FIRST ANNUAL REPORT
HONDURAS AGRICULTURAL RESEARCH PROJECT

(HARP) CID/NMSU-AID
Contract No. 525-01390-c-00-2059-00
1 January 1983 to 31 December 1983

HARP Publication 84-15

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SUMMARY OF ACCOMPLISHMENTS

The following are considered to be the most important accomplishments and contributions made by HARP staff members during the calendar year 1983. General accomplishments and contributions are presented first, followed by a listing of achievements in each target area.

1). The logistical problems inherent in bringing in the expatriate staff, setting up the HARP office, establishing living quarters for personnel, hiring local staff and establishing working contacts with the collaborators within the Ministry and CURLA were resolved in a timely manner.

2). Administrative requirements, including ten monthly reports (per U.S. staff member); numerous trip reports (per Honduran staff member); three quarterly reports (including general project reports and individual reports by Honduran team members); the 1983A, 1983B, and 1984 work plans; two TDY reports; and various literature reviews were produced; and the 1983 Annual Report was initiated.

3). Various national and international conferences and meetings, including the Farming Systems Research Symposium at Kansas State University, were attended by various staff members. Such meetings and other professional contacts maintained by all staff members facilitated interchanges of ideas and approaches to problem-solving.

4). Training courses and lectures for national and regional audiences of agricultural professionals were given in Catacamas (weed science and entomology), San Pedro Sula (weed science and entomology), and Comayagua (soil fertility and entomology).

5). Progress toward a Farming Systems Research orientation for agricultural research at the local, state, and national levels has been achieved.

6). Lists of equipment requirements at the various sites have been prepared and submitted to the Ministry.

7). An agricultural policy position paper was developed for agricultural research in Honduras.

8). Various staff members were trained to operate the project microcomputer for data analysis, word processing, and financial record keeping.

In Yoro, the HARP staff:

9). Supervised and participated in on-farm research trials in corn (ten soil fertility, seven weed control, and three entomology). Involvement included aid in design of experiments, field techniques, analysis, interpretation, and reporting of results.

10). Participated in various field days.

11). Assisted in the planning and design of on-farm research trials for the postrera season in beans (14 variety, three soil fertility, six entomology, and six weed control). Involvement included all activities described in (9) above.

12). Assisted in the preparation of a summary document combining information from three previously conducted surveys.

13). Disseminated a farm records system and trained agricultural technicians in the use of the system. Cost of production forms for various crops were also disseminated to area farmers. Detailed farm record systems were initiated on ten farms.

In the Progreso area (including Guaymas and Omonita Experiment Stations), the HARP staff:

14). Supervised and participated in Omonita/Guaymas Experiment Station research in corn (two weed control) and rice (one weed control). On-farm research trials in corn (three weed control) were recently initiated. Involvement included all activities described in (9) above. Additional training of the Guaymas Experiment Station staff was also involved.

15). Conducted a weed control seminar for the on-farm research team in El Progreso.

16). Disseminated cost of production forms for various crops to area farmers.

In the Cuyamel area, HARP staff:

17). Supervised and participated in on-farm research trials in the primera season in rice (eight soil fertility, seven weed control, and four entomology). Involvement included all activities described in (9) above.

18). Directed and participated in a "sondeo" of the area and a summary document was prepared combining results with prior data.

19). Participated in five field days.

20). Gave a course on rice production to area farmers.

21). Disseminated a farm records system and cost of production forms to area farmers.

22). Assisted in the planning and design of on-farm research trials for the postrera season in ratoon rice (five soil fertility, two entomology, and two weed control) and corn (one entomology, three soil fertility, and six weed control).

DAR No. 4

In the Masica area, the HARP staff:

23). Supervised and participated in primera season on-farm research trials in rice (five soil fertility, ten weed control, and one entomology). Involvement included all activities described in (9) above.

24). Directed and participated in a "sondeo" of the area and designed a formal survey instrument for use in early 1984.

25). Disseminated a farm records system and gave training in the system to agricultural technicians.

26). Assisted in the planning and design of ratoon rice, corn, and/or corn-cassava trials for the postrera season (six soil fertility, three insect control, eight weed control, and three variety) and helped establish ten detailed farm record books.

At CURLA, the HARP staff:

27). Reviewed the curriculum of the Agricultural Economics Department, advised on equipment and library purchases, and collaborated with CURLA faculty in research activities in soils, weed control, and entomology. Technical assistance to establish an entomological museum and to expand their herbarium was given.

28). A computer/statistical analysis center was established with the delivery of two microcomputers, hardware, and software. Seminars were presented in statistical analysis and word processing. Cooperative use with regional MNR staff was fostered.

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Appendices

ACRONYMS USED IN THE TEXT

AED	Academy for Educational Development Academia para el Desarrollo Educativo
ANOVA	Analysis of Variance Analisis de Varianza
CIAT	Centro Internacional de Agricola Tropical International Center of Tropical Agriculture
CID	Consortium for International Development (USA) Consorcio de Desarrollo Internacional
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo-Mexico International Maize and Wheat Improvement Center-Mexico
CONSUPLANE	Consejo Superior de Planificacion Economica Senior Planning Advisory Group (GOH)
CURLA	Centro Universitario Regional del Litoral Atlantico Central Regional University of the Atlantic Coast
DAR	Direccion Agricola Regional Regional Agricultural District
DEA	Departamento de Extension Agricola Department of Agricultural Extension
DIA	Departamento de Investigacion Agricola Department of Agricultural Research
ESF	Economic Support Fund (USA) Fondo de Apoyo Economico
FSR	Farming Systems Research Investigaciones de Sistemas Agropecuarios
GOH	Government of Honduras Gobierno de Honduras
HARP	Honduras Agricultural Research Proyect Proyecto Hondureno de Investigaciones Agricolas
MNR	Ministry of Natural Resources Ministerio de Recursos Naturales
NMSU	New Mexico State University Universidad Estatal de Nuevo Mexico
OFR	On-Farm Research Investigacion en Finca
PL480	Public Law Number 480 (USA) Ley Publica Numero 480 (EUA)
PNEA	Programa Nacional de Extension Agricola National Program of Agricultural Extension
PNIA	Programa Nacional de Investigacion Agricola National Program of Agricultural Research
POA	Plan Operativo Anual Annual Work Plan
TDY	Temporary Duty Obligacion de Corto Plazo
USAID	United States Agency for International Development Agencia de Desarrollo Internacional de los Estados Unidos de America

I. INTRODUCTION

The Honduras Agricultural Research Project (HARP) was initiated in the first quarter of 1983, and the four CID/NMSU members of the HARP team and two of their families traveled to post at San Pedro Sula, Honduras in January 1983. Permanent rental housing was procured for all four team members by May 6, 1983. Household furniture and project office and research equipment continued to be ordered, received, and inventoried. With the assignment and arrival of the Honduran team members early in the second quarter, office space and furniture shortages continued to be critical. Considerable time was devoted to liaison activities among the team and MNR, USAID, and NMSU personnel. Trips were made to various regions and meetings were held with MNR and USAID personnel and with other scientists.

The overall purpose of HARP as defined in the project proposal is to develop a FSR program which will contribute to the MNR's efforts to raise the productivity of small and medium size farms producing basic grains -- corn, rice, beans, and sorghum.

During the first and second quarters of HARP's activities in Honduras, information concerning agricultural practices and problems were reviewed, agricultural experiments were designed, and research and experimental trials were initiated on farmers' fields and on experiment stations. In the third quarter, activities focused upon: (1) monitoring and supervising over 100 field experiments which had been established in Yoro, Cuyamel, La Masica, and Guaymas/Omonita; (2) conducting field days, courses, and training sessions; (3) continuing HARP activities at CURLA;

(4) evaluating HARP progress and orientation; and (5) implementing various HARP TDY activities. As indicated in Quarterly Report II (Harp Publication 83-13), HARP was requested to join the on-going MNR/DIA-DEA[1/] program of OFR. Efforts were undertaken during the last two quarters to arrive at a mutual understanding among the team members of HARP with respect to similarities and differences between OFR and FSR and methods for arriving at a means of integrating a FSR approach into HARP's activities.

A personnel change in the chief administrative position of the MNR-DIA late in the first quarter and the arrival of the HARP Honduran team members in the second quarter resulted in several changes in the proposed direction of the project. As a consequence, it was not possible to produce a long-range plan of work that was satisfactory to all parties concerned. (Appendix A gives a more complete account). Therefore, a short-term, interim plan of work for the "primera" (first) cropping season was agreed upon and initiated. The writing of this short-term plan of work was not completed until the last quarter. As a result, the HARP First Annual Report will follow the format of the tentative plan of work submitted by the HARP U.S. team members and used in the first three quarterly reports of activities and accomplishments (HARP PUBLICATIONS 83-1, 83-13, and 83-19).

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Effective Sept.1, 1983 the name of the National Program of Agricultural Research (PNIA) was changed to the Department of Agricultural Research (DIA) and the National Program of Agricultural Extension (PNEA) was changed to the Department of Agricultural Extension (DEA).

Activities in the fourth quarter focused on: (1) monitoring, harvesting, and analyzing data from the experiments which had been conducted in Yoro, Cuyamel, La Masica, and Guaymas/Omonita in the first planting season; (2) writing a plan of work and planting, monitoring, and/or supervising agricultural experiments in these areas for the second or "postrera" planting season; (3) assisting with the development and use of a formal survey (encuesta) in Guaymas/Progreso; (4) developing and pretesting an encuesta for La Masica; (5) continuing HARP activities at CURLA; (6) evaluating HARP progress and orientation; (7) writing a plan of work for 1984; (8) implementing other HARP and NMSU/BIFAD TDY activities; and begin the preparation of the annual report.

Since the Honduran members of the HARP team were assigned by the beginning of the second quarter, "the team" in all subsequent activities refers to both the U.S. and the Honduran team members. Also, no distinction is made with respect to the regional MNR/DIA-DEA counterparts working in the project areas. (Appendix B is a complete list of past and current HARP, national, and regional counterparts.)

II. SPECIFIC OBJECTIVES AND ACTIVITIES

A. ACTIVITIES RELATED TO EXPECTED OUTPUTS AS PROPOSED IN THE TENTATIVE PLAN OF WORK.

1. Formulate and test in the Valley of Yoro potentially improved production technologies which reflect a multidisciplinary approach.

Numerous meetings were held with the MNR/DIA-DEA personnel assigned to the Yoro Valley Sub-region of DAR No.3 in the first and second quarters to plan and initiate trials enumerated in their 1983 Annual

Operative Plan (POA). This included at least eight trips made by HARP team members to Yoro and numerous meetings held in the HARP and MNR offices in San Pedro Sula. Primary emphasis was given to the specialty areas represented by the HARP team members -- weed science, soil fertility, entomology, and agricultural economics. However, assistance was also given in other trials, whenever possible, and additional trials were planned, especially in intercropping and minimum tillage. In addition, assistance is being given in the analysis and interpretation of three surveys that have been conducted in the area.

Normal planting of corn in the primera season usually occurs between May 15 and June 15. Rains were late this season and planting did not begin until May 31, 1983. Therefore, plantings of the experimental plots were not completed until late June. A total of 40 experiments were planted. These experiments included: (a) regional variety trials; (b) variety validation (comprobacion) trials; (c) fertilizer trials with N rates, N-P-K, varieties, and populations; (d) weed control trials (chemical control and minimum tillage); (e) intercropping (sistemas de cultivos); (f) insect control trials; (g) insect pheromone traps; and (h) farmer validation trials (cf. Appendix C).

Regular visits were made by HARP team members to the Yoro area in the third and fourth quarters to monitor experimental plots, apply experimental

treatments, collect data, participate in field days, and help obtain yield data.

In the soil fertility experiments there appeared to be visible responses to N at all sites except at San Luis. In chemical weed control trials, most plots treated either with atrazine or atrazine + metolachlor combinations had an excellent control 80 days after planting. The most dramatic results were obtained from the wireworm control trial where complete stand loss was observed in the check plots while most treated plots had less than 15% loss. However, the yield data were lost from these plots when the farmer harvested them along with the rest of the field. Inter-cropping trials were initiated involving four combinations -- maize with a green manure crop (Mucuna sp.), common red bean, climbing bean, and yuca -- in comparison to the current practice of the farmers in the area, i.e. corn with ayote. Growth of Mucuna sp. was not as profuse as has been observed in areas in the Atlantic Coast; however, the experiments could not be completed and no yield data were obtained. Use of paraquat or glysophate alone did not provide good control of weeds under minimum till. Use of paraquat prior to planting and pre-applications of residual herbicides showed significant improvement for all season weed control.

Work has been initiated to collate and summarize the information which has been collected in prior sondeos of the Yoro area. After the completion of this

work, a formal encuesta will be conducted to correct existing information deficiencies and to provide a more complete representation of the relevant agricultural production systems in the Yoro area.

