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SAFGRAD - Farming Systems Research (Purdue)

RESUME

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The initial objective of the FSU is to provide an understanding of the farming systems in the semi-arid zones of Africa and to develop new farming systems which reflect the farmer's resources and environment. The FSU was included in the SAFGRAD's framework to provide a link between the farmer and the researcher for the bidirectional transmission of information so essential in the whole process of development and transfer of technology-appropriate to small farm conditions. Primary functions :

1. To conduct research which will lead to an understanding of existing farming systems, the agro-climatic, economic and social factors that influence farm/household production and consumption decisions;
2. To utilize the results of farming systems research conducted to identify and prioritize factors serving to constrain production and productivity in the existing systems, and to interact with other components of SAFGRAD to identify research approaches;
3. To evaluate the likely impacts of new technology on existing farming systems. The impact of new technology is to be evaluated through socio-economic studies including interaction of new techniques with other household activities, as well as through agronomic trials. The techniques for evaluation will be chosen in cooperation with other scientists and SAFGRAD's Accelerated Crop Production officers in member countries;
4. To provide the exchange between the farmers and researchers for the flow of production related information to insure that research results are appropriate to farmer's needs and environment; and
5. To develop suitable methodologies for farming systems research in SAFGRAD countries.

FSU's Major Activities up to date :

Three Regions For Intensive Studies (see Map in the Questionnaires)

FSU selected 7 villages in 3 regions of Upper Volta for intensive studies - both socio-economic and agronomic. These are :

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Zorgho (with three villages), Ouagadougou (one village) and Ouahigouya (three villages). There are around 100 farm households in the sample.

Details of Information Collected through Village Studies :

Detailed profile of household members, their demographic and socio-economic activities, complete data on crops and crop rotations, labor-time, input-use, cropping patterns, yields, patterns of distribution of production responsibilities among household members, inventories, credit constraint, transactions, and time allocation of household members.

Organization of FSU Field Surveys and Studies :

1. Each village has one investigator for socio-economic survey and one for agronomic trials/studies? There are 15 farmers (households) for intensive study by each investigator stationed in the village.
2. For each region - there is a research supervisor to control the data gathering, its quality and help in analysis.
3. The team's principal scientists are in overall control of the field work and pay frequent visits to villages and farms.

Analyses of Data :

The data on crops, labor-time-use, and labor constraints during critical periods are however being sorted out for simple computation and analysis. This will help in working out the labor and non-labor input utilization and requirements by crops soils combination, and the input-output metrics for programming models intended to be developed for small farms with the help of FSU's survey data and agronomic trial data.

The FSU has installed two micro-computer in Upper Volta for data recording, cleaning and processing before these are sent to Purdue for detailed and sophisticated analyses with the help of back-stop staff at Purdue.

Data from other sources will also collected to supplement FSU's efforts.

Progress of Work :

Interviewers are following the sample farmers to collect weekly, bi-weekly, and in some cases monthly data. Uptodate we have collected comprehensive data on land preparation, planting and weeding operations and we have started tabulating some of the data

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already collected. One-shot information on socio-economic status of households members, inventories and demographic structures was collected in the initial stages of the intensive survey. The current investigation will complete the entire production cycle for this year.

We are also collaborating with a Dutch researcher who is using our questionnaires to collect production data from 3 villages in KAYA. Data from this survey will be made available to us for comparative analyses without any extra cost to the project.

The FSU is also collaborating with Bobo ORD and helping it in developing a suitable format for the collection of production data from farmers. This may eventually lead to the development of a common format for farm surveys that the ORD's conduct for collecting production and cost data.

Extensive, Descriptive and Reconnaissance Surveys :

The SAFGRAD Farming Systems Unit has also initiated general descriptive surveys in selected zones of Upper Volta which appear to have broadly different agro-climatic, social, and economic systems. We wish to identify as quickly and qualitatively as possible some of the principal means whereby agricultural production and productivity can be increased taking into account agronomic, economic, and social constraints characteristic of these zones.

The FSU has developed a detailed questionnaire (see enclosure) and used it in an initial reconnaissance survey in the Bobo region. FSU/SAFGRAD will conduct a number of such 6-10 day multi-disciplinary surveys in other zones of Upper Volta, some with the participation of other in-country specialists and research organizations. We are attracted by this low cost but potentially high yielding research methodology as an initial means of designing relevant field trials and focused social-economic survey research.

Bringing Researchers and Farmers Together :

Scientists visit farmers' fields : During the last fortnight, the FSU arranged visits by SAFGRAD and ICRISAT scientists to farmers' fields in one of its laboratory villages, Nedogo. This provided an opportunity for scientists to acquire first hand understanding and appreciation of real farm situations, and for farmers to talk with the scientists in their fields about their crops and the related problems.

The FSU's participating farmer's visit Kamboinse research station : Equally important was an organized visit to Kamboinse experiment station by the FSU's participating farmers. This visit took place only last Saturday. Twenty farmers, twelve young students from the rural school and the school teacher in-charge came to Kamboinse from Nedogo-FSU's laboratory village and spent 6 hours

in the fields seeing the experimental crop fields and exchanging ideas with the SAFGRAD and ICRISAT scientists and the Station Director. To our knowledge, such an organized visit by farmers to scientists work at the experiment station at Kamboinse occurred for the first time. I am thankful to the SAFGRAD-IITZ team Leader, Dr. Asnani and all the members of the team for their total support and help, to Dr. Pattanayak for his personal interest and assistance, and above all to Mr. Diemkoumar, station Director for having made the scheme work successfully. The farmers showed keen interest in seeing the trials, and asked pertinent questions. It was indeed an exciting sight to see the farmers and scientists interacting in the experimental fields. Such visits and interactions must occur on a much more wide scale, and more frequently and vigourously if the physical scientist's efforts to evolve new and appropriate technology, and the social scientist's efforts to help in transferring this technology to farmers are to succeed ! However, this should be done by national extension agencies.

