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UNIVERSITY OF MAINE AT ORONO
AGROFORESTRY OUTREACH RESEARCH PROJECT
QUARTERLY REPORT
FOR THE PERIOD ENDING SEPTEMBER 30, 1985
BY
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TEAM LEADER
AND
AFORP STAFF

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UNIVERSITY OF MAINE AT ORONO
QUARTERLY REPORT FOR THE THIRD QUARTER ENDING
SEPTEMBER 30, 1985

OVERVIEW

The Agroforestry Outreach Research Project (AFORP) has now been underway for six months. Field procedures have been established and tested, and data collection is progressing over all components. A few interim reports and papers prepared for special purposes have been completed and have been, or soon will be, forwarded to the Project Manager and others as specified in the contract. Those which are also of general interest are being reproduced individually within a "Working Paper Series". The first of these has just been completed and several more are in preparation. This first was the Spanish to English translation of "Normas para la Investigacion Silvicultural de Especies para Lena" originally authored by Dr. Rodolfo Salazar of CATIE. The text of this translation is providing the basis for "standardized" measurement in project work involving tree measurements, eg., species and silvicultural trials.

Several team members participated in the "Planting Trees with Small Farmers" conference sponsored by PADF and others and held in Port-au-Prince over August 4-9. Marshall D. Ashley, Team Leader, presented an invited paper entitled "Agroforestry Research in Haiti and the University of Maine Agroforestry Outreach Research Project." Douglas Gill also helped with the

computer programming and data analysis used as a basis for Bill Buffum's paper on socio-economic factors in peasant tree planting.

The UMO Team has continued a wide range of contacts with individuals interested in the project. These have included among others, representatives of the Government of Haiti, Federal Republic of Germany, the World Bank, the USAID Forestry Support Program and the Washington Office of USAID. Our staff have had several meetings with personnel from the Ministry of Agriculture, Natural Resources and Rural Development, the Ministry of Mines and Energy Resources and the Forest Resources Service. These meetings have resulted in several agreements for sharing of data and the possible cofunding of project work having mutual interest.

The representative of the German Government and the World Bank met with our staff to discuss the AFORP and their future project development plans. The World Bank team stated before departure that they would recommend that final project design for their work not be done before next year when much of our data and reports would be available for their use in their project formation.

John Palmer, USAID/Forest Service Support Program, discussed the establishment of a seed collection/tree improvement program with several staff. He also used the paper prepared previously by Dr. Kathy Carter, UMO staff member and consultant to the project, as part of the background to the report which he recently prepared outlining the options to develop such a

program. I also spent part of a day, along with Glen Smucker, in the field discussing the project with AID Director, Peter McPherson.

Overall, the project is progressing well although now encountering some of the problems and frustrations that accompany work on any project. As done in previous reports, I will now summarize the accomplishments, problems and future plans for each of the project components. The more detailed reports on each component authored by the staff member doing the work on it are presented as before in the appendices.

SYNOPSIS BY COMPONENTS

TRADITIONAL AGROFORESTRY SYSTEMS:

Activity this quarter included the completion of a paper on environmental zones in Haiti, revision of data processing pres component work by consultant Dr. Rodolfo Salazar (CATIE, Costa Rica) and fieldwork on studies of farming systems for farms within and outside the project. A paper by Gerold Grosenick and me, entitled "Ecological Zones and Erodability of Terrain in Haiti" was written and is now in review. It will be published as Working Paper Series, Paper No.2. As described in the overview, a paper using some of the data from Paper No.2 has also been written for the national Watershed Workshop to be held later this month.

The data processing format for the intensive farm studies has been revised. Susan Ashley has revised the coding and data handling procedures so that the data can now be processed much more quickly.

Dr. Rodolfo Salazar spent ten days reviewing project

activities for the traditional systems, species trials and silvicultural project components. His report detailing his thoughts on what we are doing, what should be revised, if anything, and what new future initiatives in research are needed is being eagerly waited for. However, Dr. Salazar did comment several times that there appears to be many opportunities to expand agroforestry activities with farmers in Haiti. For example, through increased use of living fences.

General cropping and intensive farm surveys stratified by Buffum/Campbell ecological zones were being undertaken throughout the quarter; twelve intensive and some sixty-five general farm studies were completed. This work is being stratified so that those ecological zones with the greatest area are receiving the greatest amount of survey effort. My Forms AFORP 1-6 and the "User's Manual" for these can be referenced for a description of the data being collected.

Problems this quarter have been relatively few. Lack of time to do fieldwork has been the principal one. Next quarter's work plan includes several activities ranging from the presentation of papers at meetings to continuing the study of traditional and project farms. Emphasis of the fieldwork will be on the intensive study of farmers' uses of trees.

NURSERY, OUTPLANTING AND SPECIES TRIALS:

Work over this quarter has included the production of an interim report on container/mix trials, the continued nursery growing prior to outplanting of another container/mix trial and of a growth schedule trial, the remeasurement of project species trials, the measurement of a direct seeding trial and the review

of standardized measurement procedures with Dr. Rodolfo Salazar.

The results of the interim study of container/mixes has some very important implications for the future of the project. There are significant differences in survival between containers and between species, but not between the soil mixes tested. Plantbands and Hilson rootainers had significantly better survival than the presently used Fives rootainer and the Styroblock. Winstrip containers gave an average survival not different from either group. Depending upon the marginal cost of the containers, survival could be increased substantially on arid planting sites using seedlings produced in either Plantband or Hilson containers. Substantial savings in nursery costs could also be achieved by more use of the local "Haitian" mix, instead of the now commonly used, more expensive imported mixes. This study also indicated that outplanting technique and maintenance (eg., water catchments, weeding, etc.) could also substantially increase survival. Another study to verify this is already underway.

The direct seeding trial was established last quarter and only preliminary data germination data has been collected. Germination and height growth measurements will be made in the next quarter. Water catchments are being used in this study and should contribute to our knowledge of their value in Haiti.

Dr. Salazar spent considerable time reviewing species trials, the procedure for their measurement, and the analysis proposed for past trial measurements in combination with Roland Dupuis' remeasurements. He also reviewed at length with Roland

the CATIE standardized procedures. Dr. Salazar and Roland both found several of the earlier remeasurements and data recording methods to be incompatible with what is needed for the final analysis of trial performance. A standardized procedure will hopefully avoid such problems in the future. Dr. Salazar's report should have more to say on this.

Substantial problems have been encountered this quarter, primary among these was the much more than expected work required to measure the species trials. The standardized procedure requires more time than was estimated beforehand. There are also now many more trials than there were when our project was proposed. The result of these problems is that there are still several trials left to be remeasured, some of which may not be because of the limited time available for this work.