A meeting was held late in the third quarter with DIA and DEA personnel in Yoro; Ing. Silvo Hugo Orozco, CIAT Bean Specialist; and Ing. Federico Rodriguez, National Bean Research Coordinator, to review existing information with respect to bean research and to plan bean research for the 1983 "postrera" or second planting season.

Additional meetings in Yoro and San Pedro Sula early in the fourth quarter allowed the finalization of these plans and the preparation of the postrera planting season plan of work. By the end of the fourth quarter, most of these experiments had been planted, treatments applied, evaluations initiated, and a few were harvested. A total of 31 experiments were initiated, and included: (a) regional variety trials; (b) variety validation (comprobacion) trials; (c) fertilizer trials with N rates, N-P-K, and residual carryover from fertilizers applied in corn in the primera season; (d) weed control trials and bioassays on herbicide carryover from the primera season; (e) slug and insect control trials; (f) insect pheromone traps; and (h) farmer validation trials (cf. Appendix D). In addition, detailed farm records are being maintained on ten farms and the preparation of a formal

survey (encuesta) form has been initiated. Preliminary data also were collected for a grain drying trial in corn to allow early harvesting and proper storage to take advantage of better grain prices.

Analysis of the data from both the first and second planting seasons have been initiated. Detailed results will not be included in this report, however, a separate report will be prepared in cooperation with the regional teams for presentation at the Annual Research Meeting for DAR No. 3, currently scheduled for February 22-24, 1984, and at the national meetings scheduled for March 5-9, 1984.

2. Conduct appropiate FSR training sessions for MNR research-extension personnel working in the Valley of Yoro.

a. The following courses were given this year:

(1) General Weed Control, July 5-7, held in San Pedro Sula and attended by 38 extension and research workers of DAR No.3.

(2) Soil Conservation, September 19-20, held in Yoro and attended by 33 participants.

(3) Bean Production Workshop, September 13, conducted by Ing.Federico Rodriguez and Ing. Silvio Hugo Orozco in Yoro and was attended by most of the HARP and regional teams.

b. Field training of personnel was stressed during the application of herbicide, fertilizer and insecticide treatments, foliar sampling for nutrients, installation of pheromone traps,

and monitoring insect populations. CIAT audio-tutorial aids were used to introduce several weed control concepts to four graduates of CURLA who recently joined HARP. Also, an informal training session was given with special emphasis on weed control in beans.

c. The Yoro team members participated in the Bean Production Conference in Olancho where HARP team members made presentations on weed and insect control.

3. Conduct appropiate FSR training sessions for MNR personnel at the Guaymas research experiment station.

As indicated in Quartely Reports I, II, and III, HARP involvement at the Guaymas Research Experiment Station has been limited to weed science. Informal training was provided during experimental data acquisition, weed collection, and identification. Several technicians also participated in the courses organized and/or given by HARP staff (see section II.A.2. and II.A.4.d., e., f., and g.).

4. Conduct, upon request, appropiate FSR training sessions for MNR personnel in designated areas outside the Valley of Yoro.

Extensive involvement of the HARP team with activities in the primary project sites of the northern region has prevented them from continuing the activities initiated in other regions during the first quarter. Besides the Yoro Valley, the other primary project sites are Cuyamel, Guaymas, and La Masica.

a. Cuyamel

The Cuyamel valley is one of the major rice producing areas in the region and was the subject of some on-farm research activities in 1982. The HARP team helped to evaluate the sondeo conducted in 1982 and to make some additional surveys to fill in some of the gaps in information. A total of 26 on-farm research experiments were planned, designed, planted, and had experimental treatments applied by the end of the Second Quarter. As in the Yoro Valley, these experiments included fertilizer trials, regional variety trials, variety validation, chemical weed control, minimum tillage, and insect control (cf. Appendix C). Since only one researcher and one extension agent were assigned to the area, considerable time of the HARP team members had to be devoted to activities in this area. This provided for extensive in-service training opportunities in all aspects of the specialities represented by the team, but resulted in a reduction of participation in activities at other sites. All trials from the first planting season were harvested late in the fourth quarter, but many had been lost for various reasons. As in the Yoro area, a complete report on the sucessful trials will be prepared for presentation at the Regional and National Research Conferences.

Other activities during the third and fourth quarters included field days and workshops at which

factors limiting production were discussed and on-farm trial demonstrations were given. Other meetings were held to plan second (postrera) season trials in the ratoon rice crop (five soil fertility, one insect control, two weed control) and corn (one soil fertility, six weed control, and two insect control). Detailed farm records were initiated on five farms and ten single sheets are being maintained for the corn crop (cf. Appendix C).

Trials planned for the second planting season in rice were either lost or eliminated due to the fact that few farmers produced ratoon rice this year. Grazing cattle caused the loss of those plots established and low prices for rice caused the decline in ratoon rice area. Corn trials could not be planted prior to the end of the reporting period due tc the lack of transportation for the regional team, and, excessive rainfall.

b. Guaymas

The Guaymas area has both corn and rice producers who have derived most of their advanced technology directly from the experiment station. An attempt was made to initiate an OFR program in the second and third quarters, but experiments were limited primarily to regional variety trials. The main involvement of HARP in this area has, therefore, been the initiation of weed control research efforts at the experiment station (cf. Section 5 and Appendix C).

During the third and fourth quarters, field days and workshops were held at which factors limiting production were discussed and on-farm trial demonstrations were given. A formal survey form was designed by the HARP team and administered by the regional team in the area. The results of the cooperative evaluation of the survey will form the basis for on-farm research on corn, rice, and bean production problems in the postrera season (cf. Appendix D). Most of these trials will not be initiated until early in the first quarter of 1984.

c. La Masica

The La Masica agency base is located between Tela and La Ceiba and is a major rice and corn producing area. In many respects it is similar to the Cuyamel area. This location is operated out of the Atlantic Coast Regional Office in La Ceiba and was well staffed with four researchers, five extension agents, and some farm laborers. The HARP team was primarily involved in the planning phases of the activities for this site. Also, assistance was required from HARP in the form of vehicle repairs, supplies, and equipment, and some assistance was given in the actual field phases of plot layout, planting, and application of experimental treatments. Twenty-four trials had been initiated by the end of the second quarter and followed the usual on-farm approach with experiments including regional variety trials, fertilizer and weed control trials,

spot-treatments with herbicides, and minimum tillage (cf. Appendix C). With the more adequate staff, it was anticipated that a number of farm records would be kept in this area to allow validation of the sondeo and economic analysis of farm production costs and returns. However, this did not prove to be the case.

A field day was held on the 9th of September for research and extension staff. The philosophy of OFR was discussed with emphasis placed on close cooperation ("Enlace") between extensionists and researchers. Prior to harvest, another field day was given for area farmers when on-farm trials were visited and demonstrations given of new technologies in fertilizers and weed control.

Team members made several visits to assist in appropiate supervision of on-farm trials, treatment evaluations, and data collection during the last three quarters.

An informal audio-tutorial training session on weed control was given for research and extension staff on the 27th of September.

Plans for the second planting season have been completed and are included in the 1983B Plan of Work. Experiments planned for this area include: (1) corn variety trials; (2) fertilizer and weed control in corn and corn-yuca; and (3) insect control in corn and yuca (cf. Appendix D).

Analyses of data from the first season are in various stages of completion. A final report of these data should be completed in mid-February and results presented at the National Research Conferences.

In addition to involvement in the OFR activities in these three areas, the HARP team was involved in the planning and/or execution of the following in-service training courses in addition to those mentioned in section II.A.2.a.:

d. Soya Production Workshop, August 31-2 September, held in San Pedro Sula and attended by 30 research and extension workers. HARP's entomologists prepared and presented the section on insect control.

e. Integrated Pest Management Course, September 5-9, held in Comayagua and attended by 19 research and extension workers from several regions of Honduras. Ing. Patricio Santa Cruz, CURLA Entomologist, assisted in the presentation of the course.

f. Soil Fertility Workshop, September 26-29, held in Comayagua and was attended by 18 participants from several regions of Honduras. Ing. Luis Alvarez Welchez, CURLA Soils Professor, assisted in the presentations.

g. Bean Production Workshop, November 21-25. HARP team members presented weed and insect control aspects of bean production at this workshop hosted by CIAT in Olancho. A total of 30 research and extension agents from several regions of Honduras attended the course.

5. Assist researchers at the Guaymas Experiment Station design, conduct, and analyze research which will meet the needs of FSR programs.

Meetings held during the first quarter resulted in the planning of considerable involvement of the HARP team at the Guaymas and Omonita experiment stations (see HARP Plan of Work for the 1983A Primera Planting Season). However, in a meeting during the second quarter with Guaymas Experiment Station personnel, HARP staff, and MNR administrators, it was decided that HARP would have little involvement in the station this season, with the exception of the weed control program. The HARP team assisted in the preparation of weed control research programs for both rice and corn. This included screening herbicides for control of itchgrass or "caminadora" (Rottboellia exaltata) and nutsedge (Cyperus rotundus) and comparisons of tillage versus no-till techniques (cf. Appendix C). Experiments were conducted at the experiment station, the Omonita Sub-Station, and on farmers' fields in the area.

The activities at the station during the third and fourth quarters consisted of the supervision, monitoring, harvesting, and analysis of experiments initiated during the second quarter. Meetings held with Guaymas and Regional MNR personnel have established that there will be increased emphasis placed upon FSR work by Guaymas personnel. This began with the sondeo discussed in the previous section and plans for trials for the postrera season (cf. Appendix D).

6. Assist MNR research personnel in designated areas to plan relevant agricultural research.

Courses and workshops were given in pest management, soil conservation, soil fertility and OFR methodology. These programs were attended by participants from all regions of Honduras.

7. Assist MNR research personnel in designated areas to evaluate agricultural research results.

Data from the sondeos conducted in Cuyamel have been summarized. Analysis and summarization of data from three earlier sondeos in Yoro have been started.

Cooperative use of the new computer facilities established at CURLA was encouraged and preliminary agreements were made between CURLA researchers and MNR researchers in DAR No.4. Computer programs for analyzing the most common types of experimental designs were translated into IBM compatible BASIC and made available for researcher use at these facilities and at HARP facilities in San Pedro Sula. Some data were analyzed under this agreement during the fourth quarter.

8. Publish reports of methodology, research results, and recommendations developed by the HARP team for use by MNR research and extension personnel.

The following documents have been prepared during this year:

a. Quarterly Report I. Honduras Agricultural Research Project (HARP). CID/NMSU-AID Contract No.522-0139-c-00-2059-00 for the period 1 January 1983-31 March 1983. HARP Publication 83-1.

b. A Bibliography of Central American Agriculture In Honduras. Charles Gordon Dean. HARP Publication 83-2/1.

c. TDY Report. Experimental Statistics. Melchor Ortiz. January 6-14, 1983. HARP Publication 83-3.

d. TDY Report. Agricultural Economics. Joel A. Diember. February 8-20,1983. HARP Publication 83-4.

e. A Bibliography of Subsistence Farming in Central America. May 1983. Charles Gordon Dean. HARP Publication 83-5.

f. Rottboellia exaltatal. A Literature Search. March 25, 1983 Charles Gordon Dean. HARP Publication 83-6.

g. Medicinal Plants of Central America. A Literature Search. April 1983. Charles Gordon Dean. HARP Publication 83-7.

h. Paspalum conjugatum. A Literature Search. June 13,1983. Charles G. Dean. HARP Publication 83-8.

i. Panicum maximum; Panicum purpurascens. A Literature Search. June 13,1983. Charles Gordon Dean. HARP Pub.83-9.

j. Panicum maximum. A Literature Search. June 13,1983. Charles Gordon Dean. HARP Publication 83-10.

k. TDY Report. Computer Science. Melchor Ortiz. June 22-July 10,1983. HARP Publication 83-11.

l. TDY Report. Computer Science. Bobby J. Creel. HARP Publication 83-12.

m. Quarterly Report II. Honduras Agricultural Research Project (HARP). CID/NMSU-AID Contract No. 522-0139-c-00-2959-00 for the period 1 April 1983-30 June 1983. HARP Publication 83-13.

n. TDY Report. Experiment Station Management. Austin Haws. August 2 - September 15, 1983. HARP Publication 83-17.

o. Quarterly Report III. Honduras Agricultural Research Project (HARP). CID/NMSU-AID Contract No. 522-0139-c-00-2959-00 for the period July 1, 1983-September 30, 1983. HARP Publication 83-19.

p. A partially annotated Bibliography of Grain Amaranths and other Amaranthus spp. A Literature Search. November 30, 1983. Charles Gordon Dean. HARP Publication 83-20.

