Project Proposal

To be Submitted to USAID Jointly by:

OAU & IITA

for

Maize & Cowpea Collaborative Research Networks
for West and Central Africa

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PREFACE

In submitting this draft proposal, it is recognized that the impact assessment study identified the issue of transfer of technology to farmers as a major weakness within the national agricultural research systems.

It is therefore proposed that NARS-Extension-farmers transfer component as well as regionally-oriented and resident research components envisaged be discussed and reviewed with the appropriate NARS and OAU representatives in a workshop within the next three months. The outcome of the workshop will be the workplan and budget for the three years of the project.

The Grant Cooperative Agreement should take cognizance of these facts in its technical and financial provisions.

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ABBREVIATIONS

ACPO	Accelerated Crop Production Officer.
COMBS	Collaborative Maize Based System.
EEC	European Economic Community.
FSR	Farming Systems Research
IARC	International Agricultural Research Center.
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics.
IITA	International Institute of Tropical Agriculture.
INERA	Institut National d'Etudes et Recherches Agricoles.
MSV	Maize Streak Virus.
NARS	National Agricultural Research Systems.
NE	North-east.
OAU	Organization of African Unity.
SAFGRAD	Semi-Arid Food Grains Research and Development.
SC	Steering Committee.
SW	South-west.
USAID	United States Agency for International Development.

I Background

1.1. Introduction

Maize and cowpea are major staples in the diet of the population in the semi-arid zones of Africa. Maize as a cereal has become the dominant food crop among the peasant farmers because of its diversified uses (food, feed, industrial use and energy) and its great yield potential under improved management practices relative to other grain crops especially in the semi-arid zones. Cowpea is a major food legume in Africa where it is traditionally considered as a food legume of the poorest of the poor and is mostly cultivated by small-scale farmers as a substitute crop. It is secondary mainly in the semi-arid ecologies in association with millet, sorghum, maize, cassava and cotton. It is drought tolerant and can be grown in poor soil. Cowpea is able to fix nitrogen in the soil efficiently at around 30 to 70 kg/ha. The dry grain yield of traditional varieties are very low: 200 - 300 kg/ha. The low yields are generally attributed to poor crop husbandry, insect pest and diseases, drought and plant type.

A major crop failure experienced by the Semi-Arid Sub-Saharan African Region for three consecutive years (1973-1975) as a result of severe drought led to a drastic food shortage, thereby creating long periods of famine, starvation and death of several thousands of people and livestock. This compelled African governments to discuss ways and means of minimizing risks associated with drought at the time when most of them were faced with the question of how best to increase production of food crops in the light of limited financial and human resources, accelerating environmental degradation and a weak institutional base.

The Semi-Arid Food Grains Research and Development (SAFGRAD) Project was established to bring to farmers improved, adapted technologies to increase yields and reduce risk. The United States Agency for International Development (USAID) agreed to fund the project under the auspices of the Scientific, Technical and Research Commission of the Organization of African Unity (OAU/STRC). The International Institute of Tropical Agriculture (IITA) was assigned the responsibility for undertaking regionally-oriented research activities for maize and cowpea while the International Crop Research Institute for Semi-Arid Tropics (ICRISAT) accepted responsibility for research on sorghum, millet and groundnuts. Purdue University, USA handled the farming systems research component.

The main objectives of the SAFGRAD project were:

- To coordinate agricultural research activities in the African sub-saharan semi-arid zone.

- Identify crop production constraints, and develop technologies to overcome the constraints through resident research for maize, cowpea sorghum, millet and groundnuts, .
- To ensure the exchange of scientific information and technology among member countries.

- To train national scientists and technicians in the identification, development and transfer of appropriate technologies to users.
- To accelerate transfer of technologies to farmers in order to ensure food security and/or increased productivity, production and income.

The SAFGRAD project which started in 1978 has since seen two phases successfully implemented. Phase I consisted of mostly resident research conducted on maize and cowpea in Burkina Faso by IITA and on sorghum in Nigeria and Burkina Faso by ICRISAT. Phase II was devoted to collaborative research networks' for maize and cowpea with backstopping provided by IITA. Collaborative research networks' for sorghum in West and Central Africa and East Africa were entrusted to ICRISAT.

1.2. *SAFGRAD Phases I and II*

During SAFGRAD Phase-I, 1978-1986, IITA's primary responsibility was to conduct regionally oriented research on maize and cowpea in collaboration with national, and international research centers. The major activities involved the development of new cultivars of maize and cowpea and agronomic practices suitable for small scale farmers in the semi-arid zone. The Government of Burkina Faso accepted to host the IITA resident research at the Kamboinse Research Station, and provided additional research sites in all the three different agro-ecological zones in Burkina Faso.