Over the next quarter container/mix and growth schedule trials will be outplanted. In addition, the top pruning and direct seeding trials will be remeasured. The species trials remeasurements and analysis will continue after the next quarter.

SILVICULTURAL RESEARCH

The silvicultural work has been involved with the production of yield tables and the establishment of some coppicing experiments. The fieldwork and most of the lab work has been completed for making yield tables for Leucaena, Prosopis, Neem, Eucalyptus camaldulensis, Cassia siamea and Columbrina aborescens. From this work some green and dry weight biomass tables have already been produced. Regression relationships between tree diameter and biomass used in making these tables all have R squared values greater than 0.95.

The major problems in this work have been locating enough trees over the range of diameter needed for study and in getting laboratory time at Damien to do the drying and weighing of samples. This phase of the silvicultural component will be completed next quarter, including the production of a report giving detailed results. The coppicing trials consisting of three treatments have been established in the Cap Haitien area. These should be remeasured and retreated periodically for several years to find the potential productivity of coppicing. Pollarding and fruit tree/Leucaena intercropping trials will be set-up in the near future and will also require periodic measurement.

ECONOMIC ANALYSES AND ECONOMIC RESEARCH

Over the last quarter several wood products surveys, a farmer, risk avoidance study, a charcoal consumer preference survey and as already described a study of ecological and erodability zones were undertaken. In addition, a cooperative agreement was reached with the Haitian "Service de Ressources Forestieres" to help them summarize their past cutting and transportation permit records, with them in turn sharing with us the summarized data.

By far, the most extensive study was a one week survey of all wood products entering Port-au-Prince. Five entry points including the waterfront, were manned continuously over the study period. Analysis of this data is not complete as yet, but will be combined with similar surveys to be done at other times so that an accurate picture of wood products delivered to Port-au-

Prince can be obtained.

Data collection for a charcoal consumer preference study has nearly been completed. Household and industrial users have been given charcoal produced at ODH from several species planted within the project and asked to rate which kinds surpass which others in quality for whatever reason the charcoal is being used (eg., cooking, bakery, distillery, etc.). The collection and analysis of data is not completed yet, but will be within the next two quarters.

A preliminary economic analysis of the project and plantings from it has been initiated and will be completed for discussion at an AFORP review early next quarter. Also, for next quarter, charcoal, fuelwood and pole consumer preference surveys will be undertaken. Analysis of quantities and origin of wood supply to the Port-au-Prince market will continue along with analysis of transportation and cutting permits for all of Haiti.

MARKETING RESEARCH

Many of the activities in this component are tied with that of the cost/benefit analysis. Several wood products surveys were initiated over the quarter. Pole and plank surveys have been started nationwide at the same sites as the charcoal price surveys discussed in earlier reports.

Charcoal producer surveys were developed and have been conducted at three sites. Seven more will be studied in the future. Charcoal consumption studies were also initiated in Thomazeau and Thiotte to provide some baseline data of use in medium size towns.

Problems encountered have primarily stemmed from the absence

of the principal researcher due to a family emergency in the United States. However, she is nearly back on schedule and should have all projected work accomplished by early next quarter.

Work projected for the next quarter includes over 100 charcoal producer surveys, 15 wood product intermediary and wood producer surveys, and the continued monthly collection of charcoal, pole and plank price information. A rough draft of the status of wood markets in Haiti will be produced from analysis of this information. This will be followed by an analysis late in the quarter to find what additional information is needed to complete the studies and produce the final report.

SOCIOLOGICAL RESEARCH

Researcher Anthony Balzano spent most of the past quarter in-residence at the village Fonds-des-Blancs collecting data for a socioeconomic profile of those planting project trees in this area. He has conducted several interviews (more than 90) over the quarter, either on their farms or at activities (eg, cock fights) within the community. Balzano has been gathering quantifiable information on age, sex, land object ownership, education, religion practices, marital status and a number of other variables indicative of socio-economic status in the community. Other diverse variables such as slope and altitude of gardens and status in pig distribution are also being collected to characterize those who do or do not participate in the AOP project.

An intensive study of agroforestry practices has been

initiated on several farms to find why the planters manage their trees the way they do and what expectations they have for these trees in the future. Balzano is also observing the broader agricultural milieu of the community for such things as farm labor requirements, post harvest processing and livestock management practices to find how all factors in the general agricultural setting of the community influence the planting of project trees.

The selection process for a second village study site began late in this quarter. The choice will be made before the end of October.

Data for the Planter Decision and Consumer Marketing studies were also collected. The Fonds-des-Blancs information will be integrated into the overall data set for the country.

The next quarter will see a continuation of this quarter's activities. Additional data will be collected at Fonds-des-Blancs and at the second study site, once it is chosen. Much more progress will be made in the Planter Decision Study when component leader Fred Conway returns from a tour in the States early in the quarter.

COMPUTER SYSTEM

Computer specialist, Douglas Gill, and other staff members have continued to expand the capabilities of our IBM PC XT system. The installation of a memory expansion board (512K) has helped greatly to meet our data analysis needs. The loan of the AOP Osborne computer to us in August has also helped meet some of our data entry and word processing needs.

Mr. Gill has also spent considerable time with ODH and PADF

helping their staff with computer work. He helped ODH set up their new IBM system and get it running and with PADF aided Bill Buffum perform some statistical analyses which could not be done on the PADF system.

Several problems have occurred with our computer system over this quarter. The first memory expansion board from the States was faulty and had to be replaced. The Osborne system has faulty disk drives and must be checked frequently for accuracy of its entries. On top of all this, even when everything is working properly, there is more demand on the machines for data entry, analysis and word processing than there is time available. This will likely continue to be a problem.

Over the next quarter many of the data entry and analysis activities will intensify. A graphics card for graphic output has been ordered and should be installed within the next month. This capability will greatly enhance some of our reports. However, we will continue to suffer from demand for computer time beyond that available.

ACKNOWLEDGEMENTS AND THANKS

Our most sincere thanks must again be expressed to all those on the grantee staffs whom assisted us in our work. You are too numerous to name, but without your help we would certainly not have accomplished what we did.

Special thanks also goes to Richard Byess, USAID, for his loan of IBM diagnostic software used in tracing out problems with our PC XT.

REFLECTIONS

The project in general is within the timelines set in our original work plan. The principal exception to this is the species trials work which is behind schedule because of the much greater volume of work required than originally planned. However, barring a complete failure of our computer system, all should continue on schedule, except some of the remeasurements of species trials may not be done.

Following this are the appendices which describe in more detail the work done in each component. For further information on any one of these, contact me or the researcher working on that component.