The following project related documents have been prepared from special NMSU and NMSU/BIFAD activities this year:

a. CURLA Report. Entomology Collection. James Zimmerman. July 2-29, 1983.

b. BIFAD Report. Plant Pathology. Jack Booth. July 25-31, 1983.

c. BIFAD Report. Nematology. Steve Thomas. July 25-31, 1983.

d. BIFAD Report. Fisheries. Richard Cole.

In addition the following manuscripts were prepared for publication:

a. Technical Plan of Work. Honduras Agricultural Research Project (HARP). CID/NMSU-AID Contract No. 522-0139-c-00-2059-00 for the period 1 January, 1983 to 31 December 1984.

b. Prevention of Spread of Itchgrass to Other Areas in Honduras. (Has been submitted to Ing. Adan Bonilla for publication as an extension pamphlet.)

c. Agricultural Policy Paper No. 1: Policy for Agricultural Research. (Completed and presented to AID and NMSU for review.)

d. Sistemas de Produccion Para Arroz y Maiz en Cuyamel. Problemas y Perspectivas de Investigacion. Antonio Ramon Silva and Leopoldo Crivelli D. Secretaria de Recursos Naturales, Proyecto Hondureno de Investigaciones Agricolas. September 1983. 30 pp.

e. Plan of Work - Primera Planting Season (1983A). Honduras Agricultural Research Project (HARP). CID/NMSU-AID Contract No. 522-0139-c-00-2059-00 for the period 1 January 1983-30 September 1983.

f. Plan of Work - Postrera Planting Season (1983B). Honduras Agricultural Research Project (HARP). CID/NMSU-AID Contract No. 522-0139-c-00-2059-00 for the period 1 October 1983-28 February 1984.

g. Resultado de Tres Encuestas Realizadas en el Valle de Yoro Durante 1982. Antonio R. Silva, Ramon Medina G., and Hector Deras. Secretaria de Recursos Naturales, Departamento de Investigacion Agricola. December 1983. 37 pp.

h. 1984 Plan of Work. Honduras Agricultural Research Project (HARP) CID/NMSU-AID-522-0139-C-00-2059-00 for the period 1 March 1984-31 Dec.1984.

9. Assist in the publication of research reports delivered from existing, but unpublished data from the North Atlantic Coastal Region.

Data were obtained from a corn-itchgrass competition experiment conducted during 1982 at Frisco. A literature search was conducted, the data were analyzed on the HARP computer facility, and the results returned to the researcher.

Copies of some other unpublished research reports have been received for reference but no request has been made to assist in preparation of publications. However, it has been very difficult in most instances to obtain copies of even the data from the 1982 trials, let alone that of prior years.

The HARP computer facility has been expanded during the last quarter as has the CURLA facility, to handle (1) multiple linear regression, (2) linear correlation, and (3) linear programming. With these additions, any future requests for data analysis can be handled except for unusual cases.

The possibility of purchasing the MSTAT software package being developed by Michigan State University is being explored and, if purchased, could greatly assist the project in design, data handling, storage, and analysis. It would especially be useful for the Guaymas/Omonita and MNR/CURLA Experiment Stations.

10. Participate in the upgrading of CURLA's new soils laboratory.

The soils laboratory equipment which was ordered during the first quarter under the AID/CURLA contract has not arrived to date. Assistance was given, however, with a new order for more equipment for the laboratory in the third quarter.

11. Provide technical assistance for the establishment of a computer facility for CURLA.

Early in the second quarter, a computer hardware, software, and supplies list was prepared and submitted to Ing. Luis Zelaya, USAID/Honduras. After receiving tentative approval, HARP sent the list to NMSU for the preparation of a formal price quotation. Ing. Zelaya and Mr. Brian Rudert gave verbal approval on June 14 for NMSU to purchase the equipment and to deliver it to CURLA in La Ceiba. Mr. Bobby Creel (Agricultural Economics, NMSU) arrived in Tegucigalpa June 15 to deliver the equipment. Part of the shipment did not arrive with Mr. Creel, but, by June 18, all of the first shipment had arrived and was officially received by the CURLA Director on June 29 (cf. Appendix D).

Due to size and weight limitations, part of the equipment was sent by air freight and as excess baggage. HARP will complete the installation of the remaining computer equipment when delivery and payment from AID has been received by NMSU.

Mr. Creel and Drs. Harper and Ortiz set up the computers and gave instruction on their operation and use during the period of June 20-July 1.

Dr. Melchor Ortiz provided additional instruction in computer applications and statistical analysis. The computers have been located in a separate room which will serve as a computer center until the new library is completed. At that time, the computers will be moved to a permanent site in the library. HARP will assist with the relocation and reinstallation of the equipment in the new library.

Activities during the third and fourth quarters included:

a. Delivered a copy of the ANOVA computer programs which had been placed on diskette by HARP personnel. The programs on this diskette provide the staff at CURLA with the analytic software necessary to carry out most ANOVA analyses.

b. Classes were conducted in the following:

(1) general use of the IBM PC microcomputer;

(2) data set preparation -- instruction was given with respect to the use of the ANOVA programs which have been placed on diskette by

HARP, creation of data sets, and merging of data sets from diskette with ANOVA programs stored on diskette; and (3) use of Wordstar, a word-processor package.

c. During the fourth quarter programs were added for: (1) multiple linear regression, (2) linear correlation and (3) linear programming .

Although the arrival and delivery of the pending shipment and supplies and the eventual physical relocation of the equipment in the new library will establish the computer facility at CURLA, additional assistance will be required before the facility can be fully operational. This additional assistance includes, but is not limited to, the following:

a. Regular assistance with minor operation and programming problems. This can be supplied by the HARP in-country staff.

b. Assistance with the establishment and implementation of data management systems for the library, registration, and general administration. CURLA recognizes this need and they indicated that requests may be forthcoming for Mr. Creel to return to provide some of this assistance.

c. Formal instruction in computer programming. Although this assistance has not been formally requested at this time, it would greatly facilitate the expanded utilization of the

computers by CURLA faculty and staff. This type of assistance could be provided by a Spanish speaking programmer from the Department of Experimental Statistics at NMSU.

12. Assist the entomology, weed science, soil fertility, and agricultural economics programs at CURLA to strengthen their respective research program.

Activities initiated in the first quarter were continued, including meetings with the Director of the University, the research and teaching coordinators, and various members of the staff. These meetings resulted in a document being drafted during the second quarter which outlines the areas in which HARP has agreed to attempt to provide technical assistance (cf.Appendix E.)

Progress in each of the programs are discussed below:

a. Entomology:

During the first and second quarters new equipment lists totaling approximately $36,000 were prepared and submitted for funding under the CURLA/AID Development Project. When delivered this equipment could result in the development of a major entomological museum if continued support, in the form of personnel, travel funds, and consummable supplies, are provided.

A study of the parasite complex of the fall armyworm and corn earworm was initiated during

the third quarter. Pheromone traps were provided for an associated trapping study and records continue to be maintained. Assistance was provided in literature search and acquisition of supplies for the student doing his thesis work on this project. Assistance was also provided to Dr.James Zimmerman, a NMSU TDY Taxonomist working on the entomology curriculum and the museum at CURLA. Several collecting trips were included.

Efforts were made during the last two quarters to assist CURLA to obtain approval and funding to purchase the insect and book collection of the late Dr. Mankins. It was recommended that the type and paratype insect specimens in the collection be placed on a 10-20 year loan to the Smithsonian Institute to assure that they would not be lost. However, the entire insect collection was purchased by and taken to the Smithsonian before the necessary actions were taken by CURLA, UTAH, and AID. The purchase of the books and reprints was still in process at the end of the year.

During the third quarter, approval was obtained from AID to supplement the equipment list with an order of a quality microscope, camera attachment fittings, camera lucida, high power oculars, objective doubler, and an ocular

micrometer. HARP-NMSU staff obtained and provided the specifications and catalog prices for this equipment and a request was made to add it to the equipment list.

Due to abnormal weather conditions the parasite study initiated in the second quarter did not yield satisfactory results. Attempts to conduct the experiment again in the fourth quarter met the same fate. However, a heavy attack of corn leaf aphids in the drought stressed corn did provide the opportunity to collect population data on the parasites and predators associated with this minor pest. In addition, observations on the parasite complex of the coccinellid predators were made. Assistance will be given in obtaining the identification of the insect specimens collected.

b. Weed Science

In cooperation with Ing. Rene Rodriguez Quispe, Head of the Department of Plant Science, technical guidance was given to a student doing his thesis work on pre-emergence weed control in corn. Assistance was given in selection of treatments, acquisition of herbicides, design of the experiment, and treatment evaluation. The experiment was very good and assistance was provided in a literature

search for preparation of the thesis.

Due to interest shown by Ing. Quispe, another experiment was conducted on the control of nutsedge in corn using preplant incorporated products as well as post-emergence applications of 2,4-D.

In visits made to the herbarium at Escuela Agricola Panamericana (EAP) and the University of Honduras at Tegucigalpa, it was found that these facilities house well-maintained specimens numbering approximately 100,000 and 13,000, respectively. Therefore, activities at CURLA have been limited to the collection of principal weeds of grain crops in Honduras. Weeds collected in experiment areas in Yoro, Guaymas, and La Masica have been brought to CURLA for identification, mounting, and storage for a herbarium. Discussions were held regarding acquisition of room and cabinets for the suitable storage of the identified specimens. Similar collections are being made in Cuyamel for eventual storage at CURLA.

Participation in classroom training was not possible as the optional weed science course failed to fill this year. The possibility of making a basic weed control course compulsory for graduation has been discussed. The basic research outlined in the agreement presented in

HARP Quarterly Report II could not be initiated due to the lack of greenhouse facilities.

c. Soil Fertility

Assistance was given in the revision of the list of soils laboratory equipment ordered through the USAID Project. References on soil analysis procedures are available and assistance will be given in setting up the laboratory when the equipment arrives. Discussions were held with three department personnel and ideas exchanged regarding the soils laboratory and in preparation of a new course in methods of soil and plant analysis. Assistance was given to faculty and students at CURLA in conducting and analyzing calibration trials for methods of phosphorus and potassium extraction (in pots) and helping Professor Alvarez with the DRIS method for evaluating fertility of soils.

Several experiments planned by members of the soils department for the primera season were discussed and helpful suggestions made.

d. Agricultural Economics:

As part of HARP's activities with the agricultural economics program at CURLA, an evaluation of the agricultural economics curriculum was conducted during the second quarter. Dr. Joel Diemer, NMSU Agricultural Economist working under BIFAD, and Dr. Harper

conducted the evaluation during May and by the end of the quarter, a first and second draft of recommendations had been prepared. The final draft has been returned to NMSU for further additions, deletions, and corrections by Dr. Joel Diemer.

Staff of the Department were given instruction in the use of the IBM microcomputers which have been placed at CURLA and plans were started to develop a program of courses or seminars to cover the research applications of microcomputers in agricultural economics.

13. Hold regular evaluation meetings with MNR and USAID personnel to facilitate project evaluation.

Numerous seperate meetings with MNR and USAID personnel have been held for the purpose of discussing HARP progress. A regular bi-weekly meeting schedule where all three groups are present has not been established, but seperate meetings have averaged almost two per month.

14. Prepare monthly reports, six quarterly program reports, an annual report, and a final report describing progress toward project goals and objectives

Monthly reports for January, February, April, May, and July through December were prepared and submitted by each member of the U.S. team. Three quarterly reports were prepared and the preparation of the annual report was begun in the last quarter.

In addition, Honduran team members submitted routine trip reports and prepared individual quarterly reports.

15. Participate in a CID/Mid-Project evaluation.

Not applicable for the reporting period, but has been tentatively scheduled early in the next quarter.

16. Provide information and records necessary for USAID project evaluations.

A general plan of work and three Quarterly Reports have been submitted. In addition to the 1983-84 General Plan of Work, plans of work for the 1983A and B (Primera and Postrera) Planting Seasons were prepared. A proposed plan of work for 1984 has been submitted to USAID and MNR for approval.

Copies of HARP publications and technical reports have been made available to USAID (c.f.II.A.8).

17. Project needs for future possible activities in the regions and experiment stations.

Short term needs were covered in the monthly and quarterly reports and in discussions and meetings during the visits of Drs. John Clemmons, Harold Matteson, Ellis W. Huddleston, Melchor Ortiz, and Dr. Austin Haws (See II.B.3.c, II.B.5., and II.B.6). However, we have been admonished by AID not to undertake additional activities that would require increases in the HARP budget.

An agricultural Policy Paper has been prepared and submitted to AID/Tegucigalpa and NMSU for review and approval prior to publication and distribution. If

this publication is well received, additional papers are planned. Other recommendations are included in Section V. of this report.

B. OTHER ACTIVITIES.

1. Housing.

All CID/NMSU team members were in permanent quarters by the middle of the second quarter. Most of the furnishing were received and the remaining major items had been shipped from the US by the end of that quarter.

