

OAU/STRC AND IITA JOINT PROPOSAL  
FOR RESIDENT RESEARCH AND NETWORK SUPPORT

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BACKGROUND AND JUSTIFICATION

Africa is afflicted with continuing food crisis which has assumed alarming proportions in recent times. In the semi-arid zones which constitute the SAFGRAD mandate area, food production has consistently failed to keep pace with rate of population growth and traditional food production systems are grossly inadequate to satisfy the food needs of the increasing rural and urban populations. This zone is the major production area for grain and livestock in Africa, and food grains particularly sorghum and millet, maize and cowpea constitute over 70 percent of all cereals produced in the area.

Food production in African Semi-Arid Tropics (SAT) is largely in the hands of peasant small holders whose traditional farming methods are yet to be adopted to utilize improved techniques of cultivation and farm inputs. It is estimated that the 26 countries in the region together have close to 230 million farmers, with overall crops yields from their farms being not only far below potential but also remained unchanged or even declining during the last two decades. As a result, hunger with its human degradation, despair and suffering continues to threaten the very survival of nation hood of many countries in the region.

Constraints to Food Production

Considerations of the constraints to satisfactory food production in the African SAT have, among other issues, focussed attention on the analysis of the environmental, scientific, and institutional difficulties which are major barriers to rapid and steady production of the principal food crops of semi-arid Africa, namely the cereals Sorghum, Millet and Maize and the legumes Cowpea, Groudnuts and Bambara nuts.

Environmental difficulties

The environment of semi-arid Africa is characterised by high temperatures, low, highly variable and unpredictable rainfall patterns, fragile and mostly infertile soils. The area is subjected to serious and continuous degradation as a result of the recent series of droughts enhanced by rapid desertification

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processes. Rainfall and its distribution are also major critical factors in food production in the region. Average total annual precipitation ranges from 300 mm in the driest areas to 1000 mm in some areas, but throughout the SAT, there are wide seasonal fluctuations and great variations in the intensity of individual rains and intervals between rains. In areas with a higher rainfall, overpopulation leads to heavy cultivation and over exploitation, which also causes rapid degradation of the fragile resource base.

#### Scientific difficulties

Rapid progress to substantially increase the food production capacity of semi-arid African countries can be made by improvements in local production systems developed by scientific research and effectively communicated by national agricultural extension services to the farmers. This has been well emphasized by the OAU Heads of State in the 1980 Lagos Plan of Action (LPA) which states as follows :

#### "Article 36

... Science and technology have a pivotal role in the development of agriculture, especially in connection with agronomic research, training and extension. Within the context of agronomic research, special emphasis should be placed on improvement of selected seeds, fertilizers, pesticides and other chemicals suitable for African conditions,

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#### "Article 38

... It is crucial that research findings be made available within minimum delay to the farming community. It is therefore recommended that :

- . a closer link be established between research and extension services,
- . the extension services should lay more emphasis on the spread of existing technologies .....

In the semi-arid zones of Africa there is a shortage of well trained scientists and technologists for effective organisation and execution of agricultural research. In a few instances where trained manpower is available, there is often these difficulties, together with several others not cited here, remain major constraints to the mobilisation of science and technology to solve the food problem in Africa.

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Nevertheless conscious efforts are being made to overcome these difficulties through various research and development activities, resolutions and proclamations by African Heads of State and Governments.

Realizing the recurrent food shortage problems that many member countries faced during this past quarter of the century, African Governments adopted a series of plans and declaration to stimulate an immediate improvement in the food situation and to lay foundations for the achievements of self-sufficiency in cereals, livestock and fish products. The Lagos Plan of Action (1980) which was closely linked with the regional Food Plan for Africa (1978) set a number of targets, including a growth rate of 4 per cent per annum for the agricultural sector which, if achieved, would eventually bring about food self-reliance on the continent.