Technologies developed through the IITA Resident Research efforts and those by NARS and other International Centers were made available to NARS through regional trials.

In order to strengthen NARS, IITA conducted in-service training at Kamboinse, Burkina Faso or at Ibadan, Nigeria, annual workshops and cowpea and maize monitoring tours for the 27 SAFGRAD member-countries. IITA also assisted in the transfer of new technologies through on-farm tests in collaboration with the SAFGRAD Accelerated Crop Production Officers (ACPO's) in selected countries. The achievements during SAFGRAD-I led to the establishment of the Maize and Cowpea Collaborative Research Networks for West and Central Africa under SAFGRAD Phase-II.

The idea of networking was a natural follow-on project to former SAFGRAD I which developed maize and cowpea varieties for the region. SAFGRAD Phase II activities aimed at disseminating these varieties through network and addressing problems of common concern. A council of directors of NARS provided policy guidelines while an oversight committee of six of their members followed up progress and performance of the networks. A steering committee of national scientists of both crops had responsibilities for research agenda and the implementation of the Networking activities based on priority needs of member countries.

Based on comparative advantage, cost effectiveness, and the interests of each NARS, collaborative research projects were assigned to relatively strong national programs (Lead Centers) by the SC of each network. Scientific information and technologies emanating from the collaborative research were made available to other member countries. Network coordinators provided by IITA implemented and coordinated the decisions of the steering committee and arranged for backstopping of network activities by technical programs at IITA headquarters

II. Achievements of the Maize and Cowpea Networks

The achievements of the maize and cowpea Networks include:

(a) Of the several socio-economic constraints to maize and cowpea production in West and Central Africa, scientific leadership development was one of the areas which the networks tackled vigorously. Lack of sufficient well trained and skilled national scientists was a major handicap to identification and development of new technologies in the sub-region. This was evident from the few new technologies which were proposed by national programs for regional testing in 1983-1987. To overcome this constraint, the networks embarked on an intensive training program for national scientists and technicians between 1988 and 1990 at various levels. As a result, the number of new technologies developed by national scientists and proposed for regional testing increased markedly between 1989 and 1991.

(b) The Networks have promoted interest in maize and cowpea research and linkages developed within and among NARS scientists have greatly increased the morale of individual scientists. The enhanced interaction (through monitoring tours, workshops, seminars) coupled with the training activities organized by the Networks and the technical backstopping provided by IITA scientists and resource persons from Lead NARS have increased the efficiency and effectiveness of research within

individual national programs through sharper focusing on major constraints and better utilization of resources.

(c) For each Network, production constraints have been identified, research priorities established and collaborative research projects assigned to strong national programs. Both Lead and Technology Adapting NARS are now better convinced of the importance and benefits of this networking approach. Lead Centers, by widely testing their new technologies through regional trials within the network, have the opportunity to identify the strengths and weaknesses of their technologies and can subsequently make necessary adjustments. Technology Adapting Centers, by conducting regional trials are in a position of identifying new relevant technologies which they can pass onto their farmers, either directly or after appropriate local refinement.

(d) One of the greatest achievements of both maize and cowpea networks is the elimination of linguistic barriers that had always prevented Francophone and Anglophone scientists from learning from one another for decades. Not only do maize and cowpea scientists throughout the sub-region now know one another personally in their respective networks, but also they are familiar with the maize and cowpea research in individual countries.

(e) An intensive exchange of germplasm and related technologies have been going on between NARS and IARCs and among NARS through the networks. As a result each NARS has been able to identify suitable technologies for different environments. Several maize and cowpea cultivars have been adopted by member countries for national adaptive trials while some of them have been released to farmers for production.

(f) Through collaborative research activities, national scientists have not only improved on their research skills, but have also become a source of technology development. New streak, *Striga* resistant/tolerant; drought tolerant and excess moisture tolerant and high yielding maize and cowpea cultivars have been developed by national scientists. These have been made available to national scientists of other member countries through regional trials. Several maize and cowpea technologies have been released and adopted by farmers or are about to be released through the efforts of the Network in member countries (Annex 1-8).

(g) The Maize Collaborative Research Network has been able to strengthen its three types of regional uniform trials towards catering for different ecological zones. The development of extra-early maize varieties has been identified as an avenue towards expanding maize production into new areas and/or those under irrigation. For example, in Nigeria, the extra-early maize regional trials constitutes an avenue for introducing the crop into the relatively dry areas where the short duration of the wet season normally precludes its cultivation. The streak resistance technology developed at IITA is being transferred to Togo and Ghana through the activities of the Maize Network.