2. Air and Surface Shipments.

Most of the problems with the shipment and release of shipments encountered in the first quarter were solved by the end of the second quarter. Due to the excellent cooperation of the Regional MNR administration and staff and Embassy GSO personnel, even small air shipments through San Pedro Sula generally have cleared customs with only minor delays.

3. In-Country Staff Selection.

a. The normal selection and hiring process used by NMSU was utilized to hire the project secretary and a second bilingual secretary toward the end of the second quarter. The MNR-PNIA agreed to hire this secretary utilizing PL-480 or ESF funds due to the additional secretarial requirements brought on by the arrival of the Honduran team members. However, her contract had not been finalized or her

salary paid by the time she resigned the position effective Nov.1, 1983. She had not been paid by the end of this reporting period.

b. The same procedure was used to hire a replacement for the above position for the last two months of the year. However, a decision by the President of Honduras resulted in her contract and salary having to be picked up on the HARP budget, with AID approval.

c. The hiring procedures of the MNR were used to obtain the service of the administrative assistant.

d. Four students from CURLA were employed at the end of the third quarter to work for HARP (See IV.B.2.c.). The hiring procedure involved a competitive examination, an interview, and evaluation of academic credentials.

e. Due to illness or deaths in the immediate family of the two regular HARP secretaries, four temporary secretaries were hired for varying lengths of time during the year.

4. Preparation of Plans of Work

The problems encountered in the first quarter continued to hamper the preparation of a general two-year Plan of Work that was satisfactory to all parties concerned (c.f. Appendix B). As evident from this report, the original Plan of Work submitted in March covers the activities that we have been requested by

MNR and AID to perform. Short-term plans of work were prepared, but pressing needs of the field phases of the project and heavy work loads on the secretarial staff prevented completion in a timely manner. However, these and a proposed general plan of work for 1984 were submitted late in the last quarter.

5. Project TDY and other short term personnel.

a. Dr. Melchor Ortiz, HARP TDY in experimental statistics, initiated his assignment early in the first quarter by making a survey of existing computer facilities and making recommendations for satisfying current and future needs of the MNR and CURLA (See HARP Publication 83-3). Dr. Ortiz returned during the period of July 22-July 9 and assisted with classes in microcomputer use and presented statistical analysis seminars for staff at CURLA. Dr. Ortiz worked with HARP personnel on the development of statistical analysis software for HARP (See HARP Publication No. 83-12).

b. Dr. Austin Haws, HARP TDY specialist in experiment station management, visited Honduras from 27 August - 15 September. During his stay, he worked with personnel of the Guaymas experiment station, CURLA, La Masica, Danli, and the experiment station in Catacamas, Olancho. (A final draft of his report, including recommendations, is in preparation as HARP

Publication 83-17).

6. Other IDY Activities.

In an effort to strengthen HARP involvement in Honduras NMSU has reprogrammed its BIFAD Strengthening Grant and certain other funds to provide short-term technical assistance in several areas of interest to MNR, CURLA, and/or AID as follows:

a. Dr. Joel Diemer, NMSU Agricultural Economist, made two trips to Honduras (February 6-19 and May 23-June 2) under BIFAD fundings to assist in the agricultural economics aspects of the project and to assist Dr. Harper with the evaluation and revision of the CURLA curriculum in this specialty area.

b. Dr. Ellis W. Huddleston, HARP CID/NMSU Project Director, and Dr. Harold Matteson, Director of the Center for International Programs at NMSU, visited Honduras during the period of March 14-22. During this visit discussions were held with AID, Embassy, and MNR personnel concerning the plan of work, budget, and administrative matters concerning the project.

c. Mr. Bobby Creel, NMSU Agricultural Economist and Computer Specialist, was in Honduras June 18-July 2 to assist with the HARP computer facility and to help establish and train personnel in the use of the computer facility at CURLA.

d. At the request of CURLA, Dr. James Zimmerman

(NMSU Insect Taxonomist) visited during July 2-28, 1983 to help with insect identification and methodology for the entomology museum to be established at CURLA. He also assisted CURLA staff in the area of curriculum development. This technical assistance was financed by the NMSU Department of Entomology and Plant Pathology, CURLA, and AID-CURLA funds. HARP only provided planning and logistical support, especially where involvement with HARP/MNR activities were being supported (see HARP Publication 83-15).

e. Dr. Ellis W. Huddleston, Dr. Jack Booth (NMSU Plant Pathologist), and Dr. Steve Thomas (NMSU Nematologist) visited the project during July 18-31, 1983. Drs. Booth and Thomas, both on BIFAD funding, spent about a week observing diseases and nematode problems and HARP on-farm trials in Yoro, Cuyamel, and La Masica (see HARP Publication 83-15 and 83-16). Dr. Huddleston accompanied them on most of these trips and held several meetings with USAID, MNR personnel, and the HARP team.

f. During August 7-18, Dr. John Clemmons, President of NMSU Board of Regents, Dr. Harold Matteson and Dr. John Owens, NMSU Entomologist, visited Honduras. They held meetings with USAID and MNR personnel in Tegucigalpa, visited HARP on-farm

research trials in Yoro, Cuyamel, and La Masica, and visited CURLA to develop an agreement for long term NMSU-CURLA cooperation in various activities.

No project funds were used for these visitors except for in-country planning and logistical support. However, considerable assistance was given the project in bringing to closure several administrative problems that had been pending for several months. Also, this top ranking administrator gained an appreciation for the project and international programs in genera.. Dr. Owens assisted in providing needed literature and methodology of insect damage assessment in corn.

g. Mr. Gordon Dean, a graduate student from NMSU who worked in Honduras (Yoro Valley area) from July 2 - August 6 collecting information concerning the agricultural practices of indigenous groups in the Yoro Valley, was provided assistance. The information collected will provide the basis for a Ph.D. dissertation proposal for more extensive research in the Yoro Valley. When completed, this study will provide HARP with more insight into the farming systems of the Yoro Valley and its relation to historical and current systems managed by indigenous farmers in the Yoro highlands. Again,

no HARP project funds were utilized to finance this trip except for liaison and logistical support.

h. Dr. George Dawson, Head of the Department of Agricultural Economics at NMSU, visited several project sites to become familiar with HARP activities, the working environment, and the role of agricultural economics in the project. Although not financed by the project, he assisted in the resolution of several technical and administrative constraints to this specialty area of the project.

i. Dr. Richard Cole, Fisheries Biologist from NMSU, visited under the NMSU/BIFAD program during the period of October 4-7 at the request of USAID, to make a study of the fish production problems at Lake Yojoa (see HARP Publication 83-18).

7. Other Meetings.

a. The National Maize Program Conference was attended by all members of the HARP team during March 8-10.

b. On the 15th of March, a meeting was held with the HARP team; Drs. Matteson and Huddleston; Dr. Myron Shenk, a Weed Control Specialist representing ROCAP; and Ing. Roger Meneses, local CATIE representative. The possibility of cooperative efforts between HARP and CATIE were discussed.

c. Drs. Ward, Matteson, and Huddleston met with various researchers at CATIE during March 23-26 in Costa Rica. Numerous relevant publications were obtained and preliminary contacts made to promote cooperative efforts between CATIE and HARP.

d. The CIMMYT On-Farm Research Workshop held in San Pedro Sula April 11-16 was attended at various times by all team members.

e. Dr. Charles R. Ward and Dr. Palamon Martinez, NMSU Extension Program, attended an AID/MNR/AED sponsored conference in Tegucigalpa on agricultural communications.

f. Several team members met with Manager Tito L. Howard and other personnel of EXTAHO, S. A. de R. L. (Export Tobacco Co. of Honduras) to discuss possible cooperative efforts. There appeared to be several opportunities, especially with corn production in relation to rotation with tobacco in the Morazan District near Yoro.

g. The team met with Mrs. Martha J. Abarca "Fundacion Horizontes de Amistad" (Horizons of Friendship Foundation) at the request of USAID. The visit to her group's Centro de Capacitacion (training center) "Alegria" revealed several possibilities of cooperative efforts. Time availability of the HARP team appeared to be the only limiting factor.

h. In the second quarter several team members met with CONSUPLANE personnel working in the Swiss Mission Area Development Project in Yoro, to continue the dialogue initiated in the first quarter, to avoid duplication of effort, and to determine areas where cooperative studies were possible. Publications nearing the release stage are to be provided when available.

Meetings were renewed with the DRI-Yoro Project in the fourth quarter and several overlapping MNR personnel assignments were indicated. HARP was requested to provide technical assistance in the Yorito and Negrito/Morazan areas of the DRI-Yoro Project. It was pointed out that HARP had no budgetary provision for expanding into other areas.

i. Most team members participated in the Annual Meeting of the Honduras National Ingeniero Agronomo Society held in Tegucigalpa on May 10-14.

j. The team attended on-farm methodology presentations given by Ing. Adan Bonilla, Head, MNR-PNIA, and Ing. Nunez, On-Farm Research leader from Olancho. The first meeting was held on May 31 and Regional administrators and HARP personnel attended. The second meeting was held on June 23 and was attended by all HARP members and most regional research and extension

personnel.

k. The HARP entomologists attended various sessions of the International Conference on the African Bee held in San Pedro Sula on June 23-25.

l. The HARP and CURLA entomologists met on June 30 with the widow of the late Dr. Jerome Mankins in Siguatepeque to discuss the possible purchase of his insect collection and books for the Museum at CURLA.

m. The MNR insect collection at Comayagua was also visited by the same group to determine its condition and the possiblities of its future use as a source of identified insects on the HARP project.

n. Dr. John Clemmons and Dr. Harold Matteson also participated in the following meetings:

(1) August 10 - Ing. Miguel A. Bonilla, Minister of Natural Resources, Ing. Roberto Larios, Director DAR No. 3, and Ing. Gerardo Reyes, Assistant Chief DIA, to discuss the implementation of HARP.

(2) August 15 - Ing. Adan Bonilla, Director DIA, Ing. Gerardo Reyes, and Honduran team members of HARP.

(3) August 15 - USAID Director, Antonio Cuaterucci, USAID personnel associated with HARP, and the U.S. Charge d'affairs.

(4) August 16 - Ing. Miguel A. Bonilla.

(5) August 16 - Dr. Oswaldo Ramos Soto, Rector of the National University of Honduras.

o. USAID Washington, Research Fact-Finding Team. HARP expatriate team members met with a fact-finding team from USAID Washington to discuss problems encountered by HARP, research needs, and priorities for agricultural research in Honduras, and the institutionalization of agricultural research in Honduras.

p. At the request of DIA, Ing. Mario Bustamante participated in the VI Annual Meeting of Plant Protection held in Cancun, Mexico.

q. Two HARP Honduran team members attended various sessions of the Fourth Course on OFR held by CIMMYT in La Ceiba.

r. All team members attended a regional MNR meeting held on October 18 to outline recent changes in the administrative structure of the ministry. The effect of these changes on the OFR program was a major topic of discussion.

s. HARP team members met with HARP and NMSU personnel in Las Cruces and were joined by a sixth team member to attend the Annual FSR/E Conference held in Manhattan Kansas, October 25-November 3,1983.

III. ACTIVITIES PLANNED FOR THE FOLLOWING QUARTER

A. Continue to improve communications with MNR and AID.

B. Complete the spanish versions of the plans of work, obtain MNR and AID approvals, and monitor their implementation in the areas covered by HARP.

C. Harvesting postrera season field plots in Yoro, Guaymas, Omonita, Cuyamel, and La Masica.

D. Data summarization, analysis, and preparation of annual technical reports and recommendations.

E. USAID and CID project evaluations.

F. Continue meetings with CURLA staff in the development of teaching and research programs in the HARP speciality areas.

G. Monitor specific needs and problems related to HARP activities in different areas covered by HARP.

H. Continue to coordinate activities of HARP TDY and NMSU/BIFAD involvement in different specialities.

IV. PROGRESS AND CONSTRAINTS TO PROGRESS TOWARD ACCOMPLISHMENTS

A. PROGRESS

The CID/NMSU/HARP has the following goals: (1) to assist MNR in the implementation of FSR and technical methodologies that may be used to improve the economic welfare of farmers who operate small and medium size farms, through increased productivity of rice, corn, and beans in the target areas of the project, and (2) to assist MNR in the strengthening of institutional and personnel capabilities to conceptualize and carry out

research activities to support FSR programs in Honduras. To accomplish these goals, HARP established the following objectives and has made progress to date as follows:

1. Assist the multi-disciplinary on-farm research teams in the Department of Yoro to expand their on-farm research programs.

a. Continued to collect and assimilate information concerning the farming systems of the Yoro area and assisted in the preparation of a report of extant data.

b. Participated with MNR personnel in helping to determine factors limiting production and alternatives in four distinct areas of the Yoro Valley.

c. Participated with MNR personnel in planning, site selection, planting, and application of experimental treatments in 40 on-farm trials to help provide answers to the factors limiting production of corn in the area in the primera season.

d. Helped design corn intercropping experiments and helped in site selection, planting, and making observations on the trials.

e. Established pheromone traps to monitor populations of the fall armyworm (FAW) and corn earworm (CEW), the two major pests of corn in this region.

f. Planned and executed a corn drying experiment for corn harvest during Quarter IV.

g. Participated in two, two-day meetings with MNR personnel to plan OFR activities for the 1983 postrera bean production season in Yoro and assisted them in the establishment and evaluation of 31 trials in the area.

h. Discussed a formal encuesta which was subsequently approved. HARP and MNR personnel will develop a survey document and conduct the data collection in the first quarter of 1984.

i. Initiated the maintenance of detailed records on 10 farms in the last quarter and continued the collection of economic data on 20 farms utilizing the single page form.