Currently, almost half of the Member States of the Organization of African Unity (OAU), particularly those in semi-arid regions, have become increasingly vulnerable to drought stress and dependent on food aid. The Harare Declaration on Food Crisis in Africa, adopted during the 13th FAO Regional Conference for Africa (July 1984), further reaffirmed commitment to the Lagos Plan of Action which provides policy guidelines to alleviate the existing serious food crisis.

Furthermore, the Assembly of African Heads of State and Government adopted, *inter alia*, a Special Programme of Action for the Improvement of the Food Situation and Rehabilitation under-utilisation or misplaced deployment of trained personnel. Expertise in planning, implementing, and evaluating agricultural research is weak and there are hardly any serious links or effective communication between national agricultural research, extension services and the farming population. There is also very poor coordination of agricultural research within the region and many research efforts are carried out in isolation; this has given room for duplication and overlap of research activities which tend to be counter-productive.

#### Institutional difficulties

Many agricultural research and training institutions have been established within the semi-arid zones of Africa. However, such institutions face many difficult problems including :

- . shortage of indigenous research management personnel;
- . acute shortage of funds for execution of research and development projects;

- . lack of adequate equipment and facilities;
- . lack of sufficient trained agricultural researchers, social scientists and technicians;
- . sometimes inappropriate and poorly defined agricultural research policies;
- . lack of effective mechanism for the distribution of improved technologies, and there is often no regional or national coordination of regular production and distribution of improved seeds to farmers.

Concrete proposals, including correcting the inconsistency between the declared objectives of giving high priority to the food and agriculture sector and the official actions, were made in this report. This action is meant to induce agricultural policy changes in African governments in order to gradually increase national resources to agricultural development by 20 to 25 per cent by 1989.

It was stressed that the current extent of hunger and malnutrition in Africa calls for resolute actions and for effective mobilization and judicious exploitation of resources on the basis of well formulated development strategies and plans of actions that could lead to food self-sufficiency and self-sustained growth and development. The importance of research, training and moving research results to farmers to attain increased food production were fully emphasized by various regional plans and strategies. Unless immediate actions are taken towards the improvement in agricultural technology, food production could not keep pace with increasing human populations in Africa's SAT.

Considerable research effort need to be oriented towards the needs of the small farmers since over 80 per cent of the working population force is in agriculture. Small farmers are generally at subsistence level, and do not produce marketable surpluses. In all countries, small farmers predominate in the production of traditional food grains. Technical solutions to on-farm problems and systems approaches are essential ingredients for improving the farm unit. Research and extension service activities need to concentrate on improving traditional systems of production.

#### FUNDING OF SAFGRAD

Over the last 10 years, USAID has contributed about 25 million in support of SAFGRAD research and technology transfer programmes which included the improvement of cowpea and maize particularly for the semi-arid ecology. During the last three years, the International Fund for Agricultural Development (IFAD) has maintained about US \$ 1.2 million annually to support FSR in Benin, Burkina and Cameroon, while the French Government through its Aid and Cooperation

Fund has continued to support on-farm testing activities in the republic of Togo. Member countries hosting some SAFGRAD programmes, for example, Burkina Faso, Nigeria, Mali, Cameroon, Senegal, Kenya, etc. have continued to provide local logistic support, personnel and funds to facilitate the implementation of research and technology adoption activities in their respective countries.

#### Achievements of SAFGRAD through IITA AND OAU/STRC - Past Collaborative efforts

The Semi-Arid Food Grain Research and Development Project (JP-31 SAFGRAD) was designed to effectively mobilize and coordinate available research resources including those of International Agricultural Research Centers (IARCs) and the National Agricultural Research Systems (NARS) in order to provide the technological base necessary to achieve significant advances in food grain production (maize, cowpea, millet and sorghum).

During the last decade, the support of USAID funding brought together IITA and OAU/STRC - SAFGRAD to work towards common objectives i.e the increase of maize and cowpea production in the semi-arid tropics and to enhance national research capabilities. As a result, many SAFGRAD countries have benefited substantially from this collaborative effort and more could benefit from it in the future.