APPENDIX A

A QUARTERLY REPORT ON TRADITIONAL AGROFORESTRY SYSTEMS

FOR THE PERIOD ENDING SEPTEMBER 30, 1985

BY MARSHALL D. ASHLEY, TEAM LEADER

TRADITIONAL AGROFORESTRY SYSTEMS

Over the quarter several intensive farm studies and regional crop surveys have been completed, while in the office data entry procedures for computer analysis were revised and improved, a summary of the area in each Buffum/Campbell zone was calculated from the previously compiled Ecological Zone map, and a study of the erosion potential and risk by Ecological Zones was completed.

Twelve (12) intensive farm interviews were conducted to study the farming systems typical of where project trees are being planted. Those interviews were done on both project and non-project farm gardens. Crop species, crop calendars and farm management involving trees were intensively surveyed. Earlier reports from this project may be referenced for examples of what data was collected using AFORP forms 1-6 and a detailed instructions manual. These are now available in English and French.

Fourteen (14) days were also spent doing general crop surveys within those Buffum/Campbell zones having the greatest percentage of area in Haiti. Some sixty five (65) farms were visited during these surveys and farmers interviewed to get specific cropping information, such as what species were planted in that zone in other seasons.

A study of erosion potential and risk by ecological zone has been completed. This should provide some of the basis for USAID or other policy planners in making program decisions concerning the influence of slope, soils and possibly other environmental variables on agricultural development and hillside farming. A draft report giving examples of how resource planners and managers in Haiti might use Buffum/Campbell on erodability data has been prepared and is now being circulated for comment. Also, another paper using some of this material has been submitted for discussion at the Haiti National Workshop on Watersheds, to be held in Port-au-Prince, October 14-15.

Problems encountered this quarter have been few. Primary among these has been the lack of time to complete the general farm surveys in preparation for the intensive study of tree use on farms. Administrative duties, report preparation and consulting with others on how to statistically analyze their data have all taken large amounts of time.

Plans for the next quarter include a variety of activities. Office work will include revising and publishing the Buffum/Campbell and erodability report as Working Paper No.2 and participation in the National Watershed Workshop. Fieldwork for the intensive farm studies will begin and continue into the next quarter. Many more intensive farm studies will be made (more than fifty) and approximately another fifteen (15) days of general crop surveys will be undertaken. Following completion of these detailed and general farm studies, the data will be summarized and a report written characterizing the influence of trees within

traditional farming systems. Many of the interviews in these surveys will be done in concert with the planter decision study being undertaken by anthropologist Fred Conway. Finally, some of the computer analysis of field data will be completed although the majority will be done in the following quarter.

APPENDIX B

A QUARTERLY REPORT ON NURSERY, OUTPLANTING AND SPECIES TRIALS

FOR THE PERIOD ENDING SEPTEMBER 30, 1985

BY ROLAND DUPUIS, FORESTRY RESEARCH ASSISTANT

This quarterly report was prepared in late August because Phase One of my contract terminated on September 1, 1985. Phase Two will cover a three week period in October 1985 and will be in the next quarter.

Outside my regular plan of work, I have been involved in the following activities. On July 25, 1985, I attended a meeting at USAID during which I briefly described my work responsibilities to AID/Haiti Director, Jerome French. On August 5, 1985, Dr. Rodolfo Salazar of CATIE and myself went on a field trip to view current AFORP research plots in Duvalierville and Ganthier. Included in the field trip were visits to the ODH plantations at Ganthier and the FAO species trial at Vaudreuil. The following day, I attended the briefing of Dr. Rodolfo Salazar at USAID during which he gave recommendations on the different components of the project.

The remainder of this report will describe my work on each of the five subcomponents within the agroforestry sector of the research project for which I am responsible.

CONTAINER/MIX SUBCOMPONENT

The trees which are to be outplanted in September or October for the container/mix trial are currently growing in the nursery. All of the trees have been placed in full sunlight and are almost

ready to be hardened-off for outplanting. Water and fertilizer measurements for each species by container and mix are being recorded.

The trial site has been moved from Ganthier to Bon Repos because of difficulty in obtaining land. The current site is 30 meters above sea level on a 2-5 percent slope and receives 850-900 mm of rainfall annually. The major vegetative cover at present is Prosopis juliflora and Acacia species which have been harvested on a yearly basis for charcoal. The site was prepared using a "ripper" which when pulled behind a tractor "ripped" a furrow in the soil 60 cm deep and 30 cm wide. During this action, vegetation on the furrow including the roots were removed. In addition, any hard pan or clay layer was broken up to a depth of 60 cm. This should markedly improve the tree's performance both in height and survival. The "ripper" passed on contour at 3.0 meter intervals. Thus the vegetation between the rows remains as a windbreak for the small seedlings. Periodic maintenance of the windbreaks will be necessary to keep shading of the seedlings to a minimum. Water catchment basins will be constructed within the furrow for each tree to maximize the rainfall. The site will also be fenced.

During the next quarter I will remeasure the trees before outplanting them on the Bon Repos site. Time trials of tree packing activities for the economic analysis will also be run on each species/container/mix combination.

At the time of this report, the neem seedlings were not growing as fast as they should and the variability among the seedlot of neem seed is extreme. It is my belief that the seed

collected for ODH this season were of very poor quality, possibly because they were picked too green. Many seedlings have stunted roots or "looped" roots which are roots that have a high degree of curvature before extending downwards.

Initially, fertilizer was unavailable for the trees because the fertilizer dispersal system at ODH was out of order. Consequently, a few containers of trees in Pro-mix are slightly yellow.

In the nursery, species/container/mix combinations are marked with white plastic tags and red flagging tape. Unfortunately, the laborers at ODH seem to have an affinity for these articles as they seem to disappear with great frequency. This could potentially cause us to mislabel an entire treatment. ODH management has been notified but the problem seems to be continuing.

Information pertaining to the original container/mix trial of October 1983 has recently been prepared and has been presented under a separate cover entitled "Container/Mix Interim Report" by Roland Dupuis. In summary, 17 month results showed that there was a significant effect on height growth and survival by container type and species selection at the 05 level of significance. Soil mix type had no significant effect on height growth or survival.

During the next quarter, this trial will be measured for the two year data. The CATIE-Salazar method of measurement will be applied.

Analysis of the trial data has been very slow. As

previously mentioned in my quarterly report for the period ending June 30, 1985, the analysis was at a standstill due to the late arrival of the "memory board" which increases the memory capacity of the computer. After its arrival and installation the computer has been in constant use for inputting and analyzing data. Unfortunately, with the vast amount of data this project is collecting and inputting, data analyses are slow to be completed. This is the reason for the late writing of the container/mix draft interim report.

GROWTH SCHEDULE SUBCOMPONENT

The trees for the growth schedule trial are currently growing in full sunlight. Differences in height and plant development between the treatments are evident because the control trees were planted 25% earlier than the extended growth trees. Fertilizer and water measurements are being recorded for economic analysis purposes. The site for this trial has also been moved to Bon Repos for the same reason as the container/mix trial site relocation. The site description and field preparations are the same as for the container/mix trial too.

