep barn.
- Five workers were hired by I.R.Z. to build fences. They dug holes for four months, but fences were not put up until November because posts and other materials were lacking. They were often re-assigned to do other work.
 - One half hectare near the dairy goat barns was seeded with Stylosanthes guiensis(sic?) and Desmodium heterocarpon seeds to improve the pasture that would be enclosed with the new wire in 2/83.
- 6/82 - Enough steel for 200 posts arrived from Yaounde and was taken to Bambui Centre to be cut into fence posts. Some were welded for corner and for brace posts. Holes were put in them at measured intervals for the tying of wire. There were not any sand, cement, and broken stones to reinforce them.
- 7/82 - Cuttings from Guatemala grass, star grass, and Bracharia and seeds of Desmodium heterocarpon and Stylosanthes were planted to improve the grazing land and to provide forage production for confinement feeding for the Belgium Sheep Project.
- 8/82 - Posts that were prepared at Bambui were used by the new head of the piggery to shore up the pigs' enclosures.
- Leuceana (Cunningham) was planted in the garden near the dairy goats' barn.
- 10/82 - Hundreds of steel posts arrived from I.R.Z.-Yaounde. Reinforcement materials for corner posts and brace posts were needed.
- 11/82 - Five paddocks (2.0 hectares) were enclosed for the local goats. The corners were not reinforced. Some wooden posts were used.
- 12/82 - The bucks overran the Guatemala grass that was established in 1981 because the fence was not repaired. The station's administration would not buy the bamboos that were needed.

- 12/82 - One paddock (1.0 hectare) was completed to provide the rams with additional grazing land. (Star grass cuttings and Bracharia seeds were planted in 6/82 to improve the pasture.)
- 1/83 - An uncontrolled bush fire burned $\frac{1}{4}$ of the Guatemala grass at the sheep barn because fire tracing was not done.
 - Rabbit workers started cutting Guatemala grass and feeding it to the rabbits because of the dry season feed stress.
- 2/83 - Four paddocks (2.0 hectares) were formed by enclosing land south of the dairy goat buildings. (About $\frac{1}{4}$ of the area was seeded with leguminous forage seed in 5/82.)
- 4/83 - The wooden post/barbed wire fence that was put up in 7/81 for the dairy bucks ($\frac{1}{2}$ hectare) was replaced by using the imported goat wire and the steel posts. The area was enlarged and divided with $\frac{1}{3}$ hectare enclosed for Guatemala grass and other forages.
- 5/83 - One paddock (1.0 hectare) was formed for the local goats by enclosing grazing land along the raffia bush.
 - Some Guatemala grass cutting and sudan grass, guinea grass, and Desmodium uncinatum seeds were planted in the former garden for dairy goats.
 - Guatemala grass cuttings covering $\frac{1}{4}$ hectare were planted near the rabbit house.
 - Seeds of Stylosanthes, Setaria, and guinea grass were sown on 0.75 hectare west of the newer sheep barn to improve the pasture.
 - Seeds of Stylosanthes hamata and Glycine (verano ?) were planted in rows inside the forage enclosure for the sheep.
- 6/83 - One enclosure (0.6 hectare) was put up to protect the Guatemala grass that was planted for the rabbits.
 - Funds were provided by the director of I.R.Z. to buy sand, broken stones, and cement for fence post reinforcement, to buy lumber and hinges for gates, and to hire five workers to put up fences for two months.
 - Construction was begun on a new dairy goat barn.
 - Cuttings from Guatemala grass and Bracharia and seeds of Stylosanthes, Desmodium, guinea grass, and molasses grass were planted in the five paddocks (11/82) for the local goats.
 - $\frac{1}{4}$ hectare was planted in Guatemala grass cuttings for the dairy goats.
- 7/83 - Cuttings of Bracharia were planted to improve $\frac{1}{4}$ hectare of pasture for the dairy goats.
 - One paddock (0.75 hectare) was enclosed west of the newer sheep barn.

- 7/83 - Two paddocks (2.0 hectares) were formed for the dairy goats by enclosing grazing land southwest of the barns.
- 8/83 - One paddock (3.0 hectares) was formed by enclosing a hill north of the sheep barns.
- The first five paddocks for the dairy goats that were put up in 10/80 were replaced with steel posts and imported goat wire.
 - The fence around the new water system/pumps (10/81) was replaced to form a 1/3 hectare paddock for the dairy does.
- 9/83 - The station's carpenters started making gates for all the enclosures that were put up during the past year.
- All the steel fence posts had been used.
 - All the imported goat wire had been used.
 - Only enough sheep wire remained to replace the barbed wire fences that were put up at the sheep barn in 1981.

HEALTH CARE

The health care programme for the sheep and goats was viewed by the I.R.Z. veterinary doctor as a job of day to day treatment of animals that had apparent symptoms/signs of illness (diarrhoea, loss of appetite, high temperature). The initiation of preventative health care practices such as vaccinations, a frequency of spraying/dipping to control ticks, use of coccidiostats in young animals, etc., had to be made by others (Dr. Nielsen and myself). No serious disease condition was unique to Mankon. Internal parasitic infestations and coccidiosis are world wide in scope. A review of existing literature includes information on heartwater and blue tongue in livestock from both indigenous and exotic breeds raised in Africa. The fact that the weaned young and the adults were confined inside filthy buildings most of the time with little (if any) harvested grass/forage to eat and that the nursing dairy kids were being underfed milk because the workers sold or drank it, were not major concerns of the veterinary doctor. It appeared that he believed that the outside environment was the source of all diseases and that the sheep and goats should be fed expensive concentrate feeds like swine and poultry. As long as the animals of all classes are nutritionally stressed, it will be very difficult to determine: 1) the cost effectiveness of preventative health care practices which are to be recommended to local farmers/livestock raisers; 2) the potential productivity of animals of the exotic and the local breeds. Mortality rates of all classes of animals

will remain too high to provide enough animals for research, for "on farm" demonstrations, and for distribution to farmers wanting to improve their livestock production by raising genetically superior animals.

During the three years progress was made in providing the animals with improved health care. Some veterinary supplies were finally kept in the goat and sheep buildings and the livestock attendants were allowed to treat animals when the veterinary doctor was not present. Vaccination against enterotoxemia should be undertaken. Whether or not the improvements that have been made are maintained and whether or not progress continues to be made will rest with the veterinary doctor who must now take the initiative.

COMMON AILMENTS OF SHEEP AND GOATS

- Coccidiosis - chronic severe diarrhoea and death
- Internal parasites (gastrointestinal) - diarrhoea and anemia
- Rumen flukes - anemia and death
- Blood parasites - anemia and death
- Heartwater - acute high temperature, loss of appetite, and sudden death
- Pneumonia - respiratory infections, high temperature, and death
- Enterotoxemia - acute diarrhoea and sudden death
- Blue tongue (only exotic sheep) - death
- Others - sore mouth, pink eye, hoof rot, mange, and ear mites

A CHRONCLOGY OF HEALTH CARE

F.22

- 10/80 - Dr. Ekue found larvae in the brain of a dairy goat that died. By May 1, 1981, larvae were found in the brains of five more animals. *Oestrus ovis* was suspected.
- 11/80 - The first dairy animal (a bull) died on a small farm. Heartwater was suspected. I was present when the Bambui veterinary doctor cut the bull's brain open.
- 3/81 - I had "palabra" with Dr. Ekue because I had asked the workers to spray the dairy goats more often than once a month to control ticks.
- Dr. Ekue agreed that spraying should be increased to once a fortnight, after a Toggenburg buck died of suspected heartwater.
- 4/81 - The dairy farmers were recommended to spray their cows twice a week because of more cases of suspected heartwater.
- Dr. Ekue agreed that spraying should be increased to once a week for the dairy goat herd.
- 5/81 - Dr. Ekue agreed that spraying should be increased to twice a week.
- 8/81 - Dr. Nielsen, the newly arrived head of the Belgium Sheep Project, identified coccidiosis as the cause of severe chronic diarrhea in the exotic buck herd. (Dr. Ekue had suspected wet grass.)
- The chief of station, Dr. Ekue, and I had to meet to approve the morning grazing of wet grass.
- 9/81 - Dr. Nielsen recommended monitoring blood and fecal samples to identify parasitic infections in the goat herd. Dr. Ekue was not interested.
- 10/81 - Abortions started in the dairy goat herd and became a chronic problem.
- 11/81 - Dr. Nielsen recommended treating pregnant does with injections of antibiotics to control abortion causing conditions.
- 12/81 - Dr. Ekue agreed to try to control abortions with injections of antibiotics. By April, 1982, more than 30 does aborted.
- 2/82 - Dr. Ekue agreed to use a different wormer each month instead of giving the same drug over and over again.
- 3/82 - After losing 2 or 3 exotic ewes to heartwater, Dr. Ekue agreed to let me treat sick animals with high temperatures by injecting with tetracycline when he was not present.

- 3/82 - Dr. Nielsen showed the technical assistants and trainees from the veterinary schools how to make an autovaccine against soremouth and how to vaccinate young animals.
- 4/82 - Dr. Nielsen identified rumen flukes in a dairy goat that died suddenly.
- 5/82 - Dr. Nielsen identified blood parasites in the blood of anemic and dying dairy does.
- I provided Dr. Ekue with a photocopy of the health care plan that was being followed in Ivory Coast.
- 6/82 - Dr. Ekue left for an eight week study/seminar at Cornell University.
- Dr. Nielsen suspected a blue-tongue infection in the exotic sheep herd. With the help of the assistant director of I.R.Z., samples were taken and sent to Britain for identification of blue-tongue.
- Dr. Nielsen recommended that some antibiotics and scours treatment be kept in the goat and sheep sections. She posted an outline of treatment procedures to be followed by the livestock attendants. The chief of station finally gave his approval to these recommendations.
- 7/82 - Dr. Nielsen recommended that Amprol, a coccidiostat, be used for 5 days as a drench/once a month for three months for young kids and lambs. (This was the practice followed for local dwarf forest lambs in Ivory Coast.) This preventive health care practice became routine.
- 8/82 - Dr. Ekue took blood samples from sheep and goats, identified anemic animals, and treated them.
- 9/82 - Dr. Ekue agreed to keep syringes and antibiotics on stock in the sheep and goat buildings to be used by the livestock attendants.
- 10/82 - Dr. Ekue began regular, systematic sampling of feces to identify parasitic problems and to monitor the effectiveness of different treatments.
- 12/82 - Dr. Ekue finally agreed to keep scours treatment on stock in the sheep and goat barns.
- Dr. Alphonse Nfi arrived at Mankon and replaced Dr. Ekue when he went to Britain in October, 1983. He worked for two months at Mankon during the rainy season of 1983. Whenever I was not present, he told the livestock attendants and the research technicians not to let the animals graze before 9 a. m. He did not want them to eat wet grass.
- 4/83 - Dr. Nielsen vaccinated all the sheep and goats against foot and mouth disease.

LIVESTOCK ATTENDANTS, TECHNICAL ASSISTANTS,
AND RESEARCH TECHNICIANS

Before October, 1980, the management of the goats was left almost completely to the livestock attendants. No one lived at I.R.Z.-Mankon Station. Since the station's office was in Bamenda, the researchers came to the farm in the morning for 2 to 3 hours per day, six days a week. When the first house was completed at the farm, I moved there so that I could assist and supervise the livestock attendants with the management of the goats everyday - morning and afternoon.

I.R.Z. had only a few persons who were trained in the health care and management of ruminants (mostly French veterinary doctors and forage researchers) and none had been assigned to work at Mankon. Persons were hired to work as livestock attendants, technical assistants, and research technicians who had no previous training in livestock production and who had little (if any) previous experience with raising livestock. No one was provided with a job description. If there was to be any training, it was left up to me to decide.

Before there could be significant improvement in the management of the sheep and goats for the long term, it was necessary that the livestock attendants improve their management skills. During the first year, I spent most of my time in the livestock sections working with them to improve the nutrition, health care, and breeding of the animals. A week after the June, 1981, livestock shipment, the first formal training programme involved two livestock attendants of the dairy goats and one livestock

attendant that had recently been assigned to work with the sheep. Since we were to some degree starting anew with the new animals, we were trying to get the workers and the animals off to a good start. The presence and leadership of Mrs. Rosalee Sinn made the training programme possible.

As the animal populations increased and as more workers were hired to be livestock attendants during 1981 and 1982, the need for the training of all livestock attendants was called to the attention of the chief of station. It was suggested that workers from the "general pool" could be assigned to work on a temporary basis in the livestock sections so that the work would not fall behind schedule and so that the animals would not be neglected while the workers of that section devoted a few hours a week to training. The chief of station found this suggestion to be unacceptable. In August or September of 1982, it was decided that all livestock attendants should meet in the new office building for one hour a week at 11 a.m. on Saturdays so that the researchers from each section (swine, poultry, rabbits, small ruminants, and veterinary medicine) could give presentations on management. After two Saturdays the programme was abandoned because the attendance of both the livestock attendants and the researchers had been very poor. It appeared that the administration of the station was not concerned with improving the management skills of the livestock attendants. Perhaps there was a lack of interest in training because the administration at Mankon (the chief of station and other influential persons) did not have a fundamental understanding of livestock productivity and had not had the experience and training in livestock management that is

required to produce animals and animal products. Did they know whether or not the confinement of ruminants indoors without harvested grass//forage to eat for 18 or more hours per day was a cost effective means of production?

There was one other formal training programme in which the livestock attendants for the small ruminant programme took part. In early December, 1982, there were four nights of training at the Rural Training Centre at Mfonta that was part of the year training programme for the Centre's 30 trainees. Most of the livestock attendants for the sheep and goats attended some of the sessions. Dr. Williams, the H.P.I. chief of party, arranged with the Mankon chief of station for a driver and vehicle and paid for the gasoline so that there would be transport for the livestock attendants. Again, Mrs. Sinn's influence, leadership, and presence helped bring about this participation. During the same period, there were plans for a training programme for the technical assistants and the research technicians that was geared to the management of a 100 ulus dairy goat herd. However, they were required by the director of I.R.Z. to participate in a programme at the new laboratory which was being put on by the Polish technicians. The new head of the laboratory subsequently expelled the technical assistants and the research technicians for the small ruminants from the laboratory because only the laboratory technicians were allowed to work in the laboratory (01/83).