Some of the notable achievements of the IITA/SAFGRAD collaborative research effort include the development of early maturing drought and pest resistant varieties that outperformed local cultivars under low to medium level input management.

- a. Through regional testing activities provided several elite materials of maize and cowpea that are being used by NARS in their crop improvement programme (18-22 member countries of SAFGRAD) These varieties possessed significant stress resistant traits to drought, pests and diseases. In case of maize, early and intermediate regional uniform trials (RUVT) were carried out. From 1979 to 1985 over 192 sets of early maturing (RUVT-1) and 171 sets of intermediate maturing trials (RUVT-2) were made available to national programmes of SAFGRAD countries. A total of 44 varieties have been tested in RUVT-1 and 42 varieties in RUVT-2. National programmes have also contributed their best yielding varieties for a wider adoption trials, a development of early maturing drought resistant varieties of maize and cowpea.

Two high yielding early maturing varieties known as SAFITA-2 and SAFITA-104 have been widely tested by national programmes. These have either been released or are in the process of pre-release in Burkina Faso, Ghana, Mali, Benin, etc... Another variety, SAFITA-102, is a medium maturing variety developed for the Northern Guinea savanna zone. It has been widely tested in many SAFGRAD countries. Major agronomic practices that minimize risk to drought stress were identified such as tied-ridges, soil tillage practices, use of early varieties and maize-cowpea rotation practices.

- b. A number of cowpea varieties have been widely tested by the national programmes. A multiple disease resistant and high yielding variety KN-1, was released in moderate (700 mm) rainfall zone. SUVITA-2, a drought and striga tolerant variety was developed and widely tested. It is included in the pre-extension trials in many SAFGRAD member countries. Another variety, 58-57 has also been shown to have a high level of resistance to striga. Considerable progress has been made in defining and recommending practices for the maize cowpea cropping system in the Northern Guinea savanna zone. Some progress was made for sorghum and millet/cowpea inter-cropping systems also.
- c. The development of soil fertility/water retention technologies. It has been demonstrated that tied ridges can conserve water. To alleviate labour constraints two versions of mechanical device adapted to annual traction (donkey and oxen model) were developed. In 1985 alone more than 130 prototype units of these tied-ridgers were widely distributed to farmers and research cooperators. Due to lack of funding large number of these units were not made in order to evaluate these mechanical tied-ridgers in different SAFGRAD member countries.
- d. Several varieties of maize and cowpea by participating countries were released through technical back stopping of IITA/SAFGRAD programme
- e. National programmes in many SAT countries are weak in manpower and sources and this weakness impeded NARS from taking advantage of improved technologies. The IITA/SAFGRAD programme based in Burkina Faso has provided in-service training for 31 researchers, crop production oriented courses for over 50 participants, supervision of thesis work for 18 participants. Long-term training (M.Sc. Ph.D levels) for 28 participants

from various countries on different aspects of food grain research and production.

- f. Workshop - Since 1979 seven workshops were held on maize and cowpea improvement involving 400 scientists from different SAFGRAD member countries. This has facilitated the exchange of technical information among scientists.

#### PROJECT OBJECTIVE

The global objective of this proposal are :

- a. To provide technical backstopping to maize and cowpea networking activities (18-22 countries) through developing suitable technology (cultivars, agronomic practices and an integrated pest management systems) adaptable to the variable and unpredictable agricultural environment of the semi-arid tropics;
- ✓ b. To fully transfer breeding materials and research methodology to NARS accrued during the last eight years of the resident research of the IITA/SAFGRAD team;
- ✓ c. To facilitate accelerated transfer of relevant research results to farmers by supporting the SAFGRAD on-farm testing activities;
- d. To foster collaborative research with selected NARS (three countries for maize research and three countries for cowpea research) in order to enhance and strengthen resident research in potential lead countries;
- ✓ e. To provide short and long-term training support to actively participating NARS in order to improve their respective research capabilities.