During the next quarter, I will plant the growth schedule trial.

As with the container/mix trial, the availability of fertilizer at ODH was a minor problem.

TOP PRUNING SUBCOMPONENT

Both top pruning trials were outplanted in early June. Monthly survival counts were taken for the first three months, with no significant findings at either site. Each site has been weeded and at the Duvalierville site the water catchment basins

have been rebuilt in preparation for the coming rainy season.

During the next quarter I plan to continue the survival counts on a monthly basis and to record heights after the rainy season. Water catchment basin repair and weeding is also planned.

I realize that hiring local labor to weed trees, no matter what their size, is not advisable unless one is willing to register a certain level of mortality for the weeding operation. Therefore, it has been necessary for us to do the weeding and water catchment basin repair ourselves. This has consumed large amounts of time originally not in the work plan which should have been spent measuring species trials.

DIRECT SEEDING SUBCOMPONENT

The seedling heights of the germinated seeds were measured at two months of age and survival counts were taken every week for the first two months and every month thereafter at each site. Water catchment basins were constructed for a random sample of seedlings at each site so that a comparison could be made on the growth and survival of direct seeded seedlings with catchments and without. All trial sites were weeded prior to September.

In Duvalierville, where rows of seedlings were planted adjacent to the rows of seed, water catchment basins were rebuilt to more effectively hold water and reduce the amount of runoff. At this site, seedling heights were recorded at one month of age.

During the next quarter I plan to continue to record survival on a monthly basis and to measure seedling heights after the rainy season (6 months). Water catchment basins will be

rebuilt where necessary.

Maintenance of the water catchment basins has been quite time consuming. I avoid using local labor for this duty as they do not seem to envision where potential breaks in the catchments may occur.

and more importantly, to keep variability among the treatments to a minimum.

SPECIES TRIAL SUBCOMPONENT

Thirteen species trials have been measured to date, representing 44 tree species and a total of 4100 trees. All CARE species trials except for two at Bombardopolis have been measured. Two other CARE trials namely Deforges and Lavaltiere will not be measured because of the slow growth and the young age of these trials. PADF trials measured to date include Mirebalais and Bassin Zim (Hinche). ODH species trial No. 4 has been measured and the two University of Maine trials outplanted by myself have also been measured. All trials are being measured according to CATIE methods. The results from the trials are presently being analyzed on the AFORP computer.

During the next quarter, no work is planned for this subcomponent because of the short term nature of Phase Two of my contract and the need for other priority work responsibilities.

Problems with this subcomponent have been numerous. The CATIE method for species trial measurement is much more time consuming than the methods used in other studies. Depending on tree form; height, diameter at breast height or basal diameter and number of forks which occur on each tree at 1.3 meters or lower are recorded. It is obvious that this will yield more

accurate information about the trees measured. However, time is of the essence when trying to measure the 25 species trials of the three grantees and concurrently carry out other project responsibilities as outlined in my contract. Difficulties have been encountered in just obtaining information about the trials. During the months of July and August, five of the eight grantee foresters were out of the country on vacation. If information was obtained before their departure, any questions I may have had about the trial had to go unanswered until their return. Species trial files obtained from grantees have been less than adequate in their completeness and accuracy of survival data. This has lead to many problems and delays in the measurement and analysis of these trials. It appears that all grantees are using a standardized form to record species trial information. Unfortunately however, different foresters seem to record different kinds of observations in different ways. The following list contains some examples of the inadequacies encountered in working with the grantees species files. Please note that this does not pertain to all of the trials.

1) Site maps depicting the trial layout have been mislabeled.

2) Data sheets of previous trial measurements have no page numbers and some have no date.

3) In all of the trials measured to date, survival counts have been erroneous. In several cases survival counts were depressed by 20%.

4) Trial measurements have not been recorded on schedule,

especially survival which should be recorded at outplanting, one, six, twelve, eighteen and twenty four months.

5) Trial data which has been collected (in some cases for more than two years) sits idle in species trial files. In particular, survival data often remains on field sheets without being summated or analyzed.

6) Different units of measurements are used throughout the measurement schedule. For example, heights at outplanting, six and twelve months are measured in inches, centimeters and meters respectively.

In addition, a memo sent by Wendy King, Project Coordinator, dated June 26, 1985 asked grantee foresters to send species trial information to her office with a photocopy of the materials for myself. To date no information has been received.

APPENDIX C

QUARTERLY REPORT ON SILVICULTURAL RESEARCH ACTIVITIES

FOR THE PERIOD ENDING SEPTEMBER 30, 1985

MARKO EHRLICH, SILVICULTURIST CONSULTANT

INTRODUCTION

The period covered by this report saw the completion of most of the field and laboratory work forseen by the silvicultural team during the six-months allocated to this research component. In the past few months, it also became apparent that in such a short time the team could only address a handful of silvicultural issues and thus barely scratch the surface of all problems related to the growth of trees and the production of forest products in Haiti. A prioritization of research objectives led to focus the team's work on the development of yield tables for many common tree species used in the Agroforestry Outreach Project and on setting up coppicing and pollarding experiments with one or more tree species.

A. YIELD TABLES

Preparation of yield tables for six different tree species involved considerable field and laboratory work. The six species include 2 natives: *Columbrina arb.* or "Kapab", and *Prosopis juliflora* or "Bayahonde", and four exotic tree species: *Leucaena leucocephala*, *Azadirachta indica* (or "neem"), *Eucalyptus cam.* and *Cassia siamea*. Suitable plantations from which a sample of trees could be harvested were located in the south-western region (Camp Perrin), in the southern region (Morne-a-Cabrit, Thomazeau) and in the northern region of Haiti (Limbe, Cap

Haitien). In the process of locating appropriate tree stands from which to extract (...cut) a sample of trees, many people have been contacted. The team must acknowledge the cooperation of Mr. Sean Finnagan (for *Leucaena*), Ron Smith and Ken Iannis (*Cassia siamea*), Peter Welle from ODH (*Eucalyptus* and *Neem*), Agr. Francois Severin, Agr. Francois Martino from DARNDR and Christian Chatelain from the World Bank Forestry project (Kapab and Bayahonde).

Specifically, 30 *Leucaena* trees were cut from a hillside plantation near Camp Perrin. At least three trees per each dbh diameter class of 2 cm were selected. Each tree harvested was weighed in its entirety by sections (e.g., pole/log, charcoal wood, leaves and small branches). In addition, each tree was measured for total length, dbh, basal diameter (at 10 cm) and ground diameter. Fresh samples from at least two trees per each diameter class were taken and stored in air-tight plastic bags. Samples were collected from the lower, middle and upper sections of the tree, storing separately wood samples from leaf samples.

