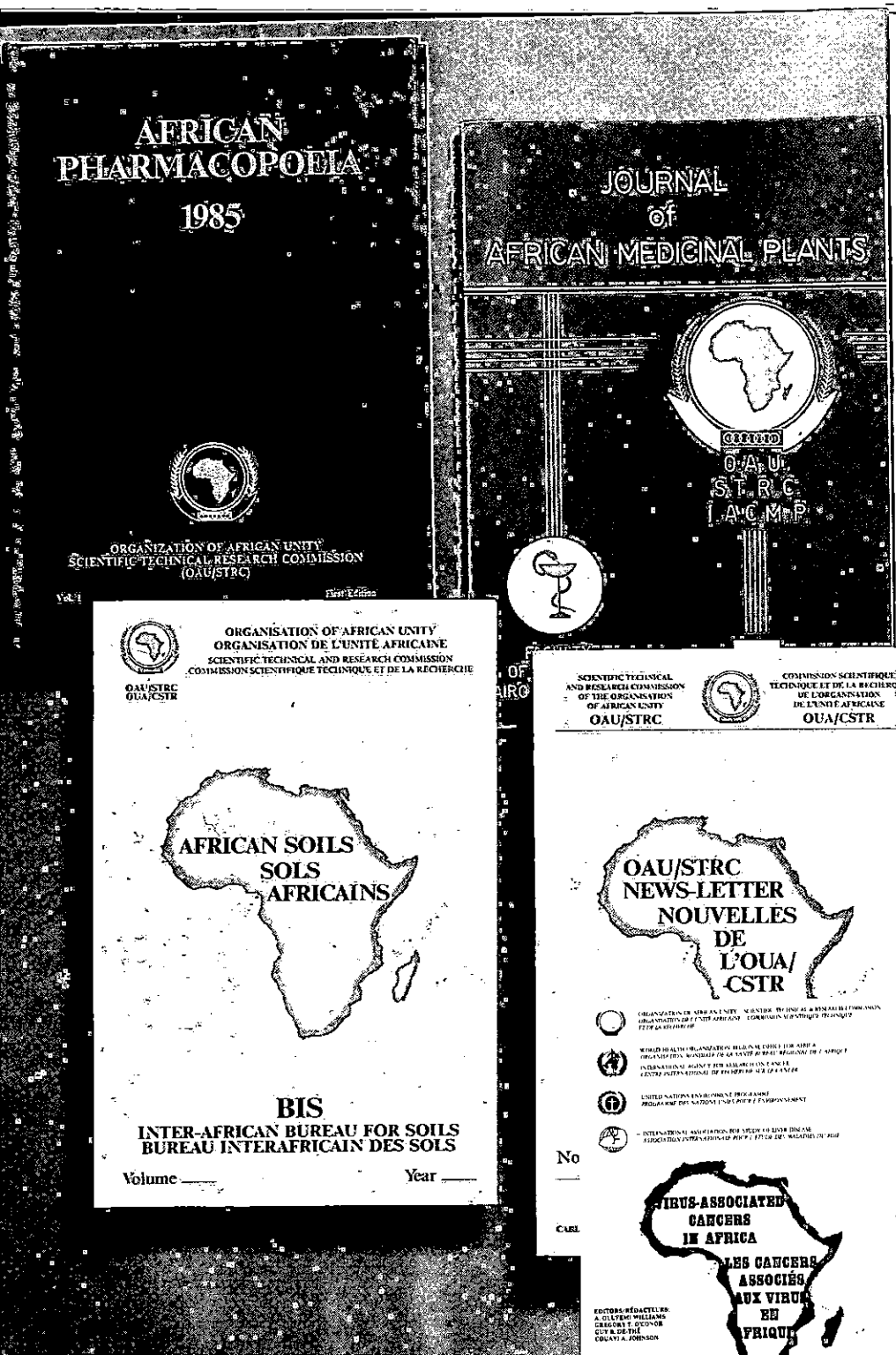


**SCIENTIFIC,
TECHNICAL & RESEARCH COMMISSION
(OAU/STRC)**

**ORGANIZATION OF AFRICAN UNITY**

# ANNUAL REPORT 1984–85

# FARMING SYSTEMS RESEARCH (FSR) OF SAFGRAD (JP 31)

PUBLISHED BY OAU/STRC OFFICE
PMB 2359, LAGOS, NIGERIA AND
SAFGRAD CO-ORDINATION OFFICE
BP 1783, OUAGADOUGOU, BURKINA FASO

ISBN 978-2453-05-6

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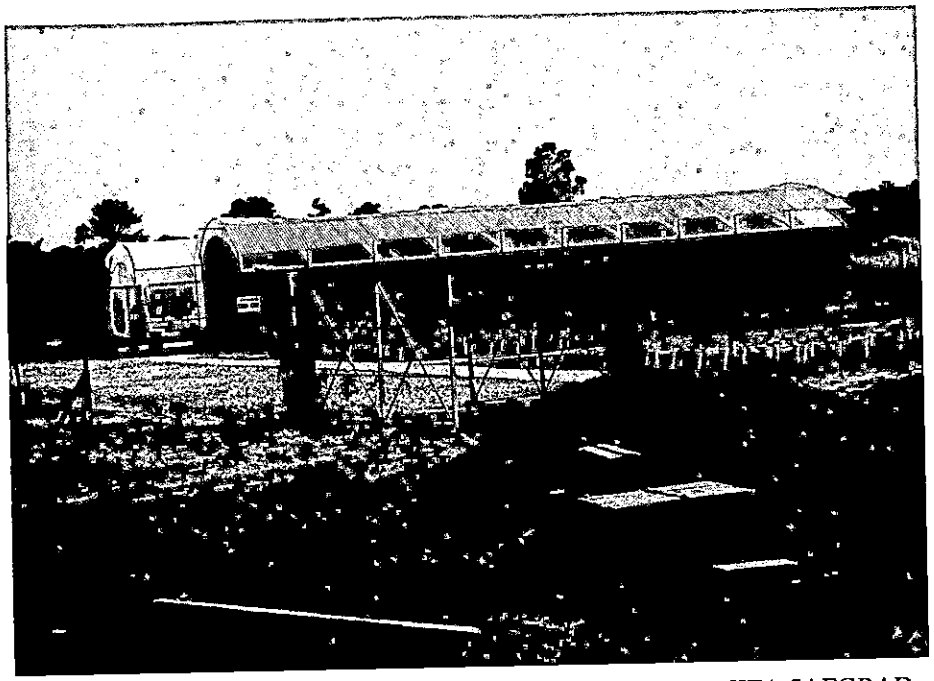

Agricultural research facilities at Kamboinse in Burkina Faso where IITA-SAFGRAD carries out research activities.



# Foreword

Research into Food Grains in the semi-arid regions of Africa has been carried out under the auspices of the Scientific Technical Research Commission of the Organization of African Unity for the past eight years. The co-ordination of research activities is effected by the Co-ordination Office headed by an International Co-ordinator and assisted by a Director of Research. Until 1982, the entire research activity was undertaken by International Agricultural Research Centres—namely IITA and ICRISAT while Purdue University pioneered Farming Systems Research in Burkina Faso.

IFAD's Technical Assistance Grant (No. 110) to OAU/STRC in 1983 provided funds for strengthening the Co-ordination office and for the employment of scientists now working in three SAFGRAD countries: the Northern area of the Republic of Benin (INA), Northern part of the Republic of Cameroon (Marua) and in Burkina Faso (Kamboinse). These scientists are responsible for the identification of appropriate technologies best suited for small farmers of the semi-arid regions of Africa. These technologies in turn are used to strengthen national farming systems research. The scientists are integrated with the national Agricultural Research Systems so that they ensure that the newly generated technologies are implemented at the national level.

This report gives a comprehensive account of SAFGRAD's Farming Systems Research component and some of the early results obtained by scientists working with agronomic practices in three selected rural areas of the semi-arid regions of Africa.

Management of the project's FSR component is effected through a Project Management Committee which includes representatives of OAU/STRC, USAID, FAC/IRAT, FSU/PU, IITA and IFAD, as well as by the Project Co-ordination Office, while management of funds is carried out by two internationally qualified accountants.

OAU/STRC's opportunity to develop institutional capacity and human resources in this area of Farming Systems Research is most commendable while the major task of the scientists, which is to develop agricultural technologies relevant to the needs of poor African farmers, is undoubtedly a healthy trend which augurs well for the future of food production in Africa.

I wish to acknowledge the contribution of the OAU to this project both in terms of human and financial resources and likewise the contribution of other donors who are continuing to support the other components of the project.

I also wish to express my sincere thanks and appreciation to the Executive Board of IFAD which has approved this grant, and to the staff of IFAD for their continued dedication and devotion to this project which is alleviating the problems of the rural small-holder farmer in Africa.

A. Olufemi Williams
EXECUTIVE SECRETARY
OAU/STRC



# Acknowledgments

The Scientific Technical Research Commission of the OAU hereby expresses its gratitude to the President of IFAD, Mr. Idriss Jazairy, and the International Fund for Agricultural Development for their support in the implementation of the projects and in the publication of this document. It has been a great pleasure for the staff of OAU/STRC and its co-ordination office to work with the staff of IFAD in the realization of the goals and objectives defined in the various projects. The effective international co-operation which has been established in the execution of these projects continues to predispose improvements in the quality of life among the peoples of Africa. The initiative of IFAD in the promotion and inclusion of agroforestry, as a component of the SAFGRAD farming systems research is hereby acknowledged. The continued collaboration and effective inputs by representatives of other donors, namely USAID and FAC are appreciated. It is hoped that other donor supports which are being solicited will be forthcoming presently. To all the other donors and collaborating agencies and institutions, we express our gratitude.

