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Semi - Arid Food Grain Research and Development  
Recherche et Développement des Cultures Vivrières dans les Zones Semi-Arides

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MISSION REPORT TO THE PEOPLE'S REPUBLIC OF BENIN

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Mission Report to the People's Republic of Benin\*  
14 - 24 October, 1987

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Meeting in Cotonou

During the morning of 15 October, a meeting was held at the Department of Agricultural Research (DRA) with the Deputy Director of Benin national research programme and SAFGRAD FSR team leader. The Director of Agricultural Research was on an official mission. I was informed that there had been some recent changes that could affect SAFGRAD FSR support in northern Benin.

At the meeting in Cotonou and during informal discussion with the IFAD consultant for Borgou II - project, I learnt that there was the general tendency (by IFAD) to fund partially or most of the FSR activities through Phase II of the rural development project.

It was pointed out to the deputy director of DRA, that the above mentioned financial arrangement to support FSR in Northern Benin was not communicated to SAFGRAD Coordination Office. It is, however, important to correctly conceptualize and identify what type of on-farm testing activities would be relevant to the above mentioned project. It was stressed that the SAFGRAD Coordination Office would do its best to provide technical assistance to DRA in northern Benin but could not retain its FSR team in the INA region ~~if~~ IFAD grants to OAU/STRC were curtailed.

Meeting with SAFGRAD FSR team

During the afternoon of 15 October, I travelled from Cotonou to Parakou, then to INA agricultural research station where the SAFGRAD FSR team is based.

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The meeting with the FSR team centered on :

- IFAD review mission
- FSR programme proposal 1988 - 1991 ;
- Review of on-going FSR activities ;
- Other matters.

Specific programme of visit for the forthcoming IFAD review mission was developed. The need to contact collaborative research agencies such as the CARDER was pointed out. Since the INA research station is about 70 km from Parakou, it was agreed that the visit of the review mission could start from there. Following a short briefing on FSR activities in northern Benin by the team leader and the CARDER office, nearby primary village site (tree crops planting system) would be visited. Starting from the INA station, other aspects of the programme would include detail discussions on current and future FSR proposal and field activities.

Even though the visit of the review mission is scheduled towards the end of the crop season, field trip to representative sites would indicate both the nature of food production constraints and general efforts that were being made to alleviate them and could provide broader understanding and perceptions of the SAFGRAD FSR programme in the region.

#### **Meeting with INA research staff**

The INA station is situated 9°58'N latitude and 2°44'E longitude at an altitude of 358 m. INA is situated in the Sudano-Guinea transitional climatic zone with mono-modal rainfall, usually between April and October (between 900 to 1200 mm).

The discussion at the station also focused on future SAFGRAD FSR support. The research staff at INA and SAFGRAD FSR team were informed, by the IFAD consultant, of the possibility to fund the FSR activities partially or completely within the Borgou II. The project would be financed through World Bank, IFAD (for research) French Government and other donors. It was pointed out to the INA research staff that, OAU/STRC/SAFGRAD Coordination Office looks forward to continued assistance to the above mentioned project and would try to retain the SAFGRAD FSR team at INA through IFAD grand support when the modality

of linking the current FSR with Borgou on-farm testing activities is sorted out. Furthermore, it was pointed out, to the INA research staff that, the on-going FSR programme would be reviewed by the IFAD mission during the first week of December and facilities at INA station would be visited. There would also be discussion on the current and proposed FSR activities. The director of the INA station and the SAFGRAD FSR leader would organize the field visits and also make arrangements for seminars. The INA research staff mentioned the need to improve research facilities. It was pointed out that the current FSR budget could not cover costs for minimum improvement of station facilities.

### **Visit to Primary Village Sites**

CARDER Seed Multiplication site is located some 25 km east of Parakou. It is used as an important FSR demonstration and training center. The crop/tree intercropping comprised of improved maize and local sorghum variety cultivated in the alley system with pigeon pea, Leucanea and other spp. of trees. The purpose of the experiment was to improve biomass production, grain yield, improvement of soil fertility, and to improve the production of livestock feed. The economic programme is currently determining the feasibility of technologies being evaluated. The recycling of resources among sub-systems of FS for eventual economic and ecologic complementarity (crops, livestock, agroforestry), is the major focus of the FSR programme. Farmers remove 70% of the crop residue for different uses (livestock feed, fuel construction, etc...). This traditional practice has led to continuous decline of the fertility of the soil in particular. The purpose of an integrated FS is to meet the needs of the farmer with regard to food, fuel, construction, cash income, etc... This is an important system to evaluate various technologies of FSR sub-systems of production in an integrated manner. This demonstration experiment has become a common interest to extension agents and farmers.