The training of the livestock attendants, both on the job and in formal sessions, emphasized the following:

Nutrition-

- a) to understand that animals that are not fed well can not be healthy and productive; grow well, give birth to healthy kids/lambs, and produce lots of milk for a long period of time (8 to 10 months each year for dairy goats);
- b) to understand that the nutritional needs of different animals differ because of age, sex, size, growth, pregnancy, level of milk production, etc.;
- c) to understand that grass/forage is the best, feed for ruminants; that the sheep and goats should have free access to grazing land and/or be provided free choice with more hand cut grass/forage than they can eat; that grass/forage differ in quality (amount of protein, energy, etc.);
- d) to understand that a feeding programme is changed slowly depending upon the animal's need for growth and/or production or the change in the availability of feed supplies;
- e) to understand that concentrate feeds and grass/forage must be balanced in a feeding programme; that animals can be switched to an all grass/forage diet but they can not be fed an all concentrate diet;
- f) to understand that the animals should be kept outdoors for as long as possible each day so they can feed themselves growing grasses by grazing; that grass/forage of high quality and quantity was not being produced only for confinement feeding, but also, for pasture improvement;
- g) to understand the need for salt/minerals and for clean drinking water to be provided free choice everyday;
- h) to understand that young kids require an average of one litre of milk to be fed every day for upto one hundred days.

Health Care-

- a) to understand that animals can not be healthy if they do not receive proper nutrition;
- b) to understand that animals can not be healthy unless they are provided with a clean place to eat, to sleep, and to drink water;

- c) to understand that animals need protection from excessive rain, wind, and sun light;
- d) to be able to identify from behavior and from appearance animals that are healthy and animals that are not sound because of acute and chronic conditions: poor coat color (look dry), loss of weight, loss of appetite, failure to grow, scours or diarrhoea (acute and chronic), sore mouth, watery eyes (pink eye), mastitis, etc.;
- e) to be able to carry out a preventative health care plan: a frequency of spraying or dipping to control ticks; regular de-worming to control internal parasites; regular drenching with a coccidiostat to prevent and/or to control coccidiosis in young animals; yearly vaccinations against sore mouth, enterotoxemia, etc.;
- f) to be able to provide treatment:
 - 1) to take the animal's temperature,
 - 2) to calculate the dosage from the size and age of the animal,
 - 3) to follow the instructions for drenching or for injecting,
 - 4) to know how to drench or to inject the sick animal,
- g) to record signs/symptoms, treatments, and deaths.

Breeding-

- a) to know at what age animals become sexually mature;
- b) to be able to identify animals in heat;
- c) to be able to carry out a breeding programme:
 - 1) to identify females that are too young for breeding,
 - 2) to know when a doe/ewe is due to be bred,
 - 3) to know what time or times to breed,
 - 4) to know how to choose a buck/ram for breeding,
 - 5) to know when and how to record breedings and births.

Other management skills-

- a) to know how to milk and to record milk yields,
- b) to know when and how to disbud kids/lambs,
- c) to trim hooves on a regular basis.

It would take more than the training of the livestock attendants to improve the management of the animals because there were structural problems within the station's hierarchy that contributed to the management difficulties. Attendance was a chronic problem. How are the animals going to be managed when the livestock attendants do not show up for work!? They often came to work late and left early, especially in the afternoons, if they came at all. Since there was only one person responsible for recording attendance and he worked only in the mornings, and since the administration of the station and the heads of programmes/researchers did not work after 2 p.m. and did not work at all on Sundays and holidays, absences were common afternoons (from 2:30 to 5:00 p.m.), Sundays, and holidays. When a livestock attendant was absent in the morning, a worker from the "general pool" was assigned to fill in if available. Since the "general pool" workers were not on duty for the afternoon work shift, Sundays, and holidays, livestock management responsibilities were too often neglected when the livestock attendants were absent. Buildings were not cleaned as often as they should have been. The animals were not allowed to graze outdoors as long as they should have been. Animals that were sick in the afternoon, on Sundays and holidays, were often neglected. There was no system for rewarding regular attendance and for good workmanship and there was little, if any, loss of wages and job benefits for neglect of work responsibilities and for unauthorized absences.

Since I was the only one to live at Mankon Station for the first 18 months (Even though Dr. Ekué moved to the farm in 9/81, he played football in the afternoons.), and since the technical assistants and the research technicians did not live there even at the time of my departure, whenever I was away from the station in the afternoon, holidays, and Sundays, no one with authority was present. I ended up being tied to the livestock sections seven days a week, morning and afternoon, to assist and to supervise the livestock attendants with the day to day management. Since too many times there were not enough livestock attendants present to get the jobs done, I became a livestock attendant. For much of the time, I was doing too much of the work myself by doing the feeding, the treating of the animals, the hauling of feed and water, and the cleaning of the buildings. At best this was a demonstration of what could and of what should be done. Otherwise, I was making most of the management decisions, was telling the livestock attendants what to do, and then, was making sure that they did what I had said to do. (I was also very busy with the fence construction and the initiation of a forage programme.)

By the time of my departure from Mankon in November, 1983, attendance had improved somewhat and some of the livestock attendants who had several years of work experience were doing a much better job with the management of the animals. The administration of the station was making an effort to monitor afternoon attendance everyday and to penalize anyone that was late or absent without authorization. There was talk of placing everyone (except the

the office staff) on a two shift work day like that of the livestock attendants. However, there was a constant problem with the continuity of the livestock attendants because of sudden illnesses, annual leaves, maternity leaves, and suspensions from work, and because the administration of the station had become less and less willing to assign workers from the "general pool" to fill in for livestock attendants that were absent for any reason. In the long term, it will be the performance of the livestock attendants that determines the success of the program because there will be high turnover of researchers, research technicians, and technical assistants due to their participation in advanced training programmes and due to transfers.

In August, 1981, Dr. Nielsen arrived at Mankon to initiate the Belgium Sheep Project with the dwarf forest sheep that are raised locally. She provided (unofficially) a back up for the inadequacies of the I.R.Z.-veterinary doctor, Dr. Ekue. Even though it often took months, Dr. Ekue eventually accepted and followed up most of Dr. Nielsens's recommendations for treatment and for disease monitoring (e.g. - fecal and blood sampling).

In January, 1982, and again in January and April, 1983, a total of four persons were hired by I.R.Z. to be research technicians in the small ruminant programme. They were graduates of the University of Yaoundé with licence degrees in biology. I provided them with materials on sheep and goat management and with short term training so that they would have a basic understanding of nutrition, health care, breeding, and forage production. There was an emphasis on record keeping and on

using records as management tools.

For the most part, the research technicians were hard working, conscientious, and took an interest in the livestock programmes. They could be relied upon to carry out day to day work assignments. Since they did not live at the station and since they were not required to work in the afternoons when the livestock attendants worked the second shift, they were not present to provide leadership and supervision of the livestock attendants during my absence afternoons, holidays, and Sundays. In September, 1982, nine months after the arrival of the first two research technicians, one technician was assigned to work full time with Dr. Nielsen in the Belgium Sheep Project.

During 1982 (in May and in October) two persons were hired to be technical assistants. They had just finished high school, were younger than the research technicians, and had had no previous experience and training with small ruminant production. There was no job description for them. They took little interest in the animals. Their attendance in the livestock sections was irregular and they could not be relied upon to provide help with routine management practices. They came to work and left at whatever time pleased them.

In mid-August, 1983, I.R.Z.-Yaoundé set up a training programme for four weeks (40 hours/week) in Bamenda for all the research technicians of the institute in all aspects of animal science research for all the species of livestock. This was the unique effort by the top administration of I.R.Z. to provide its personnel with any sort of training.

The Belgium Sheep Project made plans during early 1983 to send the first two research technicians of the small ruminant programme to Belgium for graduate studies in animal science in September, 1983. However, the new chief of station at Mankon failed to follow through on the necessary paper work in time, and as a result, the plans for study in Belgium had to be postponed for a year. (In December, 1983, the other two research technicians were told to get their academic papers in order and to seek admission in master of science programmes in American universities. By March, 1984, three of the four research technicians had been re-assigned to other I.R.Z. stations for sheep and goat work.)

Upon my departure from Cameroon in November, 1983, I.R.Z. had failed to assign anyone to head the small ruminant programme (much less to be responsible for the day to day management of the animals and supervision of the livestock attendants), in spite of the fact that the project evaluation had recommended in early 1983 that a Cameroonian researcher be assigned to head the programme. This was a return to the conditions of October 1980, when the management of the goats had been left in the hands of the livestock attendants. In spite of the time, effort, and expenses that were undertaken to improve the overall management of the sheep and goats, the progress that has been made could be short lived because of this lack of leadership. The following is a list of areas where the management is still vulnerable.

AREAS OF MANAGEMENT FAILURE

- 1) Lack of training and of supervision of livestock attendants:
 - a) Workers are hired to be livestock attendants who have not been adequately trained and no attempt is made to improve their management skills by training.
 - b) Workers are not required to clean the livestock buildings and to remove the manure from under the floors.
 - c) Workers fail to send the animals outside to graze on time because they come to work late.
 - d) Workers do not carry by hand enough clean drinking water for animals that are confined inside buildings and in paddocks.
 - e) Animals are confined inside the barns for treatment or for observation all day without water to drink and hand cut grass/forage to eat. (The livestock relies too heavily upon unreliable workers for feed and water.)
 - d) Animals are left outdoors in paddocks without shelter from the sun and from the rain.
- 2) Paddocks are overgrazed:
 - a) No one knows what overgrazing is.
 - b) Grazing is not controlled. Rotational grazing is not practiced.
 - c) Pastures are not improved with more productive and more nutritious grass/forage species and with fertilization.
 - d) Herders are not available or are too lazy to take the doe and ewe herds outside the paddocks to graze unfenced land. It is easier to leave these herds inside than to take/send them outside to graze.
 - e) There are no additional fences to expand areas for controlled grazing.
- 3) Grass/forage production is inadequate for confinement feeding and for supplemental feeding in the dry season:
 - a) There is no one trained and responsible to carry out the forage production process.
 - b) The station's administration does not provide funds to hire workers and to pay for forage seed and fertilizer that are required to establish and to manage grass/forage.

- c) Dry season bush fires destroy Guatemala grass and other grass/forages because fire tracing was not done. Requests for workers to do fire tracing are turned down by the administration.
 - d) There is poor regrowth of hand cut grass/forage (Guatemala grass and Desmodium intortum) because the workers cut the grass off too close to the ground.
- 4) There is no water for dry season cleaning of the goat and sheep barns and for filling the dipping vats:
- a) There are no vehicle and driver to haul water.
 - b) The drums that are used to haul water leak because they have not been maintained.
- 5) The kids are underfed:
- a) The paddocks are overgrazed.
 - b) There is no harvested forage for supplemental feeding.
 - c) Too much milk is sold rather than be fed to the kids.
- 6) The feed supply is irregular:
- a) The concentrate feed ran out before more feed was ordered from the feed mill.
 - b) There was no pickup with driver available to take feed from the feed mill and deliver it to the animal barns.
- 7) The veterinary personnel back slide:
- a) There are no thermometers.
 - b) Veterinary medicines are not kept on stock in the livestock sections.
 - c) The animals are not allowed to eat wet grass.
 - d) There is no vaccination programme against sore mouth, enterotoxemia, etc.
- 8) Sick animals fail to receive treatment:
- a) Livestock attendants are not trained to identify sick animals.
 - b) Livestock attendants neglect sick animals because they are not supervised and monitored.

- 9) There is no breeding programme:
 - a) There is no one trained to carry out breeding.
 - b) Record keeping is neglected.
 - c) Bucks and rams are not controlled because the fences are not good (strong and high) enough to hold them.
 - d) Does in heat are not confined inside the doe barn.
 - e) Does and ewes are too young when they are bred because male and female kids and lambs are kept together too long after weaning.
 - f) Animals are not bred because heat is not observed by the livestock attendants.
 - g) There are not enough males of each breed (unrelated males) to maintain breed integrity.
- 10) Routine management practices are neglected:
 - a) Hooves are not trimmed often enough.
 - b) Young kids are not disbudded.

AN ALTERNATIVE MILKING PROGRAMME
FOR THE EXOTIC DAIRY GOATS

November 6, 1983

- 1) Confine the doe and newborn kid(s) together for 3 to 7 days after birth. Feed the doe cut grass/forage and concentrate feed. Observe the kid(s) for soundness.
- 2) Separate the kid(s) from the doe at about 7 days of age from 8 a.m. until 4 p.m.
 - A. Feed the doe concentrate feed every morning then send her outdoors to graze.
 - B. Feed the kid(s) concentrate feed and cut grass/forage. Observe the kid(s) for soundness. Do not let the Kid(s) graze.
 - C. Feed the doe concentrate feed at 3 p.m. Milk her at 3:30 p.m. Put her and her kid(s) together for the night.
 - D. Costs are reduced because -
 - no fuel is used to heat the milk for the kids;
 - no feeding bottles are used;
 - no labor is required to feed the kids and to milk the does each morning.
 - E. Milk from the afternoon milking can be heated and used for research or sold to the workers.
- 3) Wean the kid(s) at 100 days of age. Let the kid(s) begin outdoor grazing during the day.
- 4) Milk the doe in the morning at 8 a.m and in the afternoon at 3:30 p.m. Use the milk for research and/or sell it.