The biomass was weighed (whole tree, except for a 10 cm stump and the root system) as soon as the tree was cut, using a 40 kg and a 10 kg scale. Each section of the tree was weighed separately, leaving to the cutters (local peasants) the definition of pole and charcoal wood. Poles were measured for length, top and bottom diameters. All the data were collected on specially designed data sheets.

Using a similar methodology, 33 trees of *Cassia siamea* were located near Riviere Salee (Limbe), cut, measured, weighed and sampled. *Neem* (*Azadirachta*) trees were located and harvested (22

trees) from an ODH plantation near Thomazeau. Kapab (Columbrina) trees were found on various peasant plots around Morne-a-Cabrit. Because the raining season had started and because DARNDR had previously distributed trees to local farmers for soil conservation work, it was thought appropriate to reward the cooperating peasants with tree seedlings. A total of 18 trees were cut and measured. The response to the tree seedling reward was very encouraging. Eucalyptus cam. trees were located at the Madsen Farm plantation (Bon Repos), where 21 trees were harvested and measured. Finally, Bayahonde (Prosopis jul.) trees were located at Ganthier and Duvalierville. A total of 20 trees were cut and measured. The two sites were chosen to account for different tree conditions (e.g., pruning and frequent cutting around houses vs. unrestrained growth in a protected stand).

More than 300 leaf and wood samples were processed at the soil chemistry lab of the Faculte d'Agronomie (DAMIEN). All samples were weighed while still in the air-tight bags, then oven-dried (80 C) and weighed again to determine moisture content of the different sections of the tree in each diameter class. Wood samples were also measured for green volume (before being placed in the oven) for specific gravity determination. All laboratory data were collected on specially designed forms.

All field and laboratory data was entered on the office computer and analyzed to determine as required, regression equations, sample distributions, variable correlations and means tables. From this analysis, specific yield tables will be elaborated. Each table will be developed so as to become a practical and easy to use tool for estimating production of

poles, fuelwood or total biomass production based on one simple field measure such as dbh.

B. SILVICULTURAL TREATMENTS

Given the relatively short time at our disposal, it was decided that coppicing, pollarding and intercropping experiments will be set up first. Two standard-design coppicing experiments were established in the region of Cap Haitien (Perdi Midi). Two trees species (*Leucaena leucocephala* and *Cassia siamea*) were used in the experiments. Each experiment involves the establishment of 3 treatments plots, 3 repetitions, one control plot for coppice growth and one for non-coppice tree growth.

The coppicing treatments: coppice to three dominant stems, coppice to one dominant stem and no thinning of coppice growth will be applied six months from the harvest date. Each plot measures 60 square meters and includes an average of 22 stems. Each plot is separated by a buffer plot of similar size (see figure 1: experiment lay-out). In the process of setting up the experiment a total of almost 300 trees were cut and measured for dbh and stump diameter (at 10 cm). An additional 45 trees were measured within the control plots, but not cut. A 30% sample of the trees cut were also measured for total length (for comparison in volume tables).

The researcher in the following weeks, expects to establish two formal pollarding experiments involving two tree species, as well as setting up a fruit tree/*Leucaena* intercropping experiment in the southern region. If time permits, an additional tree species will also be studied for yield table preparation.

APPENDIX D

A QUARTERLY REPORT ON ECONOMIC RESEARCH FOR THE PERIOD ENDING SEPTEMBER 30, 1985 BY GEROLD GROSENICK, FOREST ECONOMIST

I. CONSUMER PREFERENCE STUDY FOR CHARCOAL

The initial survey of charcoal users is complete. Women from forty-five households were asked to compare two charcoals and to express a preference for one or the other. Three hundred seventy such comparisons were made. The responses will be analyzed in October.

II. SURVEY OF POLE USERS AND CONSUMER PREFERENCE STUDY

Fifty pole users were interviewed. Each was asked why they had purchased the particular poles they had and to what use the poles would be put. The overwhelming majority of poles are used for construction supports. This group of urban consumers will be complemented by a group of rural consumers during the next quarter.

III. SURVEY OF WOOD PRODUCT DELIVERIES TO PORT-AU-PRINCE

In early July, a seven-day survey of all wood products entering Port-au-Prince was conducted. Five entry points were monitored continuously. Results of the survey show that approximately 43,600 sacks of charcoal, 250 cubic meters of firewood, 9600 poles, and 3400 boards were delivered to Port-au-Prince during the survey period.

This data could be expanded to yearly consumption totals

if one bears in mind the limitations of judging an entire year on one week's data. The yearly totals would be: charcoal-68,000 metric tons; firewood-13,000 cubic meters; poles 500,000; and lumber-175,000 boards.

The information will be refined as we intend to do two or three more such surveys at different times of the year.

We have also begun to summarize transportation permits issued by the District Agricoles. Using both these summaries and the survey results should give us a very good idea of the amount of the various wood products used, their origin, transportation costs, and seasonal fluctuations.

We are also working with the Ministry of Mines and Energy Resources on a similar study.

IV. COST BENEFIT ANALYSIS

A plan for integrating the results of the various studies into a cost benefit analysis was prepared and submitted to AID for review.

Collection of information necessary for the analyses continues.

V. SPECIAL EROSION STUDY

See Marshall Ashley's report for details.

VI. OTHER

UMO supervised two summer interns from the Faculte d'Agronomie. One worked in Port-au-Prince helping with the erosion study cited in V above.

A second, working in the Petit Goave/Violet area conducted an exploratory study on peasant strategies to diminish risk. Both of these students were supervised directly and given

advice on their summer research projects.

VII. FUTURE ACTIVITIES

Original work plan to be modified, at AID's request, to provide economic analyses by early 1986 so that results can be included in the Project Paper for Phase II of the AOP. Revised work plan to be submitted by October 25, 1985.

APPENDIX E

A QUARTERLY REPORT ON MARKETING RESEARCH FOR THE PERIOD ENDING SEPTEMBER 30, 1985 BY LISA MCGOWAN, ECONOMIC RESEARCH ASSISTANT

The market survey subcomponent of UMO's research project continues on schedule, now in a period of extensive information collection. In July, pole and plank survey forms were completed in many areas, and we continue to encourage that they be administered at the same sites as the charcoal price surveys. CARE and PADF animators are administering the majority of these surveys. An intensive price/market structure survey was conducted in L'Estere in July, to be repeated in December. Charcoal producer surveys were written, pretested, and to date 45 have been completed. These questionnaires will be administered to at 150 charcoal producers throughout the country. In Thiotte and Thomazeau, studies have been carried out that will give us indications of charcoal consumption in those areas, as well as flows of charcoal through to the Port-au-Prince market. With the help of Glenn Stevenson, an AID contractor working with the Ministry of Mines and Energy, we have set up cooperative working relationships with the Ministry and the Service Forestier. Stevenson's information needs overlap ours in many areas, and so we are currently sharing data and, to some extent, resources so that there is no unnecessary duplication of work.