#### SCOPE OF PROJECT ACTIVITIES

Most national research programmes particularly in the semi-arid regions of sub-Saharan Africa are weak in research manpower, infrastructure and resources. This situation prevented NARS from taking advantage of available and adaptable technologies. The special focus of this project is to hasten the transfer of research methodology and crop improvement materials by pursuing cooperative research with NARS. By utilizing the OAU/STRC mechanisms the IITA/SAFGRAD

current resident research programme based in the semi-arid regions would be linked to six national programmes who would be directly supported to conduct applied research to serve as network centres for participating NARS.

The emphasis of the programme would also be the transfer of research experience of the IITA/SAFGRAD. Technology transfer would be achieved by stimulating national programmes to undertake on-farm multi-locational testing which both the SAFGRAD Coordination Office and IITA have good experience in different countries. One of the main purpose of this project would therefore be to promote adaptive on-farm research, the usefulness of participating in regional networking to work on common food grain production constraints that transcend national borders. The SAFGRAD Coordination Office of OAU/STRC is uniquely placed to work very closely with national governments research leaders and scientists in order to forge active functional links among participating NARS, IARCs such IITA and other regional research entities.

The national research programmes whom this project is to benefit vary in their capabilities to undertake and execute research; to make verification trials and also to fully participate in networking due to acute shortage of trained manpower at scientific and technical level. The project focus would also be to support training in deficient areas of maize and cowpea research. From the IITA/SAFGRAD experience accrued during the last eight years, in service training and thesis supervision of capable candidates was found useful and need to be continued.

#### STAFFING

Technical staff requirement for the the resident research has been determined. With regard to acceleration of the technology transfer, through on-farm testing, one senior agronomist to be based at SAFGRAD Coordination Office would be required. Funding for research associates (5-15) i.e post doctoral fellows, research scholars etc., should be made available in order to enable promising NAR scientists gain practical research experience.

#### BUDGET

At this stage of the project development, the direct research support to potential lead national research centers to facilitate transfer of technology (on station and on-farm research support) in thousand of dollars is given below:



<u>Maize</u>	<u>Year</u>			TOTAL
	<u>1</u>	<u>2</u>	<u>3</u>	
Country A.	100	100	100	300
Country B.	100	100	100	300
Country C.	100	100	100	300
 <u>Cowpea</u>				
Country A.	100	100	100	300
Country B.	<u>100</u>	<u>100</u>	<u>100</u>	<u>300</u>
TOTAL	500	500	500	1500

Funds for research support to selected NARS as proposed above could be administrated by SAFGRAD Coordination Office - since it could negotiate for special agreements to allocate more resources to support such research activity by respective governments.

#### Networking support

Detail budget could be worked out with the coordinators. This support could be to enable scientists of participating NARS to fully participate in the regional research network activities.

#### Expected benefits of the project

This aspect of the project need to be elaborated.

## IMPORTANT FUNCTIONS OF SAFGRAD COORDINATION OFFICE

## 1. COORDINATION

To <sup>reverse</sup> ~~reverse~~ the unfavorable performance of food grain research in Africa, there is an urgent need for greater and more effective cooperation and coordination among SAFGRAD member countries (26) so as to achieve greater individual and collective self-reliance in agricultural research and for efficient allocation and use of outside assistance to research. The specific experience of OAU/STRC through its Coordination Office of SAFGRAD, during the last ten years, has confirmed that sub-regional cooperation and coordination can greatly enhance the productivity as well as productive capacity of agricultural research, there<sub>by</sub> bringing it more oriented towards the farmer for improved productivity and production. By utilizing the OAU mechanism :

2. To facilitate the mobility and exchange of research material, information and scientists (national and international) within SAFGRAD member countries.
  3. To provide administrative and logistic services to networks and ensure that network objectives are met.
  4. To solicit with member country governments and donors to allocate more resources to research in particular and agricultural development in general. To facilitate the transfer of technology among member countries through stimulation of on-farm research by national programmes.
  5. To facilitate training of scientists and technicians of member countries.
  6. To provide forum (under OAU) for discussion of research policy issues among member state governments in order to alleviate institutional constraints of food grain production.
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