Copies of this report can be obtained from the following:

OAU/STRC
Publications Section
PMB 2359
Lagos, Nigeria

OAU/STRC
Co-ordination Office
BP 1783, Ouagadougou
Burkina Faso

OAU Headquarters
Information Section
PMB 3243
ADDIS ABABA
ETHIOPIA

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# Acronyms and Abbreviations

| | |
|---|---|
| ABCP | Africa-Wide Biological Control of Cassava Pests |
| ABCS | African Biological Control Service |
| ACFD | African Centre for Fertilizer Development |
| ACPO | Accelerated Crops Production Officer |
| ACSAD | Arab Centre for Semi-Arid Development |
| ADB | African Development Bank |
| AMTA | Agricultural Management Training in Africa |
| BIS | Inter-African Bureau for Soils |
| CAB | Commonwealth Agricultural Bureau |
| CC | Consultative Committee |
| CDA | Co-operative Development for Africa |
| CILSS | Centre Inter-états de Lutte Contre la Secheresse dans la Sahel |
| CIMMYT | Centro Internacional de Majoramiento de Maiz y Trigo |
| ECA | U.N. Economic Commission for Africa |
| EDECO | Economic Development on Co-operation Department for OAU |
| EDI | Economic Development Institute of World Bank |
| EEC | European Economic Community |
| ESCAS | Education, Science, Cultural and Social Affairs |
| FAC | Fonds d'Aide et de Cooperation |
| FAO | Food and Agriculture Organization |
| FSR | Farming Systems Research |
| FSU | Farming Systems Unit |
| GTZ | Duetsche Gesellschaft für Technische Zusammenarbeit |



| | |
|---|---|
| IAPSC | Inter-African Phytosanitary Council |
| IARC | International Agency for Research into Cancer |
| IBAR | Inter-African Bureau for Animal Resources |
| IBRAZ | International Agriculture Research Institute of Burkina Faso |
| ICARDA | International Centre for Agricultural Research in the Dry Areas |
| ICIPE | International Centre of Insect Physiology and Ecology |
| ICRAF | International Centre for Research into Agro-Forestry |
| ICRISAT | International Crops Research Institute for the Semi-Arid Tropics |
| IFAD | International Fund for Agricultural Development |
| IFDC | International Fertilizer Development Centre |
| IITA | International Institute for Tropical Agriculture |
| ILCA | International Livestock Centre for Africa |
| INSAH | Institut de Sahel |
| IRAT | Institut de Reserche Agronomique Tropicole |
| ISNAR | International Service for National Agricultural Research |
| ISRA | Senegalese Institute for Agricultural Research |
| OAU | Organization of African Unity |
| OIE | International Office for Epizootic Diseases |
| OPEC | Organization of Petroleum Exporting Countries |
| PARC | Pan-African Rinderpest Campaign |
| PMC | Project Management Committee |
| SAFGRAD | Semi-Arid Food Grain Research and Development |
| STRC | Scientific Technical and Research Commission |
| TAC | Technical Advisory Committee |
| TCP | Technical Co-operation Programme of FAO |

| | |
|---|---|
| TTIQ | Tsetse and Trypanosomiasis Information Quarterly |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environmental Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNIDO | United Nations Industrial Development Organization |
| UNESCO | United States Agency for International Development |
| WHO | World Health Organization |



## ADDRESSES OF ALL OAU/STRC SCIENTIFIC OFFICES

*Lagos office:*

OAU/STRC Secretariat,
26/28 Marina,
N.P.A. Building, 4th Floor,
P.M.B. 2359,
Lagos,
NIGERIA.
Telephone: 633430, 633289
Cable: TECOAUNG/TECNAFRICA
Telex: 22199 TECOAUNG

*Nairobi office:*

OAU/STRC-IBAR Secretariat,
Inter-African Bureau for Animal Resources,
P.O. Box 30786,
Nairobi,
KENYA.
Telephone: 338544
Cable: IBAR Nairobi
Telex: 22893 Nairobi.

*Yaounde office:*

OAU/STRC-IAPSC Secretariat,
Inter-African Phytosanitary Council,
B.P. 4170,
Nlongkak,
Yaounde,
CAMEROON.
Telephone: 224754
Cable: Technafrique Yaounde
Telex: 8460 KN TECOUARC

*Bangui office:*

OAU/STRC-BIS Secretariat,
Inter-African Bureau for Soils,
P.O. Box 1352,
Bangui,
Central African Republic.
Telephone: 610768
Cable: Technafrique BIS
Telex: 5217

*Ouagadougou office:*
*(Co-ordination)*

OAU/STRC-SAFGRAD Co-ordination Office
JP 31 Safgrad,
B.P. 1783,
Ouagadougou,
BURKINA FASO.
Telephone: 33358 and 33277
Cable: OAU/STRC-SAFGRAD
Telex: 5381 BK

*Conakry office:*
*(Co-ordination)*

OAU/STRC Co-ordination Office
Project for the Integrated Development of the Fouta-Djallon Highlands,
B.P. 1386,
Conakry,
GUINEA.
Telephone: 441395
Cable: OAU/STRC Fouta-Djallon Project
Telex: c/o of UNDP 2147 Conakry.



# Background

The Semi-Arid Food Grain Research and Development (SAFGRAD) Project was established in 1977 with the support of donors and member countries. The Co-ordination Office of the African Unity Scientific, Technical and Research Commission (OAU/STRC) is an implementing agency of the SAFGRAD programme. Since its inception, the SAFGRAD project was designed to mobilize all available research resources, including national and international agricultural research centres in order to improve the production of food grains. Initially, the SAFGRAD project was intended to serve 18 countries but has been extended to provide technical research service to 26 member states.

The thrust of SAFGRAD programme activities consists of:

(a) Co-ordination of regional research;
(b) strengthening of national agricultural research systems; and
(c) facilitating the diffusion and transfer of technology.

The main objectives of the SAFGRAD are to:

(a) Promote improvement in varieties of cereals (sorghum, maize, millet) and grain legumes (cowpeas and groundnuts) as well as cultural practices requiring low-inputs for maximizing yields under semi-arid farming systems in the Sub-Saharan region of Africa.

(b) Co-ordinate regional research among member states. SAFGRAD's collaborative research with international institutes (IITA and ICRISAT) serves as a backstop for generating technology under smallholder farming conditions in semi-arid regions.

(c) Promote the exchange of improved plant material and technical information among member states through regional testing, workshops and monitoring tours.

(d) Strengthen national agricultural research and extension programmes through short- and long-term training, seminars and research inputs. The SAFGRAD project also focuses on improvement in the indigenous research capabilities of member states.

(e) Promote the diffusion and transfer of farm adaptive technology through the Accelerated Crop Production Officers (ACPO) programme (designed to link institutionalized agricultural research with practical extension within the national programmes of member states.

(f) Support national programmes in the development of appropriate farming systems.

## RESEARCH PROGRAMME

SAFGRAD's maize and cowpea improvement programme is contracted to the International Institute of Tropical Agriculture (IITA) where its research activities are conducted at the Burkina Faso Central Experimental Station in Kamboinse.

The sorghum and millet research is contracted to the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). Regionally oriented research on millet improvement is conducted at the ICRISAT Sahelian Centre in Niger. SAFGRAD utilizes the results developed by the Centres in its research networking activities, FSR and the ACPO programme. The SAFGRAD/ICRISAT Collaborative Programme, now being reorganized, is based in Burkina Faso. The East Africa programme, located in Nairobi, co-ordinates sorghum and millet research throughout the region.

Another component of the SAFGRAD project is the Accelerated Crop Production Officer programme which links regional research conducted through SAFGRAD with national agricultural research and extension systems. One of the programme's major activities are pre-extension trials and the introduction of farm adaptive technology through the national agricultural extension system.

SAFGRAD's Farming System Research (FSR) has until now been conducted by Purdue University. IFAD's support will strengthen national FSR in three countries. In due course this new programme will be implemented by the SAFGRAD Co-ordination Office of OAU/STRC.

The SAFGRAD project has set up training workshops in different fields of agricultural development. Short-term courses in crop production are carried out at several national research stations as well as at international agricultural research centres like IITA and ICRISAT. Long-term training as far as M.Sc. and Ph.D. levels is provided by universities.

Following experience gathered from SAFGRAD Phase I, the programme has been refocused to alleviate the major constraints to food grain production. While research will be continued on mandate crops (maize, cowpeas, sorghum, millet and groundnuts) equal priority will be given to researching improvements in soil fertility water conservation and resource management, as well as to strengthening FSR regional research networks covering crop commodities.

# IFAD Supported Activities

## IMPROVEMENT OF RESEARCH CO-ORDINATION

IFAD support for SAFGRAD started in October 1983 with the financing of the post of Director of Research. The mid-term evaluation of the SAFGRAD programme recommended that the project should place greater emphasis on the co-ordination of national and regional research. *With IFAD participation, substantial progress has been made in the improvement of research co-ordination between the national research programmes and those of international agricultural research centres (IITA and ICRISAT).* As soon as the new International Co-ordinator and Director of Research were recruited, a comprehensive review of the project was carried out, and SAFGRAD management mechanisms revitalized. In order to evaluate the SAFGRAD programme as well as to provide policy guidelines, a series of meetings have been held by both the Consultative and Technical Advisory Committees which have been the project's management bodies over the past two years. In addition, regional annual workshops on sorghum and millet, maize and cowpeas have been held in co-operation with IITA, ICRISAT and national research programmes in order to strengthen research networking activities among member countries. Both the FSR and the ACPO programmes were reorganized and given new impetus.

Evaluation of SAFGRAD Phase I, was made between January and March 1984. Since the OAU/STRC management gave priority to this final evaluation of the project, the International Co-ordinator and Director of Research became increasingly involved. Following a series of workshops and programme evaluations the marked improvement in research co-ordinating capacity as well as in SAFGRAD's technology promotion and transfer activities became evident. A SAFGRAD Master Plan was prepared after the Consultative Committee mandated the document at its 3rd meeting in April 1984. Then an outline of the SAFGRAD Master Plan was discussed at various technical meetings. At the same time an independent study was made by the consultants to identify constraints to research co-ordination and technology transfer. The details of this study are included in their report: "Framework for the Long-Term Planning of SAFGRAD". At the recent technical workshop for directors of research and senior scientists the SAFGRAD Master Plan and the consultant's report together with other relevant technical research programmes were discussed. The final document of the Master Plan, was discussed at the recent extraordinary Consultative Committee meeting (19–22 August 1985). The Committee has further called upon OAU/STRC to translate the various research areas identified in this document into definitive projects.

## RESEARCH NETWORKS

The participation of IFAD has meant that SAFGRAD can now play a key role in co-ordinating some of the following research activities. SAFGRAD's support for research networks aims at the improvement of the indigenous research capacities of member countries (networking) so that in the long-term national scientists themselves can direct and administer the regional co-operative research programme.

## NETWORKING ACTIVITIES

*Maize and cowpeas:* This regional research programme involves the introduction and evaluation of agronomic practices and improved elite varieties. The regional maize and cowpea improvement programme was started in 1979 through the IITA/SAFGRAD collaborative programme. At present, more than 23 SAFGRAD member countries from West, Central and East Africa are participating in the programme. Every year results from each national programme are evaluated at the annual workshop. In order to provide experience for national researchers, a monitoring tour to selected national research programmes is conducted

by a team of scientists from member countries and SAFGRAD/IITA researchers. Monitoring tours allow national research scientists to evaluate research materials and also to establish research contacts. In this way they can appreciate team work in regional research.