2. Identify training needs and implement training programs that meet the needs of the FSR teams in Yoro.

a. General Weed Control Workshop - July 5-7.

b. Integrated Pest Management Course - Sept.5-9.

c. Soil Conservation Workshop - September 19.

d. Soil Fertility Workshop - September 26.

e. Scheduled workshop to explain the DIA and DEA agreement of technical cooperation and the philosophy and methodology of FSR.

f. In-service, informal training was included in all stages of design, establishment, and evaluation of the trials during both planting seasons.

3. Strengthen, where appropiate, Guaymas Agricultural Experiment Station efforts to support on-farm FSR.

a. Dr. Austin Haws, HARP TDY specialist in experiment station management, conducted an extensive study of experiment station programs, activities, management, administration, and needs. His findings and recommendations will be published in a HARP publication and distributed to MNR.

b. Helped plan, design, select sites, plant, apply weed control treatments and evaluate 5 trials in corn and rice.

c. Experiment Station staff attended courses and workshops discussed above.

4. Offer technical assistance to MNR research and extension groups in other areas of Honduras:

a. Trips made to Danli, and the Departments of Choluteca and Olancho during the first quarter did not result in requests for technical assistance.

b. The MNR administration decided to limit HARP participation, except for formal training sessions, to the Northern and the Atlantic coastal regions.

c. Helped plan, design, select sites, plant, and apply experimental treatments to more than 50 on-farm rice and corn trials in Cuyamel, Guaymas, and Masica during the 1983A planting season and 40 trials during the 1983B season.

d. Encouraged cooperative research efforts between CURLA and MNR personnel in the La Ceiba region.

e. Dr. Austin Haws, also visited the experiment stations at Comayagua, Danli, and Catacamas.

f. Conducted the following courses which were attended by MNR personnel from all regions of Honduras:

(1) General Weed Control Course - July 5-7.

(2) Soya Pest Management August 31 - Sept. 2

(3) Integrated Pest Management Course - September 5-9.

(4) Soil Fertility Workshop - September 26-29.

g. Gave weed and insect control sections of the Bean Production Conference in Olancho, November 21 - 25.

h. Informal, in-service training was given in all steps mentioned in section c. above.

5. Deliver program results to the extension service

Conducted numerous field days to familiarize extension personnel with the OFR programs being conducted in the project.

The participation of extension personnel in the on-going programs of OFR in the various research areas insures that program results are immediately available to the extension personnel of those areas. This is the primary advantage of the OFR methodology being institutionalized by the MNR.

The project has produced 20 reports and another eight are in the final stages of approval and publication. In addition HARP staff members and TDY specialists are assisting in data analysis and reports on research in all areas where they have been assigned.

6. Increase MNR capabilities in the Northern and Atlantic Coastal Regions to analyze and synthesize existing unpublished data.

Data from experiments conducted at all project sites are being analyzed on the HARP and MNR computer facilities and the results returned to the researchers. Reports on results are being prepared for presentation to research and extension personnel at both regional and national levels. Assistance with regional research publications is planned for the next quarter.

Cooperative use of the new computer facilities which have been established at CURLA was encouraged and preliminary agreements were made. Additional data analisis packages are being sought for both facilities.

7. Assist CURLA to establish their soils laboratory, establish computer facilities, and strengthen research and teaching procedures in entomology, weed science, soil fertility, and agricultural economics.

a. Meetings in the first two quarters with the CURLA Director, Researcher Coordinator, Academic Dean, and other CURLA staff established their needs and desires for assistance.

b. Meetings continued to be held by individual team members within their respective departmental disciplines. This initiated the strengthening

of research procedures, possible research projects were outlined, and dates for future discussions were set.

c. Experiments in weed control, entomology, and soil fertility were planned, designed, and planted and evaluated. Some of the tests are being used as student thesis projects.

d. The entomology equipment list being ordered through USAID was expanded during the second quarter to include over $36,000.00 of specialized equipment primarily for the museum. An additional order was placed for specialized microcospic and photographic equipment in the third quarter.

e. A computer equipment list was developed, approved, and the equipment was ordered. Partial delivery of the equipment was made during the second quarter (cf. Appendix C). The equipment was installed and instruction given on maintenance, operation, and statistical analysis.

f. Dr. John Clemmons, President of the NMSU Board of Regents, and Dr. Harold Matteson, Director of Center for International Programs at NMSU, visited CURLA to discuss cooperative programs. A draft copy of a memorandum of agreement for cooperation was presented to Dr. Clemmons by Ing. Soto, Director of CURLA. The memorandum

was taken to NMSU for study and discussion. During the visit of CURLA administrators to NMSU in October a revised draft was presented for additional study by their staff. If approved, this agreement could be used to amplify and improve programs between CURLA and NMSU.

g. An evaluation was conducted of the agricultural economics curriculum at CURLA. A draft document has been returned to NMSU for editing and reproduction. A Spanish edition will be prepared upon completion of the English version.

h. Additional computer equipment for CURLA was received by HARP. Due to difficulties in clearing part of the equipment through customs, the equipment was not delivered to CURLA during the third quarter. Although now cleared from customs, it will not be delivered and installed until payment from AID is received by NMSU.

8. Assist the MNR in developing long-range plans for FSR programs:

a. Failure to establish regular joints meetings with HARP, MNR, and USAID personnel has made this difficult, but the establishment of the Regional Enlace Committee will help.

b. Agricultural Policy Paper No. 1: Policy for Agricultural Research, was completed and submitted to USAID/Tegucigalpa and NMSU for

review and approval prior to publication and distribution.

c. The report of Dr. Austin Hawes, HARP TDY Experiment Station Management Specialist, will include long range recommendations.

9. Evaluate program progress and impact:

a. HARP progress was discussed in numerous seperate meetings with USAID and/or MNR personnel.

b. The delay of an adequate survey to develop baseline data will hinder the measurement of the impact.

c. The visit of Dr. John Clemmons and Dr. Harold Matteson resulted in several meetings with MNR, DIA, DEA, and USAID personnel at the regional and national level. These meetings resulted in the identification of problems in the following areas: (1) lack of historical documentation in MNR concerning HARP, (2) differences in philosophies with respect to the implementation of FSR and OFR, and (3) general communication.

Appropiate documents -- RFTP, Technical Proposal, reports, etc -- were exchanged, meetings scheduled, and procedures established to correct the existing problems and to minimize the potential for future occurences.

d. The integration of HARP into the on-going MNR/DIA/DEA program of OFR continued to impede the efforts of HARP to implement a FSR field and training program as defined in the technical proposal.

e. Twenty project reports have been published and another eight are in the process of approval for publication.

f. The U.S. team members have written ten individual monthly reports and the Honduran team members have written trip reports and three individual quarterly reports.

B. CONSTRAINTS

1. Administrative

a. USAID

Three problems arose immediately with respect to USAID as HARP established itself in San Pedro Sula. First, determination of an adequate housing allowance resulted in delays in obtaining permanent housing.

The second problem dealt with the processing of project and personal air shipments through customs at San Pedro Sula. This problem was resolved by bringing all major air shipments through Tegucigalpa where Embassy personnel could assist with customs clearance. Surface shipment clearances through Puerto Cortes were

erratic due to documentation problems but were resolved with assistance by the shipping agent and efforts by GSO personnel. Delays in obtaining license plates caused frequent stops by police to check for documentation of the vehicle and driver. Full documentation was not received until the end of the second quarter.

The third problem area was with respect to communication and was never fully resolved, as no regular meeting schedule was established. This greatly hampered the resolution of several other constraints during the first year of the project.

Proper personnel identification documents were not received for all team members until the end of the third quarter, which resulted in increased tension due to military road blocks during the interim period.

Delays in the release of PL-480 and/or ESF funds made it difficult and at times impossible for the regional and Honduran HARP team members to obtain the necessary equipment, supplies, and logistical support. Estimates of MNR personnel indicating that these funds might not be available until the fourth quarter caused considerable concern during the first cropping season. Lack of these funds, which were anticipated in late May or early June, resulted

in a severe over-extension of the HARP team in establishing additional plots to optimize the efforts of the anticipated additional assistance. When the funds were finally made available at the local level late in the last quarter, it was too late to purchase much of the supplies needed to conduct second season experiments.

b. MNR

The integration of HARP into the administrative structure of the MNR in the Northern region was slower than anticipated. Regional counterparts were never formally assigned to work with the HARP team. This was circumvented by the team working with all research and extension personnel in the areas where requested to work. The last of the four Honduran team members was not assigned until the first month of the second quarter. None of them had fully executed contracts to sign by the end of the quarter and none had been paid their salaries or per diem.

With the arrival of the Honduran team members, office space and furniture again become a critical issue and was not resolved until the middle of May. Several items of office furniture have never been furnished and we have been informed that MNR funds can not be expended for

office furniture in 1984. AID has also disallowed the use of CID/NMSU project funds for purchasing office furniture.

One of the two vehicles that were made available for the HARP Honduran team members was in need of repairs and inoperable until the third quarter. Both vehicles were constantly in need of repairs that could not be made due to fund shortages. Both were in the MNR garage at the end of the year with no hope of being repaired until release of the 1984 budget, which generally does not occur until the middle of the first quarter.

According to reports from USAID and the MNR, these delays were the result of the inability of the MNR to obtain approvals from other branches of the government, especially Ministerio de Hacienda, the financial arm of the GOH. Problems were intensified when budgets were cut during the fourth quarter. The economic situation continued to deteriorate and before the contract for the secretary being hired on MNR funds could be processed, the President had dictated that no new contracts would be signed. Therefore, AID approval had to be obtained to pay her salary from the HARP budget for the last two months of the year.

The research-extension (Enlace) advisory committee was implemented in San Pedro Sula, DAR No. 3 during the last quarter. This has improved the coordination of HARP and MNR activities within DAR No. 3. Ing. Francisca de Escoto was named as the Executive Secretary of this committee on September 26.

c. CID/NMSU

Initial communication problems were encountered but some of these were resolved when the project office equipment was finally released from customs. Both the Honduras and CID/NMSU offices inititate corrective procedures and progress and improvement were noted by the end of the first quarter.

Some communication problems still exist due to the lack of an office telephone but have been partially solved by utilizing the home telephone of the Chief of Party. This has resulted in the disruption of work plans as schedules need to be flexible to accomodate emergency travel requirements. This also requires that extra trips be made to utilize the telephone and cuts down on efficiency.

2. Personnel

a. Initial personnel problems were encountered in obtaining the assignment of the Honduran team members and the administrative assistant.

However, the latter was assigned by the end of the second quarter and relieved the HARP Chief, and Assistant Chief of Party of many of the minor administrative duties of the project. The last Honduran team member was assigned early in the second quarter.

b. The increased work load made it impossible for one secretary to handle all the paperwork, so the MNR readily agreed to provide the project with another secretary. However, the need of a third secretary was demonstrated as technical output reports began to be prepared for publication in the fourth quarter. This situation was addressed in budget ammendment negotiations in November, but could not be resolved before the end of the period.

c. Shortage of personnel in two of the project areas, Cuyamel and Yoro, became critical in the second quarter. However, on August 29, four students from CURLA were hired as field staff for HARP. They were located as follows:

    (1) Ing. Rossana Cristina Alvarez - Cuayamel, Guaymas/Omonita, and, later, San Pedro Sula.

    (2) Srita. Mary Ann Herrera Dean - Yoro.

    (3) Sr. Jose Manuel Figueroa - Yoro.

    (4) Sr. Orlando Benjamin Enamorado- Cuyamel.

Ing. Alvarez was tranfered to the HARP office on November 15 to assist in data analysis and other specialized assignments. This has allowed the other team members to continue to participate in field activities which would otherwise have had to be curtailed. This also allowed the training of Ing. Alvarez in computer use and will lea e a trained person when the project terminates.

d. The failure of USAID and MNR to resolve the contract problems with these temporary employees in timely manner resulted in a constant source of problems. Frequent lack of personal funds resulted in some reluctance of project MNR personnel to travel to project sites and in considerable uncertainty as to their status. All team members had to live and travel on borrowed money which was difficult and expensive to obtain. This problem appeared to be resolved for the team members and administrative assistant in mid-September when they began to receive back pay, but appeared again in December when they did not recieve their checks. They also encountered difficulty in obtaining payment of their perdiem.