Designing New Production Systems :

The subject matter of agronomic research which one does in farming systems is very little different from the subject matter for the research of other agronomists. The difference lies in the research goals. In the farming systems research one is very conscious of wanting to find ways to decrease the cost of grain production. We want to increase the benefit which the farmer can derive from the resources at his disposition, and pass on a part of the benefit to others in terms of low cost food in the market.

An example of FSU's agronomic research is that of soil fertility. The soils of West Africa in general are quite poor, but they are poorer in phosphorous than in nitrogen and potassium. The nitrogen and potassium in West African soils are underutilized because of the lack of phosphorous. But most of the West African countries have deposits of phosphate rock. Instead of experimenting with ways of increasing yields from 500 to 1500 kg/ha using expensive chemical fertilizer, we in the FSU are investigating, and advising other researchers to investigate, applications of ground rock phosphate which may only increase yields from 500 to 700 kg/ha, but be much cheaper, and have a smaller foreign exchange component in their cost*. Thus we do soil fertility experiments with rock phosphate to see how it can be most efficiently used in low yield systems.

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* It needs to be stressed[^] that the current impediment to the utilization of local rock phosphate in Upper Volta is the lack of the commercial structure for distribution of the fertilizer and of the surplus grain produced, rather than the chemical characteristics of the rock.

Our field trials also include treatments using animal traction for soil preparation. There is a great deal of discussion about the economics of animal traction in West Africa, the economic returns frequently seem very poor. To outsiders the situation seems confusing. We hope our analysis of work times and planting and weeding practices will clarify some of the questions. One point is already clear. Where soils are poor and yields are low, farmers are very conscious of the labor saving possibilities of animal drawn equipment. We have therefore carefully recorded labor time information for these operations. We hope to be able to make researchers more aware of the importance of labor savings in agricultural production under these conditions.

One important question which can be solved using worktime information concerns plowing and photoperiod insensitive early sorghum varieties similar to those grown in the United States. Does the farmer really have the time available to plow before he plants, or alternatively can he produce more if he uses his time to plant a larger area of sorghum using his traditional methods? If he plows and waits to plant, he increases his risk of not being able to get the crop planted correctly. Even though his maximum possible yield has been increased, he is subjecting himself to considerable risk of failure. It may very well be that under voltaic conditions it is necessary to mechanize the planting operations before one can achieve the full benefits of plowing and the high yielding photoperiod insensitive sorghum varieties.

Next year we will be doing experiments with corn production as well. Corn production differs from sorghum production in that traditionally it has been carried out on an intensive basis by the farmers, using manure available from their small animals and the ashes from the family's cooking fires. There are two possibilities for improvement. If the corn is primarily for family consumption, one may be able to increase production by using improved varieties and cultural practices to improve moisture utilization. Alternatively, corn can be intercropped with cotton so that large applications of fertilizer may be economic. This mixture has a particular advantage in areas where rainfall is low and erratic. If the rains stop early, one will have corn to eat, but if they are good one will have cotton to sell.

Training and Institution-Building Role :

The FSU has succeeded in identifying and hiring Voltaic professionals to work with the team in its socio-economic as well as agronomic studies as potential candidates for higher-level training in the U.S. or in other countries. Among these are two economists, of these one is already working with the FSU for the last 8 months and the other is expected to join soon. The candidature of the former has already been submitted to Purdue for admission to the post-graduate school, Department of Agricultural Economics.

The FSU worked in close collaboration with the department of Agronomy, University of Ouagadougou and accepted one of its Master's students (from Chad) to work as a trainee. He has only been closely involved with FSU's field trials and studies under the supervision of team's agronomist Dr. Christensen. He has submitted his thesis that he wrote while working with the FSU team. We wish to sustain such collaborate efforts in the future also.

In addition, we are also providing on-the-job training to 8-10 persons in the areas on socio-economic survey methodologies and data collection, agronomic studies and trials in farmers fields. We propose to send one Voltaic computer technician for 6 weeks training at Purdue. We are planning to depute one of the agronomy assistants to IITA for training.

Some Final Comments :

SAFGRAD as an institution needs to be designed on a long-term basis with a long-run perspective. As any research institution, it should not be expected to create any wonder or wonders in its short life of a year or two during which it may just be able to lay the foundation. Farming systems research has therefore to be viewed in a broader and longer-range perspective than what is evident at present. To enable it to evolve its research framework with a time perspective clearly defined and made known to the scientists and the associated institutions it is essential, in my opinion, to encourage them to develop a long-term but well-knit program of research.

The feeling about the continuity of the program is essential in providing a sense of stability and security among the scientists working with SAFGRAD.

Second, it seems to me that farming systems research efforts should have more outreach in other countries, and more resources should be made available. At the same time, the farming systems research will need to involve more and more the local institutions in its programs. This is my feeling that SAFGRAD need to make some meaningful dent into these institution's teaching, research and extension. My experience so far has been that this is missing from the present system.

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