III. Impact Assessment of the SAFGRAD Crop Commodity Networks on NARS

The end of project evaluation report of SAFGRAD-II stated "the project had fully achieved most of the planned outputs and the evidence suggested that most of the project purpose had been accomplished". It recommended that USAID and other donor agencies should make a 10-year commitment, at least, of financial and technical assistance to the SAFGRAD crop commodity networks to ensure that the African food crisis faced since the 1960s is properly solved. The evaluation team did not, however, have enough information to appraise the program or sector goals. This prompted USAID to further request for an impact assessment study to be conducted from May to December 1992.

The results of the impact study showed that the networks had been successful in increasing NARS research outputs. Relevant technologies have been developed and/or identified by NARS Lead Centers and IITA core scientists (see annexes 3 - 7). Most importantly, there has been spill over of the technologies to member-countries. For an example, maize and cowpea production and productivity have been increasing steadily in Burkina Faso and Ghana since 1987. From the impact assessment study, it was clear that the SAFGRAD crop commodity networks have had tremendous impact in stimulating the capacity and initiative of national scientists to solve maize and cowpea production problems. The networks have also generated farmers interest in their occupation as a result of increased production and productivity and income.

Several promising technologies are also in the pipeline at both the networks' and NARS levels for further testing (see annex 1).

IV. The Proposal

The proposal submitted by IITA seeks:

- to build on the substantial progress and achievements made by the Networks with the assistance of IITA

- to take into account constraints identified by the end of project evaluation as well as those identified by the impact assessment study and other competent persons.

- to emphasize the growing need for greater utilization of Network generated technologies by farmers through effective linkages to leave the networks at the end of the transition period, in a position to carry out a strong, well-balanced collaborative research with minimum outside support.

The proposal therefore seeks funding support for 3 years from USAID of a total grant of $2,456,000 to enable IITA in collaboration with the OAU/STRC to continue the strengthening of NARS in the sub region through collaborative network for maize and cowpea and to consolidate the gains of SAFGRAD II.

V. Project Strategy and Objectives

The project strategy is to increase agricultural production of the peasant farmers of the semi-arid zones of sub-saharan Africa. The purpose is to continue strengthening the capacity of the Network member countries to provide high quality research and generate appropriate technologies for use by farmers of member countries.

The objective is to address through networking activities, the following component programs: Networking promotion of technologies in the pipeline through national on-farm testings, regionally oriented and resident research; regional workshops and monitoring tours; development of effective linkages and impact assessment within member countries in collaboration with other projects such as the EEC/OFAPR project and human resource development through seminars and conferences.

VI. Networking

6.1. *Promotion of Technologies in the Pipeline*

An important role of IITA during the transition period, will be to capitalize on the achievements of SAFGRAD phase-II and promote the activities which will enhance interaction among scientists and extension workers, farmers, policy makers

and other partners of agricultural development. Such activities will include on-farm testing and demonstration using promising and appropriate technologies presently in the pipeline to increase productivity, production and incomes. The following activities will be carried out at:

6.1. a) National level

In SAFGRAD-II, national programs developed or identified a number of technologies which are currently at various testing stages. IITA will encourage the fruition of those technologies by promoting them for on-farm testing and demonstration. Maize and cowpea technologies in the pipeline at the national level are listed in Annex 1: Tables 1 and 2, respectively.

6.1 b) Network level

A number of technologies have been developed or identified through Networks' Lead Centers, network coordinator's resident research, IITA and other International Research Centers. The networks would endeavor to make these technologies available to member-countries for national adaptive trials. To this end, the networks would organize maize and cowpea workshops in March/April 1993 to present the new technologies to member countries. This will enable the SC design regional trials for evaluation by member-countries.

6.1. b.1 Maize Network

Cultivars in the pipeline at the network level are listed in Annex (1) Table 3.

In addition, the following agronomic practices would be made available to NARS through training activities: seminars and group training sessions as well as monitoring tours:

- Tied-ridge technique for soil moisture conservation in the Sudan savanna;

- Better seed treatment with chemicals for good stand establishment, optimum population density and high yield;

- Increased plant population for high grain yield of early and extra-early cultivars

- Appropriate timing of fertilizer application (top dressing) for increased yield of early and extra-early cultivars.

6.1.b.2. Cowpea Netowork

Cultivars in the pipeline at the network level are listed in Annex (1) Table 4.