Wood harvest surveys are in the first round of pretesting. These surveys will give us specific data on inputs and returns on

the harvest of poles, lumber, and charcoal, as well as the peasants perception of the value of the harvesting of trees both for cash cropping and for auto-consumption.

Currently, all data collected thus far is being computerized, including data from published sources.

No problems other than the normal ones such as the difficulty of finding a farmer on his land, of getting computer time, or of ensuring accurate data collection, have been encountered.

Through good luck, a good field staff, and some overtime hours, all research is on schedule except for a 5-day field trip to a rural study site which was cancelled due to my emergency home leave. This trip has been rescheduled for November.

The next two months will be a continuation of intensive data collection and field work, during which 100 charcoal producer surveys, 15 harvest studies transportation and 5 intermediary surveys will be administered, and monthly price data will continue to be collected. The lengthy process of data collection from published and unpublished sources will continue. Sites to be visited include: Thomazeau, Cayes, Jeremie, Belle-Fontaine, Gonaives, the Northwest peninsula, Savanne Carree, Cap Haitien, Mont Organise, Plaisance and Hinche. Where appropriate, data will be computerized, spreadsheets will be developed and circulated and applicable analysis performed. In December, information thus far gathered will be analyzed within the framework of incoming UMO research and the sum of information we have from other sources. A working paper on an intensive rural study site will be written, as well as the outline and rough

first draft report incorporating all of the above. This "sit back and take stock" approach is necessary to plan the final two months of information collection, insuring that the necessary data either has been or will be collected for the final report.

APPENDIX F

A QUARTERLY REPORT ON SOCIOLOGICAL RESEARCH

FOR THE PERIOD ENDING SEPTEMBER 30, 1985

BY ANTHONY BALZANO, ANTHROPOLOGY RESEARCH ASSISTANT

This Quarterly Report for the Research Anthropologist will address itself to the activities and prospects for Anthropological research as they concern three interrelated components of the overall University of Maine research effort: the Socio-Economic profile (SEP), the Planter Decision Study (PDS) and the Consumer Marketing Study (CMS).

Description of my activities and future goals for each component will follow respectively.

I. SOCIO-ECONOMIC PROFILE

A. First Village Study Site Activities

Fieldwork at the First Village Study Site (Fond-des-Blancs, Commune d'Aquin, Departement du Sud) commenced during the preceding quarter on June 10th. Anthropological fieldwork conducted at the First Village Study Site for the purpose of constructing a SEP of that community could be viewed as being composed of five integrated methodologies: 1) Formal Socio-Economic Indicator Interviews, 2) On-Farm Agroforestry Data Collection, 3) Informal Community Participation, 4) Agricultural Strategy and Rural Economy Observation, and 5) Study of PADF and PVO Behavior, Infrastructure and Records.

1) Formal Socio-Economic Indicator Interviews

One of the few generalizations that may be safely made

for rural Haiti is that one's standing in the agricultural labor and land markets can serve as one of the more reliable indicators of rural wealth and rural social status. Planters and Non-Planters of Agroforestry Project trees are being characterized according to these and other socio-economic indicators as the basis for the SEP. Other indicators are age, sex, ownership of a cistern, home ownership, education, religion and religious practices, marital status, occupation, civil authority, livestock holdings, land holdings, and tenure status of land under one's control. In addition, there are variables which may be specific to the First Village Study Site that are being investigated as further evidence of socio-economic status: the incidence and place of residence of immediate family overseas, membership in community groups, role in pig redistribution, ownership of land other than productive gardens, place of residence, and slope and altitude of productive gardens.

Data has been collected through formal on-farm interviews for 90 cultivateurs in the study area. Preliminary analysis shows that 55% of the interviewees to be Non-Planters of Agroforestry Project trees, 42% to be Planters and 3% to be (Unregistered) Planters who have as yet not been identified in PADF documents. This last category is one PADF administrators and foresters have voiced concern for as it is generally felt that many planters share their trees with neighbors, relatives, friends and associates. However, the frequency and reasons for this behavior remains a subject for speculation.

Encoding of this data for computer analysis has begun with the assistance of Computer Specialist Gill. While the

encoding process is time consuming some preliminary readouts may be available for the SEP Mid-Term Report due a fortnight hence.

2) On-Farm Agroforestry Data Collection

This research subcomponent commenced in earnest on September 7th after variables for measurement were determined and pretesting of research tools was carried out with the assistance of Senior Anthropologist Conway. Incorporated in this subcomponent are the means to provide data for the PDS.

Primary among its objectives are to determine the presence, extent and strategy of agroforestry practices where Agroforestry Project trees have been planted. At this time, the survey is limited to 10% of the approximately 140 Planters in the study area for reasons of time and effort. Extension of this survey to include Non-Planters as well as additional Planters would take place under a Research Anthropologist Extension of Contract. Gardens, woodlots, coffee and/or fruit groves, bush lands, and pasturage where Agroforestry Project trees have been planted are being observed to determine pattern and reason for planting, plans for exploitation of trees, tree management practices, role of land tenure in planting decision, the uses of trees in the agricultural household economy and what the cultivateur views as the advantages and disadvantages of intercropping Agroforestry Project trees with other cash crops and tree crops. It should be noted that this component can only help in measuring the scope of agroforestry practices and cannot at this time hope to fully determine its nature and intent.

3) Informal Community Participation

Participation in community dialogue and activities is essential in establishing a place in the community as a foreign researcher who people feel they can be frank and open with. Informal community participation allows the researcher to observe social behavior in a non-agricultural context thus providing a further basis for analysis. For example, to observe a cultivateur that had recently been interviewed at a cockfight or community council meeting lends an added element to the information gathered while standing with him in the midst of his fields. Speaking with people on the roadside, at the weekly market, or on their stoops in the evening conversation can turn to other subjects apart from trees and gardens and provide perspective on other problems in life and the community. New insights on agricultural problems have come to light in this way, such as the connection between tree planting and pig redistribution: it has been apparently rumored for some time that the earliest Planters would be the first to receive pigs, in fact eight cultivateurs have received pigs for their role as animateurs for the Agroforestry Project. More importantly, it is paramount to determine who are the opinion makers and risk takers in the community and what they say about tree planting since Agroforestry Project tree planting does involve engaging oneself in a novel agricultural strategy and a modicum of risk.

I have been invited and attended three community council meetings where I have always been given a seat with council officers and each time introduced to the community at-large as to my goals and reasons for being there.

