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**MONITORING AND DATA COLLECTION
SYSTEM FOR THE FERTILIZER
SUB-SECTOR REFORM PROGRAM:**

STATUS REPORT

JUNE 1990

**MONITORING AND DATA COLLECTION SYSTEM FOR THE
FERTILIZER SUB-SECTOR REFORM PROGRAM**

STATUS REPORT

Submitted to:

The Technical Supervisory Committee
Government of the Republic of Cameroon

and

USAID/Cameroon

June 1990

Anthony Johnson, Agronomist
Daniel C. Moore, Soil Scientist

THE AGRICULTURAL MARKETING IMPROVEMENT STRATEGIES PROJECT
The Postharvest Institute for Perishables, University of Idaho

and

Abt Associates

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GLOSSARY

AMIS	- Agricultural Marketing Improvement Strategies Project
FSSRP	- Fertilizer Sub-Sector Reform Program
MIDENO	- North West Development Mission
UCD	- University Center at Dschang
DEAPA	- Directorate of Agro-economic Surveys and Agricultural Planning
NFRD	- National Fertilizer Response Database
TSU	- Technical Support Unit
TSC	- Technical Supervisory Committee
IFDC	- International Fertilizer Development Center
SAPD	- Sub-Activity Programming Documents
USAID	- U.S. Agency for International Development
PDRPO	- West Province Rural Development Project
CAPP	- Commercial Agricultural Production Project
MINAGRI	- Ministry of Agriculture
MINPAT	- Ministry of Plan and Regional Development
IRA	- Agronomic Research Institute

INTRODUCTION

Background

AMIS consultant Nick Minot, an information systems specialist, designed a data collection system to meet the information requirements of the FSSRP. This system is referred to as the FSSRP "Monitoring System."¹ As part of the Monitoring System, Mr. Minot proposed four activities intended to gather and interpret information relating to farm-level fertilizer use and use-efficiency issues. These activities were:

- 1) a series of baseline (farm-level) surveys on fertilizer use in Cameroon;
- 2) the exploitation of existing survey data and data collection infrastructure;
- 3) agronomic trials on crop fertilizer response; and
- 4) the collection of existing data on crop response to fertilizer in Cameroon.

An integral part of the design of the Monitoring System was that these activities should be implemented, where possible, by Cameroonian agencies with the required capabilities. This would be accomplished by the granting of contracts to appropriate agencies to perform the activities. This approach would serve the dual function of generating data required for the FSSRP, and the establishment and/or reinforcement of local capacity to perform such activities.

In pursuit of the proposed activities, AMIS consultants Jerry Johnson and Nick Minot² came to Cameroon during July/August, 1989. Regarding the farm-level surveys, Mr. Minot established contacts with Cameroonian agencies able to collect and interpret survey data, laid out methodological frameworks, and developed a survey questionnaire. These agencies were the Mission de Développement du Nord-Ouest (MIDENO), the University Centre of Dschang (UCD), and the Direction des Enquêtes Agroéconomique et de la Planification Agricole (DEAPA) of the Ministry of Agriculture. Implementation of the surveys was initially proposed for late 1989. Mr. Minot also made contact with the DEAPA, the agency responsible for the implementation of the annual national agricultural census, concerning activity #2 mentioned above.

¹"Monitoring and Data Collection System for the FSSRP," AMIS Project, May 1989.

²"Fertilizer Utilization Practices and Crop Response Research," AMIS Project, October 1989.

As for the agronomic trials, Mr. Johnson collaborated with researchers at UCD and at the Adaptive Research Unit of MIDENO to develop appropriate methodologies for fertilizer response trials. The trials were intended to be conducted during the first cropping season of 1990, beginning in March. Finally, in addressing the fertilizer response data collection activity, Mr. Johnson determined that the collection of existing fertilizer response data in Cameroon would entail a far greater effort than had originally been assumed. He therefore proposed the creation of a National Fertilizer Response Database (NFRD), broadly defining the database and outlining recommendations for proceeding on its creation.

Current Work

AMIS consultants Anthony Johnson and Daniel Moore arrived in Cameroon in mid-February, 1990. The scope of work for the consultancy included 1) following up on the 1990 Monitoring System activities, 2) appraisal and further development of the proposed NFRD, and 3) the creation of a research coordination capacity within the newly created Technical Support Unit (TSU) of the Technical Supervisory Committee (TSC) of the FSSRP. The TSU would provide ongoing technical support and coordination of FSSRP Monitoring System activities. Mr. Johnson was in Cameroon (and Lomé, Togo) for approximately four weeks during February and March. Mr. Moore was in Cameroon for approximately 17 weeks between February and June. The Scopes of Work for the consultancy are included as Annex E.

Mr. Johnson's primary tasks were as follows; 1) to define the objectives of the NFRD, 2) to contact agencies implicated in the creation of the NFRD, 3) to define and address issues related to the NFRD, 4) to conduct detailed discussions with IFDC experts on the NFRD and the possibility of collaboration between IFDC and the FSSRP, and 5) to propose a methodology for proceeding on the creation of the NFRD. Mr. Moore's tasks were as follows: 1) to finalize and set in motion the farm-level surveys, 2) to follow up on other survey-related activities, 3) to follow up on NFRD-related proposals and activities, 4) to establish a research coordination capacity within the TSU, 5) to design a general information brochure for the FSSRP, and 6) to summarize the progress and recommendations of the consultancy in a final report. A list of the persons contacted by the consultants in pursuit of these tasks is included as Annex F of this report. A list of literature consulted is included as Annex G.

This report discusses the status of each Monitoring System activity with which the consultants were involved. Discussion for each activity will include: 1) prior status of the activity, 2) progress made on the activity during the consultancy, 3) current status of the activity, and 4) future steps necessary to further and/or monitor the activity, including recommendations of the consultants. The order of discussion is as follows: 1) Fertilizer use surveys, 2) Survey-related activities, 3) Agronomic trials, 4) the NFRD, and 5) "Other" activities.

The status of 1990 activities is summarized below.

STATUS SUMMARY OF 1990 MONITORING SYSTEM ACTIVITIES

<u>ACTIVITY</u>	<u>EXECUTING ORGANIZATION</u>	<u>STATUS</u>
<u>Farm-Level Surveys</u>		
Detailed North West Province	MIDENO	to begin early June
Detailed West Province	UCD	to begin early June
General Seven-Province	DEAPA	to begin early June
<u>Existing Sources</u>		
Analyses of Census Database	DEAPA	need SAPD approvals
Modifications of Questionnaire	DEAPA	follow up needed in late 1990
<u>Agronomic Trials</u>		
North West Province	MIDENO	on hold for 1990
West Province	UCD	on hold for 1990
<u>Data Collection</u>		
Fertilizer Response Database	collaborative	preliminary mission begins 9/90

PART ONE: FERTILIZER USE SURVEYS

Three farm-level fertilizer use surveys had been envisioned for 1990. The surveys had been originally planned for late 1989, but had to be delayed due to the non-availability of funds for these activities. At the time of the arrival of the consultants, negotiations between the FSSRP and the organizations who would implement the survey activities were in varying degrees of completion. A questionnaire had also been designed for the survey, which has since undergone some modification based on comments received from various sources. This questionnaire is included as Annex B. Two of the surveys would be "detailed" provincial level surveys (North West and West Provinces) while a third, more general, survey would cover the seven provinces affected by the FSSRP.

1.1 North West Province Survey

The consultants contacted MIDENO personnel in February to discuss the status of the "North West Province Fertilizer Use Survey." Although MIDENO was unaware of the current status of the survey as they had not been contacted, they were anxious to go ahead with the project if rescheduled for 1990. Most of the research methodology and financial modalities had already been discussed between Mr. Minot and MIDENO, so that the research protocol and budgets were finalized quickly. A Sub-Activity Programming Document (SAPD) was prepared, translated, and subsequently submitted to MIDENO for approval and "letter of commitment." The SAPD was approved by the TSC and USAID by the end of May. MIDENO then forwarded an account number to the TSC for a direct transfer of the initial funds to finance the activity.

The survey activity was initially planned to begin in mid-May. However, numerous delays affecting the creation of the Monitoring Fund to finance the activity and the ultimate release of funds caused delay in the actual start of the survey activity. This delay should be considered if there is any problem on the part of MIDENO in submitting the final survey report by the date specified in the research protocol. MIDENO should be given at least the additional number of days that the initial funds were late beyond the originally scheduled completion date.

1.2 West Province Survey

The consultants contacted UCD staff in February to discuss the status of the "West Province Fertilizer Use Survey." Like MIDENO, UCD was unaware of the current status of the survey because they had not been contacted. However, they were open to the idea of conducting the survey during 1990. Unlike the case of MIDENO, the methodology and financial modalities had not been well developed, so that substantial negotiations were necessary. In addition, it had been proposed initially by Mr. Minot that UCD collaborate with the Projet de Développement Rural de la Province de l'Ouest (PDRPO) in order to access

their data collection infrastructure. The modalities of this collaboration had not yet been defined.

Several sets of meetings were held between UCD, the PDRPO, and the FSSRP consultants defining the research protocol, the nature of the collaboration between the two organizations, and the budget. Concerning the collaboration, it was decided that UCD would be responsible for the overall activity, and that the PDRPO would serve as subcontractor. A SAPD was prepared, translated, and subsequently submitted to UCD for approval and "letter of commitment." The SAPD was approved by the TSC and USAID by the end of May. UCD then forwarded an account number to the TSC for a direct transfer of the initial funds to finance the activity.

The survey activity was initially planned to begin in early-May. However, numerous delays affecting the creation of the Monitoring Fund to finance the activity and the ultimate release of funds caused delay in the actual start of the survey activity. This delay should be considered if there is any problem on the part of UCD in submitting the final survey report by the date specified in the research protocol. UCD should be given at least the additional number of days that the initial funds were late beyond the originally scheduled completion date.

1.3 Seven-Province Survey

The consultants contacted the DEAPA in February to discuss the status of the "Seven-Province Fertilizer Use Survey." DEAPA was unaware of the current status of the survey, but were open to the idea of conducting the survey during 1990. The survey methodology had not yet been fully developed, so that substantial negotiations were necessary. In addition, the budget and other financial modalities had not yet been discussed.

Several meetings took place between DEAPA and the FSSRP consultant(s) to define the research protocol and establish a budget. A SAPD was prepared, translated, subsequently submitted to DEAPA for approval and "letter of commitment." The SAPD should be approved by the TSC and USAID by the beginning of June 1990. The Caisse Autonome d'Amortissement (CAA) will then open an account for the activity on behalf of DEAPA, into which the initial part of the contract money will be deposited.

The survey activity was initially planned to begin in late June. However, numerous delays affecting the creation of the Monitoring Fund to finance the activity and the ultimate release of funds caused delay in the actual start of the survey activity. Due to the needs of the FSSRP, the final report still must be submitted by December 31, 1990.

PART TWO: SURVEY-RELATED ACTIVITIES

2.1 Modifications of the Census Questionnaire

In order to better monitor expected changes in the fertilizer sub-sector, it has been proposed to DEAPA that some modifications be made to the annual Agricultural Census questionnaire as relates to fertilizer use. A proposal was submitted to the individual at DEAPA in charge of formulating the questionnaire (Mr. René Mbappou), who suggested the modification of two questions and the addition of a third to the "standard" questionnaire used for Forms 2 and 3 of the 1984 through 1989 censuses. (No questions relating to fertilizer are asked on the Form 1 questionnaire.) A copy of this proposal is included as Annex C.

The response to the proposed modifications was positive. However, because the 1990 data collection activities will be different than in past years and given the fact that DEAPA is currently rethinking some of its methodological approaches, some follow up will need to be taken to ensure that the proposed modifications are given their due consideration. The 1990 Census will concentrate mainly on food crops. No specific questions relating to export crop production will be asked. The Form 1 (first survey round) questionnaire will be implemented around August or September 1990. This questionnaire has already been formulated. The second round of the survey (Form 2) will take place around January 1991 and will include any fertilizer use questions.

The design of the Form 2 questionnaire will take place following Form 1 data collection and "quality control," during October. At this time, the individual in charge of formulating the questionnaire should be recontacted to ensure that the proposed modifications receive proper consideration. If adopted for the Form 2 questionnaire, the same questions should carry over into the Form 3 questionnaire. Then, depending on the perceived usefulness of the changes, the questions may be incorporated into future censuses addressing both food and export crops.

Regarding the 1990 "special survey" concentrating on food crops, in addition to gathering more detailed information on trends in food-crop production, two general questions dealing with export crop production will be asked on the Form 1 questionnaire that may provide some valuable information. For growers of each export crop (Arabica, Robusta, Cacao, and Cotton) the following two questions are asked: 1) "According to you, the present profitability of growing [export crop], compared to that of food crops is: (chose one) better, the same, worse" and 2) "According to you, your next harvest of [export crop] compared to the last will be: (chose one) better, the same, worse." Data collected through these two questions may provide insight as to some of the hypothesized trends towards food crops and away from export crop production.

2.2 Further Analyses of the Census Database

In the initial design of the FSSRP Monitoring System, it was proposed by Mr. Minot that data collected through the annual agricultural census be exploited to fulfill some FSSRP informational objectives. This would be done via cross-tabulations of data contained in the census database. At the time of this consultancy, no follow-up work had yet been done regarding these proposed cross-tabulations.

Mr. Moore expanded on the Mr. Minot's idea, suggesting some additional types of tables to supplement the cross-tabulations, ultimately submitting an informal proposal to DEAPA personnel in charge of data processing. Subsequent meetings with these individuals further defined what types of additional analyses would be possible, and a SAPD was drafted for the activity by early June. It is believed by Mr. Moore that a large quantity of useful information may come from the analyses, and that is very important that the proposed activity be followed up. While DEAPA was very receptive to the idea of the analyses, as such activities are part of their envisioned mandate, their current heavy workload precluded any concrete agreements. However, a SAPD has been created for the activity and submitted and discussed with the implicated personnel. A copy of the most current research protocol and list of suggested analyses are included as Annexes D1 and D2.