In addition, a number of agronomic practices listed below would be made available to NARS through training activities:

- Tied-ridge technique.
- Windbreak techniques against mechanical damage, water and soil erosion.
- Maize-cowpea relay cropping and cereal-cowpea inter-cropping or double cropping on a single piece of land during the same cropping season.
- Minimum insecticide treatments.

6.2. Collaborative Research

Towards the end of SAFGRAD-II, the SC of each network established working groups composed of national scientists of different research disciplines. These were tasked to review common production constraints, progress made and research methodologies used in alleviating the constraints and to offer technical advise, when necessary. The SC of each network, will, based on the recommendations of research working groups assess the performance of each NARS and re-assign research responsibilities to the most capable NARS. Collaboration research projects are proposed as follows for:

6.2.1) Maize Network

(i) **Breeding for early and extra-early varieties:** Burkina Faso, Cameroon, Ghana, Togo and C_te d'Ivoire will continue to enhance the development of extra-early maturing maize varieties to fill the hunger gap in July in member countries.

(ii) **Breeding for drought tolerance:** Burkina Faso and Cameroon will continue work on the five early maturing varieties with moderate level of tolerance to drought that have been developed and made available to several national programs. Drought tolerance and adaptation to drought stress in the released varieties would be enhanced so as to make them more attractive to farmers. Also drought tolerance would be incorporated into other drought susceptible varieties already in production in member-countries. Development of an early maturing tolerant population initiated in SAFGRAD-II would be continued.

(iii) **Breeding for streak virus resistance:** Togo and Ghana will accelerate research on a number of varieties in production in some Network member countries which are still susceptible to MSV and need to be replaced by their resistant versions. Screen houses for breeding for resistance to streak have been established in Ghana and Togo. The two countries would start converting varieties for streak resistance for other NARS.

(iv) *Striga* **control:** research responsibility has been assigned to Cameroon, Ghana and Benin. One of the major biotic constraints to increased maize production in the Semi-arid zone of West and Central Africa is the parasitic weed, *Striga hermonthica*. *Striga* sick plots have been established in Ghana, Cameroon and Benin for screening for *Striga* resistance with the technical assistance of IITA. A number of promising *Striga* tolerant materials have been identified and are being used in the breeding programs. Also, evaluation of cultural practices for control of the incidence of *Striga* are in progress in Ghana and Cameroon, while Burkina Faso is working on biological control of *Striga*. The Lead Centers for *Striga* would be supported to incorporate Striga resistance genes into available varieties and breeding materials as well as to continue research into the cultural and biological methods of *Striga* control.

(v) **Stem borer control:** Stem borers (*Sesamia* and *Eldana*) are major biotic constraints to maize production in the sub-region. Côte d'Ivoire which is assigned this responsibility, has identified three species of stem borers and has initiated studies on their control. In addition, local germplasm collection, evaluation and utilization in the breeding program is going on. IITA has identified inbred lines with good levels of resistance to *Sesamia* and efforts are being made to improve the level of resistance so that borer resistant hybrids and synthetics could be developed.

(vi) **Agronomic research for early and extra-early varieties:** responsibility has been assigned to Cameroon and Nigeria. The collaborative research in agronomy would emphasize the following areas:

(a) *Management practices for early and extra-early varieties:* Grower recommendations such as fertilizer rates, population densities, time of fertilizer application, seed treatment and row planting have been developed for the early and extra-early varieties and are now available to NARS. Efforts would be made to refine the management practices and to develop new cultural practices.

(b) *Research on the use of extra-early varieties for intercropping/ relay cropping:*

Intercropping, relay cropping and rotation experiments involving the extra-early maturing varieties and legumes would be carried out in order to establish systems that best utilize the available rainfall, reduce the risk of total crop loss by drought and improve or conserve soil productivity.

(vii) **New Collaborative Research Areas:** The following three areas in maize breeding will be tackled:

(a) *Breeding for nitrogen use efficiency:* As a result of the high cost of nitrogen fertilizer, there is a need for the development of maize varieties which make more efficient use of nitrogen. This will allow a reduction in the amount of nitrogen fertilizer currently recommended for maize to be cut down without reducing maize productivity. IITA has been working in this research area since 1989. The National Program of Ghana has also started work on nitrogen use efficiency. The Maize Network would work closely with IITA and also support the Ghana Program to take leadership in this area.

(b) *Control of the larger grain borer* (**Protephanus** *truncatus):*

The larger grain borer (*Protephanus truncatus*) has been identified in Togo and Burkina Faso. In view of the potential damage that this pest can cause on stored maize, there is an urgent need to study control methods of the insect. The maize Network would work closely with the Plant Health Management Division at IITA for the control of the larger grain borer.