4) Agricultural Strategy and Rural Economy Observations

Such observations provide details for the broader agricultural setting in which Agroforestry Project tree planting and agroforestry practices are taking place. Such strategies as livestock management, cropping cycles, post-harvest processing, and labor requirements for agricultural tasks are observed. Agricultural decision making and the circumstances surrounding those decisions are also noted as they may provide clues on how the ability to make one agricultural decision, such as tree planting, may be intimately connected to another agricultural decision made beforehand. Marketing of agricultural and tree products are also noted not only as per my role in the CMS but also to determine the variable effects marketing behavior may have on the household economy and economic specialization by some people (e.g., hat makers, firewood collectors, carpenters). Who sells what for what price are useful bits of information for further analysis gleaned from visits to the weekly Friday market.

5) Study of PADF and PVO Behavior, Infrastructure and Records

I have been able to gain access to animateur documents in the study area and PADF documents in Port-au-Prince recording the distribution of Agroforestry Project trees and specific facts about the Planters. The PADF documents are quite voluminous. This data provides a method of verification for data collected in the field as well as a measure of the accuracy of the documents themselves. The documents have been most useful when they verify whether or not a Planter is registered or has

received trees from another Planter. Several important opportunities have arose where the behavior of the animateur and the PVO (Codepla) were observed. Such instances have the potential of providing important insights between the Project and the planter at the grassroots.

B. Goals for First Village Study Site

Since the Second Village Study Site will need to be established soon, On-Farm Agroforestry Data will be collected as time permits throughout the next quarter. Socio-Economic Indicator Interviews will be carried out as cultivateurs are contacted in the course of On-Farm surveys. Data from these two major components will be contextualized and analyzed for future Mid-Term, Final Draft and Final Reports.

C. Selection of Second Village Study Site

The selection process for the Second Village Study Site began during the month of August shortly after the departure of Conway. All PADF and CARE administrators and foresters were solicited with a letter asking to suggest sites according to the following criteria: 1) That the site be over 400 meters, 2) That in their opinion the site have had what they consider to be good survival rates, 3) That Agroforestry Project tree planting have taken place since sometime in 1982, and 4) That the site be within less than an hour walk from public transportation links. Discussions have been subsequently held with Mike Bannister, Stuart North, and Ralph Matthieu of PADF and Rick Scott and Marcia McKenna of CARE.

The Second Village Study Site will be selected before the close of October.

II. PLANTER DECISION STUDY

Research tools for the PDS were pretested with the Senior Anthropologist Conway, coordinator for the PDS, at Deblese on July 24th. Aspects of this field experience have been incorporated into the On-Farm Agroforestry Data Collection component of my own research. Data from this will ultimately be integrated into the wider PDS. Analysis of data in the context of the wider PDS will be made by Conway. Intensive field site analysis began on September 7th. Approximately 15 (or 10% of all growers in the study region) farm operations will be studied.

III. CONSUMER MARKETING STUDY

Data is being and will continue to be collected at both Village Study Sites for the CMS and will include information on pricing and utilization of a variety of tree products with an emphasis on charcoal, poles, and firewood. Five (5) situational observations have been made thus far. Refer to Forest Economist Grosenick's Report.

This is an on-going activity.

APPENDIX G
A QUARTERLY REPORT ON UMO COMPUTER SYSTEM
FOR THE PERIOD ENDING SEPTEMBER 30, 1985
BY DOUGLAS GILL, COMPUTER TECHNICIAN

This report describes UMO's computer and data analysis activities since the previous quarterly report of June 30, 1985.

EQUIPMENT.

The previous quarterly report mentioned that insufficient RAM (Random Access Memory) was adversely affecting the data analysis activities. This problem has since been corrected. A memory expansion board arrived in early July. Although this board was defective, it allowed UMO to perform some preliminary analysis with SPSS (Statistical Package for the Social Sciences) software. The defective expansion board restricted the analysis that could be performed, but it did allow the data analysis tasks to begin. The limited capabilities of the computer did cause a backlog of data awaiting analysis and in delaying some member's research efforts.

A replacement memory expansion board arrived in late August, allowing for the full utilization of the data analysis software. The current computer configuration appears adequate to meet future data analysis needs.

The UMO project is grateful to Richard Byess for his assistance and loan of the IBM Diagnostic Software, Sue Ashley and John Henderson (University of Maine Purchasing Department) for their part in obtaining the initial and replacement memory

expansion boards, and Marco Ehrlich for providing the project with additional software.

A backlog of data awaiting analysis still exists. A lack of available computer time is primarily responsible for the backlog. The current demand for computer time is greater than the time available. To help alleviate this problem, UMO obtained the use of AFROP's Osborne 1 computer in August. This computer has been used primarily for data entry and has relieved some of the pressure placed on the IBM. Unfortunately, the Osborne has presented a series of other problems:

1. The Osborne is not IBM compatible and data files created on the Osborne must be translated before analysis can be performed by the IBM.

2. The IBM software library is more extensive than that of the Osborne. Not all data entry can be accomplished with the Osborne.

3. The Osborne's drives do not function properly, causing errors in the data files. Fortunately when the files are translated onto an IBM format most of the errors disappear. But one still must verify the data to insure none of the errors have been transferred.

The demand of the IBM has kept word processing to a minimum. As team members begin to write reports, the conflict between data analysis and word processing will intensify. The solution to this problem does not appear either inexpensive or immediate.

OUTSIDE SERVICES.

During the past quarter, UMO provided services to two outside organizations. Analysis was performed on some of Bill Buffum's data. PADF did not have the software available to perform the statistical analysis that was necessary. UMO also provided ODH with software and enough assistance allowing them to "get started".

This type of cooperation is beneficial in that it increases the communication between organizations. The results of which could lead to quicker transfer of research findings and a sharing of data. Cooperation of this sort should be continued to increase the overall effectiveness of the Agroforestry Outreach Project. A possible extension could lead to standardized data entry and analysis of research findings.

FUTURE.

UMO is awaiting the arrival of a graphics card for the IBM. Team members will soon be able to augment reports with graphs and charts to effectively convey their results.

APPENDIX H

REPORT ON AFORP AND AOP ACTIVITIES

BY DR. RODOLFO SALAZAR, CATIE CONSULTANT TO THE AFORP

DATE: JULY 29 - AUGUST 5, 1985

OBJECTIVES

1. Visit the research activities that have been established by Panamerican Development (PADF), CARE and Operation Double Harvest (ODH) through the Agroforestry Outreach Project (AOP) in Haiti, in order to recommend systems to evaluate growth, firewood as well as biomass, production.

2. Discuss the use of field forms developed by Firewood Project in CATIE/ROCAP, to standardize the data collection and share information between projects.