Follow-up by the Technical Coordinator of the TSU to ensure that the activity is undertaken should include the following: 1) make contact with DEAPA personnel Agoum Anabel (Chief of Data Processing Section) and Jim Otto (CAPP Project Advisor-Data Management), and 2) take necessary steps to finalize agreements and timetable for carrying out the analyses (e.g. complete the SAPD). A formal request to the Minister of Agriculture to allow DEAPA to collaborate with the FSSRP has already been made. Concerning the financial support of the activity by the FSSRP, because the project proposed is part of DEAPA's work mandate, no per-table commission should be necessary as had been originally envisioned. However, the FSSRP should provide some financial support for supplies (software, disks, etc.).

PART THREE: AGRONOMIC TRIALS

Support of agronomic trials by the FSSRP as proposed in the design of the Monitoring System would serve the dual purpose of 1) generating useful data on crop fertilizer response and 2) developing a capacity within existing Cameroonian agencies for conducting on-farm fertilizer response trials responsive to changing economic and agronomic conditions. The second purpose specifically includes gaining experience in "response surface" trials and analyses such as those designed by FSSRP consultant J. Johnson in conjunction with MIDENO and UCD. Delays in the establishment of the Monitoring Fund to finance the trials meant that they had to be called off for 1990. In addition, there were some questions raised as to whether the support of such activities was a proper role for the FSSRP. The consultants notified both MIDENO and UCD that the trials had been postponed, possibly to be rescheduled for the coming year.

With the imminent creation of the NFRD, conduct of such trials may make more sense than before, for the same reasons mentioned above. In addition, some verification trials for fertilizer recommendations would be useful to test the methodologies employed in interpreting NFRD data. It is therefore recommended that the fertilizer response trials that had been planned for the 1990 cropping season (beginning March) be rescheduled and implemented for the 1991 season, by the same two organizations originally proposed.

If it is decided to proceed with the trials, it is imperative that the activities get off to an early start to allow sufficient time for procuring the necessary supplies. This means by August or September of 1990, a decision must be taken so that arrangements can be made for proceeding. The research methodology and costs for the MIDENO trials have been fairly well developed by J. Johnson.¹ On the other hand, the research methodology returned to the FSSRP by UCD involved a different approach than had been originally envisioned. It is acknowledged by both consultants that the alternate approach is viable, and because it is apparently how the UCD researchers see fit to approach the problem, there is sufficient justification for funding the research proposal. However, a reasonable budget must be negotiated.

¹"Fertilizer Utilization Practices and Crop Respons Research," AMIS Project, October 1989.

PART FOUR: NATIONAL FERTILIZER RESPONSE DATABASE

The original concept of assembling fertilizer response data for the Monitoring System developed into an idea for a technical database that has now been crystallized into a concrete proposal and action plan. Still, much of the direction and scope of the National Fertilizer Response Database (NFRD) remains to be defined during a proposed "preliminary mission" and beyond. A great amount of time was spent by the consultants in contacting institutions (MINAGRI, MINPAT, IRA, NSC, MIDENO, UCD, NCRE, IFDC, and USAID), testing assumptions, exploring possibilities, and formulating an action plan for the preliminary mission. The results of these efforts are contained in a series of attached Annexes (Annexes A1 through A5) that detail all aspects of the plan for proceeding with the NFRD, including background, assumptions, issues, recommendations, data sets, and data sources.

Those involved in following up on the recommendations presented by the consultants should bear in mind that as new information becomes available, modifications of the action plan for proceeding may be prudent. As such, the recommendations should be viewed as guidelines and not as a "recipe" for the creation of the NFRD.

PART FIVE: OTHER TASKS

Apart from the Monitoring System activities described above, two other tasks were contained within the consultants' scopes of work. These tasks were 1) the creation of a research coordination capacity within the Technical Support Unit (TSU) of the TSC, and 2) the design of an FSSRP Information Pamphlet for general distribution. Several factors limited the amount of progress that could be achieved towards these tasks; 1) specifically relating to the TSU, various delays whose end result was that as of the end of the overall consultancy, the TSU did not yet officially exist, 2) reliance on the consultants to provide general support to the overall working of the FSSRP, which meant that no time was available for design of an information pamphlet.

ANNEXES

ANNEX A1

THE NATIONAL FERTILIZER RESPONSE DATABASE: CONSULTANTS' RECOMMENDATIONS FOR PROCEEDING

Introduction

A database is a collection of different categories of information related to a common experience. The NFRD for Cameroon will consist of information collected as part of crop fertilizer response trials conducted in Cameroon. The fundamental unit of such information is the trial "data set"--the set of all available data for each fertilizer response trial. Data sets are organized within the database via a series of categories, or "fields". NFRD categories would include cropping system, soil, and climatic factors, economic factors, geographic and administrative factors, and those factors related to trial results. Annex F outlines a "site-specific" data set for use in the NFRD and also defines "non site-specific" and "minimum" data sets. These terms will be used during discussion of the NFRD in this Annex.

Due to the quantity of information involved and the complexity of its manipulation, databases are usually created and managed through computers using specialized software. A database user with specific information needs may access that information by defining its desired characteristics within the database. The computer then searches the database for all information appropriate to the user's needs and provides it in a useable form, such as a printout. Databases such as the NFRD may serve many needs. For example, a researcher may require information on intercropped maize response to phosphorus on recent volcanic soils within an altitude range of 1500-1800 meters. Or, an economist may desire a list of all cost benefit analyses done on the response of arabica coffee to nitrogenous fertilizers. Or, a distributor may wish to know the most economical and commonly recommended fertilizers for all crops over a given region. The possibilities are endless--by selecting the desired information characteristics, each user may access all appropriate information contained within the database.

NFRD objectives

Reasons for the creation of the NFRD can be summarized through an enumeration of general, use-related, and long-term use objectives:

1. Centralization of all past, present, and future crop fertilizer response data generated in Cameroon,
2. Prevention of further decentralization and loss of data,
3. Provide access to database to multipurpose users with varied objectives and information needs;

- a) provide extension services and agents with information appropriate for determining crop production strategies for given areas,
 - b) provide researchers with information useful in guiding research planning and the design of future fertilizer response trials,
 - c) provide economists with information appropriate to the assessment of the economic viability of fertilizer use,
 - d) provide planners, importers, and distributors with information useful in the forecasting supply and demand of fertilizer, and
 - e) provide farmers (via the above users) with the means of increasing the efficiency of their agricultural operations and thereby improve their overall welfare.
4. Long-term: Creation of a dynamic system of fertilizer "recommendation domains" by cropping system, soil, climate, etc., and
 5. Long-term: Monitoring of changes in fertilizer response over time to quantify changes in soil fertility and assess the need for conservation interventions.

Assumptions

There have been several assumptions made by various people involved in the design of the FSSRP Monitoring and Data Collection System with specific bearing on the NFRD. Among these assumptions was that there is not an excess of fertilizer response data available in Cameroon, and that this data could be compiled easily and rapidly into useable forms. Our present knowledge indicates the contrary. First of all, there is an abundant amount of data on crop response to fertilization in the country. In addition, it is believed that the data are viable enough to warrant collecting and assembling into a database. Crop response data has been generated in Cameroon since the late 1940's as a result of the then growing international fertilizer industry and the economic viability of fertilizer use on commercial crops in Cameroon. However, the raw data generated from this research are not centralized and must be collected by going to the regions in which they were generated.

A second assumption made relates to the range of sources from which fertilizer response data would be present and available. Because we are interested in response data for all crops for which trials have been conducted, collection of data implicates not only agronomic research structures, past and present, but also private and parastatal companies. Additionally, fertilizer response data has been generated by bilateral and multilateral development programs and

projects, and international research institutions. The consultants have compiled a master list of Cameroonian public, parastatal, and private agencies, development programs and projects, and international research organizations that may be sources of information pertinent to the NFRD. This list is presented in Annex G.

A present, Cameroon lacks the technical capacity in the creation and management of a national database such as the NFRD. Therefore, the creation and ongoing maintenance of the NFRD will require outside technical assistance and the establishment of a cooperative link between the NFRD and an agency with able to provide ongoing technical "backstopping." Early in the planning of the NFRD, it was assumed that IFDC would be able to provide the necessary support for both its creation and backstopping needs.

Issues Raised

Issues associated with the planning for and creating of the NFRD have arisen from of the interaction between assumptions made and information gathered during pursuit of the NFRD concept. Following is a brief discussion of the status of the most important issues.

Technical Backstopping. At present, there are no functioning fertilizer response databases in Africa at a national level. National research institutions in Nigeria, Niger, and Kenya have indicated the need for the creation of such databases, but have not yet located support for doing so. IFDC-Africa is currently providing limited support in Togo for regional database construction with French technical backstopping. IFDC-Africa considers the development of such databases a priority in terms of fulfilling their mandate for the African continent but at present has no donor support to create such a capacity within their own institution. This means that technical expertise and support available for the creation, management, use, and backstopping of the NFRD is limited. As such, the success of the NFRD will depend on the identification of the required expertise and backstopping capability.

Data Collection. In order that the NFRD fulfill its envisioned role, it is necessary to include within individual datasets the "raw data" generated from fertilizer response research. That is, data from the smallest experimental unit of the trial must be collected. Access to this raw data may be problematic. It is relatively easy to locate documents that report "summary data" (e.g. treatment means) and conclusions, but in general it is not standard practice to report fully the raw data in such documents. Problems in accessing raw data from previous trials are an unknown at present. Factors that influence accessibility should include: 1) time elapsed since conduction of the trial, 2) administrative status of the conducting organization, 3) continuity of international research organizations, and 4) the familiarity of members of data collection teams with previous and ongoing research.

Data Sets. Minimum and site-specific data sets must developed for use by data collection teams. These sets will be used to determine whether data should be collected, and if so, which data. An explanation of data set concepts is included in Annex F. The Action Plan section recommends that a committee be formed for further defining data sets. In addition, potential sources of non-site specific data should be identified. Non-site specific data would include economic data (fertilizer prices, harvested product value), soils information (see below), climatological information, and agronomic information including management factors and crop yield form (see below).

Crop Yield Data. Crop yield data should be based on the utilized plant parts and maturation stage at harvest. Harvest form varies by cropping season, farms, agroecological zone, and plant variety. For example, in the semi-humid forest areas is often cultivated for fresh (green) consumption and sales, whereas in the highlands maize is generally consumed and marketed as dried grain. However, researchers often convert all yields to a common form as it serves the need for extrapolation of results. This issue must be addressed for several crops in addition to maize, because fertilizer response will be partly a function of maturation stage at harvest. The suggested approach would be to enter two yield forms in different database categories; 1) yield based on utilized plant part and/or maturation stage at harvest and 2) "common" yield unit. Such an approach would allow for a greater flexibility of database use.

Soils Information. Soil resource information (e.g. soil maps) exist at varying levels of detail (scale) for the entire country, using three different soil classification systems (French/CPCS, FAO/UNESCO, and USDA "Soil Taxonomy"). For the purpose of providing information for inclusion in the database and for use in helping to define fertilizer recommendation domains, soils information must be both detailed and consistent. The issue of detailedness of information cannot be specifically addressed but rather the NFRD must rely on existing soils maps and information, both published and unpublished. However, the problem of commensurating the different classification systems can be addressed by developing strategies for interpreting and exploiting information common to the three systems.

Scope of NFRD. The creation of the NFRD was originally proposed as part of the solution to the data collection needs of the FSSRP, a project whose mandate covers the seven "southern" provinces of Cameroon. The excluded provinces, the Far North, North, and Adamaoua wholly comprise two of Cameroon's five agroecological zones (the Sudano-Sahelian and Guinea Savanna zones) and account for a large portion of national fertilizer consumption. Furthermore, a large volume of agronomic research on fertilizer response is known to have been conducted in these provinces. Considering these factors, along with its foreseen role, the NFRD should be truly "national" in scope with a mandate for covering all of Cameroon's ten provinces.

Location. Facility for the creation, management, update, use, and safekeeping of the NFRD must be considered in determining the physical and administrative structure in which the database is to be housed. This issue must be well considered before any data collection is done. Several factors must be examined in determining where the database should be located and by whom it should be managed: 1) Infrastructural capacity in computer technology and ability to maintain a clean, dry and safe environment for the necessary hardware and software; 2) Institutional capability in terms of availability of trained (or trainable) personnel to manage the database; 3) Ability and willingness to work and coordinate with other implicated institutions and individuals, including the FSSRP and USAID; 4) Professional proximity to data and data sources; 5) Interest in the data and database use; 6) Convenience of access for the envisioned users; 7) Participation in the development of the NFRD; and 8) Issues relating to the sustainability of the database after the life of the FSSRP.

Options

Viable options for proceeding towards full realization of the NFRD must address the issues discussed above. It is recommended by the consultants that a "step-by-step" approach towards creation of the database be taken so that the feasibility of the NFRD can be continuously assessed and the database can evolve as is appropriate and possible. The recommended option is largely a product of discussions held between consultant Anthony Johnson and IFDC/Lomé personnel. A summary of these discussions is included as Annex D.

Preliminary Mission

The first step towards the creation of the NFRD should be to conduct a four-week preliminary "reconnaissance" mission involving a team consisting of technical assistance from IFDC and representatives of the FSSRP, USAID, and implicated domestic organizations. The mission would be conducted to assess further the feasibility of the NFRD. Overall objectives of the mission will be: 1) to assess the quantity and quality of existing data; 2) to formulate an appropriate database design; 3) to define and address necessary training components in database management and formulation of fertilizer recommendations; and 4) to define subsequent steps to be taken in creation of the NFRD. The mission should take place between September 17 and October 12, 1990.

The preliminary mission will approach these objectives through an exercise in data collection and database construction that targets specific crops and crop associations in two of Cameroon's agroecological zones; maize and maize-based associations in the Highlands zone, and millet and sorghum and associations based on millet or sorghum in the Sudano-Sahelian zone. The two zones represent major production areas in Africa, and are different enough from one another to obtain an introduction to the types of problems

that may be encountered in the remaining agroecological zones. Furthermore, it is known that significant amounts of fertilizer response data have been generated for these crops in their respective zones. The advantage of focusing on a representative, reliable subsample of Cameroon's cropping systems and agroecological zones will be to provide a easily manageable quantity of data to work with. The mission should be focussed fully on the objectives stated (see Scope of Work, below) and not become overly involved in data collection activities. Techniques and recommendations developed through the mission could then be employed across the full range of cropping systems and agroecological zones.