(c) *Hybrid Development:* Recognizing the potential role that hybrids could play in revolutionizing agriculture in West and Central Africa, hybrid programs have been initiated by Ghana, Togo, Cameroon, Côte d'Ivoire and Burkina Faso, while

Nigeria started hybrid production in 1986. Lead Centers for hybrid development would be identified and assigned responsibilities. Emphasis would be placed on the development of heterotic groups to satisfy the long term objective of the project.

(viii) **Promotion of on-farm level seed production:** Making improved seed available to farmers is one of the essential means of ensuring high and stable maize yield. The main thrust of the collaborative project would be:

(a) To promote the diffusion and application of suitable seed production technologies through short-term training, workshops and assisting countries in the organization and development of their own seed processing units.

(b) To assist NARS in developing on-farm community level seed production schemes by working with a few lead farmers and non-governmental agencies.

(c) To facilitate the increase of breeder seed production in adequate quantities at research stations.

6.2) Cowpea Netowork

- **Breeding for drought resistance and adaptation to Sudanian-Sahelian zones:** assigned to Burkina Faso, Niger, Nigeria and Senegal.

- **Breeding for adaptation to northern Guinea savanna and resistance to major disease of moist savanna:** assigned to Burkina Faso and Nigeria.

- **Breeding for adaptation to humid, sub-humid and transition zones and for resistance to major diseases of those zones:** assigned to Ghana.

- **Breeding for Striga resistance:** assigned to Burkina Faso, Niger and Nigeria.

- **Breeding for Alectra resistance:** assigned to Nigeria.

- **Breeding for insect pests (Aphids, thrips, pod sucking bugs, Maruca and Bruchids resistances):** assigned to Burkina Faso, Ghana and Nigeria.

- **Cowpea field entomological studies:** assigned to Burkina Faso, Ghana and Nigeria.

- **Cowpea storage (including the control of storage insect pest):** assigned to Cameroon and Ghana.
- **Cowpea agronomy:** assigned to Niger and Nigeria.

- **Cowpea pathology:** assigned to Burkina Faso, Niger and Nigeria.

Research workplans will be submitted by Lead and Associate Centers annually in the month of March for review and approval by the SC of each network. A supplementary financial support will be provided yearly by the network to facilitate the execution of collaborative research activities.

6.3. Resident Research

6.3.a Locations

The Coordinator of each network will spend 20-25% of his or her time on research areas of competence and would work in collaboration with the national program of Burkina Faso. This will enable the coordinator to increase his or her experience in maize and cowpea research as the case may be in the semi-arid zone in areas where the required expertise is not fully developed. The resident research would be carried out at the following experimental sites in Burkina Faso:

6.3.a.1. Northern Guinea Savanna

Farako-Bâ Research Station (INERA), located 12 km SW of Bobo-Dioulasso. Weakly ferrallitic soils (Eutrustox, Haplustalfs, Ustorthents and Palenstalfs). Mean annual rainfall: 1100 mm. Area: about 5 ha per network.

6.3. a.2. Sudan Savanna

Kamboinse Research Station (INERA), located 14 km NE of Ouagadougou. Ferruginous tropical, hydromorphic and some ferrallitic soils (Palenstalfs, Plinthustalfs and Ustochrepts). Mean annual rainfall: 800 mm. Area: about 5 ha per network.

Loumbila (INERA, Ministry of Agriculture), located 15 km north of Ouagadougou. Mostly ferruginous tropical soils (Hapludalfs, Plinthustalfs, Ustorthents and Haplustalfs). Mean annual rainfall: 800 mm. Limited irrigation facilities are available. This site will be used mostly for cowpea seed multiplication during the dry-season. Area: 6 ha.

6.3.a.3. Sahel Savanna

Pobe, (INERA, Ministry of Agriculture), located at about 200 km north of Ouagadougou. Mostly ferruginous tropical soils (Haplargids and Cambiothids). Mean annual rainfall: 450 mm. Area: 3 ha.

In addition to the above sites, some research activities may be conducted at other sites as may mutually be deemed necessary by the network coordinator and the national scientists of Burkina Faso working on either maize or cowpea. Maize research would however, be concentrated in the northern Guinea and Sudan savannas, while cowpea research would be conducted at all the three agro-ecologies.

6.3.b Collaborative research with the Burkina Faso National Program: INERA

The purpose of the resident research to be carried out with the national program of Burkina Faso (INERA) would be to support any weakness detected anywhere in network research activities.