At Soka site, Tree/crop - intercropping was already established using different plant densities. Sorghum/maize association was being evaluated with additional fertilizer and different planting systems (ridges, planting on flat, ect...). The sorghum/cowpea association was based on local varieties that require 180/125 days respectively. After lengthy discussion it was pointed out that the choice of varieties could be crucial in order to attain particular objectives. If the aim is to increase grain production, short to medium cycle high yield cowpea (or other legume) variety should be considered. If the association of the legume is for the purpose of forage and grain production, varieties with dual purpose

should be utilized as well as varieties with higher biomass production and with good potential of regrowth (after cutting) for fodder production. Sorghum local variety is much preferred than exotic types (for its seed quality, using the stocks for fuel and construction) it, however, takes about six months to mature. It was pointed out to include medium maturing (120 days) for the Sudan zone and short cycle varieties (90 days) for the Sudano-Sahelian zone. Array of cereal/legume varieties could be made available for further verification and testing through collaborative research networks.

In collaboration with UNSO, an agroforestry trial was established at Malanville in the extreme north of Benin in the Sahelian zone. Although, the millet crop was planted late, it may produce grain, with additional few days of rain. The main purpose of the experiment is to establish leguminous trees to conserve soil, improve contents of its organic matter and eventually its moisture retention capacity. The global objective of the programme is to prevent encroachment of the desertification process. Attempt is being made to determine the appropriate density of useful trees such as Acacia albida in association with the production of food grains (millet and cowpea).

At Karemama, in the Sahelian zone, water conservation practices were being evaluated. These include tied ridging, planting on ridges and on flat land with and without the addition of fertilizer. Also varieties of millet (introduced from ICRISAT Sahelian Center) and sorghum were being evaluated. Tied-ridging with and without the addition of fertilizer enhanced growth of sorghum and millet. The tree/crop association was initiated at this site, the previous year. During the second year the growth of the Acacia albida had improved substantially. Since the area has large livestock population, certain forage legumes were introduced. Except for Pennisetum spp. the other spp. such as Centrosema pubescens, Stylosanthes hamata, and Panicum maximum have established well. Discussion with farmers from time to time revealed that they are also interested in the forage legumes.

At Ouake, in the Atacora Province, the major food production constraints are the degradation of the fertility of the soil due to water erosion and denudation of natural vegetation, and high infestation with striga. The major focus of FSR activity at this site has been the conservation of soil-water and the improvement of soil fertility and texture. The incorporation of the organic and green manure with minimum level of fertilizer has improved the yield of maize and sorghum

as demonstrated by farmer and researcher managed trials. The above-mentioned spp. of forages were established. Many farmers seem to be impressed by the vigorous growth of the forages. Proper land preparation and management have also demonstrated a good establishment of groundnut. The study at this site also included residue management. In cooperation with UNSO, the tree/crop - intercropping of sorghum/Leucaena and cowpea were established.

The evaluation of crop production technologies :

To determine suitable technologies for the three ecological zones (Sudan, northern Guinea savana, and Sahel), the major constraints that were being addressed were drought, in the extreme north of Borgou province ; cropping systems, variety selection and fertilizer, in the northern Guinea zone ; and soil and water conservation studies in Atakora province.

Sorghum/maize are important cereals in northern Benin. Crop associations comprising sorghum/maize, millet/cowpea ; maize/groundnuts ; sorghum/cowpea and sorghum/groundnut are the most common. Based on the results of the previous two years, crop association studies were modified and also continued during 1987. The treatments within crop associations (cereal/cereal, cereal/legume) may also include variety, interactions fertilizer and tied-ridging.