INSTITUTIONS AND PERSONS CONTACTED

Marshall D. Ashley - Team Leader, University of Maine

Marco Ehrlich - Silvicultural researcher, University
Maine

Roland Dupuis - Silvicultural researcher, University of
Maine

Douglas Gill - Computer analyst, University of Maine

Gerold Grosenick - Forest Economist, University of Maine

Frederick Conway - Anthropologist, University of Maine

Glen Smucker - Project manager, (PADF)

Phaebe Lansdale - Project Administrator, (PADF)

Rick Scott - New Project Director

Daniel Stephens - Regional Administrator, (CARE)

Wendy King - Coordinator, AOP/AID

Ira Lowenthal - New Project Coordinator, AOP/AID

Elia Mora - Research Responsible PNF/IDCR

Raoul Pierre-Louis - Coordinator, PFN

Henry Tschinkel - Forester Advisor, ROCAP

FIELD TRIPS

We visited the Northwest, Northeast and central region of the country, to have an overview of the forestry situation in the country and for visiting areas where PADF, CARE, and ODH have been planting trees and establishing experiments with fast growing species for wood, firewood, charcoal, and forage production. Some of the places visited were Gonaives, Charato, Limbe, Gros Morne, Bassin Bleu, Passe Catabois, Duvalierville, Messayer, Petit Bois, and Ganthier.

In the areas visited, I did not have the opportunity of observing many of the tree planting activities that the AOP has been doing with exception of Passe Catabois, Ganthier and Madsen, where tree planting looks to be very active. In Madsen, flat land for agricultural purposes where ODH is planting trees and doing species trials elimination, I found the more promising plots, but this is not a representative condition of land that must be reforested in Haiti. The rest of the areas visited where trees are being planted do not look very promising, in some cases because the species selected, and in others because of the lack of proper silvicultural techniques used.

In Haiti most of the farms are relatively small, very hilly, and with low fertility as a result of intensive use and poor farming techniques. Also by the shortage of land and high food

demand the farms are continuedly under cultivation with low production. Under these conditions it is very difficult to consider tree planting in small farms, because this would mean competition with the agricultural activities.

EXPERIMENT EVALUATIONS

The experiments established are mainly young species trials, from this point of view the evaluation of these units could be:

a. Survival evaluation every six months during the first two years. This gives only survival and replanting needs information.

b. Because of the level of research and the low rates of growth for most of the species being tested, the total height per tree and number of stems below 1,3 m of height is enough.

c. The dbh can be evaluated when more than 50% of the trees in the plot are over 2,0 m total height, and the dbh is bigger than 2,0 cm, less than this has little meaning.

d. For species trials elimination, it is unnecessary to use plots with more than 25 trees. Larger plots means wasting time and increases site variation effects.

e. Because the experience with multiple stem tree species such as Caliandra calothyrsus and L. leucocephala, the biomass and firewood production can be estimated with parameters such as number of stems, dominant height, and dbh of the average stem. Experience shows that it is not necessary to measure total height and dbh in each stem of the tree.

f. For the purposes of this Project the best time to evaluate biomass and firewood is when most of the trees in the plot can produce commercial fuelwood. The production must be

expressed in dry weight (80-85 C), and sampling methods and techniques developed by the Firewood Project CATIE/ROCAP could be used.

g. The growth variables in the experiments can be measured every six months during the first two years, afterward every year.

h. Because the forest research is a matter of long periods of study, it is absolutely necessary to use a system of data collection, which could be followed for periods and by different people, without problems of lost information, or misunderstanding of data already collected and interpretation of field experiments. Each unit established in the field must have a complete file giving all the necessary information on objectives, location, observations and measurement sheets. To have an efficient control of all the unit established in the field, it is necessary to develop some codes as those developed by the Firewood Project for Central America, which I recommend to use (Normas para la Investigacion Silvicultural de Especies para Lena). also it is necessary to train local professionals in the location of experiments, experiment evaluation, information management and file control of all units established; in this way, when the project is over, some national people will be aware of the information available, which could be used by themselves or by any other new project.

SOME GENERAL COMMENTS

1. Since 1975, FAO established 28 species elimination and fertilization trials in different parts of the country. The last

evaluation was done by FAO in 1984. The results clearly shown that some species Azadirachta indica, Casuarina equisetifolia, Eucalyptus camaldulensis, E. grandis and E. robusta are performing well. These species should be used to implement reforestation programs, at least for those areas where the species are doing well. I do not think necessary to follow with more species trials for some time. Because the whole country is deforested, the need for tree planting is urgent everywhere, but there is no sense in diluting the Project resources planting trees all over the territory, if it is not possible to give them the proper care. It makes more sense to concentrate the resources in small areas (two or three), where already there are some good results (FAO trials) of species growth. This has the advantage of:

a- The professionals will have plenty of time to look after them properly.

b- The economical resources used are concentrated in a few areas, where the impact can be easily observed.

c- Because more trees are concentrated in an area the impact on the surrounding communities will be much more effective.

2. Because land tenure system in most of the country, there is no chance of establishing compact forest plantations. The farms are small and fully cultivated, if some trees are planted in these farms, they will affect the agricultural production which already is very poor. But the people need fuelwood and charcoal. One of the few chances of tree planting in Haiti is along the fences and farm borders. This must be done in

combination with cactus (*Euphorbia lactea*), or pegwe (*Bromelia pinguin*) actually used as living fences to stop the goats going into the cultivated land. Some of the species already mentioned plus *Gliricidia sepium* and *Guazuma ulmifolia* (natives) could be also be used in this system as multipurpose trees.

3. The *Prosopis* genus needs much more research in terms of natural plantation management (density control, sprouts per stump), adaptation test of the native one in other areas, and the test of some other *Prosopis* species.

4. Because the species *Catalpa longisima* is widely used, it will be very much important to study its growth under natural regeneration as well as artificial plantations.

5. Stop planting some tree species in areas where they already present a poor performance, this could cause a negative farmers reaction, as the case of *leucaena* in Ganthier.

6. It is much more important to find better ways of tree planting in areas with low rainfall, to increase retention of moisture. Also some fertilizer trials must be established to improve the initial rate of growth.

7. From the point of view of training local people in seedling production, need not be centralized. It is also important to use cheaper ways to produce trees for poor communities as use local materials for containers, or improve the bare root system. It is necessary to teach the community people how to produce seedlings.

8. I consider very important a strong coordination with the research activities that the National Forest Project founded by

the World Bank and IDCR are implemented in Haiti, basically because both projects are dealing almost with the same species, and in many cases in the same areas.

9. Because of CATIE experience in research of fuelwood plantation, it will be very important to establish an agreement for technical assistance, this will be of great value not only for the interest of Haiti if not for the whole region, that is approaching the same forestry problems.