*Sorghum and millet regional trials:* Through the SAFGRAD/ICRISAT collaborative research programme, two regional research activities were organized. The sorghum and millet improvement programme of East Africa was initiated in 1982. Twelve countries, including North and South Yemen, participated in the evaluation of regional nursery and elite sorghum materials developed by stronger national research programmes such as those in Sudan, Ethiopia, and Uganda, also using materials developed by ICRISAT and research centres in USA, Mexico, etc. As a result of the operation promising varieties in different ecological zones (high altitude, low to medium elevation and dry-low land areas) were identified by the participating national research programmes.

The West African sorghum regional research network was initiated in 1984. The focus of regional co-operation is the improvement of this crop for Sahelian—Sudano and Guinea Savanna zones. About 18 SAFGRAD member countries, including the Sahel, are participating in the programme. Unlike other regional research programmes, SAFGRAD, as an OAU/STRC agency, links up the co-operating national research programmes of anglophone and francophone countries. At the same time, SAFGRAD serves as an effective mechanism for channelling technology realized by its collaborative programmes with IITA, ICRISAT, etc.

## TECHNOLOGY TRANSFER

When the results of research have been widely adopted by the farmers there is likely to be a boost in the production of food grain. However, with a shortage of input resources, and bearing in mind the existing inter-institutional barriers inhibiting technology transfer in every SAFGRAD member country, both the type of technology and the right approach to technology transfer call for simplification. For example, crop production technologies requiring high input management are obviously unsuited to small farmers in the semi-arid regions of tropical Africa. The ACPO programme is SAFGRAD's simplified approach since it speeds up the presentation of innovation to farmers through pre-extension on-farm multiplication trials. ACPO network activities were started in 1984 on the assumption that further donor funds would be obtained to extend the programme into countries requesting it. Annual workshops and field days on the lines of the ones held last year in Mali, Senegal, Burkina Faso, Togo and Cameroon are to continue, since they bring together the farmers, national researchers and extension agents, as well as scientists from ICRISAT, IITA and the SAFGRAD member countries.

## FSR NETWORKS

With support from bilateral aid, Farming Systems Research has been initiated in various SAFGRAD member countries. The conceptual framework, approach and components of FSR programmes vary from country to country. Employment of similar FSR methodology in different sites will naturally lead to research results applying to a specific location. As a research co-ordinating agency, SAFGRAD can initiate regional FSR networking activities among member countries in order to exchange technical information, compare methodologies and approaches and eventually develop appropriate farming systems for farmers in the semi-arid regions of tropical Africa. Provided there is adequate funding for FSR networking IFAD-supported FSR programmes would then become the nucleus for initiating such activities in 1986.

## PROGRESS IN IMPLEMENTING IFAD-FUNDED FSR PROGRAMMES

The main purpose of the FSR programme is to develop an understanding of the total farm environment and systems of

production, thereby facilitating a transfer of innovations through identification of major constraints and alleviating them through the constant evaluation of research and technology. A holistic approach to farming system practice could also facilitate lasting linkages between researchers, extension agents and farmers. FSR also has an important role to play in keeping policy-makers and planners informed on farm policy issues that require changes or modifications at national and regional level.

The overall objectives of the FSR are:

(a) To identify research gaps and provide support to national FSR programmes so that they become operational, or strengthen existing programmes in areas with deficient research;

(b) to facilitate multidisciplinary research programmes;

(c) to develop sets of specific farming practices to sustain high yields under smallholder conditions;

(d) to help train scientific research and technical staff for national FSR programmes;

(e) to improve linkages between national research and extension programme activities;

(f) to provide general guidance on FSR (through workshops and seminars) in relation to core agricultural research and extension activities of national programmes; and

(g) to facilitate the co-ordination of regionally oriented FSR networks.

## ACHIEVEMENTS

The first year of IFAD's support to SAFGRAD signalled the improvement of SAFGRAD's co-ordination capacity, while the following actions were taken to initiate the FSR programme:

(a) *Fielding of consultants*—The search for experienced consultants began in August 1983 and by mid-January, three consultants commenced work. From 14 to 28 January 1984, the Director of Research accompanied the consultants on a study tour of Mali, Senegal and Nigeria (IITA headquarters in Ibadan). The consultants' report, received on 21 February 1984, became the instrument for the IFAD supported FSR programme.

(b) *The Project Management Committee (PMC)*—According to the IFAD-FSR original document, the PMC was set up by OAU/STRC. It is composed of member governments, IITA, ICRISAT, FSU/SAFGRAD, FAO, USAID, IFAD and the Co-ordination Office. The Committee, which is responsible for the technical and administrative review of the FSR programme, met three times and provided guidance for programme implementation, staff recruitment, employment policy, etc. The PMC local committee met four times to overview the progress of the work and staff recruitment problems and management in general.

(c) *Recruitment of FSR Professional Staff*—Through a continuous dialogue, based on the interests shown by host countries, the PMC's second meeting indicated the guidelines for the forthcoming FSR programme in Burkina Faso, Benin and Cameroon. Vacancy announcements were sent to over 34 institutions in more than 20 countries to recruit professional research scientists. A search committee composed of SAFGRAD officers, team leaders and IITA, ICRISAT and FSU Scientists screened over one hundred applicants after which a short-list of candidates was drawn up and submitted to IFAD and OAU/STRC for approval. Out of 16 short-listed candidates, 13 appeared for the inverview at ADB in Abidjan on 3–4 December 1984. At the follow-up meeting of the Project Management Committee it was recommended that OAU/STRC employ the selected candidates. Between March and August 1985, six scientists had accepted the offers: an agricultural economist, a soil scientist and an animal production specialist for Burkina Faso; an agricultural economist and a soil scientist for Cameroon FSR and one agronomist for the Republic of Benin FSR programme. The agricultural economist assigned

for Benin FSR is yet to assume duty. Until the protocol of the agreement between OAU/STRC and the Republic of Cameroon to support FSR is signed, one agricultural economist will be temporarily based in Benin to conduct on-farm exploratory base line surveys.



# FSR Programmes for 1985

Some of the scientific staff recruited for FSR joined SAFGRAD in March 1985. Since the protocols of agreement between OAU/STRC and the governments of Burkina Faso and the People's Republic of Benin had been signed, the FSR programme had commenced in these two countries.

## THE BURKINA FASO FSR PROGRAMME FOR 1985

### Background

The goal of the programme is to enable smallholder farmers to produce surplus food and improve the productivity of natural resources. Therefore, the constraints limiting agricultural productivity must be ranked in order of priority. The farmer's objective conditions must be met by the programme to permit a more efficient use of locally available resources.

### Constraints

The major constraints for crop production are the low level of soil fertility and an inadequate and unreliable rainfall pattern. The low level of crop productivity will adversely affect livestock production. Of the main factors limiting animal production in the region the most important are water and the availability and quality of feed. Crop residues and dry grass pastures are the major sources of feed for most of the year. The poor quality of these feed sources (low Nitrogen and high fibre content) results in low animal productivity, including draft power.

### Approach

Agricultural productivity in the area can be improved through management practices that promote water conservation and soil fertility, taking advantage of the symbiotic relationships existing between crop/livestock/agro-forestry subsystems.

The following systems can improve agricultural productivity in the area:

(a) Cereal/legume intercropping;
(b) recycling organic matter, use of local fertilizer sources (e.g. Burkina phosphate) and chemical fertilizers;
(c) tillage practices that increase soil moisture storage and control weed growth;
(d) introduction of leguminous forages and improvement of natural pastures on fallow land for animal feed supplement;
(e) conservation of crop residues, grass and legume forages for animal feed in the dry season;
(f) inter-field planting of selected multipurpose legume shrubs and trees for fuel wood, soil erosion control and animal feed;
(g) construction of low cost erosion structures; and
(h) increase of water resources by collecting runoff and, where feasible, use of shallow subterranean water.

There are linkages between different subsystems leading to joint intervention measures covering livestock, crop and forage components (e.g. output from one component may serve as a production input factor in another).

**Implementation**

The following procedures were recommended for the planning of effective long-term interventions:

(a) review of existing data in Burkina Faso on soil/water and livestock/forage production;
(b) *selection of 3–4 village* test sites, with an area large enough for integrated research and representing major environmental and management complexes; and
(c) the conducting of back-up experiments on the research station.

**Research Programme for 1985**

In order to take advantage of the summer rainy season trials were started which reflect the programme's long-term objectives but require only a brief preparation.



**Research Sites**

*Three village sites where Farming Systems Research activities had already been conducted (FSU/SAFGRAD) were chosen.* These are Nedogo, located 30 km to the north-west, Poedogo, 130 km to the south-east, and Diapangou, 210 km east of Ouagadougou respectively. All three villages lie within the Sudanian zone; however, rainfall is highly variable and at times the sites indicate Sahelian characteristics. Soil erosion is a significant problem in all three villages.

(a) *Nedogo*
  (i) Long-term (24 years) average rainfall 809 mm/yr (compared with 452 mm in 1984);
  (ii) intensive land use with little fallow area; and
  (iii) crop production is the major component.
(b) *Poedogo*
  (i) Long-term (24 years) average rainfall 905 mm/yr (1984—633 mm);
  (ii) sizeable fallow area reserved for grazing;
  (iii) settled agriculture with some mixed farming; and
  (iv) presence of trees with scattered leguminous species, such as Acacia albida and Nyeri.
(c) *Diapangou*
  (i) Long-term (58 years) average rainfall 865 mm/yr (1984—458 mm);
  (ii) abundant land—sizeable fallow area and tree cover;
  (iii) shifting cultivation practices; and
  (iv) mixed farming prevalent.

Diapangou has the widest range of agricultural production systems followed by Poedogo.

**Research Station**

Preliminary investigation on the establishment of legume forage has begun in Kamboinse. More intensive research is anticipated in the coming year in one or more of the national research stations so that adequate research and laboratory facilities are necessary.

**Organizing the national FSR team**

A series of meetings were held between SAFGRAD and the scientists of the National Agricultural Research Institute of Burkina Faso (IBRAZ). The local technical committee agreed to limit FSR activities for 1985 to the three former Farming Systems Unit villages. This decision was based:

(a) on available socio-economic and agronomic data; and

(b) the opportunity to take advantage of the 1985 rainy season.

It was noted that future FSR activities at new villages will be determined by data arising from field surveys as soon as the agricultural economist joins the FSR team.

Although FSR was carried out in Burkina Faso (through various sources of bilateral aid including ICRISAT, IRAT, FSU/SAFGRAD, etc.) during the last decade, an integrated national FSR team programme was realized on IFAD funding and technical assistance support. The new national FSR headquarters is now based at the Komboinse Agricultural Research Centre. The FSR team consists of national SAFGRAD/FSR research scientists. In consultation with various officials and the national FSR co-ordinator, an administrative framework was developed which included financial disbursement procedures and management.

**Programme**

It is clear from previous studies, that the regional food production problem should be associated with a long-term plan to restore soil fertility through integration of crop and livestock systems, agroforestry, soil fertility and conservation, and water management. The preliminary investigations outlined below were implemented during the 1985 growing season for which field data is currently being collected for further analysis.