Recommended Preliminary Mission Team

The following persons are recommended for participation in the overall preliminary mission. Other individuals may be requested to participate in various aspects of the mission as deemed appropriate.

1. IFDC Biometrician (Julio Henao)
2. IFDC Agricultural Economist (Jacob Teboh)
3. NSC Soil Scientist (Joseph Bindzi-Tsala, head of NSC, or another representative, e.g. Jean Kotto-Same (soils research advisor), Martin Tchienkoua, or Louis Ambassa-Kiki)
4. IRA Agronomist
5. NCRE Agronomist/Agricultural Economist (Tom Stilwell or another)
6. IRA, NSC, or MINAGRI representative (plant breeder or agronomist)
7. Technical Coordinator, TSU (John Molu)
8. Representative of USAID (AMIS Consultant)

Responsibility for coordination of the mission will be with the technical coordinator of the TSU and the AMIS consultant contracted by the FSSRP.

Contact persons for each agroecological zone will be useful for the team. This person will work with the preliminary mission in his or her zone to help identify data sources and contact current research and development workers. In the Highlands zone, George Yebit, agronomist with the Adaptive Research Unit of MIDENO, has indicated that he would make himself available. Mr. Yebit would be ideal because of his role in liaising between research and development programs in the North-West Province. Dr. S.N. Lyonga should be contacted for additional help in the West Province. Dr. Lyonga is head of the Agriculture Department and Research and Extension Coordinator at UCD. No contact person has been identified in the Sudano-Sahelian zone but the mission preparation should include contact with SODECOTON personnel, Dr. Boli (IRA head of the Maroua research station), and Dr. Henri Talleyrand (Garoua cereals agronomy section, NCRE). These sources should be able to indicate a suitable contact person in the Sudano-Sahelian zone to work with the preliminary mission.

Preliminary Mission Scope of Work

The preliminary mission has an agenda that includes both broad and specific items that lead towards the creation of the NFRD. The scope of work of the mission will consist of the following tasks:

1. Gather raw data from on-farm and on-station fertilizer response trials and demonstrations for the selected crops in the two zones, according to the minimum and site-specific data sets recommended. Based on the amount of data collected, estimates will be made to determine the required capacity the database.
2. Training of appropriate personnel (or arrangements made to this end) to assure continuity in the creation and ongoing management of the NFRD. Training components should include; 1) data collection, 2) data entry, 3) database design, management, and update, 4) analyses of available data for a specific objective (e.g. the formulation of fertilizer recommendations). Given the paucity of available expertise in the creation and management of such a database, it is important to look ahead to what will remain after the preliminary mission. The mission must produce tangible products in these training components if the database is to proceed and evolve.
3. Design of a database appropriate for Cameroon based on collected data. This should include the identification of necessary computer hardware and software. This task should be associated with task #2.
4. Formulation of fertilizer recommendations for selected crops and crop associations (maize, millet, sorghum). This task should be associated with task #2.
5. Evaluate potential problems in gaining access to remaining (non-collected) raw data. Make recommendations for solutions to overcome these problems.
6. Make final decision on site-specific and minimum data sets to be used in data collection efforts for the NFRD.
7. Identify data sources and methodologies for the incorporation of non-site specific data into the database. The following issues must be addressed; 1) determination of economic data for inclusion, 2) farm management factors that influence fertilizer response should be identified, along with methodologies of accounting for them, 3) "other" farming systems data not necessarily part of the raw data (including soils and climatological data).
8. The final product of the mission should be a "skeleton" of the NFRD. This skeleton should be functional so that subsequent

data collection missions can eventually incorporate remaining data on an national scale.

9. Information generated in addressing the issues raised and performing the enumerated tasks should be summarized in a final document. Based on what is learned from the mission, the team should make recommendations as to how to proceed with the NFRD, including the development of budgetary estimates for ongoing data collection and entry, database management, technical training requirements, and other costs associated with the NFRD.

Action Plan for Proceeding

The following is an enumeration of the steps necessary for the realization of the recommended option. The steps are divided into three periods; 1) preparation for preliminary mission, 2) preliminary mission, and 3) follow-up on the preliminary mission. The efficiency of the preliminary mission will depend to a large extent on the degree of preparation for the mission. It is therefore critical that the preparatory steps be addressed fully so that the preliminary mission team can operate in its intended capacity. The TSU should be responsible for ensuring that all preparatory steps are taken.

Preparation for the Preliminary Mission

1. Letters have been sent by the President of the TSC to the Directors of IFDC/Muscle Shoals and IFDC/Africa (Lomé) explaining the FSSRP, the NFRD, and the proposed preliminary mission. The letters requested the participation of biometrician Julio Henao and an agricultural economist (likely to be Jacob Teboh) from Muscle Shoals and Lomé, respectively. Henao has been contacted and his availability assured for the proposed mission period.
2. Based on the response to the letters to IFDC, the availability of the two proposed individuals must be confirmed. The nature of the collaboration between IFDC and FSSRP must also be defined, so that contracting and travel arrangements can be made.
3. A consultant to represent USAID and assist in the coordination of the mission should be located. It is imperative that the consultant have knowledge of fertilizer response research in Cameroon and be familiar with the agencies involved in such research, as well as the agencies that will be directly involved in the NFRD. Several AMIS consultants utilized by the FSSRP in the past should possess the required capacity.
4. Copies of this report should be sent to both implicated IFDC personnel and the USAID consultant for solicitation of comments as to the structure of the mission, its agenda, and the preparatory steps. Copies should also be made available to

mission participants as well as representatives of organizations to be contacted during the mission (IRA, NSC, NCRE, MIDENO, etc.). Some flexibility should be allowed in the design of the mission so that comments from IFDC or elsewhere can be incorporated.

5. Soils information, particularly mapping data, for the Highlands and Sudano-Sahelian agroecological zones should be assembled. The NSC library at Nkolbisson should be able to provide much of what exists, but other data may also be available elsewhere. Data collected for the unpublished soils map of the Nkambe quadrangle (most of the North-West Province) should be accessed and copies made of the data. The possibility of financing the publication of the data through the Monitoring Fund should also be explored.
6. Raw Data collected during the 1967-73 FAO "Programme Engrais" should be assembled and copied so as to be ready for the mission. This should be done for at least the two agroecological zones and crops to be covered. If there is sufficient time, this can be done for the entire amount of data collected. The FAO data may be found at the Direction d'Agriculture with Mme. Djoh. Data assembled should include: raw data sheets for each site and year, summary sheets for each area, soils data (not yet located), economic data (not yet located), and the instruction forms for implementing the trials and demonstrations issued annually and by crop (experimental design, materials, and methods).
7. A committee should be formed to review minimum and site-specific data sets. This committee will recommend to the preliminary mission the use of these data sets based on their collective knowledge of the raw data to be collected. Final decisions on these data sets will be made during the mission itself. Recommended personnel to contact for the data sets committee are: Dr. Ayuk-Takem (IRA Director), Dr. Bindzi-Tsala (NCS Director), Dr. René Kaiser (IRA Research Director), Dr. Kotto-Same (CNS Research Advisor), Dr. Poku (NCRE/TLU Agronomist), and the Technical Coordinator of the TSU.
8. A communication should be made to all IRA research facilities and development institutions in the two agroecological zones informing them of the mission and what types of data will be required (data sets), the timing of the mission, the objectives of the NFRD and the role of the preliminary mission in achieving these objectives. Annexes G1, G2, and G3 list possible sources of data. Other possible sources of data or information leading to data should also be consulted (e.g. FSSRP/Abt Assoc. October, 1989 Appendix D). A pre-mission contact tour should be made to each of these two zones by the technical coordinator of the TSU prior to the mission to verify that raw data is or will be in a central location and ready to be reviewed by the preliminary mission team. Contact person(s) in each of the two zone should

be identified to serve as liaison between the team and the sites where data may be found.

9. Arrange for use of IRA Unité Informatique facilities for the time period of the mission (See Mr. Partiot). Identify one or two individuals to participate in the training components of database management. It is recommended that Martin Tchienkoua of the NSC be one such participant.
10. The USAID representative for the preliminary mission, should arrive in-country two weeks prior to the start of the mission (by September 3rd). The consultant will work with the TSU and USAID to finalize the pre-mission arrangements, including confirmation that the preparatory steps have been taken, including travel arrangements for the preliminary mission team. The consultant will also accompany the technical coordinator of the TSU on the pre-mission contact tour to the sites for verification of the existence of data.

Preliminary Mission (September 17-October 12, 1990)

The following is a suggested timetable for four phases of the preliminary mission to address the scheme of work presented earlier. This should not be considered as a fixed schedule of events, but rather viewed as flexible so that comments from IFDC or other involved persons and agencies may be incorporated. The schedule will also be a function of the progress made towards fulfillment of the "Preparatory Steps" listed above.

Phase I: September 17-19 (three working days)

Initial meeting of all team participants for briefing on scope of work and schedule. Discussion of known data sources, planning for data collection exercise. Review of locally available data and samples (FAO data and other). Infrastructural arrangement will be verified (access to required hardware and software). Discussion of data sets by committee. Divide participants into two teams for Highlands and Sudano-Sahelian zones.

Phase II: September 20-September 29 (nine working days)

Nine days data collection in each agroecological zone. In addition to on-farm and on-station trial data, attention must be given to agroclimatic data (soils, cropping system, climatic data). The itinerary of the data collection tour will depend on the contact people and sites identified in each zone.

Phase III: October 1-9 (eight working days)

Organization of data entry, and training of participants in methods to be used in determining fertilizer recommendations from collected data. Determination of database specifications, and

creation of a database of capacity to manage projected amounts of data. Design of methodologies for collection and incorporation of non site-specific data. Fertilizer recommendations for targeted crops.

Phase IV: October 10-12 (three working days)

Determination of longer-term training needs for database creation and management. Arrangements made regarding backstopping needs. Estimation of budgetary requirements for ongoing data collection and entry, database maintenance and management, and backstopping. Presentation of results and progress achieved to the FSSRP. Report writing.

Follow-up after the Preliminary Mission

1. Infrastructural and institutional arrangements made with the biometry and computer section of IRA and the NSC for long-term maintenance of the NFRD. The nature of the coordination and collaboration must be defined.
2. Continued collection of raw data for other crops and zones. Incorporation of collected data and additional non site-specific data into database.
3. Backstopping support from Julio Henao for punctual problem solving.
4. Debugging of information: information gaps or anomalies in the database (e.g. outlier or missing data) identified and either deleted or completed based on available information.
5. Adjustments/modifications of database in response to user suggestions.
6. Organization of seminar with primary objective to demonstrate to potential users the utility of the database and how to access information through the NFRD.
7. Conduct on-farm fertilizer response trials and demonstrations (e.g. through MIDENO, UCD, or other agencies) to fill information gaps, confirm/test recommendations, and add information to the NFRD.

Other Options

The recommended option described above is a way of addressing the issues that arise when a National Fertilizer Response Database is considered for Cameroon. It is not, however, the only available option. The recommended option is not all inclusive and could foreseeably incorporate components of other options that will be discussed in this section.

IFDC-Africa has strongly noted the need for a biometrician/database specialist in their office in Lomé. It would be extremely useful to fertilizer information users in the whole region if IFDC-Africa were to get support for this addition to their personnel. The Special Programs for African Agricultural Research (SPAAR) should be contacted for possible medium term support. Lance Jepson would be the person in Abidjan to contact about this and a proposal already formulated would be useful for discussion. The creation and eventual management of the NFRD for Cameroon provides a unique training opportunity for this person while it would further supplement (with spinoff effect) the time and effort that Julio Henao invests in the NFRD.

Database management is becoming more important as computer hardware and software become accessible and the potential uses become more evident. There are no known national fertilizer response databases in Africa at this time. Conditions should be good for incorporating the research and training needs of one to several doctoral candidates in the creation of Cameroon's NFRD. If actual research costs for graduate students were considered for support by the FSSRP, these would probably not be significant additions to other costs involved in the recommended option. The research done by graduate students could be incorporated into the overall scheme of creating and managing the NFRD. Such an approach may provide a lower cost technical input and ensure a greater degree of continuity.

Capability of international institutions for national fertilizer response database management has not been explored at this point. ORSTOM and CIRAD may have developed an institutional capability of this type that could be used in the creation of the NFRD. The International Benchmark Soils Network for Agrotechnology Transfer (IBSNAT) may have some experience in database management needed for the NFRD. ICRISAT probably has a capability in database management although it may not be for fertilizer response databases. If ICRISAT was interested in working in the Sudano-Sahelian zone in Cameroon (the only agroecological zone in Cameroon which fits into their mandate) on creation of the NFRD, it may be possible to train Cameroonian scientists to continue the work in the rest of the country. TROPISOILS, based at Texas A&M, may also have this kind of capability. Even if the FSSRP decides to implement the recommended option described above, these international oriented institutions should be contacted for advice etc. before the implementation stage. The objective of this contact would be to get a firm handle on what is available out there in terms of information thus more clearly defining what should be done with limited resources in the creation of the NFRD in Cameroon.

ANNEX A2

SITE-SPECIFIC DATA SET (DRAFT) FOR THE NFRD

The site-specific data set gives an idea of the data to be gathered, if available, at the site where raw fertilizer response data is located. Site specific data does not indicate, as the name may imply, geographical, topographical, climatic and soils data relevant to the site. This latter is usually not recorded along with trial results because much of it is assumed and thus not repeated for each trial. This annex intends to outline the type of data that may be included in the raw data of a trial and which the preliminary mission should consider when members make the final decision on what should be included in the data set. Geographical, topographical, climatic and soils information will have to be recorded for each trial but will not be a part of this site-specific data set. These additional data, plus the site-specific data set, comprise the "minimum data set" to be used for the NFRD. Economic information (e.g. input, output commodity prices) and farming systems data (e.g. management factors) will also become important for users of the NFRD but will be not included in the site-specific data set because they can be collected independently of the trial data set. These are the "non site-specific" data. One of the tasks of the agricultural economists and agronomists on the preliminary mission will be to decide which non site-specific economic and farming systems information will be gathered and to develop methodologies for obtaining it.