Neither the students hired in late August nor the secretaries hired from MNR funds had received their payroll checks by the end of the

year. These problems must be resolved if employee morale and enthusiasm is to be maintained.

3. Physical Facilities

a. Although isolated from the regional, research, and extension offices, HARP office space was initially adequate. With the arrival of the Honduran team members, a delay was encountered in obtaining additional space.

b. HARP continued to be without photocopy facilities until early in the last quarter, which resulted in considerable unanticipated expenditures.

c. Approval has been secured for a telephone line for HARP, but the line had not been installed at the end of the quarter.

d. The microcomputer facility of HARP has been used heavily for word-processing needs. This creates use conflicts with the development of data analysis materials and the training of the HARP team members for data analysis. This conflict became more acute as the harvest season arrived and data became available for analysis. Request was made and verbal approval obtained from USAID to purchase a second unit which would have word processing as its primary function and data analysis backup capability as a secondary function. The need for this backup capability

was illustrated during a six-week period in the third quarter when the microcomputer had to be returned to the U.S. for servicing.

4. Transportation

   a. Transportation for the Honduran team members needs to be resolved, especially if the team continues to be asked to provide regional counterparts with transport.

   b. Transportation at the Guaymas Experiment Station is critical, including transport between the main station and the sub-station, Omonita. This has greatly limited experiment station personnel's ability to conduct off-station research.

   c. Frequent lack of fuel in Yoro has greatly hampered the timely and adequate supervision of experimental plots.

   d. Spare tires and jacks are missing from non-HARP project vehicles in most locations.

   e. The above problems continued to be critical at the close of the reporting period, and promises to resolve them with ESF funds had not been kept.

   f. Due to being involved in major accidents, two of the HARP vehicles were totally inoperative during the last quarter. Since mid-July, at least one of the four vehicles belonging to HARP has been restricted to local use only, which has

resulted from a need for repairs and the lack of replacement parts in Honduras for 1983 model Chevrolets. Although the current procedure of ordering parts through NMSU results in delays, a satisfactory alternative was not found. Based upon needs to date, it would have been difficult to anticipate replacement part needs, and to maintain a stock of parts would be prohibitively expensive.

5. Materials and Supplies

a. Most locations in which we are working have been plagued by shortages of most research materials and supplies.

b. The on-farm research units in both Yoro and Cuyamel need herbicide and insecticide (separate units) sprayers.

c. The Guaymas Experiment Station Weed Control Specialist needs a sprayer and other research equipment.

d. Communications linkages with the other locations, especially Yoro and Cuyamel, need to be improved or established to allow better coordination of the program. New radios had been purchased but not installed at the close of the period.

V. RECOMMENDATIONS

A. TRAINING.

An agreement must be made between MNR and USAID on the amount of funds available to support the training programs proposed to be part of this project. Much better use of the team's time can be made if the trainees are brought to a central location, preferably San Pedro Sula since the northern zones are receiving primary emphasis.

HARP needs to evaluate and reconsider the training activities in which it participates. There seems to be an overabundance of training programs scheduled throughout the MNR and DIA systems. These courses range from one to two weeks in length. During the last two quarters HARP has been directly responsible for three such courses and has participated in others. These courses have, for the most part, had little or no direct connection with the HARP plan of work contract. Since the large number of research plots limits the time available for other activities, HARP should only participate in training activities pertaining to FSR or greatly curtail field activities.

B. ADDITIONAL TECHNICAL ASSISTANCE

It is recommended that HARP take a more critical approach to the requests for approval of BIFAD activities conducted as a result of HARP's activities in Honduras. Indiscriminate use of the BIFAD funds may result in the inefficient use of limited resources.

As pointed out in Quarterly Reports I and II, there appears to be a great need for technical assistance in many disciplines and most geographic areas. Therefore long range planning should be initiated to either plan for an extension of this project and/or create other projects to help satisfy the technical assistance needs of agricultural research of the country.

C. IMPROVED MANAGEMENT PROCEDURES

1. An agenda(s) for regular meetings among HARP, USAID, and MNR needs to be established. The current system of meeting only when there is a problem or crisis creates a negative atmosphere for conducting HARP business. HARP appears to have only problems and to raise only negative issues.

2. Care must be exercised to insure the continued flow of information from HARP to MNR and USAID and vice versa. The information and communication problems which were discussed and addressed in IV.A.9.c.(1) must be totally corrected and future occurences must be prevented.

D. FINANCIAL

1. The budget ammendment negotiations for HARP must be completed as soon as possible to allow adequate planning time.

2. The MNR and USAID must find some way to resolve the financial constraints of the MNR to provide adequate salaries, per diem, supplies, and logistical support for the Honduran HARP team members and regional personnel.

APPENDIX A
SUMMARY OF THE HISTORY OF HONDURAS AGRICULTURAL RESEARCH PROJECT (HARP)

The original Honduras Agricultural Research Project began in 1978 with a grant from the United States Agency for International Development (USAID). Then, as now, the primary purpose of the project was to assist the Government of Honduras Ministry of Natural Resources (MNR) to improve the well being of the small to medium size farmer through increased production of basic grains - rice, corn, and beans. This was to be accomplished through the continued development and expansion of multidisciplinary farming systems research methodology that had begun in 1977.

The original project began in Comayagua and included a major training component as well as a series of on-farm trials. These trials served two purposes -- to give the trainees field experience in conducting multidisciplinary on-farm trials and to provide research results directly applicable to the farmers in the area. Many people were trained during these first four years and provided a successful example of how this new methodology could work in Honduras. The researchers trained in this program and the in - service training program have gone on to initiate successful on-farm research programs in other areas. The program in Olancho is the one most frequenty used as an example of a successful program.

The Consortium for International Development and New Mexico State University (CID/NMSU) responded to the request for technical proposal (RFTP) to continue the project from USAID Honduras and the MNR with the submission of a proposal in May

1982. The specific objective of the project, as requested in the RFTP, was to develop a training program to establish multidisciplinary on-farm research teams in all seven regions of the country. Training was to follow the Entrenamiento en Servicio model so effectively used previously in Comayagua. The four CID/NMSU team members and the four MNR/PNIA team members were to form the Unidad Nacional de Apoyo Tecnico (UNAT) with the assistance of four CID/NMSU short-term (TDY) personnel and available Honduran specialists. The long-term staff represented the specialty areas of agricultural economics, soil fertility, weed science, and entomology.

Part of the team, the CID/NMSU Project Director, and CID and NMSU administrators visited Honduras in September 1982. At that time the MNR decided that the project objectives would be changed and the team was to join the regional on-farm research team in the Valley of Yoro. The budget for the project was negotiated between CID/NMSU and AID on the basis of this reduced scope of work and the contract was signed in October 1982. However, due to a shortage of funds the project was reduced to 18 months with a promise to ammend the budget to cover the items reduced or eliminated in the 18 months budget and add the funds for the other six months as soon as additional money could be obtained from AID Washington.

The CID/NMSU team members arrived in San Pedro Sula by January 9,1983 and found that office space and furniture were not yet available and that the Honduran team members had not been selected and hired. Meetings were initiated with National and Regional MNR administrators and it was discovered that the

National MNR administrators had decided to expand the scope of work to include technical assistance to other regions in addition to the proposed work in the Yoro Valley. On the basis of these discussions the CID/NMSU team members began to meet with administrators in other regions and to develop a Plan of Work for the 18 to 24 months of the project. At the same time meetings were being held with AID personnel to determine if the budget could be increased to cover the additional costs associated with the increased scope of work. In a joint meeting with MNR, AID, and HARP personnel it was agreed by AID that the additional costs both to the MNR and HARP could be covered. This included the additional costs of including technical assistance for CURLA that was mandated by AID.

The Honduran team members were selected and contracted by the MNR and the last one began to work in early April. During this time there was a change in the leadership of PNIA and discussions were held to finalize the scope of work.

Several drafts of the proposed plan of work were passed between project personnel and MNR administrators. In early May, Ing. Adan Bonilla, the new Jefe del Programa Nacional de Investigacion Agricola (PNIA), decided that the project was to join the on-farm research programs in Yoro, Cuyamel, and La Masica and to provide technical assistance to the Guaymas/Omonita Experiment Stations and CURLA. Discussions with AID personnel indicated that the additional costs associated with this plan of work could be added in the budget amendment negotiations to add the additional six months to the project.

Therefore, the CID/NMSU and Honduran team members began to meet with the regional on-farm research/extension (enlace) teams to give them technical assistance in the design, execution, and analysis of the 1983A planting season trials. Special emphasis was given to the experiments involving the four specialty areas represented by the team members. Over one hundred trials were planned and planted during the primera season with the HARP team becoming heavily involved in the planting, application of treatments, evaluation, and harvesting of the experiments.

Meetings held with regional and national administrators, Guaymas/Omonita Experiment Station staff, and the HARP team resulted in the decision that HARP involvement at the Experiment Station would be limited to the weed science specialty area. However, assistance was requested in the development of the on-farm research efforts in the Guaymas/Progreso area. Similar meetings were held with CURLA administrators and staff and a plan of work was developed with the limitation that only 10-15% of HARP's total efforts could be devoted to the University. Emphasis has been given to the development of a computer facility at CURLA and development of a working relationship with the regional MNR staff in an effort to strengthen the contract between CURLA and MNR.

In the meantime, HARP was requested to expand its scope of work to include specialty area training at the national level and courses in weed control, pest management, and soil fertility were developed and given. Over ninety MNR personnel were trained in these seminars in addition to those included in seminars given on insect control in soya and beans and weed control in beans.

Training efforts with the regional teams were limited to "entrenamiento en servicio" during each phase of trial planning, execution, and analysis.

Meetings similar to those held with the regional teams to plan the primera planting season (1983A) trials were held to plan the postrera (1983B) trials. These have been documented in written plans of work for each planting season. The 1983B plan of work included over eighty trials in the four areas where HARP has been asked to work.

A proposed plan of work for 1984 has been written by the HARP team and has been distributed to the National and Regional MNR offices for review and discussion. Preliminary discussions indicate that in 1984 HARP will be asked to reassume the national role outlined in the RFTP and project proposal. This will involve an emphasis on training on both on-farm research methodology with a systems approach and specialty area training in the four specialty areas represented by the team. The first of these courses will be given by Dr. Melchor Ortiz, HARP TDY Statistician, on experimental design and analysis in early 1984.

This change of emphasis will affect the regional teams where we worked in 1983. The HARP team will assist in the design and analysis of the experiments and will have limited time to devote to the actual field work. This involvement will focus on special methodology for the application of treatments, plot management, and data collection required by the nature of the experiments. Similar assistance will be given to Guaymas/Omonita experiment station personnel where requested. The details of the plan of work for 1984 were still being discussed at the close of 1983.

However, these plans must consider the budget limitations both of the MNR and the HARP project.

APPENDIX B
PERSONNEL

I. National Program Leaders
   A. Ing. Miguel Bonilla, Minister of Natural Resources
   B. 1. Ing. Antonio Silva, Head MNR/PNIA (January to March).
      2. Ing. Justo Torres, Acting Head MNR/PNIA (April)
      3. Ing. Adan Bonilla, Head MNR/DIA (April to present)
   C. 1. Ing. Justo Torres, Assistant Head MNR/PNIA (January to March).
      2. Ing. Gerardo Reyes, Assistant Head MNR/PNIA (April to present).
   D. Ing. Guillermo Diaz, Head MNR/DEA
   E. Ing. Ricardo Romero Trochez, Head Sanidad Vegetal
   F. Dr. Jose Santos Reyes, Head Sanidad Animal
   G. Crop Leaders and location
      1. Maiz - Ing. Roduel Rodriguez (Comayagua)
      2. Rice - Ing. Rolando Rubi (SPS) -(Jan. to May)
         Ing. Alfredo Escoto (SPS) - (May to present)
      3. Beans - Ing. Federico Rodriguez (Danli) (Until September)
      4. Sorghum - Ing. Roberto Nolasco (Choluteca)

II. HARP Team
   A. Administration

      1. Dr. Charles R. Ward, Chief of Party
      2. Ing. Antonio Silva, Assistant Chief of Party MNR
      3. a. Dr. Wilmer M. Harper, Assistant Chief of Party, CID/NMSU (January to December 15)
         b. Dr. Michael K. Bertelsen, Assistant Chief of Party, CID/NMSU (December 15 to present)
      4. Mr. Jorge Salgado - Administrative Assistant

   B. Specialties (Long Term)

      1. Entomologists:

         a. Dr. Charles R. Ward
         b. Ing. Norberto Urbina

      2. Agricultural Economists:

         a. (1) Dr. Wilmer M. Harper (January 1 to December 15)
            (2) Dr. Michael K. Bertelsen (December 16 to present)
         b. Ing. Antonio Silva

      3. Weed Scientists
         a. Dr. Dennis Sharma
         b. Ing. Mario Bustamante

4. Soil Specialists:
   a. Mr. James G. Walker
   b. Ing. Ligia de Ramos

C. Short Term Specialists:

1. Dr. Melchor Ortiz, Statistics
2. Dr. Austin Haws, Experiment Station Management
3. Two as yet not selected or budgeted

D. Secretaries

1. Mirna Maria Zelaya Ramos
2. a. Olga Marina Pineda vda. de Hernandez (from June 6, 1983 thru Oct. 31, 1983).
   b. Ruth Molina de Guzman (from Nov.1, 1983 to present).