Based on the recommendations of IFAD consultants, this programme was designed for the gradual restoration of soil fertility, the recycling of resources and the interdependence of the crop and livestock production systems. One of the initial steps was the selection of a site that could to some extent fulfill the following characteristics:



(a) prevalence of major food production constraints;

(b) suitability for long-term controlled observations and interventions;

(c) suitability for integrated FSR activities; and

(d) interest among farmers in the solution of food grain production problems.

**Features of the Site Chosen**

The agricultural system in the area is diversified as follows:

(a) adjacent fields with varying land use intensities, e.g.:
  (i) bush land;
  (ii) land recently cleared for cultivation;
  (iii) land cultivated for less than seven years; and
  (iv) land recently abandoned to be rested for seven years.

(b) land under crop-livestock integration where the livestock management system also shows varying intensities, e.g.:
  (i) grazing on bushland adjacent to crop fields during the cropping season; and
  (ii) controlled feeding with crop residues around the dwellings.

(c) the mechanization level ranges from simple hand tools to animal drawn implements and even tractor hiring.

Some of the physical constraints limiting increase in agricultural productivity are visible, i.e.:

(a) degradation of soil fertility;

(b) poor soil and water management;

(c) limited feed availability and low animal productivity; and

(d) forest degradation.

Farmers expressed their need for many of the interventions (e.g. feed and water conservation). One of the reasons they gave for not adopting these practices was lack of "know-how". They are willing to co-operate by trying new methods to improve the environment. These views were common to all the villages visited.

Proximity to development institutions, i.e. Rural Development of the Ministry of Agriculture and the Department of Forestry.

Considering the negative effects of an extensive shifting cultivation on an environment with increasing population, self-reliant integrated research capable of transforming abandoned land into a productive resource will strongly influence farmers to adopt techniques for intensive land use through the recycling of resources.

It is assumed that integrated research work at these and other future village sites will be supported by more basic controlled research on the stations, i.e. at Kamboinse and Saria.

**Livestock Component: Investigation of Feed Resources for the Crop-Livestock Production System in Burkina Faso (BF)**

*Background and Justification*

In the central plateau of Burkina Faso there is more emphasis on production of food crops than livestock in the farming system. The farmers own a substantial percentage of livestock (30% of the total population, CID 1978), usually entrusted to pastoralists. However, they still keep small ruminants on their holdings throughout the year, probably because of the low demand for feed and the minimum management required for rearing goats and sheep. To some extent this indicates the existence of the crop/livestock combination in the farming system. The benefits of this combination are realized through:

(a) The feeding of ruminants with crop residues and wild plants, as well as pasture on land not used for crop production;

(b) the draft power contribution of large ruminants as well as manure for fertilizing crops, as in Boromo (due primarily to the commercial cotton production) and in Djibo where manure is, on the whole, easily available (Jaeger, 1984).

However, despite the orientation and recognition of benefits to be realized by crop and livestock integration, the system is not used to any great enough extent. The integration of crop and livestock could open up the possibility of intensifying production and improving the potential of the natural environment.



Of the various factors that limit the production of animals in this environment, water and feed availability and quality are obviously by far the most important. The farmers do not appear to give due importance to the incorporation of forage crops in the system. It is almost too much to expect the farmers to willingly convert part of their land under food crops for forage production. They will have to be clearly shown the economic benefits that can be realized, and the inputs within their reach, before they consider adopting this system.

One of the major objectives of the programme is to investigate the feasibility of increasing livestock production in the farming system with the animals providing food, draft power and wealth as well as contributing to soil fertility.

This involves the introduction of leguminous and other forage crops as a mechanism to speed-up soil fertility and serve as a source of nutrition for the livestock.

The farmers are accustomed to providing supplementary feed for their animals, mainly draft animals. Of those who own livestock, 88%, 82% and 87% of Mossi, Gourmantche and BIssa, respectively, are known to provide their animals with some form of supplements such as sorghum, millet, groundnut and bean haulms (Vengroff, 1980). Although most of them produce the crop residues on their own farms, some are known to buy them (Z. Chantal, "personal communication"). Jaeger (1984) also noted that nearly all the farmers targeted in his study were feeding at least some cereals (50 kg/animal) to their draft animals. The farmers also devote time to collecting wild plants to feed the animals during the dry season (*Ibid*).

For most of the year the main source of feed consists of fallow fields. Although crop residues are highly valued as supplements during the dry season, utilization by the animals can never be important enough to improve animals' productivity beyond maintenance level due to the low N content. Similarly, the dry/mature grass pastures are cellulosic in nature with low N content. This could explain why a substantial amount of the pasture, both in the bush and on fallow fields, does not appear to be completely utilized by the animals during this time of year. Animals fed on these types of materials as their sole diet may be expected to show

low dry matter intake with decline in live weight.

There is evidence that the intake of such materials may be influenced by the rate at which rumen fermentation proceeds. For optimum or maximum fermentation on a given diet a certain level of $NH_3$ (ammonia) concentration in the rumen is required. The above two forms of diets cannot be expected to supply an adequate amount of nitrogen (N) to satisfy the requirements of the microbes in the rumen. Therefore, an additional source of N supplement is essential to improve the utilization of available feeds and increase the animals' productivity.

Fallow fields could be used as a "springboard" to introduce forage crops, particularly legumes, to supplement all year round production and particularly dry season feeding. The introduction of leguminous forages would allow:

(a) an increase in the use of animal products (meat and milk) by the farming communities;

(b) an increase in the use of draft animals with more efficient utilization of labour through better scheduling. This may eventually result in increased crop and livestock production; and

(c) the feeding of animals in stalls or in some form of enclosure to facilitate collection and production of manure and compost for the recycling of organic matter, gradually leading to an increase in food production.

Based on the above practice, a preliminary investigation will be conducted on various aspects of feed resources at farm level in the villages of Diapangou, Nedogo and Poedogo.

*Experiment at Diapangou Village*

Priority is being given to tests which will estimate the influence of certain leguminous forages on the content of nutrients in recently abandoned land. During this season intervention will be low-scale and concern only annual legumes with known performance. They are: cowpeas (dual purpose), dolichos and crotoloria which have been tried out as intercrops or monocrops. Stylos (humilis), which is being produced on a large scale for seed production at Farakoba, will be included because of its expected



adaptability to the conditions and minimum establishment requirements.

Perennial legume and grass forage crops for feed, soil fertility, building and mulching will also be introduced. This year's work will initiate the establishment of the plants. Forages and shrubs will be selected in consultation with IRBET, FAO, CILSS, etc.

The influence on animal performance through supplementing crop residues with conserved forages will be assessed in stall feeding (or in some sort of enclosure) during the dry season. This is expected to allow for the proper collection and composting of manure so that it can be recycled for soil fertility amelioration work during the next growing season.

**Establishment of Annual Forage Legumes on Recently Abandoned Land and Assessment of their Nutritive Value at Different Stages of Growth**

The objectives of this experiment are to establish and introduce leguminous forage crops such as cowpeas, dolichos, crotolaria and stylos planted on recently abandoned land. Their establishment, yield of dry matter (DM) and composition of DM at different stages of growth to determine the optimum stage of cutting for nutrient preservation will be determined.

*Investigation on the Influence of Conserving Forage Legumes and Natural Pasture such as Hay on The Preservation of Nutrients for Dry Season Feeding*

*Objectives*

Availability and quality of feed is the major factor limiting animal productivity in all zones. Four annual forage legumes are being grown on the fallow field and a known area of natural pasture, adjacent to the fallow (which will be reserved for the conservation as hay). The purpose of this investigation is to assess the influence of such conservation practices on the quantity and quality of the supply of nutrients to the animals, particularly during the long dry season.

*Influence of Supplementing Crop Residues with Conserved Forages on Animal Performance During the Dry Season*

*Objectives*

With this investigation it may be possible to:

(a) assess the influence of conserved forages as supplementary feeds on animal productivity;

(b) demonstrate the benefits of stall feeding, or feeding in some form of enclosure, for the collection and increased production of manure and compost;

(c) make an initial assessment of contributions from component, soil, crop and livestock interactions; and

(d) make an initial assessment of the economic benefits from forage production and conservation through animal products and manure production.

This work assumes the availability of animals of a similar physiological nature in order to evaluate parameters statistically. The means of acquiring animals and the possibility of conducting the study under controlled feeding will be investigated up to the commencement of the experiment during the dry season.

At the same time similar leguminous forages will be grown on previously acquired degraded land at Kamboinse to be conserved as hay for feeding trials in the animal shed at the station. Part of the legumes will be incorporated into soils for monitoring soil fertility amelioration.

*Observations on Perennial Forage Legume and Grass Crop Establishment on Abandoned Land*

*Objective*

To observe the establishment of some perennial forage legumes and grasses this season. The materials will be used for future tests on animal feed sources, soil restoration and wind-break purposes.

*Assessment of the Nutritive Value of Natural Pasture on Fallow Fields at Different Stages of Growth*

*Objectives*

As noted earlier substantial amounts of pasture on fallow fields



are left unconsumed by the animals during the dry season because of the possible high cell wall and low nitrogen (N) content of the materials. Cutting trials will be conducted in order to assess the change in the ratio of N and cell wall components and to determine the optimum stage of growth for preservation of the nutrient.

*Harvesting Natural Pasture at the Heading Stage for Conservation as Hay*

*Objective*

To assess the contribution of fallow fields in the supply of nutrients for farm animals.

*Influence on the Supply of Nutrients of Planting Annual Forage Legumes Along the Borders of Cropping Fields*

*Objective*

To assess the possibility of increasing the supply of nutrients, mainly N, through forage legumes grown on the unused part of the cropping field.

*Soil Fertility and Agronomy*

Scarcity of moisture and low soil fertility are among the most important constraints of food grain production in semi-arid regions of tropical Africa. Over the last decade total annual rainfall of the region not only decreased but its distribution was also erratic. Soil productivity has continued to deteriorate as a result of increasing cropping intensity, shifting cultivation, and cultural practices conducive to soil, wind and water erosion. The work plan for the 1985 season was carried out in three villages (Nedogo, Poedogo and Diapangou). The agronomic trials were based on the following recommended practices:

(a) soil-moisture conservation (tied-ridging) and its influence on cereal yields;

(b) application of low input levels—the use of chemical fertilizers to improve yields; and

(c) evaluation of improved varieties at different management level in order to determine economically feasible and acceptable management practices by the small farmer.

*Experiment*

Seven experiments were executed in the three villages and at the Central Agricultural Research Station.

*Soil Fertility Evaluation under Different Land Management Practices*

The objective of this intervention is to evaluate the differences in soil fertility associated with previous land use practices. Long-term monitoring experiments would be carried out based on the results of the first few seasons.