A CHRONOLOGY OF H.P.I. SMALL ANIMAL ADVISORS,
LIVESTOCK ATTENDANTS, TECHNICAL ASSISTANTS,
& RESEARCH TECHNICIANS

- 10/80 - I arrived at I.R.Z.-Mankon.
- There were two livestock attendants for the 40 to 50 exotic dairy goats.
- There was one livestock attendant for the 50 local dwarf goats.
- On October 21, I received the station's Suzuki 100 motor bike to ride to the station and stay there as long as necessary everyday and so that I could help the acting chief of party, Thomas Needham, with dairy farmer extension.
- 12/80 - I moved to the house at Mankon Station.
- 1/81 - Construction was begun on the new sheep barn which I designed.
- 2/81 - One livestock attendant from the dairy goats and I attended the National Agriculture Fair in Bertoua for 9 to 10 days.
- Thirty sheep of the northern Cameroon hair breed (Fulani) were bought at the fair and were brought back to Mankon.
- One worker was assigned to be a livestock attendant for the new sheep.
- Mr. Charles Burwell, Dr. Gerald Williams, and I met in Douala.
- 3/81 - Steve Steinberg departed.
- 4/81 - Dr. Williams arrived in Bamenda to be the chief of party.
- The new sheep building was completed.
- 5/81 - A third worker was hired to be a livestock attendant for the dairy goats.
- Ann Krush arrived at I.R.Z.-Mankon.
- 6/81 - The livestock shipment from H.P.I. arrived with 50 exotic American sheep and 60 dairy goats.
- A second worker was hired to be a livestock attendant for the sheep.
- 8/81 - Dr. Nielsen arrived at I.R.Z.-Mankon to initiate the Belgium Sheep Project.

- 12/81 - Twenty head of local dwarf sheep were purchased for a dry season feeding trial of cotton seed cake and an additional worker was hired to manage them.
 - An additional worker was hired to work at the local goats for a dry season feeding trial with cotton seed cake.
- 1/82 - I departed for the U.S.A. to attend the Third International Goat Conference in Arizona, to attend the H.P.I. programme support meetings in Little Rock, and to visit the U.S.P.H.S. Hospital in Carville, La.
 - Construction was begun on a second sheep barn which I had designed.
 - The first two research technicians were hired for the sheep and goats (Pauline and Luc)
- 2/82 - I returned from six weeks in the U.S.A.
- 4/82 - A worker was hired to be a herder for the dairy doe herd because it was eating local farms.
- 5/82 - A person with a high school degree was hired to be a technical assistant.
 - Ann Krush departed.
- 6/82 - Pauline, one of the research technicians, went on a maternity leave of 110 days.
 - The new office/laboratory building was dedicated.
 - I moved to mile 4, Bamenda, while a new house was being built for me. The chief of station moved into the house where I had been living since 12/80.
 - A worker was hired to be the third livestock attendant for the sheep.
- 8/82 - I moved into a new house at I.R.Z.-Mankon.
- 9/82 - Pauline returned from the maternity leave.
 - Luc, the other research technician, was assigned to work full time with Dr. Nielsen.
- 10/82 - A worker was hired to be the second livestock attendant for the local goats.
 - A person with a high school degree was hired to be a technical assistant, to work with the sheep.
 - The work was abandoned on the second sheep barn.
- 12/82 - The laboratory was equipped with Polish equipment by Polish technicians.
 - Twenty additional sheep were purchased for another dry season feeding trial of cotton seed cake.

- 1/83 - A third person was hired to be a research technician.
 - Pauline was assigned to work full time with the local goats.
 - The evaluation team from I.R.Z., H.P.I., and U.S.A.I.D. visited Mankon.
- 3/83 - SONEL brought electricity to Mankon Station.
- 4/83 - A fourth person was hired to be a research technician.
 - Steve Lukefahr arrived at I.R.Z.-Mankon.
- 6/83 - Construction was begun on a new dairy goat barn which I designed.
- 7/83 - Work was abandoned on the new barn.
 - Construction was begun on two new buildings for the local goats and local sheep.
- 8/83 - A new chief of station was appointed at Mankon.
- 10/83 - The two new buildings for the local animals were completed.
- 11/83 - I departed for Nigeria, Togo, Ghana, ..., and the U.S.A.
 - Three livestock attendants and one herder had been assigned to work with the dairy goats.
 - Three livestock attendants had been assigned to work with the local goats.
 - Three livestock attendants had been assigned to work with the sheep. (Two spent most of their time herding the ewes.)
 - Two technical assistants had been assigned to work with the small ruminants.
 - Three research technicians had been assigned to work with the sheep, the dairy goats, and the local goats.

RESEARCH STRATEGY, TRAINING, AND DISTRIBUTION

Small ruminants have a special role to play in the development of livestock production in rural areas of the Northwest Province. While the small farmers do not have a tradition of raising cattle, most small farmers have been raising sheep and goats for generations. The long rainy season produces an abundant supply of grass to feed small ruminants. Elephant grass and molasses grass establish themselves in fields that have been left fallow. These and other grasses must be cut down continuously on "coffee farms" to reduce competition for the coffee trees. When choosing between sheep and goats, small farmers usually prefer to raise goats for a variety of reasons. Many men hold the traditional belief that sheep will steal their fertility if they raise sheep during their early years of marriage. It is also believed that goats are hardier than sheep and that goat meat is tastier than the meat of sheep and of cattle. Goats also play an important role in traditional ceremonies such as marriages and death celebrations.

There are individuals that raise sheep. Herds of 100 and more ewes can be found in the grassfields north and east of Bamenda. These herds of sheep are usually owned and herded by the Fulani who are Moslems. In the same region there are others who are not Moslem that raise sheep and goats together in enclosed grazing areas.

When we consider improving the management skills of the small farmers/livestock raisers, an understanding of traditional

management systems is required and the productivity of the small ruminants that are raised under these systems must be measured. The research institute should develop management systems that improve production (quantity and quality of animals and animal products) by identifying the restrictions to production that exist in the traditional farming/production systems and by testing a combination of "interventions" that attempt to minimize, alleviate, or overcome the restrictions. The cost effectiveness of the interventions must be measured.

Many questions should be addressed. What "problems" exist with traditional breeding and nutrition and with the health care of the animals? Under traditional production systems there is no control of breeding. Inbreeding is common. Females are bred while too young and have difficulty raising their first offspring. Kids and lambs that are born during the rainy season experience more poor health than those born during the dry season. There is no record keeping and there is no genetic improvement. During the rainy season animals are tethered to control grazing. After the tethered animals are soaked by downpours, feed intake is reduced. In the dry season they are allowed free range and destroy newly planted cassava and plantains. Small ruminants commonly suffer from mange and ear mites. Ticks are always present. Some young kids and lambs become afflicted with high levels of internal parasites and coccidiosis which cause chronic diarrhoea and death. Most sick animals are never shown to a veterinary doctor. Animals of all ages die of unidentified causes.

Given the uncontrolled breeding, the traditional feeding, and lack of a health care programme, how productive are these animals? How many kids or lambs are born per adult female each year? What is the yearly average milk production for the local dwarf doe? What is the mortality rate of animals for all ages and classes? What is the growth rate of those that reach "market" or slaughter weight? What is the selling price per pound of animals sold? What is the value of the labor input for each animal that is sold? What is the value or cost of other inputs? It is only after these and other questions are answered that the restrictions to production can be identified and that the cost effectiveness of an improved management system (combination of "interventions") can be tested and evaluated.

The productivity of the traditional farming/livestock production systems can be estimated by setting up simulations of traditional production at the research stations and by monitoring samples of traditional production units "on farm". A certain amount of "on farm" testing of the combination of "interventions" is required to overcome the research institute error factor.

The research institute should also identify the breed characteristics of the local breeds and identify from within these breeds genetically superior individuals that can be used to increase the productivity of the local livestock. New breeds (non-indigenous and exotic) should be studied to determine what role (if any) they could play in improving the performance of local animals by crossbreeding or by breeding up. Since the

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traditional production systems have developed under the restrictions of existing technology and environmental conditions (and also, of not so obvious sociological and historical factors), the management systems where the new breeds originated can not be automatically transferred for replication. The new breeds of animals may require a combination of "interventions" that is different from that which is recommended for the raising of local livestock.

What kind of research staff is necessary to develop improved management systems, to identify and to raise genetically superior animals for breeding programmes, and to study non-indigenous and exotic breeds and to determine their potential for improving the performance of the local animals? Researchers should be well trained in livestock breeding, nutrition, and preventative health care programmes. They should have extensive experience with traditional production systems and have regular contact with livestock producers and livestock extension agents. Researchers should also have a personal and professional interest in improving livestock production because the management of the animals on a day to day basis at the research station is not limited to the office hours of 7 a.m. to 2 p.m. and because the herders and livestock attendants often require assistance and supervision on holidays and Sundays.

However, most of I.R.Z.'s researchers at Mankon and Bambui have not had much previous experience with raising livestock because they come from families of civil servants and traders or

of forest zone farmers where livestock production is marginal. After primary school, education is continued in towns and cities. Since most of the research staff have recently completed a programme of advanced study in an urban setting, they have not had recent contact on a regular basis with livestock producers. Because of lack of experience with livestock production and lack of contact with traditional producers, these researches can not be expected in the short run to have a very good idea of what the improved management should be, of what level of production can be reasonably expected, and of what a long term comprehensive research strategy should be. Given these circumstances, it was not surprising that the herdsman/livestock attendants did not receive adequate training, assistance, and supervision in managing the station's animals, and as a result, that the overall management of all livestock (animals of both the indigenous and new breeds) was mediocre at the research stations. The potential for performance of the new breeds was not being accurately measured and individual animals that were genetically superior (whether from within the indigenous breeds or from within the new breeds) were not being identified. Mediocre management also resulted in fewer births and in higher mortality for all classes of animals and, therefore, there were fewer animals (if any) available for "on farm" research and for improving local livestock production by distribution. Livestock management practices and production systems that had been studied and developed haphazardly were being recommended to small farmers/livestock raisers without adequate evaluation, especially for cost effectiveness.

offspring raised for "on farm" research and for distribution to farmers/livestock raisers. Generally speaking, the improved ^{MANAGEMENT} of the small ruminants (as approved by the administration of I.R.Z.) was the replication of management systems that had been established where the exotic animals originated. Since the traditional production systems were hardly being considered, little of the livestock work that was being done at Mankon pertained directly to the development of a research strategy geared to the production of local and exotic animals in small production units "on farm." The fences for the sheep and goats were made almost completely of very expensive imported materials that were not available in the local market and, therefore, could not have served as models for local livestock raisers. The buildings which housed the animals were too large for small production units and too expensive for small farmers to build, having been designed for more than 100 adult animals and costing millions of francs CFA. One community leader visiting the small ruminant programme at Mankon commented that the buildings for I.R.Z.'s animals were better than the houses of most of her people.

The station's veterinary doctor had not yet expressed an interest in a preventative health care programme. He had the attitude that small farmers/livestock raisers were not capable of treating their own animals.

As for forage research, little more had been done than the identification of a few exotic grasses/forages that would grow well in that region. The research had not gone far enough to be able to make recommendations for extension because the quantity and quality of the fodder produced by the selected grasses/forages

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had not been measured. The amount of land that is needed to be planted (in Guatemala grass, for example) to produce enough fodder for 10 goats during the dry season had not yet been determined. Very little research attention had been given to measuring the productivity of such local grasses as elephant grass (Pennisetum purpureum) and molasses grass (Melinis minutiflora). The research stations had the monetary resources to provide the animals year round with expensive supplemental concentrate feeds that were fed to fill the fodder production (quantity and quality) gap. The institute's administration was not interested in the cost effectiveness of this feeding practice for small ruminants.

For most of the six years, since the arrival of the local dwarf goats, they had not been controlled and, as a result, very little had been learned from them. Inbreeding had been common. There were no individual performance records and there had not been any genetic improvement by selective breeding. The building of fences to enclose more than 3.0 hectares (six paddocks) during the year from 11/82 to 10/83 meant that finally we had "control" of the dwarf goats and that we knew where they were and what they were doing. (Whether or not they would have enough grass/forage to eat year round was yet to be determined.)

As for integrating the exotic breeds into the traditional livestock production systems, only enough crossbreeding had been done to know that the local females (does or ewes) of the dwarf forest breeds could be bred by the exotic males (bucks or rams) and produce crossbred offspring. We did not know yet whether or not the exotic X local offspring were less susceptible to blue

tongue and heartwater than their exotic fathers. We did not know whether or not the crossbred animals produced more milk (goat) and meat than the animals of their mothers' breeds.

One of the primary goals of the I.R.Z./H.P.I./U.S.A.I.D. cooperative project was to train small farmers/livestock raisers improved management techniques and to provide them with genetically superior animals which would help them increase the productivity of their livestock production. Since the opportunities for training in livestock production in Cameroun are limited primarily to highly selective, long term institutional programmes which usually exclude everyone except civil servants, and since most of the animals of the H.P.I. shipment were unique to Cameroun, many small farmers/livestock raisers were quite interested in participating in training programmes that would improve their management skills and that would make them eligible to obtain exotic livestock. The intense regional interest in goats made the training for goat production particularly attractive, regardless of the possibility of receiving an exotic goat.

Since many persons in Cameroun have been raising small ruminants of the local dwarf forest breeds for generations, can the production of these animals be improved upon? Is there information already available that can alleviate or minimize some of the restrictions to small scale traditional production? If this information exists, how can it be organized and presented to the small farmer/livestock raisers who want to increase and to improve small ruminant production? How can technical innovations be made that overcome or that atleast minimize those restrictions that are unique

to Cameroon or that have not been previously dealt with by scientific research? These are the challenges for training and research.

