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Collaborative Research Efforts:

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FSIP/CIAT COLLABORATIVE WORK: A PRELIMINARY REPORT

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INTRODUCTION

In September 1985, the FSIP team visited CIAT at ISAR/Rubona as part of its exploratory survey process. During this visit, the team became interested in CIAT bean work, particularly that relating to on-farm testing in the FSIP area. The team at this time also discussed areas of possible collaboration. The team deemed this association important for two reasons:

1. To identify promising bean materials for FSIP on-farm adaptive research commencing March 1986;
2. To serve as a training ground for FSIP agronomes and technicians who are completely new to this environment.

A follow-up trip was made to Rubona around the end of September to discuss further the technicalities of the proposed joint research. The trials were finally installed on farmers' fields in early October. This preliminary report covers the design aspects of these trials and some observations made. A full report including yield data will be produced when the trials are harvested in February/March 1986.

Trial 1

Objective. To determine the primary factor(s) that limits bean production on farmers' fields.

Treatments.

(1) Fungicide + insecticide
(2) Insecticide + manure + fertilizer
(3) Fungicide + manure + fertilizer
(4) Fungicide + insecticide + manure + fertilizer
(5) Control (farmers' practice).

Explanations.

(1) Fertilizer: Diammonium phosphate was applied before planting at a rate of 150 kg/ha.
(2) Manure: applied at 30 t/ha.
(3) Fungicide: Benlate (50 kg/ha) + Ridomil (25 kg/ha) were applied before planting followed by Benlate (1.1 kg/ha) plus oxychloride (4.4 kg/ha) every two weeks after planting.
(4) Insecticide: Carboryl (1.5 kg/ha) applied after planting, followed by Dimethoat (865 kg/ha) every two weeks.

Replication. Treatments were repeated twice at four locations. The trial was researcher managed with some degree of farmer involvement.

Observations. The differences among the various treatments, especially the fertilizer + manure + fungicide and the control, were outstanding. Lack of fertilizer and manure seemed to limit growth most. Judging from the appearance of the control (farmers' practice), it is very doubtful whether a farmer could reap anything beyond 0.2 t/ha.

We can capitalize on the demonstration element built into these types of trials to convince farmers to use improved technologies. I propose two interventions compatible with farmers' resource base. These are:

(1) The use of bean varieties with high N-fixing potential and the possibility of using inoculated seeds.
(2) Intensification of our search for organic N sources for soil fertility improvement.

Trial 2

Objective. To find out the performances of varieties of climbing and short beans under farmers' field conditions.

Treatments.

There were nine varieties of short or dwarf beans:

(1) Melange local
(2) Melange ISAR 85 NRW
(3) Kilyumukwe
(4) Bataaf
(5) Inyumba
(6) Ikinimba
(7) Ubusosera
(8) Kirundo
(9) Rubona 5.

There were seven varieties of climbing beans:

(1) Urunyumba 3
(2) Melange ISAR 85 V RW
(3) CIO
(4) Kiruli
(5) Melange local
(6) Gisenyi 2 bis
(7) G 2333

Replication. Treatments were replicated two times on farmers' fields. Six farmers were involved in each of the trials. The trials were researcher managed with farmer participation.

Observations. Ikinimba, an improved variety, showed the best growth performance for dwarf beans. It is a black bean variety, and I gathered it has low farmer acceptance even though it is noted to be the highest yielder. Next in terms of good growth performance was Kirundo, also an improved variety. Using the same criteria, the melange local may rank third. From my view point, Ubusosera, an "improved" variety, showed the worst growth performance. The picture was not only different but also shocking with respect to the climbing varieties. The superiority of the melange local relative to the "improved" varieties was very clear. Poor seed handling at ISAR/Rubona was offered as explanation for this occurrence. This observation serves as an important lesson for the FSIP. Pretesting of seeds and planting materials at the research station or through researcher-managed on-farm trials is a necessary precondition to full-scale farmer-managed trials. I recommend that we visit these trials individually or as a group. Technology generation does not end until such a time as farmers accept and use it.

In addition to aiming at high yields, CIAT also works on farmers' preferences. Krista Dessert is the lead person in the farmers' preference test, and she is at the moment working on their preferences for green leaves, fresh beans and green beans. Is there any way the FSIP can get involved in this exercise?

Trial 3

Objective. To find the effect of some selected agroforestry shrubs on food crop performance and soil fertility status.

Treatments.

Shrubs:

(1) Leucaena leucocephala (with and without inoculation)
(2) Calliandra calothyrsus
(3) Sesbania sesban.

Food Crops:

(1) Sweet potatoes
(2) Sorghum/Maize
(3) Beans (dwarf and climbing).