*Millet and Cowpea Association on Recently Abandoned Land*

The purpose of this study is to evaluate yield performances of local millet in association with an improved variety of cowpeas (SUVITA 2) on abandoned land, in order to assess the quantity and quality of forage that could be harvested, to incorporate cowpea and millet residue at the end of the season and monitor the effect on soil rehabilitation for the coming seasons.

*The Effect of Manure Application in Improving the Yield of Millet*

*Objective*

(a) to determine the effect of local fertilizer on the yield of millet; and

(b) to test the residual effect of manure and Volta phosphate.

*Response of Sorghum to Fertilizer and Tied Ridging Treatments*

*Objective*

(a) to evaluate the response of sorghum (ICRISAT white sorghum) to fertilizer with and without tied ridges;



(b) to detect micronutrient deficiency and how far it limits cereal yield.

*Evaluation of Improved Sorghum Varieties at Two Levels of Management*

The purpose of this intervention is to introduce improved management practices within the economic and technological reach of the small farmer.

*Effect of Tied-Ridges and Residual Volta Phosphate on Millet*

The purpose of the study is to determine the residual benefit of Volta phosphate applied in the last three years (1982, 1983, 1984).

*Evaluation of Mechanical Tied-Ridges*

The SAFGRAD/IITA Collaborative Research Programme has introduced tied-ridges formed by a new animal traction implement using donkeys or oxen. This device is in use at several sites. All agronomy and soil-fertility management field-experiments are implemented by the FSR animal improvement component.

## 1985—SAFGRAD/BENIN FSR PROGRAMME (IFAD FUNDED)

### Background

The People's Republic of Benin has an area of 112,600 km$^2$ and a population of about 3·6 million inhabitants. It is situated between latitudes 6° 30′ south and 12° 30′ north, thus stretching across several ecological zones.

The SAFGRAD/BENIN FSR project covers the two northern provinces namely Borgou and Atakora. Borgou province has an area of 51,000 km$^2$ (45% of P.R. of Benin) with a population of 530,000 (1983) inhabitants. While Atakora province has an area of 31,200 km$^2$ with a population of 481,509 (1979) inhabitants. SAFGRAD/BENIN FSR Project activities have been initiated with a total of 7 sites at Ina Research Station in Borgon province, as well as at the Kokka, Bensekou and Birni Lafia villages of, respectively Sinende, Kandi and Karimama districts. In Atakora

province, the sites are at Guilmaro, Koumagou and Koukoulounda villages in the Kouande, Boukoumbe and Ouake districts, respectively. Efforts are also being made to strengthen the Donga Station, an outreach of Ina Research Station in Atakora.

**Short-term Objectives**

Whereas the long-term objectives of the FSR support programme were outlined in the protocol of agreement, the short-term objectives to develop the research activities were:

(a) to conduct an exploratory baseline survey in Kokka, Bensekou, Birni Lafia, Ouake, Guilmaro and Koumagou in order:
  (i) to obtain basic information on the existing crop and livestock production systems;
  (ii) to identify location-specific physical and socio-economic constraints to agricultural production;

(b) to select sites and participating farmers for the purpose of conducting on-farm adaptive agronomic trials in collaboration with national research programmes and the extension service; and

(c) to design agronomic trials directed to address the identified constraints.

**Research Activities in 1985**

In view of what was observed on reconnaissance trips and taking into consideration the proposed FSR methodology in the People's Republic of Benin, it was decided to initiate work along three simultaneous lines, as follows:

(a) socio-economic studies at the six sites. These covered climate and soils, description of basic production systems, consumption pattern and food preferences, farmers priorities and goals, farmers social environment and the farmers production constraints (physical and socio-economic), causes of crop loss or failure, labour constraints and farmers' infrastructural facilities;

(b) researcher managed trials at the six sites; and



(c) trials at Ina Research Station and later at Donga aimed at generating technology for testing in the farmers' fields. These experiments undertake:
  (i) evaluation of the performance of maize and sorghum in pure stand and in association. Planting is done either on the flat or in ridges. Cotton fertilizer (NPK at 150 kg per ha) is being tested on these crops. Both an improved and a local variety serve as test materials;
  (ii) evaluation of the performance of maize and groundnuts in pure stand and in association. These crops are tested either in ridges or on the flat, with or without cotton fertilizer;
  (iii) sorghum and cowpeas are tested in pure stand or in association. As with the other crops the crops are grown either on the ridges or on the flat, with or without fertilization.
  (iv) cotton is a major cash crop in the two northerly provinces of the People's Republic of Benin (Borgou and Atakora). In comparison with the work on food crops cotton research is relatively more advanced and there are certain cultural recommendations which are practiced by the farmers on this crop. Maize is one of the important food crops in this zone. Research findings on maize are relatively scanty and the existing recommendations are not practiced by the farmers. This experiment was initiated with the objective of evaluating the performance of these crops either in pure stand or in association utilizing the fertilizer inputs recommended for cotton, which farmers have accepted.
  In order to avoid undue contradiction between this experiment and the recommendations now being made by the extension staff, it was decided to limit this trial to the Ina Research Station and in future to Donga.

During the reconnaissance trips it was not easy to establish which of the two crops was more important because of their

different roles. It was therefore considered relevant to test these crops under 100% monoculture, each of them then shifting to associations of 50% maize and 50% cotton and thereafter to 75% maize and 25% cotton, or 75% cotton and 25% maize, respectively. This trial has been initiated, fully realizing the implications of the use of herbicides and insecticides currently used on cotton.

The above activities take into account such existing information of long term rainfall data for the various sites.

**Achievements**

In spite of a late start in 1985 there has been positive progress in various areas:

(a) The reconnaissance trips were successful. An inventory was made of farm activities covering crops and the cropping calendar, rainfall quantity and distribution, soils, vegetation, livestock, marketing, credit, source of farm power, existence of research recommendations and the languages spoken. It was observed that:

  (i) most farmers grow cotton in pure stand. Fertilizers are normally applied and insecticides are also used. Few apply herbicides;

  (ii) most food crops are grown in association. The common associations are maize/sorghum, sorghum/groundnuts, maize/groundnuts, sorghum/millet, cassava/maize, sorghum/cowpeas;

  (iii) literally no high energy inputs such as fertilizers are used by the farmers in growing food crops;

  (iv) rainfall onset pattern and distribution is a major factor in determining the planting time of the crops;

  (v) scanty data exist on the performance of local varieties;

  (vi) there is little available technology on food crops which could be directly extended from the research station to farmers;

  (vii) a suitable rotation involving cash and food crops may need to be planned for the Kouande district;



  (viii) there is a serious soil degradation problem in Boukoumbe and a suitable method of soil conservation as well as aspects of agroforestry deserves serious consideration;

  (ix) there seems to be conflicting responses on the use of ridges and cultivating on the flat in both provinces. Studies along these lines merit attention;

  (x) Karimama district faces a serious drought problem. There seems to exist a potential for the introduction of suitable varieties as well as water preservation techniques. Agroforestry studies may also prove useful.

Excellent working relationships have been established with CARDER and the researchers at Ina, as well as collaborating village administrations and farmers—a key element in the effective execution of the programme.

All six observers for the six villages have been recruited and are already in their respective villages. Two observers are temporarily stationed at Ina. The People's Republic of Benin has contributed one full time researcher for the FSR project as well as eight field assistants, four of whom have already reported. The two researchers who are already participating contribute 30% of their time on FSR project activities.

Socio-economic studies have already been initiated in all the six villages.

Researcher managed trials have been established at Ina, Sokka, Bensekou and Birni Lafia in Bourgou Province. These experiments cover maize, sorghum, cowpeas, groundnuts, millet and cotton. Yams and cassava, though important, were left out because it was too late for the planting season. The performance of local varieties, and any existing improved varieties, are being evaluated either on the flat or ridges. The use of cotton fertilizer, which is widely accepted by the farmers for cotton but not for food crops, is being tested. The contribution of green manure to maize yield is also being evaluated.

Field staff training has been completed. This was conducted at Ina during which the field staff were oriented to FSR methodology, socio-economic data collecting, the setting up of

field experiments and techniques of field operations as well as recording.

## CAMEROON

The IFAD supported FSR programme will be initiated by mid-October 1985. An agricultural economist and a soil scientist will be based at Marua Research Station, northern Cameroon. It is to be recalled that the agricultural economist recruited for Cameroon FSR is currently based at Benin to undertake the socio-economic base line surveys.

### Programme

The IFAD-supported FSR programme would be closely integrated with existing research activities so that research scientists at Marua station combine FSR with on-going research. Initially, the programme component will include cropping systems, soil fertility and socio-economic studies. Since one of the most successful of SAFGRAD's Accelerated Crop Production programmes is also based in the same region, complimentary on-farm testing activities with FSR would be planned. Between mid-October and end-December, the agricultural economics and soil scientists recruited for the FSR would initiate socio-economic on-farm surveys to develop the specific FSR programme for the region. In addition, the team would procure supplies and equipment to start the 1986 FSR activities.



# Proposal for 1986 IFAD-supported FSR Programme and Research Co-ordination Activities

### Research Co-ordination

IFAD support for improving the co-ordination of SAFGRAD regional research activities and strengthening the three FSR programmes which commenced in 1985 (Burkina Faso, Benin and Cameroon) is expected to continue. With regard to the co-ordination of SAFGRAD research, the following activities would be carried out:

(a) supervision of FSR programme development and implementation;

(b) monitoring and co-ordinating SAFGRAD collaborative research programmes with ICRISAT (sorghum and millet), IITA (maize and cowpeas), and ICRAF (integrating agro-forestry with on-going IFAD support for FSR programmes) and possibly linking the animal production systems component of SAFGRAD FSR to ILCA activities;

(c) strengthening on-going regional research networks now jointly administered by SAFGRAD and international agricultural research centres, emphasizing improvement in the indigenous research capabilities of member countries;

(d) establishing FSR networks using IFAD-supported FSR as the core programme activities;

(e) co-ordinating and monitoring the activities of the Accelerated Crop Production Officers programme with major emphasis on speeding up the process of technology transfer;

(f) executing in-house annual review and planning of FSR programmes;

(g) organizing the annual FSR workshops (maize and cowpeas in co-operation with IITA, sorghum and millet in co-operation with ICRISAT). All workshops will be organized with the full participation of member countries;

(h) serving as a member of the Secretariat for the planning and organizing of the SAFGRAD Consultative and Technical Advisory Committee Meetings; and

(i) co-ordinating SAFGRAD's direct research support activities with national research programmes.

The IFAD Financial Controller will continue to supervise the disbursement of IFAD and other donor funds provided for SAFGRAD.