Outline of Site-Specific Data Set

- A. Administrative factors**
1. Who conducted the trial or demonstration. What institution and which individual(s) within the institution?
 2. Was there collaboration with other institutions? If so, which ones?
 3. Year and cropping season experiment was conducted.
 4. Province, Department, Town (Village) and Research Station or Farm where experiment was conducted.
- B. Crops (and intercrops) and varieties used**
1. Crop(s) for which yield data was recorded.
 2. Varieties (cultivars) or populations of above crop(s).
 3. Were there other crops (in association) for which no yield data was recorded in same plot? If so, identify these crop species and varieties.
- C. Research or extension objectives**
1. Who was the research client?
 2. What was (were) the research objective(s)?
 3. What research hypotheses were tested in trial?
 4. What assumptions were made?

D. Methodology and design factors

1. Trial or demonstration was conducted on-station, on-farm or other.
2. Trial or demonstration was researcher, extension agent or farmer managed?
3. General and specific design used (ie. RCB in 2³ factorial layout).
4. Indicate which variables were random, fixed, independent or nested.
5. Treatment identification, number of levels and specification (where applicable) of main plots, subplots or sub-sub plots etc.
6. Number and identification of locations where trial was conducted. This must be clear especially when data was combined over more than one location and should be indicated in A.4, above.
7. Replication number at each location.
8. Were blocks used? Identification of blocks. Were replications considered as blocks (at the same location)? Were locations considered as blocks?
9. Surface area (m²) of the smallest plot for which yield data is recorded. Surface area by treatment, replicate, block and location and indicate if this is what was used in recording data.
10. How was randomization accomplished? What treatments were randomized? Which weren't randomized?

E. Management factors

1. Seedbed preparation, how was it accomplished and date(s)?
2. Sowing, transplant or cutting installation date(s) of crops listed in B.1-3, above. Specify which was used.
3. Plant spacing and plant density at sowing, germination and harvest for crop species listed in B.1 and B.3, above.
4. Weeding methods and dates.
5. Nematicides, insecticides or herbicides - application methods and dates, and doses used.
6. Harvest method(s) and date(s).
7. Damage assessment. Disease, insect, parasitic weeds, animals (wild or livestock) or lodging - identification, timing, methods used to estimate damage and % damage.

F. Yield

1. Units used to report plot yield for each crop.
2. Plant part(s), maturity stage and moisture content ie. dried grain at 10% moisture or fresh green cob weight.
3. Raw data (nonconverted, nontransformed and nonadjusted) from each plot or subplot and for each crop.
4. Conversion, transformation or adjustment factors or formulae.
5. Were observations recorded in E.7, above, used to alter yield data in any way? If so, how?

- G. Plant tissue analyses on crop(s) in experiment*
 - H. Soil laboratory analyses of plot soil samples taken either before sowing, during or right after cropping season*
- * All soil and plant tissue laboratory results should be reported in a uniform and systematic manner.

ANNEX A3

LIST OF STRUCTURES OF THE INSTITUT DE RECHERCHE AGRONOMIQUE

The structure of the Institut de Recherche Agronomique (IRA) consists of a headquarters, six "Research Centres," 16 research "Stations," and 29 research "Antennas." The headquarters are situated in Nkolbisson, which also serves as the location for three of the Research Centres. The following is a list of IRA structures and accompanying information on personnel, addresses, and telephone/telex numbers. A map is included showing the location of the structures. More information may be available through the IRA structures themselves. A map showing the location of the structures is also included.

Nkolbisson (Direction de Recherche Agronomique)

Directeur: Dr. Ayuk-Takem Jacob
Directeur Adjoint: Dr. Bakala Joseph
Address: B.P. 2123 Yaoundé
Telephone: 23.26.44/23.31.05
Telex: 1140KN, 1141KN, 1142KN, 8512KN

Maroua (Centre de Recherche Agronomique)

Chef du Centre: 29.13.26
Bureau de Domayo: 29.11.78
Bureau Djarengol: 29.11.64

Maroua (station)

Chef de Station: Dr. Boli
Address: B.P. 33 Maroua

Antennes:

Garoua (B.P. 415), Ngaoundéré, Kousséri, Guetale, Maga, Yagoua, Tchatabali, Makebi, Soucounou, Sangouere, Fignol, Tchollire, Ndock, Touboro.

Chef des Antennes: 29.12.05

Njombe (Centre de Recherche Agronomique)

Chef du Centre: M. Michel Foyet
Address: B.P. 13 Njombe

Njombe (station)

Address: B.P. 13

Antenna:

Mbouroukou.

Dschang (station)

Chef de Station: Dr. Nzietchueng
Address: B.P. 44
Telephone: 45.13.02

Antenna:

Sentchou.

Bamendi (station)

Chef de Station: M. Ngong-Massah E. (M. Nankam Claude?)
Address: B.P. 80 Bamendi

Antennes:

Babungo, Bamendi, Sante, Mbouda (B.P. 15 Bamendi; (8.51.93).

Ekona (Centre de Recherche Agronomique)

Chef du Centre: Dr. Simon Lyonga (à Dschang)
Chef du Centre: Dr. Managah Chebesi (interim)
Address: B.P. 25 Buea

Ekona (station)

Address:

Antennes: Niété, Edea, Kribi (B.P. 178; 46.11.15), Kumba (M. Songue
Nicholas; 35.41.44)

La Dibamba (station)
Chef de Station: M. Kalga Kondjo

Antenne: Mondoni

Nkolbisson (Centre de Recherche Agronomique)
Chef du Centre: Dr. Ayuk-Takem Jacob
Address: B.P. 2026 Yaoundé
Telephone: 23.26.44

Nkolbisson (station)
Address: B.P. 2026 Yaoundé
Telephone: 23.26.44

Antennes: Mbalmayo, Bertoua (B.P. 203 Bertoua; 24.16.28), Abong-Mbang,
Belabo

Foumbot (station)
Address: B.P. 665 Foumbot
Telephone: 44.14.76

Antennes: Fouban (48.21.18), Bangangte (48.42.54)

Barombi-Keng (station)
Address: B.P. 62 Kumba

Antennes: Eyumojock, Kumba.

Nkoemvone (station)
Chef de Station: M. Kaije Alexis (?)

Nkolbisson (Centre de Recherche Forestière)
Chef du Centre: Dr. Nsangou
Telephone: 23.35.82

Stations: Nkolbisson, Douala, Kumba, Herbar National (B.P. 1601 Yaoundé, 22.44.)

Nkolbisson (Centre National des Soils)
Directeur: Dr. Bindzi-Tsala Joseph
Directeur Adjoint: Dr. M.G. Kuoh Moukouri
Address: B.P. 5578 Yaoundé
Telephone: 22.33.62

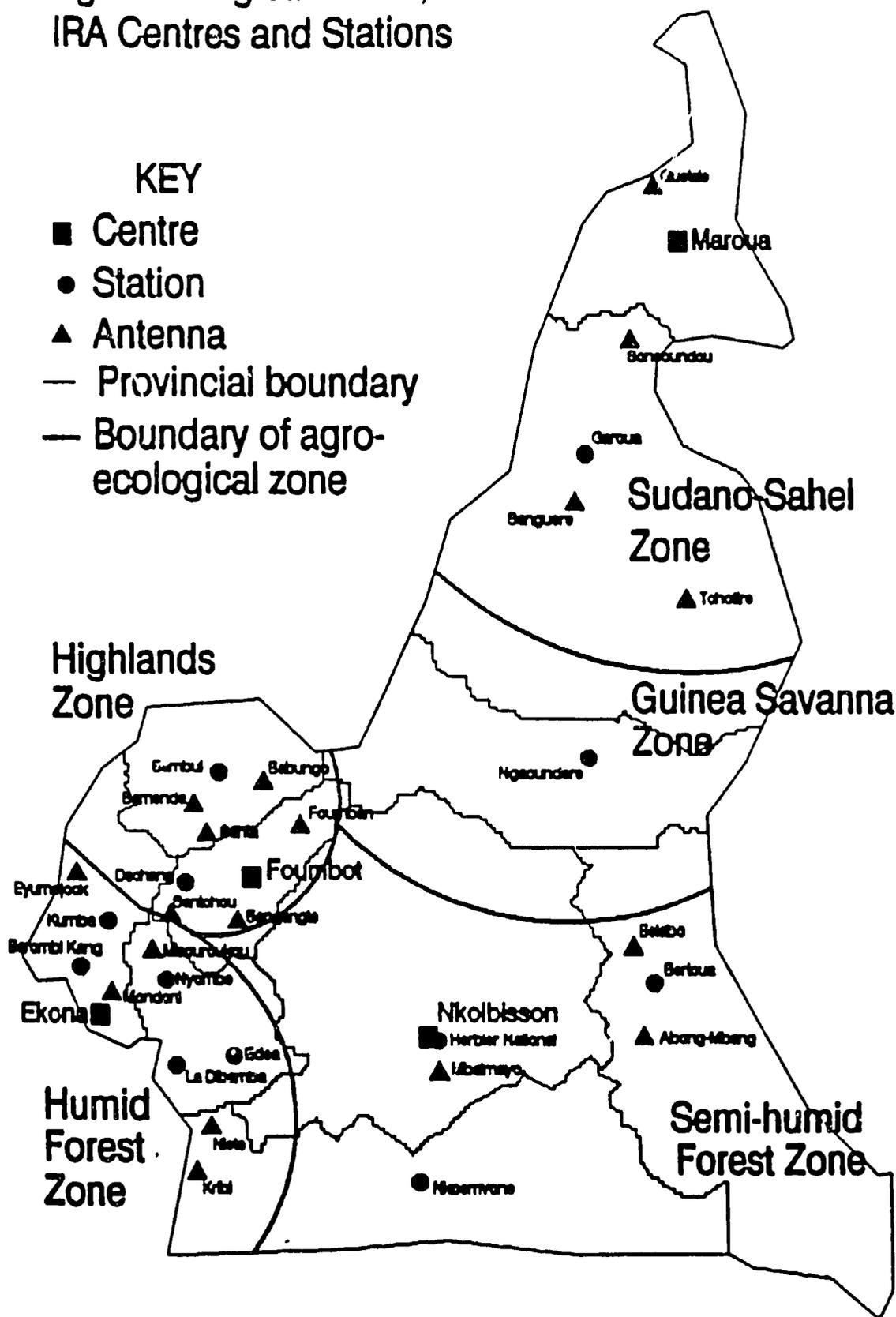
Nkolbisson (station)
Chef de Station: Dr. Bindzi-Tsala
Address: B.P. 5578 Yaoundé

Ekona (station)
Chef de Station: M. Moukam Appolinaire
Address: B.P. 51 Buea

Dachang (antenne)
Chef d'Antenne: Dr. Awah
Telephone: 45.12.82

Marcou (antenne)
Chef d'Antenne: Dr. Seiny Boukar L.

Figure : Map of Cameroon Showing Agro-Ecological Zones, and IRA Centres and Stations



ANNEX A4

RESEARCH, EXTENSION, AND DEVELOPMENT INSTITUTIONS/PROJECTS IN CAMEROON THAT MAY HAVE FERTILIZER RESPONSE DATA OR OTHER RELEVANT INFORMATION FOR THE NFRI

<u>Name of the Institution/Project</u>	<u>Activities</u>	<u>Legal Status</u>	<u>Super-Vision</u>	<u>Years</u>	<u>Address, Telephone and Telex</u>	<u>Agro-Ecol. Zone*</u>
Centre Universitaire de Dschang (CUDS)	Agricultural Ed., Research, and Extension	Parastatal	MESIRES	1977-pres.	B.P. 96/110 Dschang 45.12.67/45.11.34 7013 KN	1,3,5
Mission de Développement de la Province du Nord-Ouest (MIDENO)	Development, Research, and Extension	Parastatal	MINAGRI	1981-pres.	B.P. 442 Bamenda 36.13.78/36.13.79 5842 KN	3
Société de Développement de la Haut Vallée du Noun	Agric. Devel. of Upper Noun Valley	Development Society	MINAGRI	1970-pres.	Ndop and Mezam	3
Mission d'Etude pour l'Amenagement du Littoral (MEAL)	Development of Littoral Prov.	Parastatal	MINPAT	1972-pres.	B.P. 6102 Yaoundé B.P. 5400 Douala 23.23.13/42.52.38	4
Mission d'Etudes pour l'Amenagement de la Vallée Supérieure de la Benoué (MEAVSB)	Development of Greater Benoué Valley	Parastatal	MINPAT	1972-pres.	B.P. 11 Garoua 27.14.35 7672 KN	1
Mission de Développement d'Ombessa (MIDO)	Agric. Devel. and Extension	Parastatal	MINPAT	1973-pres.	B.P. 33 Ombessa 28.53.18/23.53.07	5
Mission de Développement Intégré des Monts Mandara (MIDIMA)	Development of Mandara Mountain area	Parastatal	MINPAT	1982-pres.	Mokolo	1
Société de Développement du Nkam (SODENKAM)	Devel. of Yabassi-Bafang area	Development Society	MINPAT	1970-pres.	B.P. 2 Nkondjock	4
Société Régionale de Développement des Zones d'Actions Prioritaires Intégrées de l'Est (ZAPI-EST)	Development of East Province	Development Society	MINPAT	1972-pres.	B.P. 132 Bartoua 24.13.35 8522 KN	5
Wum Area Development Authority (WADA)	Development of Wum area	Parastatal	MINAGRI	1973-pres.	B.P. 12 Wum 37.30.26	3
Projet de Développement Rural de la Province de l'Ouest (PDRPO)	Development and Extension	Development Society w/in Cooperative	MINAGRI	?-present	B.P. 1002 Bafoussam 44.18.45/44.14.39 7005 KN/7051 KN	3
Fonds National de Développement Rural (FONADER)	Agricultural and Rural Development	Parastatal	MINAGRI	1973-1989	B.P. 1548 Yaoundé 23.10.25/22.09.45 8365 KN	1,2,3 4,5
Mission de Développement des Semences et des Cultures Vivrières, Marachères, et Fruit. (MIDEVIV)	Seed production, Distribution, Agric. Devel.	Parastatal	MINAGRI	1973-pres.	B.P. 1682 Yaoundé 23.06.68/23.38.09	1,2,3 4,5