A management programme that attempted to deal with some of the restrictions was put together for the sheep and goats: 1) from observations that were made of conditions in the Northwest Province and at I.R.Z.-Mankon, 2) from the literature reviewed in I.L.C.A.'s Small Ruminant Production in the Humid Tropics (West Africa), and 3) from management practices that have been established in the U.S.A. and Europe. As far as I.R.Z. is concerned, most of the work at Mankon is done to imitate some of the management facilities and practices that are recommended for raising the exotic animals in their country of origin. As previously mentioned, most of I.R.Z.'s facilities were too expensive and too large to be models for the improvement of small scale production. Also, the trainees that came to Mankon to gain management experience while working with the animals learned some bad management practices from the poor work habits of unreliable livestock attendants. Since we had not systematically studied the productivity of the animals (both local and exotic) using the resources available to small farmers/livestock raisers, most of the restrictions to production were not well understood and the effectiveness of the recommended "interventions" had not been evaluated, especially for cost effectiveness.

I.R.Z. had very little, if any, tradition with training programmes. The three years marked a rapid increase in the number of inexperienced personnel, at every level, that were hired to manage the livestock and to carry out research. In spite of the fact that most of these new persons were not adequately equipped technically and educationally to fulfill their work responsibilities

A CHRONOLOGY OF TRAINING AND DISTRIBUTION

- 10/80 - The director of I.R.Z., Dr. Tebong, did not want any dairy goats distributed from Mankon because of the high mortality rate during 1980.
- 11/80 - A new chief of station was assigned to Mankon. Kenneth Ndamunkong had been a teacher at Bambili CCAST with a M.S. in zoology (research in snails) from Nigeria.
- Thomas Needham, as acting chief of party, Steve Steinberg, and I met with Dr. Tebong and Mr. Ndamunkong in Bamenda to work out the details of the 1981 H.P.I. livestock shipment: 48 dairy goats (36 does and 12 bucks) and 36 American sheep. It was agreed that 12 of these does and 3 bucks were to be distributed to missions and to small farmers.
- 12/80 - The three H.P.I. livestock advisors and the two chiefs of Station had a distribution meeting. The Baptist Seminary at Ndu was approved two does. Mr. Hammon of Bambui was approved a buck.
- 2/81 - Dr. Tebong, Mr. Charles Burwell, and Dr. Williams met in Yaounde to finalize the plans for the livestock shipment of June 1981. All animals numbers were increased.
- 5/81 - A five-month old buck was distributed to Mr. Hammon of Bambui. The Buck died in 7/83 after leaving some cross-bred offspring.
- 6/81 - Sixty dairy goats (45 does and 15 bucks) and fifty exotic sheep arrived from H.P.I.
- Dr. Tebong decided that no animals from the shipment were to be distributed.
 - Mrs Rosalee Sinn, Ann Krush, and I put on a training programme for 25 local small farmers, an extension agent, and three livestock attendants.
- 7/81 - Two trainees from the Baptist Seminary spent 10 days at Mankon working with the dairy goat livestock attendants and me to learn how to manage the dairy goats.
- 9/81 - Two does that had been raised at Mankon were distributed to the Baptist Seminary at Ndu. One doe died 2/83.
- 12/81 - I made my first trip to Ndu and to Nkambé.
- Mrs. Sarah Avolou, a trainee from Yaoundé, spent a week or more at Mankon to learn dairy goat management.
 - There was a distribution meeting to approve two does for the Rural Training Centre at Mfonta and two does and a buck for Mrs. Avolou.

- 3/82 - There was a training programme in sheep and goat management for the two new research technicians, five trainees from the veterinary extension school at Jakiri, one trainee from the veterinary extension school at Maroua, and two trainees from the Centre Universitaire de Dschang.
- Two does were distributed to Rural Training Centre at Mfonta.
 - There was a Dairy Goat Management Day as a follow up for the trainees of June, 1981.
- 4/82 - Two does and one buck were distributed to Mrs. Avolou in Yaoundé.
- 6/82 - Because of the blue tongue outbreak, no exotic sheep were to be distributed until more study had been done, according to Dr. Tebong. He limited the distribution of dairy goats to bucks that had been born at Mankon.
- The distribution meeting approved the distribution of one exotic buck to a veterinary extension agent at Nkambé.
- 7/82 - There was a training programme for 18 PCV's, 2 extension agents, and one technical assistant in sheep and goat management.
- An exotic buck was taken to Ndu to breed the two does.
- 8/82 - There was a training programme for 20 small farmers from Bafut in sheep and goat management.
- The swine fever "quarantine" blocked training at Mankon Station.
 - The two does taken to Yaoundé died of CCP.
- 9/82 - One exotic buck was taken to Ntambeng (mile 9) to cross-breed the local dwarf does for a small farmer for 3 weeks.
- 10/82 - An exotic buck from Ndu was taken to the Rural Training Centre at Mfonta.
- 11/82 - There was a three night training programme at Ndu for the seminary students with Mrs. Rosalee Sinn. Two does and a Kid were taken from Mankon for demonstration.
- There was a training programme at the Valentine's Young Farmers Club of Bansa in dairy goat management. The two does were left there for one year for follow up training and demonstration. There were monthly meetings throughout 1983.
- 12/82 - There was a training programme at the Rural Training Centre of Mfonta for the trainees and for the livestock attendants of the sheep and goats.

- 2/83 - An exotic buck was taken to the mixed farmers group of Mforya-Bafut to crossbreed their local dwarf does. (Two of the farmers attended the training at Mankon 8/82.)
- There was a training programme for a new research technician and for eight PCV's.
- 5/83 - An exotic buck was taken to Banso to breed the dairy does and for demonstration.
- 8/83 - A buck was taken to Ntambeng for crossbreeding the local dwarf does for a small farmer.
- There was a request for an exotic buck from the Mforya-Bafut mixed farmers group to crossbreed their local dwarf does. The new chief of station delayed approval of this request indefinitely.
- 9/83 - There were two one-hour lectures in Bamenda and one three hour presentation/demonstration of sheep and goat management for the research technicians of I.R.Z. This was the only time given to small ruminant production out the 160 hours of presentations.
- There was a 1½ hour presentation on forage management for small farmers at the training programme for the agricultural extension agents at the National Agriculture College of Bamibili.

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HPI RABBIT PROGRAM IN CAMEROONA. Bambui Project

In November of 1982, twenty farmers from Bambui village received rabbit training by Mr. Clement Abam (rabbit section manager, IRZ) and Mr. Michael Goldman. Upon my arrival last April, one of the trainees, Mr. Alex Mbianda (agricultural extensionist), was providing routine monthly supervision to the other new rabbit farmers, being paid by HPI for this service. Mr. Mbianda is an enthusiastic and hard-working person who has devoted much time and energy to the project. Each month, Alex submits extension sheets to HPI on each farmer visited (see attached sheet). This extension form, incidentally is used on some of the other rabbit projects.

Although the number of rabbit farmers in Bambui has steadily increased over a year's time, the present number being thirty-four, this number does not include farmers that have retired from rabbit raising nor farmers that have been dismissed from the program due to lack of motivation and/or interest. The Bambui rabbit farmers group is very serious about successful rabbit raising and attends regular monthly meetings.

One recent development discussed during the February and March meetings was the rabbit marketing scheme. For the past few months, rabbits have been supplied to various hotel-restaurants in Bamenda to test the local demand for rabbit meat. The response has been encouraging. One business in town, Hotel Le Bien, has expressed a need for 80 - 100 rabbit fryers per month, consumers being both Cameroonian and expatriate. Recently, ten fryers were sold and consumed in the same day (over sixty rabbit meals served) at Le Bien.

Now that the demand for rabbit meat appears sound, the next step was to make the connection between the local business and the rabbit farmer. By agreement of local rabbit farmers in Bambui, Mankon and Bambili, the marketing approach is as follows:

- 1) farmers with fryers for sale notify their local rabbit farmer leader (in Bambui - this is Alex){
- 2) the local rabbit farmer leader makes a list of the number of farmers with fryers for sale{
- 3) each week the local rabbit farmer leader makes the business rounds in town and takes orders for rabbit fryers - an arranged time is set and the quantity of fryers is established{
- 4) the local rabbit farmer leader refers to his list and collects the fryers from farmers - suitable size, conformation and health is required of each potential fryer and

- 5) rabbit fryers are transported to the awaiting business manager where receipts are signed and money is received which is then made immediately available to the farmer(s). The current price for a rabbit fryer is 2.500 cfa, however, the farmer receives 2.400 cfa (100 cfa less to cover transportation costs). Also, steps 3 and 5 usually occur simultaneously.

To avoid confusion among the various village rabbit farmer leaders monthly network meetings are held in which, among other things, these village leaders decide on who will make the business rounds for the following week(s). My role is one of supervising the marketing activities for the next twelve months. After that time, the marketing program should be operating on its own.

Overall, local rabbit farmers are enthusiastic in knowing that channeled markets exist for their rabbits when income is needed.

B. Mankon Project

Before my arrival in the Cameroon, Mr. Clement Abam, rabbit herdsman at Mankon Station (IRZ), was involved in supervising rabbit producers in Mankon. Most of these producers had received no formal training prior to production, so many, of course, felt no obligation to respond to Clement's suggestions. Furthermore, several producers were living in Bamenda town where rabbit raising is usually more difficult - inadequate forage availability, greater threat from thievery and predation, noise pollution, etc. - than in a rural setting. More on this subject later.

Some mention should be made, however, of one particular farmer, Stephen Ngyah, who lives in Mankon village. Last May, when Clement first introduced me to Stephen, he was facing serious problems in his two-doe rabbitry. Stephen's rabbits were poorly fed (receiving only grass), sanitation was less than desirable, and no records were being kept. Consequential results included cannibalism, low breeding vigor and rampant mortality due to enteritis.

Only after the first few ensuing visits, Stephen had turned his operation completely around: now rabbits were receiving a plentiful variety of local plant foods, kitchen refuse and maize bran; cages and nestboxes were thoroughly cleaned and useful records were being maintained. Stephen has had no further herd calamities, and usually at least thirty rabbits are observed in his operation upon each visit.

Last November, we suggested to Stephen that he now had sufficient experience to begin possibly training some of the farmers that were showing an interest in getting started in rabbit raising themselves. Our suggestion was accepted, and presently, Stephen is rigorously involved in this activity. Each farmer spends a full week with Stephen as he demonstrates how to manage rabbits, e.g., breeding, feeding, record keeping, rabbit manure composting and sanitation. After such training, Stephen then sells young stock to the farmer. To date, six farmers have been trained and started in rabbit production by Stephen; more interested farmers are approaching Stephen to also get started.

Recently, I asked Stephen why he "trains before he sells", and his reply was, "because I do not want to see rabbit farmers struggling and their stock suffering, as I was last year".

Stephen's program is supported by HPI, in terms of providing training manuals, record forms, advice and unrelated bucks (to avoid inbreeding). Also, monthly meetings - involving Stephen's farmers group - are attended by Clement and myself.

Near Mankon Station (IRZ), four other farmers (three of which are relatively new farmers) presently are keeping rabbits. Although limited in size, these farmers are very enthusiastic and are presently meeting monthly.

Out of these farmers, Bayo Nendah, piggery worker at IRZ, has been raising rabbits for nearly two years. Last year, he too was facing similar problems as was Stephen Ngyah[primarily, enteritis due to inadequate feeding and sanitation, and no records. With assistance from Clement Abam and myself, Bayo has developed into a fine rabbit farmer. Just recently, he completed a pole-type barn for the purpose of expanding his rabbitry to a ten-doe operation. In addition, Bayo has sold many rabbits, directly and indirectly, to farmers in Mankon and surrounding villages, besides loaning his bucks to cross his neighbors does.

Another farmer, Mrs. Rebecca Ngouti, who was trained by Anna Neh, rabbitry worker at IRZ, now has two does, one buck and eleven kits. Rebecca's primary reason for raising rabbits is "to better feed my children". Also, later this year, Anna and I have discussed and plan on training her village people in Alamandum (located between Mankon and Mbengwi) in rabbit farming, where she is willing to both conduct training and provide supervision afterwards.

The Mankon farmers (currently eleven in number) are likewise involved in the Bamenda rabbit marketing scheme. Presently, Clement is notified by Stephen Ngyah when any of his farmers (or himself) have rabbit fryers for sale, as well as personally inquiring from the other four farmers mentioned above. Saleable fryers are taken to town by Clement on his motor-cycle, where he sells them to the awaiting business manager. Immediately afterwards, the money is made available to the farmer(s). These farmers are pleased in knowing that markets exist for their rabbits when income is needed.

At the present time, all Mankon farmers have been at least informally trained in rabbit production. They are motivated and responsive to advice given during meetings and visits. Past farmers which showed little interest and concern for their rabbits have either discontinued production or have been dismissed from the program. Our time is now being spent much more effectively.

C. Valentine's Young Farmers Club, Kumbo Project

Last May, I first met Colonel Valentine and his boys, most of which are either orphans or are from very poor families. For two or more years time, the boys are provided with financial support for schooling, agricultural

experience involving crops and livestock, and, most importantly a loving home where one may attain such values as responsibility, caring for others confidence and cooperation. Over the years, the Colonel has developed a close kinship with his boys (some of which he has legally adopted) as well as fine Cameroon citizens.

Livestock species maintained by the club are dairy goats, a Jersey bull and local cows, sheep, chickens, guinea pigs, rabbits and fish. HPI has and continues to assist the project in the form of donated stock, training, supervision and financial aid.

Concerning the rabbit project, the demand for breeding stock by area farmers and community workers basically exceeds the club's supply. To date, the rabbit project is the only livestock enterprise that is making a profit. In June, we discussed plans therefore on expanding the operation from a six to a twelve doe project. (Please refer to the attached letter for financial assistance). A sum of 133,600 (CFA's) was granted through HPI to support rabbitry expansion. A total of eighteen permanent-type cages were constructed the same month, and on June 30, six young does and two bucks were further donated to the club. As to training, from September 12 14, the boys and the club manager, Samuel Valentine (one of the Colonel's adopted sons), received HPI rabbit training, just prior to the time that the young doe stock were approaching breeding age.