## FARMING SYSTEMS RESEARCH CO-ORDINATION

For further elaboration of the FSR programmes in the three respective countries in order to improve approaches and methodologies, FSR's 1986 co-ordinative activities will include:

(a) *An In-house Annual Review and Planning Meeting:* the purpose of this annual meeting is to review the past year's results and also to conduct detailed planning sessions for 1986/87. The participants of this session will consist of national scientists working within the project, SAFGRAD/FSR scientists and one or two invited senior FSR scientists. The inclusion of farmers representatives would also be explored.

(b) *Regional FSR Workshop:* the three countries FSR programmes supported by IFAD will serve initially as core programmes to strengthen FSR networking activities among SAFGRAD member countries. National FSR co-ordinators and scientists from 15 to 20 SAFGRAD member countries would be invited to attend the workshop. The regional annual workshops not only provide mechanisms for reviewing and evaluating research methodologies, but would also help to strengthen the national programmes in the scope and approach of FSR activities. This activity will be augmented by on-site observation in countries where such workshops would be held and by occasional monitoring tours of selected FSR programmes. Occassionally specific themes related to FSR development will be discussed in order to develop and appreciate FSR concepts.



## EVALUATION

FSR Consultants will be appointed to review on-going FSR activities in the three countries. This review mission is expected to be effected by IFAD presently.

## MONITORING THE IMPLEMENTATION OF FSR PROJECTS

The Director of Research will co-ordinate backstopping technical research services for FSR from various programmes including those of ICRISAT, FSR, IITA, CIMMYT/FSR activities in East and Southern Africa and other national FSR programmes. Field visits on project sites have been planned. Progress research reports will be received every six months from the three FSR programmes.

# ICRAF-SAFGRAD Co-operative Research Activities in Agro-Forestry

A substantial population increase is expected to occur in the semi-arid tropical areas of Africa over the next 20 years. The ongoing dilemma of too many people and not enough food will become increasingly serious in the absence of technological breakthrough in food production. Such breakthrough could be attained if combined activities of integrated resource management research are carried out. Woodlot farming, with controlled cutting and harvesting of trees, needs to be started as a component of FSR to ensure the prevention of soil erosion, and water conservation organized through the protection of the landscape.

Through the initiative of IFAD discussions have been held between ICRAF and SAFGRAD to identify potential areas of research co-operation. Most previous FSR programmes in many SAFGRAD countries are relatively narrow in scope and lack a broad resource management approach to farming systems since they are for the most part limited to cropping systems. SAFGRAD/FSR activities would include other components to improve the resource base for productive agriculture in order to sustain increased yields by the farmer. The main objectives of an ICRAF-SAFGRAD co-operation will be to integrate the agroforestry dimension into on-going IFAD-supported FSR programmes (in Burkina Faso, Benin and Cameroon). The purpose of the proposed ICRAF and SAFGRAD collaboration will also be to assist national institutions in strengthening the research capability of participating countries in order to:

(a) evaluate existing land-use systems *vis-à-vis* the potential of agroforestry technologies in order to improve their productivity and/or sustainability;



(b) derive from such evaluation the corresponding agroforestry research projects, designing agroforestry research to generate technologies for overcoming the diagnosed constraints; and

(c) launch the implementation phase of research projects aimed at developing location-specific agroforestry technologies.

Provided funding support is made available for the above-mentioned collaborative research programme, the implementation of the project is visualized as follows:

(a) *Joint activities for Project Initiation:* a detailed research programme for each country would be developed to generate location-specific technologies for initiation within the life of the project. ICRAF will provide backstopping in general, but in particular it will conduct problem identification, research planning and manpower training. SAFGRAD will implement the agroforestry component as integrated activities of FSR through ICRAF's backstop support.

(b) *Staff Recruiting and Development:* ICRAF will assist SAFGRAD in recruitment of three agroforestry scientists to be attached to each country's FSR. The proposed senior scientists as zonal co-ordinator would be based at SAFGRAD headquarters as ICRAF contact person (but with dual responsibility). ICRAF will provide the first 4 to 6 months after recruitment. SAFGRAD would pay their salaries. Most of 1986 activities will therefore include project identification, staff recruitment, manpower training and research design.

## BENIN

The FSR activities are being further elaborated on the basis of field diagnostic studies. The programme development would also be based after analysis of the 1985 results. In general, this year's programme would be fully developed.

### Proposed Activities for 1986

The FSR activities in the R.P. Benin in 1986 will be a continu-

ation of what has been initiated in 1985. These activities will include:

(a) analysis of data from the socio-economic studies as well as field experiments initiated in 1985;

(b) studies on root crops especially cassava and yam will be initiated;

(c) review of the available technologies and their constraints will be continued;

(d) researcher managed trials at Ina, Donga as well as the six sites in Borgu and Atakora Provinces initiated in 1985 will be continued;

(e) Additions will be made to:

  (i) rotation and soil/water studies;

  (ii) agroforestry studies:
  - a collection of tree species from the R.P. Benin will be initiated. These will be screened on their suitability for the cropping pattern, bearing in mind their use regarding either soil fertility or forages;
  - on-farm trials where some of the best known promising species will be initiated;

(f) the strengthening of research facilities at Ina and Donga station will be continued; and

(g) a plan for the training of one M.Sc. and two technicians.

## RESEARCH PROGRAMME FOR 1986. BURKINA FASO

The research programme for 1986 will be carried out on selected village sites and on research stations. At least one of the villages from 1985 will be retained in the programme. Selection of village sites based on a reconnaissance survey will be carried out during the remaining part of 1985.

The following activities are planned:

(a) Socio-Economic Studies.
The new member of the FSR team, an agro-economist who joined SAFGRAD recently, will elaborate the socio-economic research work. This could focus on identification of constraints in specific locations; economic feasibility and the likelihood of the adoption of recommended practices or technologies. Based on the diagnosis of prevailing constraints through field on-farm surveys, FSR programmes would be designed for new village sites.

(b) Soils and Agronomic Component.
Soil fertility status will be investigated under different land management practices. This will continue from 1985. Intensity of soil sampling and analysis will be worked out based on the results of the previous year. This study will help relate the soil fertility condition to management practices and land use intensity which could indicate identification and/or alteration of indigenous soil restoration practices.

Soil moisture regime will be studied on selected village locations. The objective is to measure the soil moisture changes in time and the relation to rainfall quantity and pattern and critical times of moisture stress for crop growth can be delineated. The relevant physical properties of soil will also be monitored.

Soil erosion and water runoff will be evaluated under different conservation practices. The conservation practices include low cost terraces, vegetated strips or mulch cover. This long-term study will be conducted on research stations and in one or two village sites. Evaluation will include measurement of soil and water loss; the assessment of cost and time required to install conservation structures or measures, and their effect on crop growth.

### Crop variety adaptability trials

This is an ongoing study to evaluate the performance of traditional varieties by agronomy researchers. The evaluation will focus on adaptability to specific sites, yield and yield components, farmers' acceptance and input requirements. The varieties included for testing will be decided on consultation with collaborating institutes.

*Cereal/legume intercropping experiments*

Cereal/legume association cropping for 1985 is being conducted on fallow fields. The cereals are millet and sorghum. Legumes include cowpeas, bambara nuts, pigeon peas, *phaseolus aureus* and *crotolaria*. Based on this year's results and observations of farmer's practices some trials will be continued in several locations in 1986.

Cereal/legume rotation experiment will be initiated at Kamboinse Research Station.

*Long-term effect of manure and Burkina phosphate on cereal yields*

This investigation will be continued to assess the cumulative effect of additions to the inputs on millet yield. Sorghum and maize will receive similar treatment.

Evaluation of tillage practices on soil moisture storage and crop yield. (At research station and one village site.)

A comparison of various tillage implements and ploughing time on soil moisture storage and crop yields will be studied. The implements under consideration are the "daba" (hoe), traditional plough, animal drawn moldboard and the rented tractor operation.

*Ploughing during pre-season rains*
*Ploughing at planting time*

The details are still to be finalized.

Runoff collection (one or two village sites) and shallow ground well digging (one or two sites).

The feasibility of supplementing the water supply for dry season animal watering and nursery seedlings will be evaluated. The possibility for limited supplemental irrigation at critical crop growth stages (e.g. flower-grain formation) will be examined.

**Animal Production Systems**

Integrated tests on the productivity of forages for animal feed, soil fertility and structure improvement will be continued on the basis of the results of the 1985 trials.

*Site:* on STATION and SPECIFIC village sites.



Studies to establish a system for fattening draft ruminant draft animals with the locally available feed resources.

*Site:* on STATION and SPECIFIC village sites.

Studies to establish a system for fattening draft animals after the main working period.

*Site:* on STATION and SPECIFIC village sites.

Investigation of the effect of feeding crop residues supplemented with conserved forages on the performance of indigenous cows (Maure and Peul) at different physiological conditions.

*Site:* on STATION.

Comparisons between indigenous lactating cows and oxen in regard to draft power and product output on a basic diet of crop residue supplemented with conserved leguminous forages.

*Site:* on STATION.

Studies on the nutrition and productivity of sheep and goats using locally available feed resources.

*Site:* on STATION and SPECIFIC village sites.

Preliminary investigations on the Nitrogen contribution of leguminous forages from abandoned land compared to the Nitrogen needs of animals and subsequent cereal crops.

*Site:* on STATION and SPECIFIC village sites.

Investigations on the bio-degradability of the Nitrogen components of forages in the rumen to improve the utilization of crop residues by ruminant animals.

*Site:* on STATION.

All feeding trials will be made in stalls or in some form of enclosures to allow for the collection and management of manure for work in soil amelioration.

Tests on forage adaptability and productivity will incorporate new recommended species including shrubs (as part of the AF work). Special emphasis will be given to indigenous species.

*Comments*

The time available for planning activities for 1986 is relatively short but the above listed proposals are based on the limited experience gained since the arrival of new crops and reflect only the Sahelian-Sudanese zone. The Sahel zone, where immediate

action is needed, will be studied and new sites selected. The proposals, therefore, may have to be modified and detailed at a later date.

## CAMEROON FSR—1986 (AT ELABORATION STAGE)

As pointed out earlier, the FSR programme shall be initiated during the last three months of 1985. Initially, the programme components would include:

*Cropping Systems*

(a) Socio-economic on-farm studies would be made to acquire a fuller understanding of the agricultural system in order to design the relevant FSR programme;

(b) Elaborated integrated soil fertility and management research would be carried out using the major food grains and other important staple food crops.