<u>Name of the Institution/Project</u>	<u>Activities</u>	<u>Legal Status</u>	<u>Super-Vision</u>	<u>Years</u>	<u>Telephone and Telex</u>	<u>Eco Zon</u>
Société de Développement de la Riziculture dans la Plaine de Mbo (SODERIM)	Agric. Devel. (rice)	Development Society	MINAGRI	1977-pres.	B.P. 12 Santchou 49.15.58 5344 KN	3
Société d'Expansion et Modernisation de la Riziculture de Yagoua (SEHRY)	Agric. Devel. (rice)	Development Society	MINAGRI	1971-pres.	B.P. 46 Yagoua 29.62.13 7566 KN	1
Cameroon Development Corporation (CDC)	Exploitation of large plantations	Parastatal	MINDIC MINAGRI	1966-pres.	B.P. 23 Limbe 33.22.51/5242 KN	4
Société Camerounaise de Palmeraies (SOCAPALM)	Oil Palm Devel., Processing	Development Society	MINDIC	1968-pres.	B.P. 691 Tiko 42.31.28/42.81.38 5576 KN	4
Plantations Pamol du Cameroun, Ltd.	Oil palm and Rubber plantations	Private	MINDIC	1967-pres.	B.P. 55 Limbe	4
Société de Palmeraies de la Ferme Suisse (SPFS)	Oil Palm plantation	Private	MINDIC	1976-pres.	B.P. 6 Edea-Ongue 23 Rue de l'Admiral d'Estaing 75116 Paris 30.06.84	4
Société Camerounaise d'Hevea (HEVECAM)	Promotion of Rubber	Development Society	MINAGRI	1975-pres.	B.P. 174 Kribi B.P. 1298 Douala 42.75.64/5880 KN	4
Société Africaine Forestière et Agricole du Cameroun (SAFACAM)	Forestry, Rubber and Oil palm plantations	Private	MINDIC	1962-pres.	B.P. 100 Dizingue 42.75.12	4
Organisation Camerounaise de la Banane (OCB)	Banana Marketing Advertising	Parastatal	MINDIC	1968-pres.	B.P. 221 Douala 42.31.21/42.30.93 5694 KN	4
Société des Nouvelles Plantations de Nyombe-Penja (SNPNP)	Banana plantations	Private	MINDIC	1919-pres.	B.P. 3 Nyombe	4
Mukete Plantations	Cacao, rubber, oil palm, and coffee plantations	Private	MINDIC	???	B.P. 1 Kumba 35.45.35 5242 KN	4
Société de Développement du Blé (SODEBLE)	Wheat marketing and production	Development Society	MINAGRI	1975-pres.	B.P. 41 Ngaoundere 25.11.56/7642 KN	1,2
Société de Développement du Coton (SODECOTON)	Production, Proc., Marketing of Cotton	Development Society	MINDIC	1974-pres.	B.P. 302 Garoua Immeuble SHI Y'dé 27.10.30/7617 KN	1,2
Société Camerounaise de Coton et de Compresses Bandes (CAOCAM)	Processing hydrophilic Cotton	Private	MINDIC FOGAPE	???	B.P. 343 Yaoundé	1,2
Cameroon Sugar Company (CAMSUCO)	Prod., Proc. of Cane Sugar	Private	MINDIC	1975-pres.	B.P. 1462 Mbandjock 23.39.26/8309 KN	5

<u>Name of the Institution/Project</u>	<u>Activities</u>	<u>Legal Status</u>	<u>Super-Vision</u>	<u>Years</u>	<u>Telephone and Telex</u>	<u>Ecol. Zone*</u>
Société Sucrerie du Cameroun (SOSUCAM)	Prod., Proc. of Cane Sugar	Private	MINDIC	1967-pres.	B.P. 857 Manga Eboko 22.39.26/8323 KN	5
?? Ananas Camerounaise? (ANACAM)	Pineapple	Private?	MINDIC	???	???	4,5
Société Camerounaise des Tabacs (SCT)	Prod., Proc. of Tobacco	Private	MINDIC	1964-pres.	B.P. 29 Y'dé/8567 KN 22.14.88/22.50.60	3,5
Société Agricole et de Collecte de Tabacs (SACTA)	Prod., Proc. of Tobacco	Private	MINDIC	1958-pres.	B.P. 1032 Y'dé 22.04.00/22.16.64 8212 KN	3,5
Société de Développement du Cacao	Tech. Assist. in Cacao production	Parastatal	MINAGRI	1974-pres.	B.P. 1651 Yaoundé 22.45.44/22.09.91	4,5
Union Centrale des Cooperatives Agricoles de l'Ouest (UCCAO)	Coordination of Cooperatives	Cooperative Union	MINAGRI	1958-pres.	B.P. 1002 Bafoussam 44.14.39/44.18.45 7005 KN/7051 KN	3
Société Agricole de Foubot (SAF)	Agric. Production, Extension	Private	MINAGRI	1950-pres.	B.P. 9 Foubot	3
Société Africaine de Fruits et Legume (SAFEL)	Fruit, Vegetable prod., marketing	Private	MINDIC	1976-pres.	B.P. 1184 D'la/5225 KN B.P. 688 Bafoussam 42.15.02/44.15.66	3,4
Office National de Regeneration de Forets (ONAREF)	Reforestation	Parastatal	MINAGRI	1982-pres.	B.P. 1341 Yaoundé 22.42.81/22.40.88	1,2,3 4,5
Centre National de Développement des Forets (CENADEFOR)	Forestry Devel., Extension	Parastatal	Sec'y State for AGRIC	1981-pres.	B.P. 360 Yaoundé 22.51.93 8561 KN	1,2,3 4,5

* See ANNEX for agroecological zones in Cameroon: 1=Sudano-Sahelian; 2=Guinea Savanna; 3=Highlands; 4=Humid Forest; 5=Semi-Humid Forest.

ANNEX A5

INTERNATIONAL AGRICULTURAL DEVELOPMENT INSTITUTIONS/PROJECTS IN CAMEROON THAT MAY HAVE FERTILIZER RESPONSE DATA OR OTHER RELEVANT INFORMATION FOR THE NFRD

<u>Acronym</u>	<u>Nom</u>	<u>Interets de Recherche</u>	<u>Province d'Intervention</u>	<u>Zones Agro-Ecologique*</u>
ADRAO	Amelioration et Développement du Riz en Afrique de l-Ouest	Recherche systeme et l'amelioration du riz	Extreme Nord, Nord, Adamaoua, Nord-Ouest	1,2,3
Banque Mondiale	Banque Mondiale	Développement et vulgarisation		4,5
CARE/Cameroun	CARE/Cameroun	Foresterie et agroforesterie		
CIAT	Centre International d'Agriculture Tropicale	Amelioration des haricots, recherche systemes		
CIMMYT	Centre International de Mejoramiento de Maize y Trigo	Amelioration du Mais et blé, recherche systemes		
CIP	Centro International Papas	Amelioration des pomme de terre	Ouest, Nord-Ouest, Sud-Ouest	3
CIRAD/IRAT	L'Institut de Recherche Agronomique Tropicale	Cultures vivrieres tropicales	Extreme Nord, Nord, Ouest, Nord-Ouest, Centre	1,2,3,5
CIRAD/IRCT	L'Institut de Recherche du Coton et Textiles Exotique	Cultures et industries de textiles	Extreme Nord, Nord, Adamaoua	
CIRAD/IRHO	L'Institut de Recherche pour les huiles et oleagineuse	Principalement palmier a huile	Sud-Ouest, Littoral	4
CIRAD/CTFT	Centre Technique Forestiere Tropicale	Especies, techniques, et gestion forestier		1,2,3,4,5
CRDI	Centre de Recherche pour le Développement International	Recherche systemes, tubercules, et cultures racines	Sud-Ouest, Sud, Littoral, Centre, Est	4,5
CRSP	Collaborative Research Support Program	Amelioration niebe	Extreme Nord, Nord	1
FAO	Organisation Nations Unies pour l'Alimentation et Agriculture	Pedologie et reponse des cultures aux engrais	Extreme Nord, Nord, Nord-Ouest, Ouest, Sud-Ouest, Littoral, Sud, Centre	1,3,4,5
FAVP		Reforestation	Extreme Nord	1
Gatsby	Gatsby Foundation of the United Kingdom	Tubercules	Sud-Ouest, Sud, Littoral, Sud, Ouest, Adamaoua	2,3,4,5
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit	Mechanisation, developement, et ferme d' experimentation	Nation (FONADER), Nord, Nord-Ouest	1,3

<u>Acronym</u>	<u>Nom</u>	<u>Interets de Recherche</u>	<u>Province d'intervention</u>	<u>Zones Agro-Ecologique*</u>
IBSRAM	International Board for Soil Research and Management	Pedologie et sols	Centre	5
ICRAF	International Centre for Research and Agroforestry	Agroforestire recherche et gestion		
IFAC	L'Institut Français des Agrumes Coloniaux	Cultures et industries fruitieres	Sud-Ouest, Sud, Littoral	4
IFCC	L'Institut Français sur Café et Cacao	Plantes stimulantes café, cacao, thé	Ouest, Nord-Ouest, Sud	3,5
IFDC	International Fertilizer Development Center	Engrais et reponse aux engrais	National	1,2,3,4,5
IITA/MCRE	International Institute of Tropical Agriculture/ National Cereals Research and Extension Project	Recherche systemes et cultures vivrieres (Cerealieres)	Extreme Nord, Nord Nord-Ouest, Ouest, Sud-Ouest, Centre	1,4,5
IMPHOS	Institut Mondial de Phosphore	Gisement de phosphate		
INTSORMIL	International Sorghum and Millet Program	Amelioration du Sorgho et mil et systemes culturales		
INTSOY	International Soybean Program	Amelioration de la Soja et systemes culturales		
IRRI	International Rice Research Institute	Germplasm du riz et systemes culturales	Extreme Nord, Nord, Adamaoua	1,2
Israel		Agroforestire	Extreme Nord	1
ORSTOM	Institut Français de Recherche Scientifique pour le Développement en Cooperation	Pedologie et autres etudes	National	1,2,3,4,5
ROTREP	Roots and Tuber Research and Extension Project	Cultures de racines et tubercules	Sud-Ouest	4
SAFGRAD	Semi-Arid Food Grain Research and Development	Niebe, cereales, et prevulgarisation	Extreme Nord, Nord	1
TSBF	Tropical Soil Biology and Fertility	Matiere organique et son evolution dans le sol	Centre	5
TROPSOILS	Tropical Soils Collaborative Research Support Program			

* See ANNEX for agroecological zones in Cameroon: 1=Sudano-Sahelian; 2=Guinea Savanna; 3=Highlands; 4=Humid Forest; 5=Semi-Humid Forest.

ANNEX B

FERTILIZER SUB-SECTOR REFORM PROGRAM

1990 FERTILIZER USE SURVEY

Survey Information:

Background Information. In 1987, the government of the Republic of Cameroon signed an agreement with the United States Agency for International Development (USAID) creating the Fertilizer Sub-Sector Reform Program (FSSRP). The goals of the FSSRP are as follows:

- 1) Improve importation and distribution of fertilizer;
- 2) Increase the responsiveness of fertilizer supply to demand;
- 3) Improve the effectiveness of on-farm fertilizer use; and
- 4) Create an adaptable and sustainable fertilizer sub-sector.

Survey Objectives. The purpose of the Fertilizer Use Survey is to provide information on fertilizer use at the farm-level. This will be done by gathering information from individual households throughout the province using a questionnaire. Information collected through the survey will be tabulated on a province-wide basis. Interpretation of this (and other) information will help guide planners in meeting FSSRP goals.

Confidentiality. Farming households are selected for interview at random, based on the sampling units defined by the National Directorate of the Agricultural Census within the Ministry of Agriculture. Information collected on individual survey questionnaires will be held on a strictly confidential basis, and will not be used for other than the above-stated survey objectives.

QUESTIONNAIRE

No: _____

Enumerator: _____

Date: _____

Farmer(s) name: _____

Sex: M ___ F ___

Location: _____

Household Characteristics

- 1) How many people live in your household? _____ people
- 2) How much area does your farm cover? _____ hectares
- 3) How much of that area is currently cultivated? _____

What crops did you harvest last year?
Was it for home consumption, for sale, or for both?

	Do not produce	Do produce for:		
		Home cons.	Sale	Both
4) Coffee	0		2	
5) Cacao	0		2	
6) Maize	0	1	2	3
7) Beans	0	1	2	3
8) Yams/Cocoyams/Taro	0	1	2	3
9) Irish Potatoes	0	1	2	3
10) Plantain/Bananas	0	1	2	3
11) Cassava	0	1	2	3
12) Oil Palm	0	1	2	3
13) Sugar Cane	0	1	2	3
Others (specify):				
14) _____	0	1	2	3
15) _____	0	1	2	3
16) _____	0	1	2	3

Do you keep any of the following animals?

- 17) Cattle 0-No 1-Yes
- 18) Goats/Sheep 0-No 1-Yes
- 19) Pigs 0-No 1-Yes
- 20) Fowl 0-No 1-Yes

Does your household work in any of the following professions?

- 21) Trading (buying and reselling) 0-No 1-Yes
- 22) Artisanry (tailoring, repair, etc.) 0-No 1-Yes
- 23) Agricultural wage-labor 0-No 1-Yes
- 24) Other wage-labor 0-No 1-Yes
- 25) Other (specify) _____

Do you own any of the following items?