By November, several does had kindled successfully and were raising a total of some 70-odd offspring. Unfortunately, however, in the month to follow, nearly fifty kits had perished due primarily to improper feeding. The one boy in charge of the rabbit project, Nathaniel, had decided to cease providing the daily supplementary ration (fish meal and fortified corn mash), only green-chop remaining. This incident persisted for approximately two weeks, the result being starvation in 3-4 week-old kits due to a virtual halt in milk production since dietary requirements for protein and energy, primarily, were being inadequately met. Sadly enough as it is though, during my early January visit (when the cause of the above problem was revealed) the other boys, themselves, pointed out to Nathaniel that they remembered from training that rabbits should not only be fed with grass. This was a frustrating experience for all of us.

The same day of my visit, the Colonel addressed the boys that evening on the consequential financial losses that occurred during the past year due to animal mis-management. Besides the rabbit project, similar cases as the above had taken place in the poultry project (inconsistent management resulting in low egg production). The boys agreed that they would be more responsible this year and the livestock manager, also Samuel, would make closer daily supervisions.

One limitation in better developing the livestock program of the club is that, presently, all but two of the fifteen boys attend school during the day. This leaves only the late afternoons for all the boys to assist in tending for the animals, week-ends excluded. In all seriousness, though, I believe that HPI has perhaps attempted to do too much for the club, as far as providing substantial number of animals and of great variety (requiring

special management techniques for each species). This has imposed a particular burden on the club to adequately manage the entire livestock program. During my March 6 visit, I convinced the Colonel and the club to liquidate the poultry project since it is the most costly project, has not been profitable, is time-consuming, and the club really needs some revenue at the present time. Once this is accomplished, we remain optimistic that greater time and emphasis can be made in the other livestock programs.

Currently, six does are with litters (total of thirty-one kits) and the other two does are confirmed pregnant. Rabbit management is steady now and hopes are running high in the club.

INSTITUT DE RECHERCHES ZOOTECHNIQUES
I. R. Z.
INSTITUTE OF ANIMAL RESEARCH

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OVERALL VIEWS OF IRZ ON THE PROJECT "SMALL FARMER LIVESTOCK AND POULTRY
PROJECT, USAID/HPI/IRZ No. 631-0015"

I. IMPACT

- 1) The Cameroon public and Government have ^{been} greatly sensitized to the potential for developing livestock industries in the areas of dairy, meat and egg production.
- 2) Improved breeding livestock and poultry namely dairy, cattle, pigs, rabbits, sheep and goats have been readily available to Cameroon farmer.
- 3) Improved livestock and poultry were made available to the Institute of Animal Research (IRZ) to enhance research capability.
- 4) Six Cameroon graduates are being trained for M.Sc. level which will enhance IRZ research capability.
- 5) Six technicians were trained in the USA as support staff for extension and research. Others were trained on the Station.
- 6) Farmers were trained in the practical skills in animal production and management.
- 7) Training of on station staff and young researchers was made by technical assistance staff.
- 8) The project has enabled acquisition of research infrastructure and some equipment.
- 9) The project has provided technical assistance to small farmers.

- 10) Organization of farmers into production cooperatives has been initiated e.g. Bamenda dairy cooperative.
- 11) A better knowledge of local feedstuffs and by-products has been acquired for better feed compounding by both large and small scale farmers.

II. CONSTRAINTS

- 1) Management on the station was not optimal.
- 2) IRZ did not make available all the trainees in time.
- 3) IRZ did not supply all the counterparts during the first year of the project.
- 4) Cameroonian counterparts assigned to the project were ignored by technical assistance staff.
- 5) The hierarchy of the project was not well defined.
- 6) Subsidies unknown to the Cameroon Government were made.
- 7) Reward was based on friendship not on merit by the technical assistance staff.
- 8) Drugs, antibiotics, vaccines, were imported and distributed to farmers unknown to Cameroon authorities.
- 9) A well developed and defined package for extension was not yet established.
- 10) There was little active participation by MINEPIA, one of the parties to the convention.
- 11) Some of the HPI staff appeared not to have the proper orientation for their assigned task.
- 12) HPI tended to impose their will sometimes rather than act like advisors.

HPI RESPONSE TO IRZ OVERALL VIEWS ON THE PROJECT "SMALL FARMER LIVESTOCK AND POULTRY PROJECT, USAID/HPI/IRZ No. 631-0015

IMPACT

Item 2 probably overstates the availability of some species of livestock to the Cameroonian farmer although there is without question, more superior stock available than before the project began. Other statements in that section are considered accurate.

CONSTRAINTS

Item 4. The comment overstates the situation. It is true that effective counterpart relationships did not evolve to a desirable degree. This occurred because of lack of training and sensitivity by HPI personnel to their counterpart role, rapid turnover of counterpart assignments in some areas by IRZ, lack of interest by some IRZ researchers in field assignments which they did not perceive to be important and lack of preparation by both HPI and IRZ of personnel selected for counterpart roles. The dairy advisor repeatedly tried to involve his IRZ counterpart in on-farm work but was unsuccessful although their relationship was effective in on-station research. The agricultural economist felt that his relationships were effective even though his research counterpart was not assigned until December, 1983.

Item 6. Subsidies were identified in the basic project documents. The specific nature of some subsidies may not have been known to IRZ, but the principle involved was contained in the project agreements.

Item 7. HPI does not agree with this statement although it is admitted that in small rural villages everybody could be considered a friend. In addition, it should be noted that IRZ participated in decisions of the distribution committee and was involved in the distribution process.

Item 8. Drugs, antibiotics and vaccines were shipped in accordance with needs identified and shared with IRZ. The point is raised in conjunction with importations hand carried by HPI consultants or staff which may have resulted in incomplete documentation, not illegal entry as might be construed from the statement.

Item 9. A very well developed and defined extension package was developed in the rabbit program. This package was extensively field tested and has proven to be successful. Continual development and improvement of the dairy extension package was made during the life of the project.

Item 11. Staff orientation may have been more a problem of conflicting roles between IRZ and HPI than in orientation per se. This same problem was a factor in IRZ's view that staff sometimes tended to impose their wills.

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memorandum

DATE: March 8, 1985

REPLY TO
ATTN OF: Marcei Ngué, Project Officer *MAN*

SUBJECT: Small Farmer Livestock and Poultry Development (631-0015)
End of project evaluation on review meeting (Feb. 28, 1985)

TO: ARD Files

The review meeting was the final phase of the project evaluation process which covered field data collection (Feb 4-19) and report preparation (Feb 20-27). The meeting was attended by representatives of MESRES, MINEPIA, MINPAT, PAID/Buea, HPI and USAID/Yaounde (see Attachment 1).

The five point agenda was covered in six hours (see attachment 2). Major points covered include:

1. Introductory remarks
In his welcome speech, Mr. Herbert Miller invited all the participants to approach the discussion in the real sense of cooperation. He advised them to minimize the problems that have surfaced between IRZ and HPI during the implementation of the project, and to figure out what can be done in the future to develop a more successful collaboration.
2. Audio-visual production
A 20 minute audio-visual presentation of project achievements followed Mr. Miller's speech. The film provided participants a better feeling about the project. The weak point about the film was that nobody from MINEPIA was interviewed.
3. The End of project evaluation
Dr. Tebong was reluctant to go into any discussion about evaluation findings as the draft report handed over to him was not the same as the one that was being used by the evaluation consultant. For that reason, he suggested that the meeting be postponed for 24 hours so that he and his staff have time to review the new draft and be more prepared for the discussions. Any attempt to convince him that the substance of the report was the same and that only ideas have been reorganized in a more logical sequence appeared hopeless. A way out was found after one hour of intensive discussion through my suggestion that the consultant should make an oral presentation of his findings without referring to a specific draft.



Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

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Dr. Mac Bailey then took the floor to conduct a critical review of major evaluation conclusions and recommendations which were amended one after the other by participants. The final version of these recommendations has been attached (see attachment 3).

4. Comments and general discussion about the project

Key representatives of IRZ/MESRES, HPI, MINEPIA and USAID/Yaounde made final comments about the project as follows:

- a) Dr. Tebong: It was a rewarding experience. It is a pity that some implementation problems have been blown out of proportion. I am grateful for HPI and USAID collaboration.
- b) Mr. Litwiller: It was a good project after all as progress was made in reaching the farmers.
- c) Dr. Agborbesong: I was impressed by what I saw. We should find ways to follow up project activities after its current PACD (2/28/85).
- d) Dr. Devries: Although the project officially terminates today, I do not see it as the end of HPI in Cameroon. HPI would like to continue working here if Cameroonians want them to do so.
- e) Mr. Scott: PDE Secretaries did a good job in having the evaluation typed in a very short time. We should be grateful to them.
- f) Mr. Atekwana: The whole project was implemented illegally as no official representative of GRC signed the project document. Funds were released erroneously.
- g) Mr. Ngue: Evaluation is not a keep-smiling-exercise as it should cover what we want to hear and what we do not want to hear. Project failures can be a positive experience only if we want to learn from them.
- h) Dr. Mac Bailey: The evaluation team made recommendations which will affect the farmers. It is important that we be frank to farmers and make sure that our recommendations are oriented towards helping them.

The general impression, as summarized by Mr. Kosheleff, was that participating agents agreed that mistakes were made on both sides (HPI and IRZ), that both HPI and IRZ have learned from these mistakes, and that there was hope that this was not the last time to work with HPI in Cameroon.

Attachments: 1. List of participants
2. Agenda of the meeting
3. Evaluation recommendations

cc: A/DIR
A/D/DIR
PDE
PRM
ARD FILES

HPI EVALUATION MEETING (2/28/85)

PARTICIPANTS

MESRES

1. Mr. Charles Binam Bikoi, Chief of Service for Scientific and Technical Cooperation
2. Mr. Ngoh Nkwain, Assistant Chief of Service for Scientific and Technical Cooperation
3. Dr. Emmanuel Tebong, Director, IRZ
4. Dr. Ngou Ngoupayou, Deputy Director, IRZ
5. Mr. Dia Ndumbe, Chief of Research Unit, IRZ
6. Mr. Philip Wirya, Chief of Administration and Finance Service, IRZ
7. Dr. Rubi Komunyan, Chief of IRZ Station, Mankon
8. Dr. David Mbah, Chief of IRZ Station, Wakwa.

MINEPIA

9. Dr. Ben Ayuk Agborbesong, Provincial Delegate
of Livestock, Bamenda
10. Mr. Joseph Alekwana, Livestock Engineer
11. Mrs. Françoise Fotso, Service of Studies and Projects
12. Mr. Paul-Frederic Kamdem, Chief of the Planning Unit.

MINPAT

13. Mr. Jean-Claude Tchadjet, Division of Studies and Project.

PAID/BUEA

14. Dr. Foday MacBailey, Consultant.

HPI

15. Dr. James Devries, Program Director for Africa and the Near East (Littlerock)
16. Dr. Lowell Watts, Chief-of-Party/Bamenda.

USAID/YAOUNDE

17. Mr. Herbert Miller, Acting Director
18. Mr. Bruno Kosheleff, Acting Deputy Director
19. Mr. Sam Scott, PDE Officer
20. Ms. Helen Vaitaitis, Acting Program Officer

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21. Mr. William Litwiler, ARD Officer
22. Mr. Larry Dominessy, Deputy ARD Officer
23. Dr. Dick Norton, HRD Officer
24. Mr. Daniel Erickson, Legal Officer
25. Mr. Thomas Baranyi, MGMT/SMD Officer
26. Mr. Chris Phelps, ARD, Project Officer
27. Mr. Ronald Ruybal, ARD Project Officer
28. Mr. Marcel Ngué, ARD Project Officer
29. Mr. William Schillinger, ARD Project Officer
30. Mr. Kingson Apara, Program Specialist
31. Mrs. Carole Gervais, Program Economist
32. Mr. Tony Carvalho, PDE

End of Project Evaluation Review Meeting
USAID Project No 631-0015

February 28, 1985
3:00 P.M. - USAID Conference Room

A G E N D A
=====

1. Introductory Comments - Mr. Herbert N. Miller, Acting Director, USAID/Cameroon.
2. "A Retrospective of HPI/IRZ Project Activities", Audio-Visual Production prepared by the USAID/Cameroon Audio-Visual Unit (R. Shaw)
3. The End of Project Evaluation - (Dr. Fouday MacBailey, Evaluation Team Leader)
 - General impressions and observations about the project and the evaluation process
 - Conclusions and recommendations
4. Commentary from Key Project Implementation Organizations
 - IRZ/MESPRES
 - HPI
 - MINEPIA
 - USAID/Cameroon
5. General Discussion - (successes, failures and lessons learned as a result of the project)

-ATTACHMENT 3-
EVALUATION RECOMMENDATIONS

Based on the evaluation findings, the following recommendations are made:

A. Bambui Station

- That research be continued on-station on the exotic purebred Holsteins and Jerseys and the local Zebu (white and Red Fulani)
- That cross-breeding the exotics with the locals be continued as currently planned, but serious consideration be given to cross-breeding the best exotic dairy breed (Holstein) with the best local dairy breed (white Fulani).
- That the dairy data base be expanded to include on-farm data where possible.
- That multiplier herds (Local Zebu) be used to produce desired cross-breeds stock (primarily heifers) for farmer's use. IRZ/MINEPIA should consider the establishment of multiplier herds different from farmer's herds.
- That more pasture land be made available to the project.

B. Wakwa Station

- That cross-breeding be continued (Holsteins with Gudali) as currently planned.
- For both stations, artificial insemination (with imported frozen semen) should be preferred over natural service (which may involve importation of live animals).

C. Management (All IRZ Stations)

In order to improve management capabilities in all IRZ stations, herd managers must be employed at once. Already, one each has been employed in Wakwa and Bambui.

D. Livestock distribution

- That the question of subsidies be reviewed and a definite policy adopted.

- That, due to inadequate numbers of animals on station, IRZ consider extending its research data base to include information from farmer recipients of project animals.
- That the selection of trainees and the distribution of livestock be better controlled in order to minimize the possibility of favoritism.
- That MINEPIA/IRZ follow-up activities be strengthened with recipients of project livestock in order to maintain the confidence and the effective interaction with farmers.
- That only cross-bred animals which are more adaptable to local environment be given out to farmers.
- That more effort be made to distribute rabbits from IRZ stations.