An agricultural economist and soil scientists were recruited and will be based at Marua Research Station in Northern Cameroon. Although the detailed FSR programme will soon be elaborated the projected schedule of programme activities is as follows:

| | *1985/1986* |
|---|---|
| Completion of Socio-economic base line surveys for proper diagnosis of constraints | November–February |
| Training of Field Technical Staff | January |
| Technology Review | February |
| Design and formulation of farm adaptive research | February–March |
| Project Implementation | April–July |
| Workshop | August–September |
| Data collection and analysis | October–November |



# Budget Proposal—1986

The proposed budget reflects the needs of the programme. Seven international staff members will provide technical support for FSR programmes in Burkina Faso, Benin and Cameroon. The Director of Research and Financial Controller based at the SAFGRAD Co-ordination Office have improved the Co-ordination of regionally oriented research and FSR activities among SAFGRAD member countries. Budget support to implement the various FSR programmes at field level is necessary. More funds will be required to improve national research facilities where IFAD-FSR programmes are being implemented. The limited funds allocated for training local personnel need to be increased in order to ensure that on-going FSR will be self-sustaining (by local support) in the long term.

1986 Budget Request for IFAD-Supported FSR and Research Co-ordination Office within SAFGRAD Project (US$ 000)

| *Budget Item* | *Co-ordin. Office* | *Benin* | *Burkina Faso* | *Cameroon* | *Total* |
|---|---|---|---|---|---|
| *International Staff* | | | | | |
| Research Director | 56 | – | – | – | 56·0 |
| Financial Controller | 50 | – | – | – | 50·0 |
| Agric. Economist (3) | – | 50 | 50 | 50 | 150·0 |
| Soil Scientist (2) | – | – | 50 | 50 | 100·0 |
| Agronomist (1) | – | 50 | – | – | 50·0 |
| Animal Prod. Spec. (1) | – | – | 50 | – | 50·0 |
| Agroforestry (3) | – | 20 | 20 | 20 | 60·0 |
| Adm. Sect. (1) | 23 | – | – | – | 23·0 |
| | | | | | 539·0 |

| *Budget Item* | *Co-ordin. Office* | *Benin* | *Burkina Faso* | *Cameroon* | *Total* |
|---|---|---|---|---|---|
| *Local Personnel* | | | | | |
| Research Associates (9) | – | 13·0 | 13·0 | 13·0 | 39·0 |
| Enqueteurs (9) | – | 10·0 | 10·0 | 10·0 | 30·0 |
| Field Assistants (15) | – | 9·0 | 9·0 | 9·0 | 27·0 |
| Secretaries (5) | 12 | 4·8 | 4·8 | 4·8 | 26·4 |
| Acct. Clerks (4) | 3·6 | 3·6 | 3·6 | 3·6 | 14·4 |
| Drivers (8) | 4·8 | 6·2 | 4·8 | 4·8 | 20·6 |
| | | | | | 157·4 |
| *Operational Expenses* | | | | | |
| Inputs, etc. | – | 16 | 16 | 16 | 48·0 |
| Supp. & Communications | 10 | 4 | 6 | 5 | 25·0 |
| Fuel & Maintenance | 8 | 10 | 10 | 10 | 38·00 |
| | | | | | 111·0 |
| *Equipment* | | | | | |
| Vehicles (5) | – | 8 | 8 | 24 | 40.0 |
| Motorcycles (7) | – | 2·4 | 2·4 | 3·6 | 8·4 |
| Farm equipment | – | 20·3 | 20·3 | 20·3 | 60·9 |
| Lab Equipment | – | – | 8·0 | 5·0 | 13·0 |
| Office Equipment | – | 4·0 | 6·0 | 10·0 | 20·0 |
| | | | | | 142·3 |
| *FSR Co-ordination & Networking* | | | | | |
| In-House Planning Reviews | 10 | – | – | – | 10·0 |
| Regional Workshop | 30 | – | – | – | 30·0 |
| Training | – | 25 | 25 | 25 | 75·0 |
| | | | | | 115·0 |
| *Travel* | | | | | |
| Local (300) | 1 | 5 | 6 | 6 | 18·0 |
| International (40) | 14 | 8 | 10 | 18 | 40·0 |
| | | | | | 58·0 |
| *Consultancy* | 45·2 | – | – | – | 45·2 |
| Base Cost | | | | | 1167·9 |
| Contingency | | | | | 32·1 |
| Total Cost | | | | | US$ 1,200·0 |



# List of Donors

## BENEFACTIONS AND GRANTS TO OAU/STRC AND ITS OFFICES

In addition to the regular budget which originates from contributions from member states the OAU/STRC received technical assistance and grants from various donors and organizations for implementation of its projects:

**USAID (United States Agency for International Development)**

USAID has been the main donor to the SAFGRAD project since its inception in 1977. It has financed the project which has gained momentum in the semi-arid regions of Africa. USAID has also given assistance to ISNAR for Agricultural Management Training for African Research Directors in Southern Africa.

**IFAD (International Fund for Agricultural Development)**

Headquartered in Rome has provided technical assistance grants for farming systems research components of the SAFGRAD project in Ouagadougou and the Agricultural Management Training in Africa (AMTA).

SAFGRAD (Semi-Arid Food Grain Research and Development) is a project which is implemented in 25 countries of the semi-arid region of Africa with headquarters in Ouagadougou. Its main objectives are to improve the following three cereal crops (millet, sorghum and maize) and two leguminous plant crops (cowpeas and groundnuts).

**EEC (European Economic Commission)**

An International Co-ordinator has been fully supported and consultants from EEC have been put at the disposal of the OAU/STRC/IBAR Office in Nairobi for the Rinderpest Campaign to start in 1986.

**Government of France**

The Government of France has provided a technical expert as the accelerated crop production officer for the SAFGRAD Togo programme. The Government has also undertaken the complete translation of the First African Pharmacopoeia into French and supported the participation of 3 French experts to the symposium on virus associated cancer in Africa.

**FAO—TCP**

The Africa-Wide Biological Control Project on Cassava Pests which is to start presently, will enjoy the services of technical experts fully supported by FAO. Considerable support has also been provided by FAO for the Rinderpest Campaign which is being supervised by the IBAR Office. The level of the support is now gaining momentum.

**Donations received towards support of OAU/STRC meetings**

WHO, IARC, Institut Pasteur Production, Government of France and UNEP made significant contributions to the OAU/STRC meeting on "Virus Associated Cancers in Africa" held in Nairobi, Kenya, from 24–29 April 1984.

The International Agency for Cancer Research (WHO) of Lyon supported the participation of several experts at this meeting, provided editorial facilities for the publication of the proceedings and has arranged for the publication of the proceedings by Oxford University Press in New York. The Government of France, through the Ministry of Co-operation, supported the participation of three experts from France. One of these experts was a consultant for the organization of the meeting and a co-editor of the proceedings. The UNEP (United Nations Environmental Programme) supported three experts to this meeting. One of the experts supported by UNEP is a Nobel Laureate, Dr. Blumberg.

Institut Pasteur Production (Marnes la Coquette) France supported the participation of several delegates including experts from the Institute and also gave a donation towards the organization of the meeting.

The World Health Organization (Africa Region) supported the participation of nine African experts and also gave a donation towards the organization of the meeting.

The OAU/STRC gratefully acknowledges the contributions and co-operation of all the above named donors which predisposed to a highly successful meeting. The 770 page proceedings has already appeared in print. Copies can be obtained from the publishers, O.U.P. (Oxford University Press) New York, the OAU/STRC Office in Lagos or the IARC (WHO) Office in Lyon, France.

# OAU/STRC LAGOS STAFF AND SAFGRAD INTERNATIONAL STAFF

| *Position* | *Name* | *Nationality* | *Co-operator* | *Donor* | *Location* |
|---|---|---|---|---|---|
| Executive Secretary | A. O. Williams | Nigerian | OAU/STRC | OAU | Lagos |
| Assistant Executive Secretary | A. Johnson | Togolese | OAU/STRC | OAU | Lagos |
| Scientific Officer | M. Akle | Beninois | OAU/STRC | OAU | Lagos |
| *Co-ordination Office* | | | | | |
| International Co-ordinator | J. M. Menyonga | Cameroonian | OAU/STRC | USAID | Ouagadougou |
| Director of Research | Taye Bezuneh | Ethiopian | OAU/STRC | IFAD | Ouagadougou |
| Financial Controller | E. A. Odonkor | Ghanaian | OAU/STRC | IFAD | Ouagadougou |
| Accountant | E. A. Adanlete | Togolese | OAU/STRC | USAID | Ouagadougou |
| Administrative Assistant | M. A. Briggs | Gambian | OAU/STRC | IFAD | Oaugadougou |
| Project Manager[1] | A. Fleming | American | PASA | USAID | Ouagadougou |
| *ITA/SAFGRAD* | | | | | |
| Team Leader (Maize Agronomist) | M. Rodriguez | Colombian | IITA | USAID | Kamboinse |
| Cowpea Agronomist | N. Muleba | Zairean | IITA | USAID | Kamboinse |
| Cowpea Breeder | V. D. Aggarwal | Indian | IITA | IDRC/IITA | Kamboinse |
| Entomologist | J. B. Suh | Cameroonian | IITA | USAID | Kamboinse |
| Maize Breeder | A. O. Diallo | Guinean | IITA | USAID | Kamboinse |
| Soil Scientist | H. R. Hulugalle | Sri Lankan | IITA | USAID | Kamboinse |

[1] As at 1 August, 1985.

| *Position* | *Name* | *Nationality* | *Co-operator* | *Donor* | *Location* |
|---|---|---|---|---|---|
| *ICRISAT/SAFGRAD* | | | | | |
| Sorghum/Millet Co-ordinator[2] | B. Gebrekidan | Ethiopian | ICRISAT | USAID | Nairobi |
| Sorghum Breeder | D. S. Murty | Indian | ICRISAT | USAID | Kamboinse |
| *FSU/SAFGRAD* | | | | | |
| Team Leader (Agronomist) | H. W. Ohm | American | PURDUE UNIV. | USAID | Ouagadougou |
| Agricultural Economist | J. Nagy | American | PURDUE UNIV. | USAID | Ouagadougou |
| *FSR Programme* | | | | | |
| Soil Scientist | T. Kibreab | Ethiopian | BURKINA FASO | IFAD | Kamboinse |
| Animal Prod. Specialist | Kassu Yilala | Ethiopian | BURKINA FASO | IFAD | Kamboinse |
| Agronomist | B. J. Ndunguru | Tanzanian | BENIN | IFAD | Ina |
| Agricultural Economist | D. S. Ngambeki | Ugandan | BENIN | IFAD | Ina |
| *ACPO*[3] | J. J. Johnson | American | CAMEROON | USAID | Maroua |
| | Renaud Henri | French | TOGO | FAC | Kara |
| | Moussa Kabore | Burkinabe | BURKINA FASO | USAID | Kamboinse |
| | Lamin Traore | Malian | MALI | USAID | Sotuba |
| *ACPO Counterparts*[4] | Toky Payaro | Togolese | TOGO | USAID | Kara |
| | Jean Nzoning | Cameroonian | CAMEROON | USAID | Maroua |

[2] For Eastern and Southern Africa

[3] Salaries of National ACPOs and ACPO counterparts are paid by the host government. ACPO programmes are funded by SAFGRAD.