- 26) Radio 0-No 1-Yes
- 27) Bicycle 0-No 1-Yes
- 28) Motorcycle 0-No 1-Yes

How many years of schooling do you have?

29) Husband _____ years

30) Wife _____ years

31) Are you a member of a coffee cooperative? 0-No 1-Yes

Coffee Production

32) Did you harvest coffee last year? 0-No 1-Yes
(if No, skip to Maize Production; if Yes, continue)

33) What kind of coffee trees do you have?

1-Arabica

2-Robusta

3-Both

34) How many trees do you have? _____ trees

35) What is the distance between trees? _____ meters

36) What is the distance between rows? _____ meters

37) Did you intercrop other crops with the coffee? 0-No 1-Yes
(if No, skip next question)

Which crops did you intercrop with the coffee? (check those that apply)

38) Maize 0-No 1-Yes

39) Beans 0-No 1-Yes

40) Plantains/Bananas 0-No 1-Yes

41) Irish Potatoes 0-No 1-Yes

42) Yams/Cocoyams/Taro 0-No 1-Yes

43) Other (specify) _____

44) Other _____

45) How many sacks did you harvest last year? _____ sacks

46) Who did you sell the coffee to/

1-Cooperative

2-Coffee Processor

3-Merchant

4-Other (specify) _____

47) What month did you deliver the coffee harvest? _____

48) When did you receive the first payment for the coffee?

1-Immediately

2-Within one week of delivery

3-Between one and four weeks

4-Between one and three months

5-Longer than three months

6-Not yet

For each type of fertilizer, answer the following questions:

	Ammonium sulfate	Urea	20-10-10	10-30-10	12-06-20	
How many bags did you use?	75	76	77	78	79	80
What was the price per bag?	81	82	83	84	85	86
What month did you buy it?	87	88	89	90	91	92
What month did you apply it?	93	94	95	96	97	98

On which crop(s) did you use fertilizer? (mark with an "X")

	Ammonium sulfate	Urea	20-10-10	10-30-10	12-06-20	
Arabica	99	100	101	102	103	104
Robusta	105	106	107	108	109	110
Maize	111	112	113	114	115	116
Irish Potatoes	117	118	119	120	121	122
Other _____	123	124	125	126	127	128
Other _____	129	130	131	132	133	134

How did you put fertilizer on the fields? (check those that apply)

- 135) Scattered 0-No 1-Yes
- 136) Along line 0-No 1-Yes
- 137) Around each plant 0-No 1-Yes
- 138) Between plants 0-No 1-Yes

139) Was the fertilizer mixed into the soil? 0-No 1-Yes

- 140) Where did you buy your fertilizer?
 1-Through a cooperative
 2-From a merchant
 3-From a project
 4-From another farmer
 5-Other (specify) _____
 6-More than one source
- 141) How did you buy the fertilizer?
 1-In cash
 2-On credit
 3-Part cash, part credit
- 142) Were you allowed to buy as much fertilizer
 as you wanted at the going price? 0-No 1-Yes
 (if Yes, skip next question)
- 143) If not, why not?
 1-Limitation on the quantity of fertilizer available
 2-Limitation based on amount of coffee sold
 3-Limitation of the amount of credit available
- 144) Was the fertilizer available on time? 0-No 1-Yes
 (if Yes, skip next question)
- 145) If not, what month would you like it available? _____
- 146) Were the types of fertilizers
 you wanted to buy available? 0-No 1-Yes
 (if Yes, skip next question)
- 147) If not, what types of fertilizer did you want but were not
 available?
 1-Ammonium sulfate
 2-Urea
 3-NPK 20-10-10
 4-NPK 10-30-10
 5-Other (specify) _____
 6-Other (specify) _____
- 148) Was the quality of the fertilizer good? 0-No 1-Yes
 (if Yes, skip next question)
- 149) If not, what was the problem?
 1-Bags were ripped
 2-Fertilizer was clumped together
 3-Other (specify) _____

Recent Fertilizer User

150) Do you use more or less fertilizer than you used before 1989?

- 1-More
- 2-Less
- 3-About the same

(if More, continue to next question; if Less, skip next question; if About the same, skip to question #166)

Why have you increased fertilizer use since 1989? (check those that apply)

- | | | |
|--------------------------------------|------|-------|
| 151) Increased personal buying power | 0-No | 1-Yes |
| 152) More credit available | 0-No | 1-Yes |
| 153) Wish to further increase yields | 0-No | 1-Yes |
| 154) Crop prices higher | 0-No | 1-Yes |
| 155) Fertilizer easier to obtain | 0-No | 1-Yes |
| 156) Fertilizer prices lower | 0-No | 1-Yes |
| 157) Other (specify)_____ | | |
- (skip to question #166)

Why have you decreased fertilizer use since 1989 (check those that apply)

- | | | |
|---|------|-------|
| 158) Decreased personal buying power | 0-No | 1-Yes |
| 159) Less credit available | 0-No | 1-Yes |
| 160) Found that it does not increase yields | 0-No | 1-Yes |
| 161) Crop prices lower | 0-No | 1-Yes |
| 162) Payment for crop not certain | 0-No | 1-Yes |
| 163) Fertilizer more difficult to obtain | 0-No | 1-Yes |
| 164) Fertilizer prices higher | 0-No | 1-Yes |
| 165) Other (specify)_____ | | |

166) What do you think about fertilizer distribution now compared to before 1989?

- 1-Much better now
- 2-Somewhat better now
- 3-About the same as before
- 4-Somewhat worse now
- 5-Much worse now

In what way has fertilizer distribution gotten better? (check those that apply)

- | | | |
|--|------|-------|
| 167) You are allowed to buy more fertilizer now | 0-No | 1-Yes |
| 168) The fertilizer arrives more on time now | 0-No | 1-Yes |
| 169) More types of fertilizer are available now | 0-No | 1-Yes |
| 170) The fertilizer is less expensive now | 0-No | 1-Yes |
| 171) The quality of the fertilizer is better now | 0-No | 1-Yes |
| 172) Credit for fertilizer is more available now | 0-No | 1-Yes |
| 173) Fertilizer is now sold closer to your farm | 0-No | 1-Yes |
| 174) Other_____ | | |
| 175) It has not gotten better in any way | 0-No | 1-Yes |

In what way has fertilizer distribution gotten worse? (check those that apply)

- | | | |
|---|------|-------|
| 176) You are not allowed to buy as much as before | 0-No | 1-Yes |
| 177) The fertilizer arrives later than it used to | 0-No | 1-Yes |
| 178) Fewer types of fertilizer are available now | 0-No | 1-Yes |
| 179) The fertilizer is more expensive now | 0-No | 1-Yes |
| 180) Credit for fertilizer is less available now | 0-No | 1-Yes |
| 181) The quality of the fertilizer is worse now | 0-No | 1-Yes |
| 182) You must now go further to buy fertilizer | 0-No | 1-Yes |
| 183) Other _____ | | |
| 184) It has not gotten worse in any way | 0-No | 1-Yes |

Non-User of Chemical Fertilizer

How do you maintain adequate crop yields on your farm without chemical fertilizer? (check those that apply)

- | | | |
|--|------|-------|
| 185) You allow periods of fallow (let land rest) | 0-No | 1-Yes |
| 186) You apply manure (or compost) | 0-No | 1-Yes |
| 187) You use crop residues | 0-No | 1-Yes |
| 188) You rotate crops | 0-No | 1-Yes |
| 189) You use improved varieties | 0-No | 1-Yes |
| 190) Soils are good, no fertilizer is necessary | 0-No | 1-Yes |
| 191) Other (specify) _____ | 0-No | 1-Yes |

- 192) Do you believe fertilizer will increase yields on your farm? (if Yes, skip next question)
- | | | |
|--|------|-------|
| | 0-No | 1-Yes |
|--|------|-------|

- 193) If fertilizer does not increase yields, why not?
- 1-Fertilizer has little effect due to good soils
 - 2-Fertilizer has little effect due to poor soils
 - 3-Crops/varieties grown do not respond to fertilizer
 - 4-Other (specify) _____
- (skip to question #197)

- 194) Do you believe fertilizer is worth the cost and risk? (If Yes, skip next question)
- | | | |
|--|------|-------|
| | 0-No | 1-Yes |
|--|------|-------|

- 195) If it is not worth it, why not? (check those that apply)
- 1-Crop prices are too low
 - 2-Payment for crop is not certain
 - 3-Fertilizer price is too high
 - 4-Risk of crop failure is too high
 - 5-Possible damage to crops
 - 6-Possible damage to soil/land
 - 7-Other (specify) _____
- (skip to question #197)

- 196) If fertilizer increases yield and is worth the risk, then why do you not buy fertilizer?
 1-No money
 2-Can not buy on credit
 3-Can buy on credit, but do not want to borrow
 4-Fertilizer arrives too late to use
 5-Fertilizer is not sold nearby
 6-Correct type of fertilizer is not available
 7-Other (specify) _____
 (if answer is "lack of resources," give choice of first three)
- 197) Do you know where you can buy fertilizer? 0-No 1-Yes
 (if No, skip to Fertilizer Knowledge)
- 198) If so, how far away is it? _____ kilometers

Fertilizer Knowledge

- 199) What is the most important source of information on the correct use of fertilizer?
 1-Cooperative
 2-Extension agent
 3-Other farmers
 4-Merchant
 5-Radio
 6-Own experience with fertilizer
 7-Other (specify) _____
 8-No sources of information are available
- 200) Have you been visited by an extension agent in the last 12 months? 0-No 1-Yes
 (if No, skip next question)
- 201) If so, how many times? _____ times in 12 months
- 202) Which fertilizer contains the most nitrogen?
 1-Ammonium sulfate
 2-Urea
 3-NPK 20-10-10
 4-NPK 10-30-10
 5-No difference
 6-Do not know
- 203) Which fertilizer works better if it is covered by soil?
 1-Ammonium sulfate
 2-Urea
 3-NPK 20-10-10
 4-NPK 10-30-10
 5-They should all be covered
 6-Do not know

- 204) Which fertilizer can make the soil most acidic?
 1-Ammonium sulfate
 2-Urea
 3-NPK 20-10-10
 4-NPK 10-30-10
 5-Do not know
- 205) Do you believe that land/crops can become dependent on chemical fertilizers after a few years of fertilizer use, so that if you stop using fertilizer, crop yields will go way down?
 0-No 1-Yes
- 206) Do you use any agricultural chemicals to kill weeds, insects, or diseases? 0-No 1-Yes
 (if No, skip to Pesticide/Herbicide Non-User, if Yes, continue)

Pesticide/Herbicide User

What kinds of chemicals do you use?

- 207) Chemicals to kill insects and other pests 0-No 1-Yes
 208) Chemicals to kill weeds 0-No 1-Yes
- 209) Do you know the name(s) of the chemicals? 0-No 1-Yes
 (if No, skip next question)

What are the names of the chemicals?

- 210) _____
 211) _____

Are there any problems in getting these chemicals? (check those that apply)

- 212) Not enough is available for sale 0-No 1-Yes
 213) The chemicals arrive late 0-No 1-Yes
 214) Sometimes the chemicals are not available 0-No 1-Yes
 215) Chemical you need is not now available 0-No 1-Yes
 216) There is no credit available 0-No 1-Yes
 217) The chemicals are sold too far away 0-No 1-Yes
 218) Other (specify) _____ 0-No 1-Yes

END OF SURVEY

Pesticide/Herbicide Non-User

Why do you not use these products? (check those that apply)

- 219) The crops you grow do not need them 0-No 1-Yes
 220) They are not worth the cost 0-No 1-Yes
 221) They arrive too late to use 0-No 1-Yes
 222) They are rarely or never available 0-No 1-Yes
 223) There is no credit available for them 0-No 1-Yes
 224) They are sold too far away 0-No 1-Yes
 225) Other (specify) _____ 0-No 1-Yes

END OF SURVEY

ANNEX C

PROPOSED MODIFICATIONS OF AGRICULTURAL CENSUS QUESTIONNAIRE

Background:

Until 1987, approximately 60% of the fertilizer used in Cameroon was imported by FONADER and sold at subsidized prices to coffee growers. The price was uniform throughout the country and for all types of fertilizer imported. In 1988, the government of Cameroon with the support of USAID launched the Fertilizer Sub-Sector Reform Program (FSSRP). The objectives of this program are to privatize the distribution of fertilizer and to progressively reduce and eventually eliminate the subsidy. Given these changes in the fertilizer sub-sector, it is important to monitor more closely the distribution and use of fertilizer. With this objective in mind, the FSSRP would like to propose some minor modifications of the survey questionnaire. This includes modification of two questions and the addition of one question.

NOTE: These modifications were proposed initially by USAID consultant Nick Minot, an Information Systems Specialist, and submitted to the Director of Statistics and MINAGRI/DEAPA. Mr. Minot reported that there was a "favorable response" to the initial submission of these proposed modifications, no final decisions were reached. Given the recent changes at DEAPA in survey methodology, including the current revision of the 1990 questionnaire, the original proposal has been updated and resubmitted for consideration.

Question Modification #1:

Given the liberalization of fertilizer prices, it would be useful to know the prices paid for various fertilizers. In addition, it would be useful to change the list of the types of fertilizer to better reflect the most frequently purchased types.

Original version:

What quantities of chemical fertilizer did you use this year (indicate the type)?

	Quantity
a. Ammonium sulfate	_____ bags
b. Urea	_____ bags
c. Composite fertilizers	_____ bags
d. Others	_____ bags

Proposed version:

What quantities of chemical fertilizer did you use this year and at what price did you purchase them (indicate by type)?

	Quantity		Price	
a. NPK 20-10-10	_____	bags	_____	FCFA/bag
b. NPK 12-06-20	_____	bags	_____	FCFA/bag
c. Urea	_____	bags	_____	FCFA/bag
d. Ammonium sulfate	_____	bags	_____	FCFA/bag
e. Other	_____	bags	_____	FCFA/bag

Question Modification #2:

In order to better understand demand for chemical fertilizers, it would be helpful to separate manure from chemical fertilizer use among crops fertilized. It may also be advisable to break chemical fertilizer broken down into individual types (NPK 20-10-10, NPK 12-06-20, Urea, Ammonium sulfate, and Others).