UNCLASSIFIED
AID 86/11/85

~~REF: STSCOTT~~

FDE:STSCOTT:FK

1.AKD:DHGHE, 2.PRM:HVAITAITIS(INFO)
AID7 DCM CHRON

TELEX

TO: JAMES DE VRIES OR ARMIN SCHMIDT
HFIFER PROJECT INTERNATIONAL
TELEX: 783116
LITTLE ROCK, ARKANSAS.

SUBJECT: END OF PROJECT EVALUATION - SMALL FARMER
LIVESTOCK AND POULTRY PROJECT (631-0015)

1. SUBJECT EVALUATION REPORT HAS BEEN FINALIZED AND IS COMPLETE EXCEPT FOR KEY FINANCIAL EXHIBITS WHICH WERE TO HAVE BEEN PROVIDED BY HPI. WE ONLY HAVE AVAILABLE A SUMMARY STATUS STATEMENT OF EXPENDITURES AS OF 11/31/84 REFLECTING AID AND MPI TOTALS FOR THE VARIOUS LINE ITEMS (SALARIES, HOUSING ALLOWANCES, TRANSPORTATION, TRAINING, CONSTRUCTION, VEHICLES, ETC.) WE HAVE CONTACTED EVALUATION CONSULTANT TEAM LEADER, FOUADY MACBAILLEY, AT PAID/RUEA AND HE DOES NOT HAVE DETAILED MPI FINANCIAL EXHIBITS.

2. IN ORDER TO COMPLETE THE EVALUATION REPORT SO IT ACCURATELY REFLECTS THE PROJECT'S FLOW OF FINANCIAL CONTRIBUTIONS OVER THE 4 YEAR PERIOD OF THE GRANT, IT IS REQUESTED THAT MPI PROVIDE THE FOLLOWING AS SOON AS POSSIBLE.

3. DATA REQUESTED:

- A. HPI-AID GRANT EXPENDITURES FOR EACH PROJECT YEAR (BROKEN DOWN INTO MAXIMUM DETAIL POSSIBLE).
- B. COMPARISON OF PROJECT COSTS (ACTUAL) WITH THOSE ORIGINALLY PLANNED IN THE GRANTS FINANCIAL PLAN.
- C. SUMMARY OF FINANCIAL INPUTS (SERVICES, EQUIPMENT COMMODITIES, ETC.) PROVIDED THE GOVERNMENT OF CAMEROON (IRZ) IN SUPPORT OF HPI'S PROJECT IMPLEMENTATION EFFORT. WERE IRZ AND HPI CONTRIBUTIONS MADE ACCORDING TO SCHEDULE?
- D. HAVE ALL AVAILABLE GRANT FUNDS (FOR COMMODITIES, TRAINING, VEHICLES, CONSTRUCTION, SALARIES ETC.) BEEN UTILIZED? IF NOT, PLEASE INDICATE WHERE BALANCES REMAIN, AND PROVIDE BRIEF EXPLANATION AS TO WHY FUNDS WERE NOT EXPENDED AS PLANNED.
- E. WE WOULD ALSO APPRECIATE A BRIEF SUMMARY FROM HPI INDICATING WHETHER THE GRANT FUNDS (AND

TELEX-----

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IFZ CONTRIBUTIONS) WERE USED APPROPRIATELY AND EFFICIENTLY, TO INCLUDE SOME MEASURES OF THE IMPACT/EFFECT OF PROJECT CONTRIBUTIONS ON THE SMALL FARMER TARGET GROUP. ANY FINANCIAL RECORDS OR ACCOUNTING DATA KEPT ON SPECIFIC GROUPS OF SMALL FARMERS WOULD ALSO BE USEFUL FOR INCLUSION IN THE EVALUATION'S FINANCIAL EXHIBITS SECTION.

AN EXPEDITIOUS RESPONSE WILL BE VERY MUCH APPRECIATED. PLEASE FEEL FREE TO EXTEND YOUR REPLY BEYOND THE AREAS MENTIONED ABOVE, AS APPROPRIATE, TO EARLY ILLUSTRATE THE PROJECT'S OVERALL END OF PROJECT FINANCIAL STATUS.

SIGNED: SAMUEL T. SCOTT
PROJECT DEVELOPMENT OFFICER
AID, AMERICAN EMBASSY
YOUNDE, CAMEROON
TELEX: 8223KN

-----TELEX-----



P.O. BOX 808
825 WEST THIRD STREET
LITTLE ROCK, ARKANSAS 72203
TELEPHONE: 501 376-6836
TELEX: 783116 HEIFER LRK

HEIFER PROJECT INTERNATIONAL

6 May 1985

Mr. Samuel Scott
Project Development Officer
USAID/Cameroon
Department of State
Yaounde (ID)
Washington, D. C. 20520

Dear Mr. Scott:

In response to your telex, attached please find the requested financial exhibits. I regret the delay in submitting these. It had been my understanding that the information submitted by Mr. Schmidt was adequate. Please note that this is a report of expenses from March 1, 1980 thru December 31, 1984. Complete expense reports for January-March, 1985 are not yet available, but will be submitted to AID in due course. U.S. training related expenses will continue into early 1986 as authorized by AID to allow candidates to complete their degrees.

Regarding the specific data requested:

A. HPI-AID grant expenditures for each project year (broken down into maximum detail possible). Exhibits 1 and 2 show the funds expended for each year for the AID and HPI portions respectively and broken down by line item.

B. Comparison of project costs (actual) with those originally planned in the grants financial plan. Expenditures up to the end of 1985 for AID portion and HPI portion of grant are summarized in Exhibits 3 and 4 respectively and compared to the project budget as summarized on page 10 of the grant document. As can be seen, the budget lines were quite broad and not very clearly defined. Several major planned costs including livestock purchases and administrative direct costs and overhead are not shown at all in the budget. The question of allowable overhead charges has been raised with REDSO/WA and the mission and we await a response. As shown in the exhibits, others have been included here. Comparing the actual and planned costs, I would make the following comments:

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- a. AID Portion - Exhibit 3
1. U.S. Technicians - long term: After inflation adjustment slightly over budget primarily due to cost of having to replace first COP and high cost of travel within Cameroon.
 2. U.S. Technicians - short term: after inflation adjustment slightly over budget due to more person months consultants than anticipated. An example is a forage production expert at USAID/Cameroon recommendation and a swine expert at IRZ request.
 3. Training: a substantial balance remains because:
 - (1) U.S. training is still in progress for 3 candidates
 - (2) Due to late nomination of candidates and the inability of a selected candidate to go for training only six candidates will be trained instead of seven.
 - (3) Costs of in-country training lower than anticipated due to training being done in villages because of quarantine at Mankon station and effectiveness of this approach.
 4. Equipment and Supplies: as budgeted up to end of 1984 but will likely go over budget due to such factors as higher than anticipated costs of fencing, semen, feed supplements, additional incubators, etc.
 5. Vehicles: slightly under budget as one less vehicle was purchased with AID funds than planned.
 6. Construction: significantly overspent due to higher than anticipated cost of constructing the main office/laboratory building and need to construct temporary buildings to house animals as permanent housing was not ready.
 7. Transportation (freight): below the anticipated expenditure as costs of shipping livestock and materials from U. S. were not as high as anticipated and equipment and material could be purchased locally.
 8. Vehicle operation: costs exceeded budget significantly because there were more staff than anticipated - a team of five instead of three technical assistance personnel. Frequent breakdown and high cost of parts of US origin vehicles also inflated costs.
 9. Evaluation: this will be somewhat overspent as high costs of final evaluation are not included. Higher cost is due to need to employ a consultant and for two trips to Cameroon by HPI staff for this evaluation.
 10. Other: there is not budget line for these items which are related to administration of the project.
 11. Total: the balance of \$143,511.41 will be spent on regular project expenses during January-March, 1985 (\$20,000-\$30,000), completion of degree level training (\$50,000-\$60,000), some materials, supplies and semen charged against the HPI portion of the budget (\$40,000-\$50,000) and any allowed overhead costs.

Mr. Samuel Scott
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b. HPI Portion - Exhibit 4

1. U.S. Technicians - long term: significantly over budget due to field team of five instead of three staff.
2. Livestock equipment and supplies: significantly over budget, but anticipate allocating some of these costs to AID portion (see note 4 and 11 of AID Portion).
3. Vehicles: HPI did not need to pay for the purchase of a vehicle as those purchased with AID funds proved adequate.
4. Revolving fund: below budget because not as many animals distributed as had been planned.
5. Subsidy fund: approximately as anticipated.
6. Evaluation: balance of funds will be spent when final evaluation costs are included.
7. Other: these are necessary project expenses for which there was no clear line in the budget.
8. Total: as shown actual costs were much higher than budgeted even after adjusting for inflation. The primary reasons are:
 - (1) increased number of staff
 - (2) higher costs of livestock and materials
 - (3) administrative costs not budgeted for.

C. Summary of financial inputs (services, equipment commodities, etc.) provided the Government of Cameroon (IRZ) in support of HPI's project implementation effort. Were IRZ and HPI contributions made according to schedule?

The major inputs into the projects can be summarized as follows:

1. U.S. Technicians-long term - 240 pm
2. Consultants-short term - 9 pm
3. Degree level training-long term - 144 pm
4. Livestock shipment from the U.S. including:
 - 85 dairy cattle
 - 35 pigs
 - 57 sheep
 - 67 goats
 - 52 rabbits
 - 4,000 chicks
5. Funds to construct an office and laboratory building.
6. Funds to construct livestock housing and develop pastures.
7. Major equipment including:

Diesel engine water pump
Air conditioner
3 Incubators
Forage chopper.
Radio communication system
Projector
4 Calculators
Semen Storage
Office furniture and equipment
Electric welder
Feed mill

Mr. Samuel Scott

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8. Vehicles:

3 four wheel drive vehicles (Jeep)

3 passenger cars (Renault)

1 truck (8 ton Mercedes Benz)

3 motorcycles (Suzuki)

9. Funds for local purchase of a wide variety of supplies, semen, drugs, tools, small equipment, etc.

10. Funds for maintenance and operation of project vehicles.

In general, the contributions or disbursements were made in a timely manner and there were no delays in project implementation due to unavailability of funds. The budget was not broken down by years and it is therefore not possible to compare timing of disbursements against any plan. There were a number of delays in project implementation but these delays were not caused by late or a lack of financial disbursements. For example, delays in beginning long-term training were due to late nominations and delays in providing necessary documentation. Availability of vehicles was delayed by prolonged customs proceedings. Late completion of construction was due to contractor delays.

D. Have all available grant funds (for commodities, training, vehicles, construction, salaries, etc.) been utilized? If not, please indicate where balances remain, and provide brief explanation as to why funds were not expended as planned.

This is covered in B above.

E. a. Were funds used appropriately and efficiently?

In HPI's opinion, funds were both used appropriately and efficiently. Grant expenditures were limited to budgeted items although as indicated above and shown in the exhibits, budgets were exceeded in many cases. This as explained was the result of carefully considered decisions. For example, early on in the project it was recognized that two advisors could not possibly deal with management, research, training, etc. related to all the species of livestock involved. It was also concluded that the economic aspects of production needed careful attention to assure farmer incentives to follow recommended practices. The technical assistance team was therefore expanded to include an Agricultural Economist and a second Small Livestock Advisor. This expanded team in turn required additional vehicles, operating funds, materials, etc. Overruns on construction costs were allowed only after careful review of costs and in light of unanticipated changes in design during the process of construction.

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Mr. Samuel Scott
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Funds were used efficiently in the sense that expenditures were carefully controlled and use was made of low cost but appropriate equipment, supplies, transport, etc. Major contracts for building, transportation of livestock and supply of vehicles were let after competitive bidding. Technical assistance staff and consultants were also provided at a very reasonable cost. Technical assistance staff cost an average of \$26,000 per person year and consultants an average of \$80 per day including all expenses and fees. We do not have detailed information on IRZ inputs. In general we, however, feel that IRZ funding has been more than adequate and disbursements have been timely.

b. Impact of Project Contributions on the Small Farmer Group and Specific Examples of Financial Records Kept on Specific Groups.

The impact of the project on the target group is adequately addressed in the Mid-Term Evaluation Report and other sections of this end-of-project evaluation report. Specific examples of farmers records are attached as follows:

- Exhibit 5: Portrait of a Cameroonian Poultryman
- Exhibit 6: Case Study: Small Farmer Swine Production Commercial Mash Versus Local Feedstuff Utilization
- Exhibit 7: Case Study: Small Scale Dairy Farming in the Northwest Province of Cameroon
- Exhibit 8: A Technical Assessment of Production and Economic Aspects of Small-Scale Rabbit Farming in Cameroon

I trust that you will find this information helpful and adequate and will be happy to supply further details if required. We look forward to receiving the final report.