Design. Systematic design by Dr. P.A. Huxley. (see ICRAF Working Paper No. 12, 1983, Nairobi or contact FSRP for an explanation of this design).

The experiment is located at the ISAR Rwerere research station, Rugezi experimental plots, and was established by Willi Graf (CIAT) at the beginning of November 1985. FSIP/ISAR is charged with the overall supervision, including replacement, maintenance and data collection/monitoring.

Observations. The experiment is barely 30 days old, so it is too early to say anything concrete. However, one thing worth mentioning is that the Calliandra established from seeds had still not germinated as of Nov. 22, 1985, i.e. after more than three weeks.

COLLABORATIVE RESEARCH PROGRAM AMONG FSIP, UNR AND ISAR

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INTRODUCTION

This joint research, which is mainly in the area of soil fertility management, is aimed at generating useful information on-station as quickly as possible to be used as a basis for on-farm research in the very near future. An important component of the program will be the training that will be offered to students of UNR interested in majoring in soil science and agronomy. The scientists responsible for the work are Dr. Valens Ndoreyaho (UNR); Jean Marc Mulindabyumba, Andre Sebahutu and Vennant Rutunga (ISAR/Rubona); and Dr. Charles F. Yamoah (FSIP).

The research areas indicated below were those discussed with Dr. Valens Ndoreyaho on July 22, 1986.

RESEARCH AREAS

Characterization of Soils in the FSIP Area

The base map for the study is the soil association map developed by ISAR/Rubona and obtained from RRAM/Ruhengeri. Permutation of sites (altitude, temperature, rainfall) and soil association resulted in nine sampling points. Details of sampling are as shown in Table 1. Studies on the vertisols will dwell mainly on its management as much is already known about its chemical and physical properties. Soil samples will be analyzed for aluminum, iron, pH, phosphorus, organic carbon, base saturation and effective cation exchange capacity (ECEC). Results of the above analysis will be combined with those from the site-specific and on-farm trials currently being analyzed at ISAR to facilitate the soil characterization. In this study, emphasis will be placed on soil fertility capability classification (SFCC) as advocated by experts such as Sanchez, Boul and Juo. However, mechanical analysis for textural class determination will be done to make interpretation and consequent management decisions on the soils more meaningful.

It is hoped that all future FSIP off-station researcher-managed trials will be planned in accordance with the above classifications to make extrapolation of findings to fields of farmers with similar agro-climatic conditions a possibility.

Green House Experiments

The following green house experiments were proposed:

(1) Effects of different rates of manure on complexing of Fe and Al and subsequent availability of major nutrients.

(2) Effects of lime and manure on the availability of major nutrients. In this case, the pH of the soil will be raised to 5.5 with lime, and the same rates of manure as in (1) above will be applied. The lime material will come from a local source, most likely from Ruhengeri.

(3) Development of lime requirement curves for the identified agro-climatic zones. The aim here is to determine the amount of lime needed to raise the pH of the soils to 6.5.

(4) Effects of manure and complete chemical fertilizer on the performance of selected food crops.

(5) Effects of manure and complete fertilizer with soils limed to a pH of 5.5 on performance of selected food crops.

(6) Effects of complete fertilizer with soils limed to a pH of 6.5 on the performance of selected food crops.

(7) Effects of complete fertilizer with soils raised to a pH of 5.5 on the performance of selected food crops.

(8) i. This will be the same as (7) but without N.
ii. Same as (7) but without P.
iii. Same as (7) but without K.
iv. Same as (7) but without Mg.
v. Same as (7) but without lime.

NOTES

-- Manure rates are tentatively fixed at 0, 5, 10, 15 and 20 t/ha.
-- Treatments will be replicated at least five times.
-- Observations to be recorded will include % germination, weekly plant growth, deficiency symptoms, dry matter yield and uptake of N and P.

The result of the green house experiments (which will be conducted at UNR and ISAR) will be tested in the field at the FSIP area before they are given to farmers. However, farmers' exposure to these technologies through field days (as already planned for the agroforestry and mulch systems) will be strongly encouraged.

Table 1. Soil sampling based on association map.

Association[1]	Commune	No. of Samples
1.	Nyarutovu; Cyeru	10
2.	Nyamugali; Cyeru	2
3.	Nyamugali; Cyeru; Butaro	15
4.	Butaro; Cyeru	2

[1] 1. Ferrisols humus intergrades developed on schists and phyllites.
2. Lithosols developed on quartz and ferrisols intergrade.
3. Lithosols on ferrisols humus intergrade. Also underlain by schists and phyllites.
4. Vertisols.

Source: Association map prepared by ISAR, Rubona, 1984.