Original version:

On which crops did you use fertilizer?

List:

Proposed version:

On which crops did you use fertilizer (indicate fertilizer type(s))?

List:	Manure	Chemical	Both
_____	0	1	2
_____	0	1	2
_____	0	1	2
_____	0	1	2

Question Addition:

With the privatization of fertilizer marketing, a diversification of the channels of distribution is expected. It would be useful to identify such channels of distribution for the rural areas.

New question:

Where did you purchase your fertilizer this year?

- a. Cooperative
- b. Store
- c. Market
- d. Other _____

ANNEX D1

RESEARCH PROTOCOL FOR FURTHER ANALYSES OF CENSUS DATABASE

Summary Information

Name of survey: Further Analyses of Census Database

Contracting institution: Fertilizer Sub-Sector Reform Program

Contracted institution: Direction des Enquêtes Agro-Economique
et de la Planification Agricole (DEAPA)
Ministry of Agriculture

Principal Investigator: Jim Otto

Title/position: Technical Advisor, CAPP Project
MINAGRI/DEAPA

Other Investigators: Agoum Anabel
Takou Pierre

Background

The Agricultural Census provides a large amount of data on the patterns of fertilizer use in Cameroon and its ten provinces. However, the possible analyses of the Census database concerning fertilizer use have not been exhausted--there is still valuable information to be gained through further analyses. Appropriately selected analyses may be useful in meeting some of the FSSRP's information needs regarding farm-level fertilizer use. The FSSRP will commission additional analyses of the Census database, for the years 1984-1989. These additional analyses will result in the production of three types of "supplementary tables."

Supplementary Tables

- 1) tables produced through disaggregation of existing provincial-level fertilizer-use tables to the divisional level,
- 2) two-variable tables to be produced through cross-tabulations (at the national level), and
- 3) tables as mentioned under 1) and 2) with data grouped according to "agroecological zones" (as opposed to administrative divisions).

A complete listing and description of the tables to be produced is included as Annex C.

Timetable (yet to be determined)

Reporting Requirements

The TSU and USAID will periodically review of the tables as they are produced. This review should be part of an ongoing dialogue between the FSSRP and DEAPA to ensure that the activity is meeting its stated objectives.

The final reporting requirement to the FSSRP will be a final document delivered to the TSU, with a copy for USAID. The document will consist of a title page, an index to the tables, and the tables themselves. All tables should be presented in a form similar to that used for the 1984 Agricultural Census publication, including title and footnotes as appropriate. Some information on sample size should be included as relates to the statistical reliability of the tables. There will be no qualitative interpretation of the table.

ANNEX D2

TABLES TO BE PRODUCED THROUGH FURTHER ANALYSES

The following is a list a list of tables suggested by the FSSRP for production through further analyses of the agricultural census database. These tables should be viewed as representing the information needs of the FSSRP as opposed to an enumeration of tasks to be performed for the activity. It may not be appropriate nor possible to produce all of the suggested tables. It may however be possible to produce useful tables other than those that have been suggested. As such, the direction and final product of this activity should be flexible, and defined over the period of implementation of the activity through dialogue between the FSSRP and DEAPA. This Annex summarizes and enumerates the initial ideas on the direction and final products of the activity.

Divisional-Level Analyses

Divisional-level data are desired to provide greater resolution of the existing information on fertilizer use. In addition, the separation of data into smaller sets will make subsequent analyses using different groupings more accessible.

The following is a list of tables to be produced by further breaking down the level at which data are summarized. Provincial totals should be given along with their representative divisional results. There are five types of tables, one each for six years ('84 through '89), and a six-year aggregate, giving a total of 35 tables.

List of Tables:

1. Total crop farms and farms using fertilizer (number and proportion) by kind of fertilizer (manure, chemical, both), season (Form 2, Form 3, and total) and division, for '84 through '89 plus six-year aggregate.
2. Farms using fertilizer (manure or chemical) by crops fertilized (cocoa, coffee, cotton, rice, tobacco, foodcrops), season (Form 2, Form 3, and total) and division, for '84 through '89 plus six-year aggregate.
3. Total crop farms and farms using chemical fertilizer (number and proportion) by type of chemical fertilizer (ammonium sulfate/urea, compound, other), season (Form 2, Form 3, and total) and division, for '84 through '89 plus six-year aggregate.
4. Farms using chemical fertilizer, total quantities of chemical fertilizer used by type (ammonium sulfate/urea, compound, other) and average quantity used per farm (using, total), season (Form 2, Form 3, and total) and division, for '84 through '89 plus six-year aggregate.
5. Farms with crops, cocoa farms, arabica farms, robusta farms, cotton farms, farms with foodcrops (and

proportions for all) and division, for '84 through '89 plus six-year aggregate.

Cross-Tabulations

Cross-tabulations are intended to provide information by illustrating relationships between two or more variables. Cross-tabulation should be possible through manipulation of the Census database. Ranges of the categories should be defined based on the distributions observed. The list below are tables to be produced through cross-tabulation. These tables will show data at the provincial level only, with national totals given as well. Tables #1-3 and #13 are to be produced for the six-year aggregate only. The remaining nine tables are to be produced for each of the five years ('84 through '89) plus for the six-year aggregate. This gives a total of 67 tables.

List of Tables:

Farm Operator Characteristics:

1. Percentage of farms using chemical fertilizer by sex of farm operator, for six-year aggregate sample.
2. Percentage of farms using chemical fertilizer by age of farm operator, for six-year aggregate sample.
3. Percentage of farms using chemical fertilizer by education of farm operator, for six-year aggregate sample.

Farm Characteristics:

4. Percentage of farms using chemical fertilizer by farm size (total area planted and average per farm area for export, food, and total crops), for '84 through '89 plus six-year aggregate.
5. Percentage of farms using chemical fertilizer by value of agricultural sales (export, food, and total), for '84 through '89 plus six-year aggregate.
6. Average quantity of chemical fertilizer used (kg) by farm size (total area planted and average per farm area for all crops), for '84 through '89 plus six-year aggregate.
7. Average quantity of chemical fertilizer used (kg) by farm size (total area planted and average per farm area for export crops), for '84 through '89 plus six-year aggregate.

8. Average quantity of chemical fertilizer used (kg) by farm size (total area planted and average per farm area for food crops), for '84 through '89 plus six-year aggregate.
9. Quantity of chemical fertilizer used by value of total agricultural sales, for '84 through '89 plus six-year aggregate.
10. Quantity of chemical fertilizer used by value of export crop sales, for '84 through '89 plus six-year aggregate.
11. Quantity of chemical fertilizer used by value of food crop sales, for '84 through '89 plus six-year aggregate.

Coffee Production

12. Quantity of fertilizer used and the percentage of farms using it among farmers using fertilizer only on coffee (arabica, robusta), for '84 through '89 plus six-year aggregate.
13. Coffee yield by quantity of fertilizer applied per hectare of coffee (arabica, robusta) among farmers using fertilizer only on coffee, for six-year aggregate sample.

Agroecological Framework

Analyses of Census data beyond the national level have thus far been based (for good reason) on administrative boundaries (provinces and divisions). Unfortunately, such divisions are somewhat arbitrary with respect to the distribution of Cameroon's major agricultural production zones. Analyses based on such divisions may be of limited usefulness to those who desire information focused with an agricultural perspective. For programs such as the FSSRP, an agriculturally-based framework for analysis may provide more appropriate information. Numerous types of such groupings are possible. The FSSRP proposes to try one such grouping, with the idea that if it is useful, additional groupings may be employed, depending on information objectives.

It is suggested that certain data be regrouped using the framework of five "agroecological zones" defined for Cameroon. In theory, these zones more effectively group broad areas of similar agricultural practices. Boundaries of these zones may be approximated using provincial and divisional administrative lines. It is also possible to further subdivide divisions using "segments," although substantially more effort would be involved.

For the purposes of this exercise, administrative boundaries will be employed. The five agroecological zones and their administrative components (provinces and divisions) are given below.

Sudano-Sahelian Zone:

Far North Province (all divisions)
North Province (all divisions)

Guinea Savanna Zone:

Adamaoua Province (all divisions)

Highlands Zone:

West Province (all divisions)
North-West Province (all divisions)

Semi-humid Forest Zone:

Centre Province (Mbam, Haute Sanaga, Nyong et Mfoumou,
Mefou, Nyong et Soo Divisions)
East Province (all divisions)
South Province (Ntem, Dja-et-Lobo Divisions)

Humid Forest Zone:

South-West Province (all divisions)
Littoral Province (all divisions)
South Province (Ocean Division)
Centre Province (Lekie Division)

Analyses performed using the agroecological zone framework will be for the production of tables #1-5 listed under Divisional-Level Analyses as well as for tables #4, 5, 6, and 9 listed under Cross-Tabulations. These tables will be produced for the six-year aggregate sample only, giving a total of nine tables.

ANNEX B

SCOPE OF WORK: CONTINUATION OF SUPPORT TO ONGOING INFORMATION GENERATION AND MONITORING FERTILIZER SUB-SECTOR REFORM PROGRAM

Background

The scope of work for "Support to Ongoing Information Generation and Monitoring" (PIO/T 631-0510-3-90016) contained three phases. The second phase, "Research Design" called for "working with identified collaborating projects or organizations on developing and finalizing the research designs for the surveys and agronomic trials" planned for 1989/90. This work was undertaken by two AMIS Project consultants during a TDY in July and August 1989. The two consultants made significant progress toward achieving the specified objectives, but, through no fault of their own, were unable to complete the specified activities.

The principal obstacle the consultants faced was that at the time of their mission, USAID and the GRC had not signed the documents necessary to use program funds in the Special Local Currency Account to finance monitoring activities. As a result, it was not possible to formalize the research designs, budgets, and timetables the two consultants negotiated.

In the time since the consultants left, the necessary documents identifying uses of program funds have been signed. Moreover, establishment of the GRC's Technical Support Unit (TSU) is imminent. Therefore, the time is ripe for completing the work necessary for establishing the monitoring network and permitting the collaborating organizations to carry out their tasks.

Activities to Be Performed

The AMIS Project will provide a team of two monitoring system consultants in early February 1990. The senior member of the team will be in-country for three weeks, with the other member remaining for another eight weeks or until the work is completed, whichever comes first. The team has two major responsibilities. The first is to establish a research coordination capacity within the FSSRP's Technical Support Unit. The second is to complete the work started in the previous consultancy by finalizing the arrangements for 1990 monitoring activities with those institutions participating in the FSSRP monitoring network.

Establish a Research Coordination Capacity Within the TSU

Under the terms of the amended FSSRP project description, the Ministry of Agriculture is to provide a suitable individual to serve as research coordinator within the FSSRP's Technical Support Unit. This research coordinator is charged with monitoring the implementation of the studies and surveys commissioned by the FSSRP and liaising with agricultural research organizations on issues related to fertilizer response and soil fertility. Once the research coordinator has been selected, the consulting team, along with USAID as necessary, will:

1. Thoroughly brief the research coordinator on the design of the FSSRP monitoring system and the organizations to be involved in implementation,
2. Accompany the research coordinator on an initial contact tour to the sites of the collaborating organizations,
3. Assist the research coordinator to prepare a year-long work program, which includes oversight of the activities envisioned for 1990 under the FSSRP monitoring system.

Finalize 1990 Monitoring Activities

The consulting team and research coordinator will work together to finalize the following 1990 FSSRP monitoring activities:

Annual National Survey. The consulting team will discuss with the Direction of Surveys (DS) in MINAGRI how best to incorporate more detailed questions on fertilizer use into the annual national agricultural survey. To the extent that new questions are needed, the consulting team will prepare draft questions and submit them to MINAGRI/DS.

Other Surveys. The consulting team will prepare complete Sub-Activity Programming Documents (SAPD) for the following surveys: (1) the seven province survey to be undertaken by MINAGRI/DS, (2) the North West Province detailed survey to be conducted by MIDENO/PEM, and (3) the West Province detailed survey to be conducted by UCD/Dept. of Rural Economics with possible collaboration with UCCAO/PDPRO. Each SAPD will contain, as annexes: a budget and timetable, the survey instrument and research protocol, and a signed letter committing the organization to performing the work.

In the case of the two detailed surveys, the survey instrument will need to be modified slightly to take into consideration recent comments.

National Fertilizer Response Data Base. The consulting team will follow-up on the proposal to establish, with the assistance of IFDC/Africa, a national fertilizer response data base within the National Soils Research Center. The first step is to arrange a formal GRC invitation to IFDC/Africa to send a representative to Cameroon for discussions and preparation of a work program. Subsequent steps, including consultation with IFDC in Lome, will be taken as appropriate and with the agreement of USAID/Cameroon.

Liaison with IRA/NCRE on Fertilizer Response Research. The consulting team will follow-up on discussion with IRA and NCRE about better incorporating fertilizer response into the ongoing research program.

Qualifications of the Consultants

The consultants should both have an M.S. or higher degree in agronomy, soil science, agricultural economics or a related degree. Between the two, they should have previous experience in survey design and computerized analysis of survey data and experience in the design, implementation, and analysis of agronomic trials in Africa. Both consultants must have a working knowledge of French and previous work experience in Africa. The senior team member should have at least three years of relevant African work experience.

Given the length of the consultancy, hiring the junior member of the team locally should be considered -- assuming a suitable candidate can be found.

AMENDMENT TO: CONTINUATION OF SUPPORT TO ONGOING INFORMATION GENERATION AND MONITORING FERTILIZER SUB-SECTOR REFORM PROGRAM SCOPE OF WORK

Background

The scope of work for "Continuation of Support to Ongoing Information Generation and Monitoring" (PIO/T 631-0063-3-70113) contained two primary tasks. The first was to establish a research coordination capacity within the Technical Support Unit (TSU) of the Technical Supervisory Committee (TSC), and the second was to finalize the 1990 Monitoring Activities. This work was undertaken by two AMIS project consultants during a TDY which began in early February 1990 and is scheduled to end on April 19. The two consultants made significant progress towards the defined objectives, but through no fault of their own were unable to complete all specified activities.