Best regards,



James DeVries
Program Director, Africa/Near East

JD/mn

EXHIBIT 1

FINANCIAL STATUS REPORT SUMMARY - CAMEROON
GRANT REDSO/WA - 80 - 199 PRLC 72-00-1044

Description	1980	1981	1982	1983	1984	TOTAL
Aid Portion						
Salaries		12,780.00	20,040.00	23,092.65	28,668.03	85,180.68
Housing Allowance				5,797.63	12,926.09	18,723.72
Payroll Taxes		908.68	1,459.98	1,907.21	2,568.88	6,844.75
Employee Benefits		990.39	8,213.35	2,263.99	1,216.77	12,684.50
Transport and Outfit	3,182.34	7,645.58	1,565.56	8,129.75	15,673.33	36,196.56
Recruitment	111.00				912.16	1,023.16
Freight on Shipment	2,094.34	141,556.60	37,455.14	7,088.96	11,956.80	200,151.84
Transport - US		1,753.48	42.14	322.07	186.15	2,303.84
Equipment - Supplies	28,486.35	38,008.65	8,786.06	11,645.99	321.09	86,606.16
Vehicle Purchase	750.00	17,395.60	33,346.98	14,357.07	23,130.14	88,979.19
Semen					2,637.50	2,637.50
Insurance		72.00				72.00
Promotion*		21.32				21.32
Admin Direct Cost*			2,326.36	352.40	114.44	2,793.20
Consultation Fee		1,155.00	325.20	973.31	16,374.48	18,827.99
Consultant Travel & PD	1,378.00		2,041.02	160.46	690.57	2,888.91
Evaluation				3,697.58		3,697.58
Phone/Cable/Postage				.80		.80
Travel	3,442.16	3,563.89	10,174.78	10,216.20	22,617.70	49,994.63
Vehicle Operation	7,595.63	1,544.34	26,861.64	33,715.99	59,682.33	129,399.93
Training	291.22	340.23		66,209.08	57,583.42	124,423.95
Research Mtrls		46.09	350.94	188.38		585.41
Lib/Ref Mtrls			998.15	872.42	452.83	2,323.40
Printing				624.32	1,304.01	1,928.33
Bldg & Renovation	509.25	343.80	55,698.47	26,236.15	179,512.77	262,200.44
Contingencies*					998.80	998.80
TOTAL	47,820.29	228,125.25	209,585.67	218,452.41	437,504.94	1,141,488.59

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EXHIBIT 2

FINANCIAL STATUS REPORT SUMMARY - CAMEROON
GRANT REDSO/WA - 80 - 199 PRLC 72-00-1044

Description	1980	1981	1982	1983	1984	TOTAL
HPI Portion						
Salaries	17,381.56	37,611.66	54,043.80	68,019.50	63,461.25	240,517.79
Housing Allowance				2,235.09	2,565.72	4,800.81
Payroll Taxes	1,671.97	2,923.52	4,187.82	5,659.17	5,500.31	19,942.79
Employee Benefits	4,112.47	3,757.08	7,936.84	4,906.36	3,617.62	24,330.37
Recruitment	1,136.73	790.23	85.00	1,253.73		3,265.69
Transport & Outfit	1,706.29	4,857.95	5,222.02	25,246.96	2,114.42	39,147.64
Professional Development		635.05	189.49			824.54
Animals		97,056.34	140.01	514.85	2,519.03	95,192.17
Equipment & Supplies	15,712.69	16,295.62	6,947.15	5,019.97	10,867.81	54,843.24
Semen		9,589.95		1,205.00		10,794.95
Freight on Shipment		1,250.00				1,250.00
Transport - U.S.		550.67				550.67
Animal Health		3,118.53	3,118.53		788.67	7,025.73
Animal Registration		37.50				37.50
Attendants		152.00				152.00
Holding Center Costs		23,978.21	80.64			24,058.85
Travel		14,805.78	544.55	2,058.23	5,457.29	22,865.85
Admin Direct Costs	4,335.11	955.70	11,168.15	5,571.09	10,013.88	32,043.93
Phone/Cable/Post		2,279.91	418.23	933.57	1,631.07	5,262.66
Insurance		205.00				205.00
Consultant Fees			100.00			100.00
Consultant Travel & PD			394.00			394.00
Evaluation					2,271.63	2,271.63
Revolving Fund	2,347.23	337.19	4,742.42	3,303.93		10,730.77
Subsidy Fund		8.00	3,429.99	2,647.27	18,792.27	24,877.53
Local Farmer Anat.		140.75		7,163.65	14,208.47	21,512.87
Training	1,816.30			425.16		2,241.46
Training Ex-Cntry		2,059.64				2,059.64
Research Materials		94.29				94.29
In-Country Empl Exp	1,899.33					1,899.33
TOTAL	52,119.68	220,990.47	90,145.20	6,837.16 143,000.69	11,029.21 158,679.99	19,765.70 649,936.03

EXHIBIT 3

COMPARISON OF PLANNED AND ACTUAL COSTS/AID PORTION

AID PORTION TOTALS	U.S. Tech Longterm	U.J. Tech Shortterm	Training U.S./CAM	Equip & Supplies	Vehicles	Construc- tion	Transporta- tion	Vehicle Operation	Evaluation	Other	Grand Total
Salaries	85,180.68										
Housing Allowance	18,723.72										
Payroll Taxes	6,844.75										
Employee Benefits	12,684.50										
Transp & Outfit	36,196.56										
Recruitment	1,023.16										
Freight on Shipments							200,151.84				
Transportation - U.S.							2,303.84				
Equip & Supplies				86,606.16							
Vehicle Purchases					88,979.19						
Semen				2,637.50							
Insurance	72.00										
Promotion											
Admin Direct Costs										21.32	
Consultant Fees		18,827.99								2,794.00	
Consult Travel & Per Diem		2,888.91									
Evaluation									3,697.58		
Travel	49,994.63										
Vehicle Operation								129,399.93			
Training - U.S. & Cameroon			124,423.95								
Research Materials			585.41								
Library/Ref Materials			2,323.40								
Printing			1,928.33								
Building & Renovation						262,200.44					
Contingencies										998.80	
Project Totals	210,720.00	21,716.90	129,261.09	89,243.66	88,979.19	262,200.44	202,455.66	129,399.93	3,697.58	3,814.12	1,141,488.59
Project Budget	150,000.00	15,000.00	310,000.00	75,000.00	90,000.00	190,000.00	212,000.00	66,000.00	9,000.00		1,117,000.00
(Over)/Under Budget	(60,720.00)	(6,716.90)	(180,738.91)	(14,243.66)	1,020.81	(72,200.44)	9,544.32	63,399.93	5,302.42	(3,814.12)	(24,488.59)
Adjust for Inflation	22,500.00	2,250.00	46,500.00	11,250.00	13,500.00	28,500.00	31,800.00	9,900.00	1,350.00		168,000.00
	(38,220.00)	(4,466.90)	227,238.91	(2,993.66)	14,520.81	(43,700.44)	41,344.32	53,499.93	6,652.42	(3,814.12)	143,511.41

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COMPARISON OF PLANNED AND ACTUAL COSTS/HPI PORTION

HPI PORTION TOTALS	U.S. Tech Longterm	Lvstck, Equip Vehicles & Supplies	Revolving Fund	Subsidy Fund	Evaluation	Other	Grand Totals
Salaries	240,517.79						
Housing Allowance	4,800.81						
Payroll Taxes	19,942.79						
Employee Benefits	24,330.37						
Recruitment	3,265.69						
Transport & Outfit	39,147.64						
Professional Dvlpmt	824.54						
Animals		95,192.17					
Equipment and Supplies		54,843.24					
Semen		10,794.95					
Freight on Shipments						[1,250.00]	
Transportation - U. S.						[238.00]	
Animal Health		3,118.53					
Animal Registration		37.50					
Attendants						152.00	
Holding Center Costs		24,058.85					
Travel	22,865.85					32,043.93	
Admin Direct Costs						5,262.66	
Phone/Cable/Post							
Insurance	205.00						
Consultant Fees						100.00	
Consultant Trvl & Per Diem						[1,877.63]	
Evaluation					3,303.93		
Revolving Fund			19,381.47				
Subsidy Fund				24,810.11			
Local Farmer Assistance				565.91			
Training						1,816.30	
Training Ex-Country						2,059.64	
Research Materials						94.29	
In-Country Empl Expenses						19,765.70	
Project Totals	<u>355,900.48</u>	<u>188,045.24</u>	<u>20,000.00</u>	<u>19,381.47</u>	<u>25,376.02</u>	<u>3,303.93</u>	<u>649,936.03</u>
Project Budget	<u>165,000.00</u>	<u>130,000.00</u>	<u>20,000.00</u>	<u>20,000.00</u>	<u>20,000.00</u>	<u>4,000.00</u>	<u>359,000.00</u>
(Over)/Under Budget	[190,900.48]	[58,045.24]	20,000.00	618.53	[5,376.02]	696.07	[290,936.03]
Adjust for Inflation	24,750.00	19,500.00	3,000.00	3,000.00	3,000.00	600.00	50,000.00
	[166,150.48]	[38,545.24]	23,000.00	3,618.53	[2,376.02]	1,296.07	[240,936.03]

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CAMEROON GOVERNMENT
SUMMARY OF EQUIPMENT BUDGET ALLOCATION FOR MANKON STATION

ITEMS	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985	TOTAL
- Construction of Laboratory	20,000,000	-	-	-	-	20,000,000
- " " Sheep barn	5,000,000	1,000,000	-	-	-	6,000,000
- " " Rabbit barn	3,000,000	-	-	-	-	3,000,000
- Completion of Farrowing house	9,000,000	-	-	-	-	9,000,000
- " " Chicken barn	3,000,000	-	-	P. M.	3,000,000	12,000,000
- " " of incubation room	-	-	-	P. M.	5,000,000	8,000,000
- Staff houses	25,000,000	-	-	-	-	-
- Water Supply	7,500,000	5,000,000	-	3,000,000	P. M.	28,000,000
- Electrification	7,500,000	-	-	2,000,000	5,000,000	19,500,000
- Fencing	4,000,000	-	-	1,000,000	5,000,000	13,500,000
- Purchase of Scales	2,000,000	-	-	-	3,000,000	7,000,000
- Purchase of Animals	1,000,000	-	-	-	-	2,000,000
- Completion of Biochemical lab	40,000,000	-	-	1,000,000	5,000,000	7,000,000
- Small Scientific equipment	4,000,000	-	-	-	-	40,000,000
- Barbed wire	2,000,000	-	-	-	-	4,000,000
- Running equipments	4,000,000	-	-	1,000,000	-	4,000,000
- Office and home equipments	4,000,000	-	-	-	P. M.	3,000,000
- Construction of roads	4,000,000	-	-	3,000,000	-	4,000,000
- Cleaning of room for store	-	-	2,000,000	-	5,000,000	12,000,000
- Barbed wires	-	2,500,000	-	-	2,000,000	4,000,000
- Diverse equipment (Haycutter etc)	-	3,500,000	4,000,000	1,000,000	-	3,000,000
- Grinding mill	-	-	5,000,000	-	-	5,000,000
- Technico-Analyser I + II	-	3,000,000	-	-	-	5,000,000
- Office equipment	-	10,000,000	-	-	-	3,000,000
- Household equipment	-	1,000,000	3,000,000	7,000,000	-	7,000,000
- Materials for butchery + workshop	-	1,000,000	2,000,000	3,000,000	3,000,000	6,000,000
- Completion of electric Intallation	-	-	3,000,000	10,000,000	-	5,000,000
- Purchase of animals	-	9,000,000	10,000,000	1,000,000	-	13,000,000
- Construction of poultry	-	4,000,000	8,000,000	1,000,000	-	11,000,000
				10,000,000	10,000,000	9,000,000
						20,000,000

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- Improvement of Lab yard	-	-	-	20,000,000	-	20,000,000
- Construction of butchery	-	-	-	-	8,000,000	8,000,000
- Venetian blind for Lab	-	-	-	2,000,000	4,000,000	6,000,000
- Construction of garage	-	-	-	1,500,000	-	1,500,000
- Scientific documentation	-	-	-	-	9,000,000	9,000,000
- Purchase of tractor	-	-	-	P. M.	15,000,000	15,000,000
- Forage drier (80 x 60 x 142m)	-	-	-	-	15,000,000	15,000,000
- Feed mill equipment	-	-	-	-	15,000,000	15,000,000
- Equipment for Rabbit production	-	-	-	-	15,000,000	15,000,000
- " " pig development	-	-	-	-	13,000,000	13,000,000
- Equipment for butchery, garage etc	-	-	-	-	10,000,000	20,000,000
- Water pump	-	-	-	P. M.	3,000,000	3,000,000
- Telephone installation	-	2,000,000	-	P. M.	4,000,000	4,000,000

CAMEROON GOVERNMENT
EQUIPMENT BUDGET FOR MANKON STATION

ITEMS	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985
Extension of poultry unit	-	-	-	-	-
- Layers	-	-	5,000,000	P. M.	-
- Growers	-	-	5,000,000	P. M.	-
- Chicken barn	-	-	6,000,000	P. M.	-
- Incubation room	-	-	10,000,000	20,000,000	-
- Extension of rabbit unit	-	3,000,000	3,000,000	P. M.	-
" pig unit	-	3,000,000	4,000,000	P. M.	-
- Equipment of Library	-	-	1,500,000	2,000,000	-
- Construction of an administrative office and Laboratory	-	1,000,000	30,000,000	P. M.	-
- Construction of Staff houses	-	20,000,000	30,000,000	P. M.	-
- Construction of Herdmen's houses	-	5,000,000	10,000,000	6,000,000.	P. M.
- Exotic goats (HPI) barn	-	-	5,000,000	P. M.	-
- Local goat barn IPB	-	-	8,000,000	P. M.	-
- Exotic sheep barn (HPI)	-	-	5,000,000	P. M.	-
- Local sheep barn - Belgian sheep)	-	-	5,000,000	P. M.	-
- Light vehicles	-	3,500,000	6,000,000	5,000,000	6,000,000
- Bus (personnel)	-	-	6,000,000	-	-
- Completion of Lab.equipment (nutrition)	-	-	6,000,000	-	-
- Purchase of silos	-	-	-	-	-
- Small technical equipment	-	-	5,000,000	-	-
TOTAL	-	5,500,000	6,000,000	4,000,000	-
	-	51,000,000	150,000,000	87,000,000	6,000,000