II. Regional Teams

A. Cortes (DAR No. 3), San Pedro Sula

1. Administrative

a. Ing.Roberto Larios Mejia, Regional Director
b. Ing. Juan Salgado, Assistant Regional Director (Until October).
c. Ing. Victor Leva, Head Department of Agriculture (Since November)
d.1. Ing. Marco Tulio Palao, Regional Research Coordinator (Until October).
  2. Ing. Eliseo Navarro, Head Regional Research Department (November to present)
e.1. Ing. Hector R. Munoz, Regional Extension Coordinator (Until October)
  2. Ing. Enrique Cano, Head Regional Extension Department (November to present)
f. Ing. Francisca de Escoto, Regional Planning (Until October); Currently Executive Secretary of Enlace Committee
g. Ing. Armando R. Milla Viada, Regional Sanidad Vegetal Coordinator
h. Dr. Luis Gustavo Garay Games, Regional Coordinator of Sanidad Animal.

2. Yoro Corn/Bean Area On-Farm Research Team

a. Ing. Oswaldo Paz - Subregional Research and Extension Coordinator
b. Ing. Ramon Medina - Subregional On-Farm Research Coordinator
c. Ing. Hector Deras - Subregional Extension Director
d. Ing. Maynor Castillo - On-Farm Research
e. Ing. Luis Cruz - Yoro Extension Agent

f. Ing. Leonel Sanchez - Yoro Extension Agent (Until October)
g. Ing. Alberto Lujan - Yorito Extension Agent (Until October)
h. Another Extension Agent needs to be assigned.
i. Two students assigned to do " Servicio Social ":
   a. Jose Manuel Figueroa
   b. Mary Ann Herrera Dean
j. Blanca Canales - Promotora

3. Cuyamel Rice Area On-Farm Research Team

a. Ing. Leopoldo Crivelli, On-Farm Research Coordinator
b. Agr. Amberto Dominguez - Extension Agent
c. Agr. Roberto Hernandez - Promotor
d. Students assigned to do "Servicio Social":
   a. Orlando Benjamin Enamorado
   b. Rossana Cristina Alvarez (Part Time).

4. Guaymas Rice Area On-Farm Research Team

a. Ing. Concepcion Romero - On-farm Research
b. Agr. Humberto Lopez - On-farm Research
c. Agr. Gilberto Juarez Regalado - Extension Agent
d. Student assigned to do "Servicio Social":
   (1) Rossana Cristina Alvarez (Part Time)

5. Guaymas Experiment Station
   a. Administrative

      1. Ing. Armando Badia - Director (Until October)
      2. Ing. Marco Tulio Palao - Director (November 1 to present)

   b. Crop Research Program Leaders
      1. Ing. Alfredo Escoto - Rice
      2.a. Ing. Julio Romero - Corn
        b. Ing. Victor Mendez - Corn (Assistant)
      3. Ing. Armando Borjas - Weed Control
      4. Ing. Sergio Castro - Soya

B. Litoral Atlantico (DAR No.4), La Ceiba
   1. Administrative

      a.1. Ing. Enrique Azurdia - Regional Director (May to September)
        2. Ing. Ivette de Ponce - Assistant, Acting or Regional Director (January to present)
      b. Ing. Gustavo Batiz - Assistant Regional Director (October to present)

c. Ing. Manelio Maradiaga - Director of Department of Agriculture (December to present)
d. Ing. German A. Flores - Executive Secretary of Enlace Program (October to present)
e.1. Ing. German A. Flores - Regional Research Coordinator (January to October)
2. Ing. Renan Zuniga - Regional Research Coordinator (October to present)
f.1. Ing. Orlando Castellon V. - Regional Extension Coordinator (January to September)
2. Ing. Manelio Maradiaga - Regional Extension Coordinator (September to December)
g. Ing. Guadalupe de Colon - Regional Plant Health Coordinator
h. Ing. Luis Alonso Bustamante - Regional Planning Coordinator

2. Masica On-Farm Research Team

a.1. Ing. Cecilio Lozano Puerto - Subregional Extension Coordinator (Until October)
2. Ing. Helington Antunez - Subregional Extension Coordinator (November to present)
b. Ing. Alma Salinas, On-Farm Research
c. Ing. Roberto Gutierrez - On-Farm Research
d. Ing. Eusebio Casco - On-Farm Research
e. Ing. Rafael Sosa - On-Farm Research
f. Ing. Rafael Garcia - Extension Agent
g. Ing. Francisco Medina - Extension Agent (Until October)
h. Ing. Pedro Banegas - Extension Agent
i. Ing. Enna Rudith de Diego de Morazan, Extension Agent (Until October)
j. Ing. Carlos Mayorga Pinto, Extension Agent (Until October)
k. Agr. Armando Erazo Lobo, Extension Agent
l. Ing. Maria Teresa Lopez - Promotor
m. Ing. Rosa Maria Sandoval - Promotor

IV. CURLA - Centro Universitario Regional del Litoral Atlantico

A. Administrative - CURLA

1. Ing. Jorge Soto, Director
2. Ing. Orestes Vasquez, Assistant Director (since September)
3. Ing. Joel Yangali, Research Coordinator
4. Ing. Freddy Starkman, Teaching Coordinator

B. Administrative MNR/USAID

1. Ing. Marco Nunez, Counterpart DIA/CURLA
2. Ing. Rafael Carias, Counterpart CURLA/DIA
3. USAID - Dr. Rafael Pietri, Coordinator at CURLA

4. USAID - Tegucigalpa
   a. Mr. Ken Martin, Tegucigalpa, Project Officer
   b. Mr. Luis Zelaya, Tegucigalpa, Procurement
   c. Mr. John Moran, Tegucigalpa & CURLA, Library

C. Faculty Contacts
   1. Entomology

      a. Ing. Elias Prudot, Plant Science
      b. Ing. Patricio Santa Cruz, Forestry

   2. Weed Science

      a. Ing. Rene Rodriguez (Head, Dept. of Fitotecnia)

   3. Soils

      a. Ing. Estela de Lanza, Head
      b. Ing. Juan Rojas D.
      c. Ing. Juan Trelles
      d. Ing. Luis Alvarez W.
      e. Ing. Rolando Garcia Ruiz
      f. Ing. Manuel Lopez, Head of Soil Laboratory

   4. Agricultural Economics

      a. Ing. Edison Cardenas, Head
      b. Ing. Hernan Madrid
      c. Ing. Roberto Rivera
      d. Leticia Kawas de Acosta, M.S.

V. Special Programs
   A. Entomology

      1. Dr. Keith L. Andrews - Escuela Agricola Panamerica, Zamorano
      2. Ing. Federico Rodriguez - Danli (Until September)
      3. Dr. Everett Mitchell - USDA Insect Behaviour Lab. Gainesville, Fla.

   B. Soil Fertility

      1. Mr. Beto Sattell - Peace Corps Volunteer, ENA
      2. Ing. Feliciano Paz - Director National Soils Laboratory

APPENDIX C
LIST OF EXPERIMENTS CONDUCTED BY AREA IN THE FIRST (PRIMERA) PLANTING SEASON

I. Yoro Valley (See Section II.A.1)

A. Regional Variety Trials (7) [1/] - comparison of 12 new corn varieties with the locally grown or criollo variety. Includes three trials with early maturing varietis, three with tropical varietis, and one with yellow varieties.

B. Demonstration (Comprobacion) Trials (8) - comparison of five varieties in two replications.

C. Fertilizer Trials on Corn (10)
   1. Plant populations (densities) x varieties x nitrogen rates in a split-split plot, resulting in a total of 12 treatments with three replications in each of two locations.
   2. Varieties x nitrogen in a split plot, resulting in a total of six treatments with four replications in each of four locations.
   3. Nitrogen x phosphorus x potassium in a complete factorial, resulting in 12 treatments with three replications in each of four locations.

D. Weed Control Trails on Corn (10)
   1. Chemical weed control vs. farmer's practice in comparison with 4 treatments and 4 replications at 3 locations.
   2. Weed control in minimum till with 5 treatments and 3 to 4 replications in three locations.
   3. Inter-cropping with 10 treatments and three replications at four locations.

E. Insect Control Studies in Corn (3) All with 8 Treatments and 3 Replications.
   1. Chemical control of the corn rootworm.
   2. Chemical control of wireworms.
   3. Chemical control of white grubs.

F. Insect and Babosa Control Study in Beans (1) with 2 Unreplicated Treatments to Observe Effects on Plant Stands.

G. Pheromone Traps (1) to Monitor Adult Populations of the Fall Armyworm (Spodoptera frugiperda or cogollero) and the Corn Earworm (Heliothis zea or elotero).

H. Farmer Validation Trials (19) with an Improved Variety with Fertilizer Treatment (Unreplicated) Compared to the Farmer's Variety without Fertilizer.

I. Farm Records were maintained on 19 farms.

1/ The number in parenthesis indicates the total number of trials planted of this type in various locations (for more detail see HARP 1983A Plan of Work).

II. Cuyamel (See Section II. A. 4.)

A. Regional Variety Trials (3) - comparison of 13 rice varieties in 4 replications.

B. Demonstration (Comprobacion) Trials (8) - comparison of three rice varieties in 2 replications to the farmer's current variety.

C. Fertilizer Trials on Rice (8)

1. Varieties x nitrogen rates in a split plot, 12 treatments and 3 replications in 5 locations.

2. Nitrogen x phosphorus x potassium in a complete factorial, 12 treatments and 3 replications in three locations.

D. Weed Control Trials on Rice (14)

1. Seven gramoxone rates in no till with 4 replications at 2 locations.

2. Roundup rates vs. gramoxone in no till with 7 treatments and 4 replications at 2 locations.

3. Propanil rates with 7 treatments and 4 replications at 7 locations.

4. Evaluation of new products with 10 treatments and 4 replications at 3 locations.

E. Pheromone Traps to Monitor Adult Population Levels of the Fall Armyworm and the Corn Earworm.

F. Farm Records were maintained on 10 farms.

III. Guaymas and Omonita (see Section II. A. 4. and 5.).

A. Guaymas

1. Rice

a. Rice fertilizer trials (3) with 7 treatments and 3 replications (2 are on-farm trials).
b. Farmer validation trials (3) with 2 unreplicated treatments (2 are on-farm trials).

2. Corn (Guaymas and Omonita)

a. Regional variety trials (5) with 12 treatments and 4 replications (4 are on-farm trials).

b. Variety demonstration (comprobacion) trials (9) with 6 treatments and 2 replications (8 of them are on-farm trials).

B. Omonita - Corn Weed Control Trials (4)

1. Screening of herbicides and their combinations for itchgrass control with 11 treatments and 4 replications (1 location).

2. Control of nutgrass and itchgrass with preplant incorporated (PPI) herbicides with 8 treatments and 4 replications (1 location).

3. Comparison of minimum till vs. regular cultivation practices on effectiveness of weed control, disease and insect incidence, yield and other agronomic characteristics with 4 treatments and 4 replications (1 location).

4. No till observation plot with 2 treatments and 1 replication (1 location).

IV. Masica (see Section II. A. 4.) Rice only

A. Regional Variety Trials (3) with 12 Varieties and 3 Replications.

B. Exploratory Trials (2)

1. Plant density with 8 treatments and 3 replications.

2. Varieties with 235 lines and unreplicated.

C. Weed Control Trials (10)

1. Propanil rates with 7 treatments and 4 replications at 5 locations.

2. Evaluation of new products and their combination with 9 treatments and 4 replications at 5 locations.

D. Fertilizer and Weed Control Trials on Rice (3)

1. Varities x nitrogen x weed control methods in a complete factorial.

2. Timing of application of Nitrogen (1) with 7 treatments and 4 replications.

E. Pheromone Traps to Monitor Adult Populations of the Fall Armyworm and Corn Earworm.

F. Farm Records were maintained on 15 Farms.

V. CURLA (See Section II. A. 11 and 12.)

A. Identification of Parasites of Spodoptera frugiperda (fall armyworm or cogollero) and Heliothis zea (corn earworm or elotero) at CURLA (with a comparison of populations in weeded and non-weeded corn plots) and Pheromone Traps to Monitor Adult Populations of These Two Major Pests of Corn.