[4] In countries where the ACPO is still an expatriate (Cameroon and Togo).

— OAU/STRC —

FUNDING BY INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT

**IFAD**
**STATEMENT OF AUDITED ACCOUNTS**
FOR THE PERIOD
OCTOBER 1983 TO 31ST DECEMBER 1984
GRANT NO. TA110

**Contents**


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## REPORT OF THE AUDITORS TO THE SCIENTIFIC TECHNICAL AND RESEARCH COMMISSION OF THE ORGANIZATION OF AFRICAN UNITY (OAU/STRC) FUNDING BY INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT

We have examined the balance sheet of OAU/STRC in relation to the funding by International Fund for Agricultural Development, for the period from October 1983 to 31 December 1984, and the related income statements. Our examination was made in accordance with generally accepted auditing standards and accordingly included such tests of accounting records and such auditing procedures as we considered necessary.

To the best of our knowledge and belief the funds have been exclusively used in accordance with the provision of section 1.02 of Article I of the Technical Assistance Agreement dated 8 September, 1983 between the Organization of African Unity through its Scientific Technical and Research Commission and The International Fund for Agricultural Development.

In our opinion, the aforementioned financial statements present fairly the financial position of the funding by the International Fund for Agricultural Development.

Peat, Marwick, Ani, Ogunde & Co.
CHARTERED ACCOUNTANTS

17 June 1985

## BALANCE SHEET AS AT 31 DECEMBER, 1984

| | Notes | $ | $ |
|---|---|---|---|
| Fixed assets | 1 | | 28,604 |
| Current assets | 2 | 179,664 | |
| Less: Current liabilities | 3 | 17,731 | |
| Net current assets | | | 161,933 |
| Net assets | | | 190,537 |
| Represented by: | | | |
| Excess of income over expenditure for the period | | | 190,537 |

*Signed*:
A. Olufemi Williams EXECUTIVE SECRETARY – OAU/STRC

J.M. Menyonga INTERNATIONAL CO-ORDINATOR – SAFGRAD

The notes on pages 62 and 63 form part of these financial statements.



## INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD OCTOBER 1983 TO 31 DECEMBER 1984

| | $ | $ |
|---|---|---|
| Income: | | |
| IFAD grant received | | 400,000 |
| Miscellaneous income | | 5,258 |
| | | 405,258 |
| Less: Expenses | | |
| (a) Salaries and benefits | | |
| Established posts | 83,636 | |
| Temporary assistance | 792 | |
| Overtime and night differential | 500 | |
| Housing allowance | 16,763 | |
| Pensions | 1,887 | |
| Medical assistance | 132 | |
| Gratuity on completion of service | 8,323 | |
| Education allowance | 10,758 | 122,970 |
| (b) Travel and allowances | | |
| Travel on initial recruitment | 7,013 | |
| Installation allowance | 8,882 | |
| Travel of staff on official duty | 22,134 | 38,029 |
| (c) Conferences and workshops | | – |
| (d) Consultants | | |
| Research co-ordination | 1,919 | |
| Consultants and counterparts | 27,791 | 29,710 |
| (e) Operational expenses | | |
| Maintenance of vehicles | 464 | |
| Maintenance of equipment and furniture | 277 | |
| Maintenance of premises | 242 | |
| Utilities (Water, electricity, etc.) | 886 | |
| Insurance of vehicles, equipment, etc. | 2,967 | |
| Fuel | 2,772 | |
| Cable and telex | 960 | |
| Postages | 199 | |
| Pouches | 260 | |
| Stationery and office supplies | 2,110 | |
| Bank charges | 803 | |
| Other supplies and services | 68 | |
| Reproduction and photocopying | 1,298 | |
| Gain on exchange | ( 471) | |
| Depreciation | 7,151 | |
| Audit fee and expenses | 4,206 | 24,192 |
| | | 214,721 |
| Excess of income over expenditure for the period | | 190,537 |

## STATEMENT OF SOURCE AND APPLICATION OF FUNDS FOR THE PERIOD OCTOBER 1983 TO 31 DECEMBER 1984

| SOURCE OF FUNDS | $ |
|---|---|
| Excess of revenue over expenditure for the period | 190,537 |
| *Add:* Item not involving the movement of funds: | |
| Depreciation of fixed assets | 7,151 |
| | 197,688 |
| *Less:* APPLICATION OF FUNDS | |
| Purchase of fixed assets | ( 36,755) |
| INCREASE IN FUNDS | 161,933 |
| REPRESENTED BY INCREASE/(DECREASE) IN WORKING CAPITAL AS FOLLOWS:- | |
| Debtors | 6,800 |
| Creditors | ( 17,731) |
| Balance at bank | 172,739 |
| Cash on hand | 125 |
| | 161,933 |



## ACCOUNTING POLICIES

The following are the significant accounting policies adopted by the commission in preparing its financial statements:

1. Basis of accounting
   The accounts of the commission are prepared under the historical cost convention and on an accrual basis.

2. Tax status
   SAFGRAD is exempted from local taxation in accordance with the agreement between the OAU/STRC/SAFGRAD co-ordination office and the local national governments. The area of tax exemption include import/excise duties on acquisition of motor vehicles, equipment and furniture for the SAFGRAD projects, road tax as well as on purchase tax on fuel consumed by the project vehicles.

3. Depreciation of fixed assets
   Furniture and fixtures, office equipment and motor vehicles are depreciated on the straight line method over an estimated 5 year period at a rate of 20% per annum.

4. Currency translation
   Grants from IFAD are made in U.S. dollars and converted into CFA Franc at the rate of exchange ruling between the U.S. $ and the CFA Franc on the date of receipt. A standard internal rate of 400 CFA Francs to one U.S. dollar is adopted by the OAU/STRC in converting CFA Francs to the dollar for accounting purposes.
   The net gain on exchange arising from the differences between the internal rate and the ruling rates used in settling contractual obligations during an accounting period is credited to the Fund's income and expenditure account.

## NOTES ON THE ACCOUNTS
## FOR THE PERIOD OCTOBER 1983 TO 31 DECEMBER 1984

1. Fixed assets

| | *Furniture and fixtures* | *Office equipment* | *Motor vehicles* | *Total* |
|---|---|---|---|---|
| 1. Cost | $ | $ | $ | $ |
| Additions during the period | 18,811 | 7,686 | 9,258 | 35,755 |
| At 31 December, 1984 | 18,811 | 7,686 | 9,258 | 35,755 |
| Depreciation: Charge for the period | 3,762 | 1,537 | 1,852 | 7,151 |
| Net book value at 31 December, 1984 | 15,049 | 6,149 | 7,406 | 28,604 |

2. Capital commitments:
Capital expenditure authorised by the International Co-ordinator but not provided for in these accounts amounted to approximately:

| | $ |
|---|---|
| Contracted | 24,150 |
| Not contracted | Nil |

2. Current assets

| | $ |
|---|---|
| Sundry debtors | 6,800 |
| Balance at bank | 172,739 |
| Cash on hand | 125 |
| | 179,664 |

3. Current liabilities

| | |
|---|---|
| Sundry creditors | 11,618 |
| Accrued expenses | 6,113 |
| | 17,731 |



4. Excess of revenue over expenditure for the period has been arrived at after charging:-

| | $ |
|---|---|
| Depreciation | 7,151 |
| Auditors remuneration: | |
| Fee | 3,250 |
| Expenses | 956 |
| and after crediting: | |
| Interest on bank deposit | 5,220 |
| Gain on exchange | 471 |

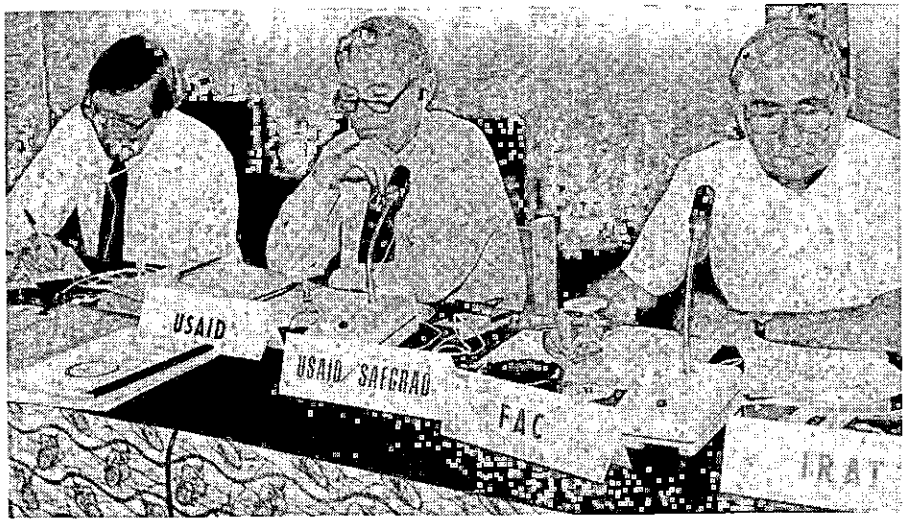
5. This is the first period of operation of the IFAD/SAFGRAD hence there are no comparative figures.

Peat, Marwick, Ani, Ogunde & Co.
CHARTERED ACCOUNTANTS

17 June 1985

# Photographs

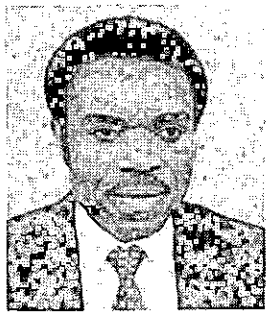
The Assistant Executive Secretary of OAU/STRC Prof. Johnson of Togo, signs the extension of grant by USAID to SAFGRAD. On his right is the American Ambassador to Burkina Faso and on his left is the USAID mission Director to Burkina Faso—Mr. Melaven. On the extreme right is the Director of Research for SAFGRAD, Dr. T. Bezuneh.




Representatives of Donors at Consultative Committee Meeting of SAFGRAD. From left to right Mr. R. GRAY of USAID, Mr. Hilleman of USAID and Mr. Nicou representing FAC and IRAT of France.




Coordination office for Research into Food Grains for Africa located in Ouagadougou, Burkina Faso.



Dr. Joseph M. Menyonga
International Co-ordinator

Dr. Taye Bezuneh
Director of Research

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STEPHEN AUSTIN AND SONS LTD, HERTFORD



1984

# Annual report 1984-85, SAFGRAD JP 31 Farming System Research (FSR)

AU-SAFGRAD

AU-SAFGRAD