CAMEROON GOVERNMENT
SUMMARY OF BUDGET ALLOCATION FOR THE DAIRY SECTION OF I.R.Z: BAMBUI CENTRE

ITEMS	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985	TOTAL
- Purchase of plants of animal mat.	200,000	1,000,000	800,000	1,597,000	1,600,000	
- Feed etc...	2,250,000	10,000,000	12,000,000	11,964,000	12,000,000	
-	-	-	4,000,000	4,988,000	5,000,000	
- Padaging materials	-	300,000	300,000	224,000	300,000	
- Med Labo + Experimen Sup.	150,000	500,000	400,000	298,000	300,000	
-	-	100,000	80,000	59,000	100,000	
- Fuel	600,000	1,500,000	1,000,000	2,247,000	2,300,000	
- Water, etc, for research	130,000	500,000	-	-	-	
- Duty for purchases	-	-	-	-	-	
- Scientific Documentation	40,000	150,000	75,000	56,000	100,000	
- Mat for Forest	-	-	-	-	-	
- Protective clothing and Med	40,000	100,000	80,000	59,000	50,000	
- Transport and Travelling allowances	130,000	500,000	400,000	298,000	300,000	
- Scientific analysis abroad	100,000	500,000	500,000	74,000	100,000	
- Research mat maintenance	500,000	500,000	500,000	448,000	500,000	
- Temporary workers	160,000	300,000	200,000	149,000	650,000	
- Pasture improvement and Fertilizer	4,300,000	15,950,000	500,000	372,000	300,000	
TOTAL	4,300,000	15,950,000	20,435,000	22,833,000	23,600,000	

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CAMEROON GOVERNMENT
SUMMARY OF EQUIPMENT BUDGET ALLOCATION - BAMBUI CENTRE

ITEMS	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985	TOTAL
- Construction of fattening barn	2,500,000	-	2,000,000	500,000	1,500,000	
- Fencing	2,000,000	-	-	-	-	
- Purchase of scale	1,250,000	-	-	1,500,000	2,000,000	
- " of Animals	2,500,000	1,500,000	6,000,000	P. H.	-	
- Completion of dairy Lab	5,000,000	-	-	30,000,000	10,000,000	
- Completion of Agrostology Lab	2,500,000	1,500,000	1,500,000	-	1,500,000	
- Small Scientific Equipment	2,000,000	-	-	-	-	
- Completion of dairy equipment	-	3,000,000	-	-	-	
- Barbed wires.	1,250,000	2,250,000	2,500,000	1,500,000	3,000,000	
- Construction of paddocks	-	-	4,000,000	-	-	
- Purchase of silos	-	-	5,000,000	-	-	
- Small Technical Equipment	-	2,750,000	3,000,000	P. H.	3,000,000	
- Equipment of Feed-mill	-	-	2,500,000	1,750,000	1,500,000	
- Purchase of grinding mill	-	-	3,000,000	1,500,000	4,000,000	
- Construction of offices + dairy	-	-	15,000,000	P. H.	-	
- " of Hay Storage barn	-	-	-	2,500,000	-	

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CAMEROON GOVERNMENT
EQUIPMENT BUDGET - BAMBUI

ITEMS	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985	TOTAL
Construction of H ₂ O points in paddocks		2,500,000	2,000,000	1,000,000	-	
Construction of crunch	-	-	1,000,000	-	-	
Tractor and accessories	-	-	-	500,000	-	
Concreting of dairy yard	-	-	-	500,000	1,500,000	
pasture Improvement	-	-	-	-	1,500,000	
Construction of paddocks	-	8,000,000	-	-	-	
Construction of grainery	-	-	-	2,500,000	-	
Construction of roads in paddocks	-	-	-	-	1,500,000	
Improvement of drinking troughs	-	-	-	3,500,000	2,500,000	
" Drying room	-	-	-	-	1,500,000	
TOTAL	19,000,000	21,000,000	47,500,000	47,250,000	28,000,000	

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CAMEROON GOVERNMENT
SUMMARY OF BUDGET ALLOCATIONS FOR THE ANIMAL RESEARCH STATION - MANKON

ITEMS	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985
<u>RUNNING OF SERVICES</u>					
A. - SALARIES					
- Daily paid workers	11,900,000	10,735,416	17,346,584	27,829,000	94,097,000
- Reserve for promotion	328,000	214,708	346,931	557,000	1,882,000
- Reserve for duty allowance	-	384,000	See directorate	-	-
- Reserve for Recruitment	1,620,000	1,830,900	-	-	-
- " " Overtime	50,000	50,000	-	-	-
- Reserve for holiday jobs	-	-	100,000	110,000	250,000
- " " hired Labourd	-	50,000	-	-	400,000
- " " Social Security Charges	1,547,000	1,610,312	150,000	150,000	200,000
			2,802,277	4,379,000	16,589,000
B. - ADMINISTRATION					
- Water, Electricity, gas and Postal Charges	500,000	1,000,000	2,935,000	2,935,000	3,500,000
- Stationeries and subcriptions for journals.	500,000	500,000	750,000	750,000	1,000,000
- Maintenance of vehicles	400,000	500,000	1,000,000	2,500,000	2,700,000
- Fuel (adminitration)	500,000	700,000	1,400,000	2,000,000	2,200,000
- Documentation and publication	-	-	-	-	150,000
- Out Station and transport allow	300,000	300,000	500,000	1,100,000	1,300,000
- Printings	-	500,000	-	-	-
- Personnel, uniform, death, medecine.	-	-	50,000	50,000	150,000
			200,000	200,000	400,000
- Sundries (insurance, entertain-ment, banks, etc)	4,900,000	4,900,000	5,250,000	3,470,000	3,400,000
- Maintenance of building	300,000	300,000	500,000	500,000	1,500,000

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AGROSTOLOGY

- Plant and Animal Materials	50,000	50,000	200,000	303,800	400,000
- Feed raw materials	-	25,000	800,000	1,214,000	1,400,000
- Laboratory drugs for experiments	50,000	25,000	100,000	151,900	200,000
- Exploitation of Results	-	25,000	25,000	37,900	50,000
- Feed for animals out of program	-	-	-	9,000,000	9,500,000
- Fuel	25,000	150,000	300,000	455,700	600,000
- Treatment of Animals out of re- search	-	-	-	1,500,000	1,500,000
- Duty for purchase	-	25,000	25,000	37,900	50,000
- Clothing and drugs (protective)	-	50,000	300,000	455,000	500,000
- Electricity for research	-	-	-	3,000,000	3,000,000
- Travelling allowances	100,000	50,000	200,000	303,800	400,000
- Foreign analysis of results	50,000	50,000	500,000	75,950	100,000
- Maintenance	100,000	100,000	300,000	455,700	500,000
- Hired Labour	10,000	50,000	200,000	303,800	350,000
- Documentation	15,000	25,000	200,000	303,800	350,000

VETERINARY SECTION

- Feed raw materials	-	200,000	200,000	204,000	300,000
- Packaging materials	-	50,000	50,000	51,000	100,000
- Laboratory drugs	100,000	450,000	800,000	816,000	900,000
- Analysis of results	-	50,000	50,000	51,000	500,000
- Fuel	300,000	500,000	600,000	612,000	800,000
- Water, Electricity, gas etc...	-	50,000	-	-	-
- Subscription for Scientific Jour-	50,000	50,000	150,000	152,000	200,000
- Clothing and research drugs	400,000	800,000	1,000,000	1,020,000	1,500,000
- Transport and allowances	50,000	50,000	100,000	103,000	200,000
- Foreign analysis of results	50,000	50,000	80,000	81,000	100,000
- Maintenance of research Materials	50,000	50,000	100,000	102,000	500,000
- Research raw materials	-	-	200,000	204,000	500,000
- Feed (non research animals)	-	-	200,000	204,000	500,000

PIG SECTION

- Purchase of plant animals	100,000	1,050,000	800,000	1,297,000	1,000,000
- Research raw materials	3,300,000	7,000,000	4,000,000	6,484,000	8,000,000
- Non-research raw materials	-	-	2,000,000	3,242,000	3,800,000
- Research packaging	-	100,000	80,000	129,680	150,000
- Medicine, lab experiments	50,000	500,000	200,000	324,400	400,000
- Analysis of research results	-	1,000	50,000	81,100	100,000
- Fuel	400,000	900,000	500,000	810,500	1,000,000
- Duty on purchase	-	100,000	50,000	81,000	100,000
- Scientific Documentation	50,000	100,000	50,000	81,000	100,000
- Protective clothing + medicine	150,000	500,000	400,000	648,400	750,000
- Transport and allowances	200,000	500,000	200,000	324,200	200,000
- Scientific analysis abroad	50,000	1,000,000	50,000	81,050	-
- Maintenance of research materials	50,000	150,000	100,000	162,100	500,000
- Temporary workers	-	100,000	70,000	113,470	200,000
- Water and Electricity for research	50,000	100,000	-	-	-
TOTAL				13,860,000	16,500,000

SMALL RUMINANTS (GOATS)

- Purchases of plant + animals	500,000	450,000	1,000,000	1,333,000	2,500,000
- Research raw materials (feed)	500,000	1,400,000	3,199,200	3,199,000	7,000,000
- Non research raw material feed	-	-	-	-	3,000,000
- Packaging materials	-	50,000	50,000	67,700	100,000
- Medicines and Labo material for experiments	50,000	300,000	600,000	799,800	2,000,000
- Exploitation and analysis of re- search	-	50,000	50,000	67,050	500,000
- Fuel	150,000	550,000	700,000	933,100	1,500,000
- Duty for purchases	-	50,000	50,000	66,650	250,000
- Scientific Documentation	50,000	100,000	250,000	333,250	400,000
- Clothing and medicine	50,000	150,000	200,000	266,600	450,000

- Transport and travelling allow	50,000	250,000	300,000	399,900	400,000
- Scientific analysis abroad	50,000	150,000	150,000	199,950	200,000
- Maintenance of research equip	50,000	150,000	200,000	266,600	600,000
- Temporary Labour	-	100,000	200,000	266,600	500,000
- Water and Electricity for re-	50,000	150,000	-	-	-
TOTAL				8,200,000	19,400,000

- Animals and plant materials	100,000	600,000	1,100,000	1,543,000	1,800,000
- Research raw materials	3,000,000	7,000,000	7,340,000	10,291,000	11,500,000
- Non Research raw materials	-	-	2,585,000	3,625,000	4,000,000
- Packaging materials	-	50,000	700,000	982,000	1,000,000
- Medicine and Lab supplies	100,000	500,000	100,000	141,000	200,000
- Exploitation of research results	-	50,000	1,200,000	1,683,000	1,800,000
- Fuel	400,000	900,000	260,000	365,000	400,000
- Duty for purchases	-	150,000	300,000	421,000	500,000
- Scientific journals	50,000	100,000	300,000	421,000	500,000
- Protective cloth and medicine	200,000	200,000	500,000	701,000	750,000
- Transport and allowances	200,000	300,000	165,000	231,600	250,000
- Scientific analysis abroad	50,000	150,000	450,000	630,000	700,000
- Hired Labour (Temporary)	50,000	100,000	250,000	350,500	400,000
- Water & Electricity for research	100,000	500,000	-	-	-

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CAMEROON GOVERNMENT

SUMMARY OF BUDGET ALLOCATIONS FOR THE DAIRY SECTION OF I.R.Z.: WAKWA CENTRE

ITEMS	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985
Purchase of plants and animal Mat	2,100,000	600,000	1,300,000	858,800	900,000
Fee etc	2,100,000	5,500,000	8,750,000	6,620,000	7,000,000
- -	-	-	3,000,000	3,920,000	4,000,000
Packaging materials	-	-	-	-	-
Medecine and labo & experi	50,000	300,000	100,000	144,000	150,000
- -	-	150,000	50,000	32,000	50,000
Fuel	600,000	1,000,000	500,000	1,320,000	1,400,000
Water, electri, research	30,000	100,000	-	-	-
Duty for purchase	-	-	-	-	-
Scientific Documentation	40,000	150,000	50,000	32,000	30,000
Protective cloth & Med.	40,000	150,000	50,000	32,000	50,000
Transport & Trav. allowance	130,000	300,000	100,000	64,000	200,000
Scientific analysis abroad	100,000	200,000	-	-	-
Research maintenance mat.	200,000	600,000	200,000	1,128,000	1,200,000
Temporary workers	200,000	300,000	280,000	679,200	800,000
TOTAL		9,300,000	14,380,000	14,830,000	15,780,000

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CAMEROON GOVERNMENT
SUMMARY OF EQUIPMENT BUDGET: WAKWA CENTRE (DAIRY SECTION)

ITEMS	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985
- Dairy barn	10,000,000	-	-	-	-
- Fencing	2,000,000	-	-	-	-
- Small Technical equipments	-	3,750,000	3,000,000	-	-
- Purchase of scales	1,250,000	-	-	-	-
- Purchase of animals	5,000,000	4,250,000	5,000,000	2,500,000	-
- Completion of dairy lab	30,000,000	-	-	-	-
- " " vet equipments	20,000,000	50,000,000	-	-	-
- Small Scientific equipments	2,000,000	-	-	-	-
- Workshop equipment	-	2,000,000	-	-	-
- Barbed wires	1,250,000	2,750,000	2,000,000	1,500,000	3,000,000
- Completion of dairy	-	8,000,000	3,000,000	P. M.	-
- " " deworming bath	-	-	3,500,000	-	-
- Construction of paddocks	-	-	2,000,000	1,000,000	-
- " " of stables	-	4,500,000	2,000,000	500,000	1,500,000
- Purchase of silos	-	-	2,500,000	2,500,000	1,500,000
- Completion of dairy equipment	-	10,000,000	-	-	-
- Purchase of grinding mill	-	-	2,500,000	-	3,000,000
- Purchase of (charrue)	-	-	-	1,500,000	-
- Purchase of maize (semoir)	-	-	-	500,000	-
- Purchase of forage seive	-	-	-	1,000,000	-
- Completion of Agrotology Lab.	1,500,000	1,000,000	-	-	-
- Achat pelle à adapter au tracteur	-	-	-	500,000	-
- Electricity installation	5,000,000	3,000,000	-	-	-
- Construction of roads	-	-	1,500,000	-	-
- " " of Herdsmen's Houses	-	6,500,000	-	-	-
- Feasibility studies for varied constructions	-	-	4,000,000	-	-
TOTAL	78,000,000	95,750,000	33,000,000	11,500,000	9,000,000

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