After reviewing the various association studies at three villages, the following comments were made : with regard to such studies being conducted, it was suggested that, the data of the last three years should be examined thoroughly in order to arrive at a certain conclusion. Experiments dealing with crop association studies may need to consider the following parameters of production :

#### 1.0 Pattern of planting crops

- (a) farmers' practice,
- (b) alternate rows,
- (c) different level of plant population,
- (d) bloc planting.

#### 2.0 Consideration for choosing varieties

- (a) maturity - length of growing season,
- (b) plant height and form,
- (c) competition for utilization of light, available moisture and nutrients,

- (d) could the variety fit into traditional or modified multiple cropping systems of associations and relay cropping practices ?
- (e) purpose or objective for choosing a particular variety (for grain yield, forage, biomass production and dual purpose).

### 3.0 Cash and food crop-combination

### 4.0 Useful trees/crop-combination

#### **Agroforestry interactions**

The major focus of the agroforestry trials is to introduce useful trees and forages into the existing cropping system. For example, forage legume not only can serve as fodder but could also contribute to restoration of the fertility of the soil. Tree/crop interplanting is an important source of organic matter (or biomass production). Furthermore, trees and shrubs could be used for fuel, construction, livestock feed and to enhance water and soil conservation. To address the above mentioned food production constraints in the semi-arid ecology, some variety of pigeon pea, useful spp. of trees, improved grass spp. for forage are being evaluated at INA station and on primary village sites.

#### **General comments**

The FSR team in northern Benin was advised :

- to work very closely with thematic researchers at INA station so as to facilitate the introduction of elite varieties of sorghum, maize, cowpea and millet from the regional food grain research networks currently operating in West and Central Africa (through the IITA/SAFGRAD and ICRISAT/SAFGRAD and ICRISAT/SAFGRAD collaborative research programmes) ;
- to develop farmer managed trials relevant to Borgou Phase II project since partial cost for such trials could be supported from this project ;
- Conduct short-term training not longer than one week for field technicians within the project ; and for CARDER agents that monitor farmer-managed trials ;

- Conduct seminars on relevant themes.
- Arrange annual "field days for farmers in the respective villages".

Furthermore, suggestion was made to transform FSR experience into the appropriate farming system development. Since the average land holdings in northern Benin is reported to vary from 2 to 3.5 hectares, it was suggested to introduce an appropriate land use and management system with selected farmers comprising of an integrated production systems such as cropping, livestock, improvement of fallow land use, agroforestry, resource conservation etc.. The transformation of FSR experience into suitable farming system could be one of the major emphasis of SAFGRAD/Benin FSR Phase II activities.

The FSR team, however, pointed out the following as major impediments in implementing the on-going FSR activities :

1. Availability of fund.  
The amount of budget allocated to the FSR project was not only insufficient but it was not made available on time.
2. Shortage of transport  
Only two cars are working properly and this has caused constraints of mobility of researchers in various research sites.
3. The need to strengthen INA research station  
Because of lack of experienced researchers and shortage of resources at INA, there was no backlog of available technologies that could be extended to farmers with only minor modification through FSR. There are few researchers and facilities are inadequate to promote even crop commodity oriented research. Efforts to improve the research capacity of INA station could require particularly long-term training support, improvement of existing facilities (particularly infrastructure) and definition of short and long term research priorities based on FSR feed-back. Furthermore, new donor support needs to be coordinated in order to build upon research progress already obtained instead of starting from scratch or repeating what already was done.
4. Linkages were already established with CARDER extension and rural development agencies UNSO and other agencies at national level. These



Linkages are informal and may need to be institutionalized. The team, however, also stressed the need to strengthen linkages with International Agricultural Research Centres (such as IITA, ICRISAT, etc) and to regional collaborative research networks (sorghum, millet, cowpea and maize) through the SAFGRAD project. Formal annual visit to nearby IARC activities or to attend relevant workshop in the region need to be encouraged.

5. Format for reporting - preparing annual reports in English and French caused considerable delay to the timely availability of research results to national research programmes. It was agreed that technical reports need to be prepared in French with English summaries to rectify the situation. General reports covering overall research activities and management, could also be prepared in English. General guidance regarding format of reporting of project activities would be worked out in consultation with SAFGRAD Coordination Office.
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