B. Weed Control Trials (2)

1. Corn trial with 9 treatments and 3 replications.

2. Corn trial with 8 treatments and 3 replications.

C. Helped Plan Fertility Trials with 3 of the Staff.

APPENDIX D
LIST OF EXPERIMENTS PLANNED BY AREA IN THE SECOND (POSTRERA) PLANTING SEASON 1/

I. Yoro Valley (Beans)
- A. National Yield Nurseries (3)
- B. Regional Variety Trials (4)
- C. Variety Demonstration Trials (2)
- D. Selection Trials for the Variety Chingo (1)
- E. International Bean Yield Trials (4)
- F. Fertilizer Trials (3)
  1. NPK factorial (1 location).
  2. Residual in beans from NPK factorial on corn (2 locations).
- G. Insect Control Trials (6)
  1. Population dynamics of insects under three levels of technology (2 locations).
  2. Effectiveness of non-destructive sampling techniques (2 locations).
  3. Comparison of traps and baits for determining babosa populations (1 location).
  4. Comparison of foliar sprays, baits, and granular insecticeds applied at planting for babosa control (1 location).
  5. Pheromone traps (1 location x 2 pheromone types).
  6. Residual effect of insecticides applied to corn for soil insect control on bean pest problems (1 location).
- H. Weed Control Trials (6)
  1. Residual effect in beans from atrazine on corn (4 locations).
  2. Chemical Weed Control in beans (2 locations).
- I. Farm Records Maintained (30)
  1. Single sheets (20 locations).
  2. Record books (10 locations).

1/ For details see the HARP 1983B Plan of Work.

II. Cuyamel Valley

Ratoon Rice Crop

A. Fertilizer Trials (5)
   1. NPK factorial (2 locations).
   2. Variety x nitrogen split plot (1 location).
   3. Residual from NPK factorial on the primera rice crop (2 locations).

B. Insect Control
   1. Pheromone traps (1 location x 2 pheromone types).

C. Weed Control Trials (2)
   1. Comparison of chemical weed control vs. no weed control (farmer's practice) (2 locations).

D. Farm Records Maintained (6)

Corn Crop

A. Fertilizer Trials (3)
   1. Factorial 2 x 4 with N fertilization, density, weed control, and varieties (3 locations).

B. Weed Control (6)
   1. Control of Heliconia and Musa spp. (3 locations).
   2. Chemical weed control (comprobacion) (3 locations)

C. Insect Control (2)
   1. Soil Insect Corn (1 location).
   2. Chemical control of the fall armyworm (1 location).

D. Farm Records Maintained (16)
   1. Single sheets (10 locations)
   2. Record books (6 locations)

III. Guaymas/Omonita and Progreso (Corn)

A. Weed Control Trials (3)
   1. Itchgrass control with herbicides (3 locations - including one on the experiment station).

B. Farm Records Maintained (16)
   1. Single sheets (10 locations).
   2. Record books (6 locations).

IV. Masica

A. Fertilizer Trials (6)
   1. NPK factorial on corn following green manure beans (4 locations).
   2. NPK factorial on corn following corn (5 locations).
   3. NPK factorial on corn and yuca in association (2 locations).
   4. Weed control x density x nitrogen x variety factorial (1 location).
   5. Fertilizer and green manure mulch on corn (4 locations).
   6. Fertilizer on green manure bean varieties (1 location).

B. Insect Control (3)
   1. Pheromone traps (1 location x 2 pheromone types).
   2. At planting insecticide in corn for soil insect control and effects on early season foliar pests (1 location).
   3. Survey and identification of pests of ratooned rice, corn, and yuca in the postrera season.

C. Weed Control Trials (8)
   1. Chemical control of itchgrass in corn (3 locations).
   2. Chemical control of bermudagrass in corn-yuca plantings (1 location).
   3. Effect of Mucuna sp. on weed control and its comparison to other systems of weed control and crop production (1 location).
   4. Screening herbicides for itchgrass control in rice (1 location).
   5. Weed control with roundup in yuca (1 location).
   6. Control of platanillo (1 location).

D. Variety Trials
   1. Corn variety trials (3 locations).

E. Farm Records Maintained (10)
   1. Record books (10 locations).

V. CURLA

A. Weed Control Trials (3)
   1. Control of nutsedge in corn (1).
   2. Biology of itchgrass in the greenhouse (1).

B. Insect Control (2)
   1. Parasite and predator studies (1).
   2. Pheromone traps (2 types).

C. Soil Fertility Trials
   Fertilizer on corn and yuca in association.

D. Variety Trials
   1. Criollo bean variety selection.

APPENDIX E
LIST OF COMPUTER COMPONENTS RECEIVED BY CURLA

The following is a list of the computer hardware, software, and supplies received by CURLA on 27 June 1983.

	ITEM	SERIAL NUMBER
1.	IBM PC-XT System with 128KB RAM, keyboard, 360 KB DS DD Disk Drive, and 10 MEG Byte fixed Disk Drive.	0022527
2.	18-8KB RAM chips (installed in IBM PC-XT)	
3.	Monochrome/Parallel Adapter Interface Board (installed in IBM PC-XT)	
4.	Monochrome Display	0649772
5.	Epson MX-100 Matrix Printer	397439
6.	Two Parallel Printer Cables	
7.	IBM PC-XT Guide to Operations	6936810
8.	IBM BASIC (2 Copies)	6025010
9.	IBM DOS version 2.0	6024061
10.	IBM Hardware Maintenance & Service	6025072
11.	IBM Technical Reference Manual	6025005
12.	IBM VISICALC version 1.1 (2 copies)	6024004
13.	IBM Asynchronous Communications Support version 2.0	6024032
14.	Micropro Wordstar (2 copies)	
15.	Lemon AC Surge protector	
16.	IBM Inventory Control by Peachtree	6024015
17.	IBM General Ledger by Peachtree version 1.1	6024058
18.	EPSON MX Printer Manual with Graftax (2 copies)	
19.	IBM PC System 64 with 64 KB RAM, keyboard, and 320 KB DS DD Disk Drive	0319756
20.	Monochrome Display	0548614
21.	27-8K RAM Chips (installed in IBM PC System 64)	

22.	Monochrome/Parallel Adapter Interface Board (installed in IBM PC System 64)	
23.	Tandom 100-2 320KB DS DD Disk Drive (installed in IBM PC System 64)	S3319360
24.	AST MEGAPLUS Memory Expansion Board with 256KB RAM (installed in IBM PC System 64)	8256
25.	EPSON MX-100 Matrix Printer	399677
26.	IBM PC Guide to Operations	6025000
27.	IBM DOS version 1.1	6024001
28.	Lime AC Surge Protector	
29.	8 MX-100 Printer Ribbons	
30.	20 Boxes of 5 1/4" Diskettes (10 Diskettes per box)	
31.	STSC APL*PLUS Language: a. Character set ROM Chip b. STSC APL*PLUS/PC "Programmers Manual" c. STSC "APL is Easy" d. "APL An Interactive Approach"	011125
32.	IBM Fortran Complier	6024012
33.	Printer paper continuous fanfold: a. 1 box 11" x 9 1/2", 15 , 1 ply b. 1 box 14-7/8" x 11", 15 , 1 ply	

APPENDIX F
TECHNICAL ASSISTENCE WITH CURLA

I. Introduccion

Segun lo estipulado en el convenio operacional de investigacion agricola entre el PNIA y CURLA, sobre la asistencia tecnica por medio de proyectos especificos en esta oportunidad se cuenta con un grupo asesor del Consorcio de Desarrollo Internacional, convenio MNR-AID/NMSU/HARP. El tiempo estipulado para esta labor de asesoramiento se ha estimado aproximadamente en un 20% para la zona del Litoral Atlantico que incluye La Masica y el CURLA, de acuerdo a la disponiblidad de tiempo del grupo asesor.

Con el objeto de fijar un primer planteamiento de labor conjunta se realizo una reunion los dias 7 y 8 de abril del presente ano, con la participacion del grupo asesor de la Universidad Estatal de Nuevo Mexico y profesionales de las diferentes areas de especialidad afines a los del grupo asesor tanto del Ministerio de Recursos Naturales (MNR) como del CURLA. Las areas especificas son Entomologia, Control de Malezas, Fertilidad de Suelos y Economia Agricola.

Se formaron los grupos de trabajo por especialidad, a fin de establecer en primera estancia un diagnostico; y en base a la disponiblidad de recursos fijar los alineamientos y planteamientos especificos de accion inmediata y mediata.

II. Objetivos

Entre los objetivos se plantean los siguientes:

A. Asistencia tecnica al CURLA, en materia de investigacion de parte del grupo asesor de la Universidad Estatal de Nuevo Mexico, en las especialidades de Entomologia, Control de Malezas, Fertilidad de Suelos y Economia Agricola.

B. Proporcionar la participacion de egresados del CURLA (cuatro) en trabajos de investigacion con fines de tesis de grado a traves de los fondos PL-480.

C. Fortalecer la actividad docente con charlas y/o conferencias, sobre topicos especificos y afines a las especialidad del grupo asesor.

D. Organizacion e implementacion de los procedimientos de analisis quimicos en el laboratorio de suelos.

E. Organizacion e implementacion del museo y laboratorio de entomologia con participacion de especialistas en taxonomia de insectos.

F. Establecer en el Departamento de Fitotecnia un herbario de malezas para fines didacticos.

G. Capacitacion en programacion y uso de computadoras, con participacion de tecnicos especialistas.

H. Cooperacion para conseguir financiamiento para material basico de investigacion y laboratorios a traves de los fondos PL-480.

III. Acuerdos Tomados

Segun el analisis y planificacion de los grupos de trabajo por especialidad se han llegado a las siguientes consideraciones:

A. Aspectos Generales

1. Existe deficiente numero de personal tecnico en las diferentes especialidades a excepcion de suelos.
2. Escasez de materiales y equipo de laboratorio.
3. Falta de asesoramiento en otras areas de especialidad.

B. Aspectos Especificos por Especialidades

1. Entomologia
   a. Formacion del museo entomologico con participacion de 1 o 2 especialistas en taxonomia de insectos.
   b. Investigacion en: "Identificacion de los principales parasitos de Spodoptera frugiperda y Heliothis zea, en el cultivo de maiz en el CURLA cuyo proyecto sera oportunamente presentado.
   c. En un futuro se planificaran proyectos de investigacion conjunta con el MNR.
   d. Se establecera un convenio entre la seccion de Entomologia del CURLA y la Sanidad Vegetal del MNR.
2. Control de Malezas
   a. Establecimiento de un herbario de malezas para fines didacticos.
   b. Cooperar en los ensayos basicos de principales malezas a nivel de macetas.
   c. Evaluar el control de malezas con tipos y dosis de herbicidas.
   d. Ensayos con cero labranza y frijol de abono.
   e. Experimentos conjuntos con MNR a nivel de fincas.
   f. En docencia: demostraciones de trabajos y conferencias para estudiantes.
3. Fertilidad de Suelos
   a. Contacto a nivel internacional para el proyecto de investigacion de leguminosas forrajeras adaptados al tropico.
   b. Continuacion con trabajos de calibracion de metodos de analisis de suelos.
   c. Evaluacion de sistema de cultivos asociados a nivel de finca.
   d. Proyecto sobre niveles de fertilizacion con N.P.K. a nivel de estacion experimental.
   e. Implementacion de metodologia de analisis quimicos de suelos y plantas.
   f. Identificacion y clasificacion de rocas.
   g. Trabajos conjuntos con el equipo de investigacion en finca en La Masica.

4. Economia
   a. Montaje del centro de computo al llegar el equipo de computacion.
   b. Capacitacion en programacion y uso de microcomputadoras para analisis estadisticos y financieros, para el personal que estara a cargo de ella.
   c. Seminarios y charlas para estudiantes.
   d. Revision de programa y plan de estudio con participacion de un asesor tecnico.
   e. Elaboracion de programas analiticos sobre practicas de materias.
   f. Organizacion para la formacion del Departamento de Estadisticas y Computo.
   g. Participacion en analisis de costos, diagnosticos y predicciones de estudios economicos e investigacion.

IV. Recomendaciones
   A. En todo trabajo de investigacion de tipo agricola se debe tomar en consideracion los siguientes analisis:
      1. Agronomico
      2. Estadistico
      3. Economico
   B. En lo posible los trabajos de investigacion deberan ser multi-interdisciplinarios.
   C. Crear un banco de informacion cientifica con resultados de investigacion.
   D. Publicacion de resultados.
   E. Fortalecer la labor de investigacion conjunta, del convenio CURLA-PNIA tanto a nivel de estacion experimental como a nivel de finca.