Two obstacles faced by the consultants at the time of their mission prevented the completion of the defined objectives. The first was that TSU had not yet been created, so that "establishment of a research coordination capacity" within the TSU was not possible. The second limitation was that the Monitoring Fund Account to finance the information generation and monitoring activities had not yet been opened so that none of the 1990 monitoring activities could be officially finalized.

However, the document creating the Monitoring Fund is about to be approved, meaning that funding for the monitoring activities will soon be available. As such, activities can now be officially finalized and set in motion. Moreover, establishment of the GRC's Technical Support Unit (TSU) is imminent. Therefore, the next several weeks will be a critical period for completing the work necessary for establishing the monitoring network and permitting the collaborating organizations to carry out the activities. Additionally, two further tasks that relate to the Information Generation and Monitoring System have been identified that will be added to the previously mentioned tasks.

Activities to Be Performed

The AMIS Project will extend the present contract of the monitoring system consultant remaining in Cameroon by a period of six weeks. The activities to be performed, in order of priority, are as follows: 1) Finalization of 1990 Monitoring Activities; 2) Design of an FSSRP information brochure; 3) Establishment of a research coordination capacity within the FSSRP's Technical Support Unit; and 4) Interpretation of data generated under proposed Monitoring activity involving the production of supplementary tables from the Agricultural Census database.

Finalize 1990 Monitoring Activities

The consultant will finalize the following 1990 FSSRP monitoring activities:

Fertilizer Use Surveys. The consultant will complete the steps necessary to finalize Sub-Activity Programming Documents (SAPD) in order to set in motion the following surveys: (1) the seven-province survey to be undertaken by MINAGRI/DEAPA, (2) the North West Province detailed survey to be conducted by MIDENO/PEM, and (3) the West Province detailed survey to be conducted by UCD/Dept. of Rural Economics in collaboration with UCCAO/PDRPO.

National Fertilizer Response Data Base (NFRD). The consultant will follow-up on the steps necessary to prepare for the proposed NFRD preliminary "reconnaissance" mission. These steps are outlined in the final report of AMIS consultant Anthony Johnson.

The first step is to arrange a formal GRC request to IFDC/Africa to release or provide personnel for the preliminary mission in Cameroon.

Annual National Survey. The consultant will follow up on the proposal submitted to MINAGRI/DEAPA suggesting modifications of the Agricultural Census questionnaire related to the generation of more appropriate data on fertilizer use.

Further Analyses of Agricultural Census Database. The consultant will follow up on the proposal submitted to MINAGRI/DEAPA requesting that "supplementary tables" be produced from the census database. To the extent that production of the tables is possible, the consultant will prepare a SAPD for the activity, including a research protocol defining the types of tables to be produced and a budget.

FSSRP Information Brochure(s)

The consultant will design the format and contents of an FSSRP "information brochure" intended to disseminate information about the program to the general public as well as to those interested in direct participation in the fertilizer sub-sector. The informational content of the brochure(s) will be discussed with the FSSRP program manager and deputy program manager as to appropriateness. The design of the brochure will take into consideration the capabilities and limitations of local printing facilities. The brochure will be produced locally through a purchase order.

Establish a Research Coordination Capacity Within the TSU

Under the terms of the amended FSSRP project description, the Ministry of Agriculture is to provide a suitable individual to serve as research coordinator within the FSSRP's Technical Support Unit. This research coordinator is charged with monitoring the implementation of the studies and surveys commissioned by the FSSRP and liaising with agricultural research organizations on issues related to fertilizer response and soil fertility. Once the research coordinator has been selected, the consultant, along with USAID as necessary, will:

1. Thoroughly brief the research coordinator on the design of the FSSRP monitoring system and the organizations to be involved in implementation,
2. Accompany the technical coordinator on an initial contact tour to the sites of the collaborating organizations,

3. Assist the technical coordinator in the preparation of a year-long work program that includes oversight of the activities envisioned for 1990 under the FSSRP monitoring system.

Interpretation of Agricultural Census Data:

The consultant will interpret the data generated by DEAPA under the proposed activity "Further Analyses of the Agricultural Census Database." Interpretation and discussion of the data will be presented in a report that will include supplementary tables produced by DEAPA.

Reporting

A final report will be produced by the consultant for the TSC. The report will contain the following; a background on the Monitoring System design and status of activities prior to the start of the consultancy; a description of the relationships established between the FSSRP and the various organizations involved in the Monitoring System; the status of all Monitoring System Activities, including an enumeration of follow-up steps for the activities; a status report on the NFRD including progress made, recommended options for proceeding, and information sources; a description of the status of the TSU and the progress made in establishing a research coordination capacity therein; a status report on the FSSRP information brochure; annexes including the final SAPDs created for the various activities, copies of proposals submitted to collaborating organizations, a references list, and a list of people contacted. Interpretation and discussion of further analyses of Agricultural Census data will be contained in a separate report.

Qualifications of the Consultant

The consultant should have an M.S. or higher degree in agronomy, soil science, agricultural economics, or a related degree. The consultant should have previous experience in survey design and computerized analysis of survey data and experience in the design, implementation, and analysis of agronomic trials. The consultant must have a working knowledge of French and previous work experience in Africa.

ANNEX I

LIST OF PEOPLE CONTACTED

Institut de Recherche Agricole (IRA)

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Lucien Zeh	Lab Technician (particle size analysis)
Robert Tatou	Lab Technician (exchangeable Aluminum, soluble Phosphorus)
Stephane Mboning	Lab Technician (exchangeable bases)
Robert Moussa Ndinga	Lab Technician (free iron, moisture retention, and oxygen)
Jean Baptiste Fodjo	Lab Technician (total carbon and organic nitrogen)
Mr. Thongo	Lab Technician (total iron)
Boniface Nboma	Lab Worker (soil sample preparation)
Simon Lappe	Lab Worker (soil sample preparation)
Laurent Mbanga	Librarian, CNS, Nkolbisson

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Ministry of Plan and Regional Development (MINPAT)

Mohamadou Talba	Secretary General, MINPAT, Yaoundé/President, TSC
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Ministry of Agriculture (MINAGRI)

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ANNEX G

LITERATURE CONSULTED

- Ambassa-Kiki, R., Aboubacar, Y. and Boulama, T., 1987. Etudes sur les methodes de travail du sol, Compte rendu d'essai sur sol verticale (No.3), Deuxieme campagne 1987 (SP). MESIRES/IRA/Centre National des Sols et Ministere du Plan et de l'Amenagement du Territoire/Mission d'Etude et d'Amenagement de la Vallee Superieure de la Benoue/Ferme Experimentale de Karewa. Nkolbisson, Republique du Cameroun.
- Benac, R., 1968. Etude des besoins en elements majeurs du cafeier arabica en pays Bamoun. Colloque sur la fertilite des sols tropicaux, Madagascar, du 19 au 25 Nov. 1967. Organise par I.R.A.T. ONAREST/ORSTOM.
- Bertrand, R., Falipou, P. and Legros, J.P., 1984. Reseau International de Traitement de Donnees de Sols, Systeme de Transfert de l'Information Pedologique et Agronomique (S.T.I.P.A.). Agence de Cooperation Culturelle et Technique, INRA/IRAT, Montpellier, France.
- Chuba, P.N., Gobina, S.M. and Langlois, S.J.C., 1988. Top soil foliar survey and manuring recommendations for 1988 CDC rubber estates. MESERES-IRA-CNS/Soils Station Ekona-CAR/Latex Section Ekona. No. 2534 Bibliotheque Centrale de l'IRA, Nkolbisson, Republique du Cameroun.
- DGRST/IRA/IRCT, 1982. Agronomie Section Coton, Rapport Annuel 1981-1982, Premiere Partie Resume-Texte. Centre de Recherches Agronomiques de Maroua. Bibliotheque Centrale de l'IRA (No.894), Nkolbisson, Republique du Cameroun.
- FAO, 1974. Rapport au Gouvernement du Cameroun sur le Programme Engrais. FAO (95). Rome, Italy.
- FSSRP/USAID, 1989. Privatization of fertilizer marketing in Cameroon: First-year assessment of the fertilizer sub-sector reform program, technical report. AMIS project/PIP/Abt Associates, Washington, D.C.
- FSSRP/USAID, 1989. Fertilizer utilization practices and crop response research: Recommendations for the Fertilizer Sub-Sector Reform Program of Cameroon. Prepared by Nicolas Minot and Jerry Johnson, AMIS Project/PIP/Abt Associates, Washington, D.C.
- FSSRP/USAID, 1989. Monitoring and data collection system for the Fertilizer Sub-Sector Reform Program of Cameroon. AMIS Project/PIP/Abt Associates, Washington, D.C.

- Gillenson, M.L. and Golberg, R., 1984. Strategic planning, system analysis, and database design. The continuous flow approach. John Wiley & Sons, New York.
- Gomez, K.A. and Gomez, A.A., 1984. Statistical procedures for agricultural research. Second edition. Wiley-Interscience Publications, New York, New York.
- ICRISAT, 1984. Proceedings of the International symposium on Minimum Data Sets for Agrotechnology Transfer. ICRISAT Center, Patancheru, India March 21-26, 1983. IBSNAT/SMSS/USAID.
- IFDC, 1986. Management of nitrogen and phosphorus fertilizers in Sub-Saharan Africa. Proceeding of a symposium, held in Lome Togo, March 25-28, 1985. (Eds.) A. Uzo Mokwunye and Paul L.G. Vlek. Martinus Nijhoff Publishers, The Netherlands.
- IFDC, 1986. Cameroon fertilizer sector study. Prepared for USAID/Cameroon under contract number AFR-0510-A-00-5053-00, Muscle Shoals, Alabama USA.
- Ikawa, H. and G.Y. Tsuji (eds.), 1987. Proceedings of the Third International Forum on Soil Taxonomy and Agrotechnology Transfer. Technical Report 10. College of Tropical Agriculture and Human Resources, University of Hawaii.
- IRA/ISNAR, 1989. Action plan for restructuring, reprogramming and rehabilitating the Institute of the Agricultural Research (IRA). Submitted to the National Commission for Rehabilitation of Enterprises in the Public and Parastatal Sector, Yaounde, Republic of Cameroon.
- IRA/MESIRES. 1988. NCRE Annual Report 1988. IRA/MESIRES and USAID/IITA, Republique du Cameroun.
- IRA/NCRE/TLU Ekona, 1989. Farming systems survey of Ndian Division, South-West Province, Republique of Cameroon. Ekona.
- IRA/NCRE/TLU Ekona, 1989. Farming systems survey of Manyu Division, South-West Province, Republic of Cameroon. Ekona.
- MESIRES/IRA/NCRE, 1989. NCRE Semi-Annual Progress Report (March-August 1989). MESIRES/IRA and USAID/IITA, Republique du Cameroun.
- MINAGRI/National Directorate of the Agricultural Census, 1987. 1984 Agricultural Census; Traditional Sector; vol.1 Results at the national level; vols. 2A-J Results for the Far North, North, Adamawa, East, Centre, South, Littoral, South-West,

West, and North-West Provinces. Yaoundé, Republic of Cameroon.

- Musenja, J.I., 1981. Oil palm fertilization experiments in South-West Province, 1962-1980. D.G.R.S.T./Ekona Research Station. Service de la bibliothèque, de la documentation et de publications (No. ?), Nkolbisson, Republic of Cameroon.
- Ngatchou, Nya J., 1982. Evolution de la Recherche Scientifique et Technique au Cameroun. Service des Publications, DGRST. Yaounde, Republique du Cameroun.
- Ninane, F., 1972. Pedologie generale vol.1. Universite Federale du Cameroun/Ecole Federale Superieure D'Agriculture/FAC. Tirage No.4. Yaounde, Republique du Cameroun.
- Ninane, F., 1972. Pedologie generale vol.2 description des principaux sols du Cameroun. Universite Federale du Cameroun/Ecole Federale Superieure D'Agriculture/FAC. Yaounde, Republique du Cameroun.
- ORSTOM, 1987. Bibliographie des travaux de l'ORSTOM au Cameroun, 1947-1984. HORIZON Base bibliographique ORSTOM. Sur contrat MESIRES (D.G.R.S.T.) Cameroun/ORSTOM, du 30 Septembre, 1982. Republique du Cameroun.
- Oyebog, M. and Browne, A.E., 1984, 1985, 1986 and 1987. Top soil foliar survey and manuring recommendations for CDC rubber estates. CPM/CDC, Ekona, Republique du Cameroun.
- Pearson, R.W., 1975. Soil Acidity and Liming in the Humid Tropics. Cornell International Agriculture Bulletin 30. Cornell University, Ithaca, New York.
- Shaw, R.H. and Hill, R.W., 1975. Reference climatic sites for agricultural technology transfer. Utah State University, Dept. of Agricultural and Irrigation Engineering. USAID contract AID/csd-2459. Logan, Utah.
- Tisdale, S.L., Nelson, W.L. and Beaton, J.D., 1985. Soil fertility and fertilizers. Fourth edition. Macmillan Publishing Company, New York.
- USAID/Cameroon, 1989. Country development strategy statement (CDSS) FY 1990-1994-Cameroon. Agency for International Development, Washington, D.C.
- USAID/Yaounde, 1989. Midterm evaluation of the National Cereals Research and Extension Project, Phase II (631-0052). Prepared by DAI-Abt Associates-USAID/REDSO/WCA-TROPSOILS, Yaounde, Republic of Cameroon.

- Van Ranst, E., 1983. Les systemes de classification des sols au Cameroun. Premiere edition. Centre Universitaire de Dschang/Ecole Nationale Superieure Agronomique/Departement des Sciences du Sol, Yaounde, Republique du Cameroun.
- Van Ranst, E., Pauwels, J.M., Debaveye, J. and Zweier, K., 1989. Soil characterization and maize fertilization of PAFSAT experimental farms in the North-West Province, Technical Report No.1. GTZ-MIDENO/Soil Science Department-UCD. Dschang, Republic of Cameroon