6.3.b.1. Maize research

Trials will be conducted mostly at Farako-Bâ and at Kamboinse in the Sudan savanna. The following activities will be carried out:

- breeding for extra-early and early, drought tolerant and streak resistant varieties.
- Participate in the national variety trials including on-farm testing and demonstration in Burkina Faso;
- Seed multiplication of maize varieties nominated for regional trials.
- Establish nurseries for training purposes.

6.3.b.2. Cowpea research

Trials will be conducted at Farako-Bâ, Kamboinse and Pobe. The following activities will be carried out:

- Impact of maize-cowpea relay cropping and intercropping on soil fertility maintenance.
- Impact of windbreak techniques on crop productivity andsoil fertility maintenance.
- Adaptation to semi-arid zone of cultivars developed by other national and international cowpea programs.
- Seed multiplication of cultivars nominated for regional testing.

6.4. Regional trials

Data on promising new technologies developed or identified by the network Lead Centers, other NARS, and IITA or any other International Center will be presented for discussion during the bi-annual Workshops to be organized by each network. Technologies of interest to the network would be included in the regional trials designed by the network SC for evaluation by NARS member-countries. Regional trials, would thus continue to be an important vehicle for technology exchange within the network.

6.4.1. Maize

Regional trials will be dispatched yearly to NARS upon request. The following trials are proposed for 1993, 1994 and 1995.

- Regional Uniform Early Variety Trials (RUVT-1): with the objective of identifying early cultivars, i.e., 90-95 days to maturity;

- Regional Uniform Intermediate Variety Trials (RUVT-2): with the objective of identifying intermediate cultivars, i.e, 105-110 days to maturity; and

- Regional Uniform Extra-Early Variety Trials (RUVT-3): with the objective of identifying extra-early cultivars, i.e less than 82 days to maturity.

6.4.2. Cowpea

Regional trials will be dispatched bi-annually to NARS during the year when a Workshop is held, the following year would be devoted to further testing of promising technologies nation wide by national scientists to confirm the results of the previous year. The following trials will be proposed for 1993 and 1995.

- Regional trial for adaptation to northern Guinea savanna;

- Regional trial for adaptation to Sudanian-Sahelian zones;

- Regional trial for adaptation to transition zones;

- Regional *Striga* resistance trial; and

- Observation nursery.

6.5. Regional Workshops - Monitoring Tours

Workshops serve as the fora for exchange of scientific information and new technology. Workshops for both networks will be held in 1993 and 1995. These will allow presentation and review of the results from the previous year's regional trials and other relevant research conducted by Lead and Associate Centers, other NARS, IITA and other International Centers. The regional trials will be made available on request to participating NARS. Other relevant activities for the success of the network including the election of the new SC will be carried out during the workshop.

A Monitoring tour will be organized by the networks in 1994. Scientists from selected network member-countries will visit several other national programs, including IITA, if possible.

They will have the opportunity to observe and discuss in detail with scientists in the host countries, issues such as production constraints and new technologies developed to overcome the constraints, research methodologies used in developing the technologies and problems faced by scientists in carrying out their research activities. The monitoring tours would not only provide a means for strong interaction among national scientists, but also would re-enforce the goals of networking.

6.6. Linkages and Impact

6.6.a. Linkages

The objective of this component is to establish and maintain links with institutions that conduct agronomic and socio-economic research.

The success of any agricultural research enterprise depends on effective linkage with agricultural extension and development institution as well as with international agricultural research institutions. Some NARS are well linked with national and international research systems and enjoy good relationship with national extension and relevant development agencies. Others appear not so well linked. The project would seek to forge linkages with national extension and development agencies and with other projects such as the EEC on-farm adaptive research project and COMBS of IITA.

6.6.b Impact Assessment

The objective is to constantly monitor the adaptation and release of technologies developed by the project, the area under cultivation and the production levels in member countries during the next 3 years so as to determine impact of the research effort of the networks. Such information would be obtained during monitoring tours, through questionnaires to collaborators supplemented by reports from national Bureau of statistics.

6.7. Human Resources Development

Training will be an important activity of the Networks. The Networks will organize annual in-service training and workshops. These will focus on particular production problems or research methodologies identified by the Steering Committee of each network. Participants at the different training sessions will include research scientists and technicians from the network member-countries. Some potential topics include: breeding for *Striga* resistance; impact of appropriate technologies on-farm testing, on-farm demonstration, technology adoption and agricultural policy changes; genetic and environmental manipulations for a sustainable agricultural production in semi-arid zones; management of agricultural experiment stations, seed production and varietal maintenance and data collection, processing and interpretation.

VII. Project Implementation

7.a Steering Committees

This project will support collaborative research and networking activities of the maize and cowpea networks in West and Central Africa. Each network will be directed by a Steering Committee. The Steering Committee will be composed of active scientists from participating network member-countries. The Steering Committee, in collaboration with IITA will implement and monitor network activities. To this end, the Steering Committee will review work plans and progress reports and will provide guidance on all technical and managerial matters of the networks. These include responsibility for setting agenda for regional workshops, monitoring tours and problem-specific workshops within each commodity network.

7.b Technical Assistance: Network Coordination

IITA will continue to play a catalytic role and provide backstopping through network coordinators, for a total of 72 man months.

Job Description: A network coordinator will be responsible for:

(1) the management of the network secretariat;
(2) making necessary arrangement to facilitate network meetings: steering committee, workshops, monitoring tours, etc.;

(3) implementing decision on networking matter taken by the steering committee including collaborative research activities, training and regional trials;

(4) providing guidance on planning, analyzing and reporting on network activities; and

(5) serving as a link between IARCs and network member countries and arrange backstopping when necessary.

Qualification:

Ph.D. or MSc degree in agricultural biological sciences and at least five (5) years of experience in agricultural research and related activities. Additionally, candidates must have proven capabilities of being able to work with other nationals. Candidates must possess French language FSI proficiency rating of S-3; R-3.

VIII. Collaboration with OAU

In order to attain the objectives set forth under this grant, IITA will cooperate with the Organization of the African Unity (OAU) and National Agricultural Research Systems (NARS). Specifically, IITA will, together with OAU plan the Workshops and Steering Committee meetings, monitoring tours and training sessions --although IITA will retain the primary implementation responsibility for these activities. IITA representatives will also attend meetings organized by OAU pertaining to network matters in order to receive guidance on IITA's research and networking programs and to interact with other OAU network cooperators. IITA will also provide research materials and seed for on-farm trials for Accelerated Crop Production Officers' (ACPO's) and Farming Systems Research (FSR) programs, wherever they may be operating in West and Central Africa.

OAU/STRC Network Coordinating Entity (Office)

The OAU/STRC as an African regional umbrella organization will provide a Network Coordinating office (NCO) to play a service-oriented role that is focussed on facilitating the work of the networks such as meetings, workshops, information exchange and liaison with NARS leaders to provide the framework for assuring gradual financial responsibilities for the network.

Council of NARS Directors

In order to ensure the sustainability of the networks at the end of the transition period, the OAU/STRC will have the responsibility to sensitize the NARS leaders towards their national commitment to support the networks with contributions from their national budget. A biennial meeting of NARS leaders should become the forum for review of progress and to provide guidance in management and policy issues.

Oversight Committee

To this end, an Oversight Committee will be established by NARS leaders composed of national agricultural research administrators and prominent agricultural university scholars with the following responsibilities.

- provide guidance in management and policy issues of the networks.

- review workplans and provide guidance on how networks could provide effective technical services to national research programs of member countries.

- facilitate the realization of food grain research and related network activities administered by scientists of participating countries.

- review annual technical progress of the network resident research and other related activities.

IX. Financial Plans

9.1. The United States Agency for International Development (USAID) project inputs under this Project Agreement will total **$2,456,090** over a three year period: April 1st to March, 31st, 1996.

9.2. **Budget estimate for Maize and Cowpea Network Coordinators.**

	US $
A. Salaries and Allowance for Professional and support staff	976,400
B. Operational cost	1221,690
C. Commodities	116,000
D. Overhead	141,600
Total	**2,456,090**

X. Logistic Support

The grantee shall provide administrative and logistic support including housing and utilities to the technical assistance personnel. Technical assistance personnel in Burkina Faso shall be allowed limited access to the American Embassy Health Unit, banking and recreation facilities in accordance with the specified regulations of the Embassy. The host government would provide office space to the grantee.

IX. Reports

a) Network Plan of Work: Steering Committees shall prepare detailed work plan within 3 months of the start of the project. The plan will encompass the research, on-farm trials and demonstration programs to be implemented and plans for training and human resource development in member countries.

b) Semi-Annual Progress Report: The Network Coordinator under the guidance of the Steering Committee will prepare six-month progress report by 31 March and 30 September each year. These reports will be related to the workplans and will include summary narrative description of activities, main achievement, major problems encountered and recommendations for improvement and follow-up action.

c) Final Report

Sixty days prior to the completion of this project, the coordinators under the guidance of the Steering Committee will prepare a draft of the final report incorporating a review of project achievements, problems encountered and recommendations for future activities with regard to specifically stated objectives. After receipt of comments from USAID/BF, a final report will be submitted 30 days after the end of the project.

XII. Project Outputs

1. Maize and Cowpea Networks will be fully staffed.
2. Network Steering Committees will meet bi-annually.
3. Research for each collaborative research network will be evaluated annually.
4. Future research activities will be identified, planned and allocated to participating countries.
5. Training needs of national scientists will be identified, planned and training programs implemented.
6. In-country research will be carried out by NARS.
7. Increased on-farm testing and demonstration will be conducted by NARS.
8. Cultivars will be released and cultural practices recommended.
9. Increased productivity, production and income at farmers' level will be ensured.
10. Responsive technical backstopping by IITA.
11. Network priorities will be set by NARS.

XIII. Logframe

See Table 1.

Table 1. Logical Framework Matrix

Narative Summary	Objective Verifiable Justification	Means of Verification	Important Assumptions
(1) Program or sector goal	Measures of goal achievement		
To increase the productivity and production of maize and cowpea among small scale producers in network member countries.	- increase production area, - increase adoption of improved technologies - increase yield and production.	- Government statistics - Case studies	- Increase allocation of national resources to research and extention; - changes in agricultural policies; - Availability of needed inputs and credit; - Incentive price policies.
(2) Program Purpose	EOP Stutus: Conditions to Indicate Achievement		
To increase the efficiency and effectiveness of agricultural research on maize and cowpea in the network member countries by strenthening commodity specific research networks to plan, broaden their base of support and make productive use of resources.	- Effectively operating collaborative research networks for maize and cowpea in West and Central Africa which operate by the following criteria: . establish common goals; . policy set by steering committee of researchers; . Conduct, at least, annual meetings to identify objectives, technical problems, review past and plan future research and other relevant network activities. . Effective linkage between research, and extension including non-government organisations at the national level.	- Annual Reports; - Attendance at steering committee meetings; - Attendance at the network meetings; - Reports from country missions; - Information from networks, NARS's, and OAU-SCO.	- All interested parties willing and able to participate; - NARS actively participating and enventually willing and able to assume leadership; - IITA willing to assume leadership roles and operate networks in participatory manner; - Improved prioritization of research work by NARS's through participation in the networks.

Table 1 (cont'd) Logical Framework Matrix

Narative Summary	Objective Verifiable Justification	Means of Verification	Important Assumptions
(3) Outputs	Magnitude of Outputs		
- An effectively functioning African Coordinating organization; - Research for each network reviewed and evaluated annually; - Future research activites identified, planned and allocated among participants - In country research implemented by NARS's; - Varieties released and cultural practices recommended; - Responsive technical back-stopping by IITA; - Network steering committees meet at least biannually; - Network priorities are reflected in NARS decision making; - Opportunities for future donor support at regional and national levels clarified.	- Annual meetings of oversight committee provides guidance for IARCS. - Annual meetings of scientists, monitoring tours and steering committee meetings. - Network planned agronomic trials; - Relevant varieties released in each commodity crop, based upon thorough testing and cultural practices.	- Reports by networks and IITA. - Monitoring of network meetings. - Visits to and data from NARS's - Visits to and data from IITA networks.	- Able leadership in Africa Regional Coordination and network meetings coordinators; - NARS's willing to review plan, and allocate research responsibilities. - NARS will fund in country research costs. - IITA, CRSPs, and AID directly-managed centrally funded projects will interact responsibly with NARSs. - Technologies will be developed, involving improved multi-disciplinary participation and on-farm testing and it will be diffused to farmers.

Annex 1:

Technologies in Pipeline

Promising maize and cowpea technologies in the pipeline are as follows:

Table 1. Promising maize varieties in the pipeline for release by NARS in West and Central Africa in 1992.

Country/Name	Varieties
Benin	DMR-ESRW, Pool 16 DR, EV 8328-SR
Burkina Faso	FBC 6, KPB, KPJ, KEB, KEJ, Pool 16DR
Cape Verde	Maka
Central Afr. Republic	CMS 8501, CMS 8710
Chad	Pool 16 DR, CMS 8602, CSP x L. Raytiri F3
Côte d'Ivoire	Maka, Pool 16 DR, TZEF-Y, Ferke 8336
Ghana	Dorke SR (Pool 16-SR), GH 8363-SR (QPM)
Guinea	Ikenne 83 TZSR-Y-1, EV 8428-SR, IRAT 200, IRAT 292, Poza Rica 8526
Mali	DMR-ESRY, TZEF-Y, Los Banos 8531, Across 8464
Mauritania	Gwebi 8422, Pool 16 DR, CSP Early
Niger	Composite Kollo 1
Nigeria	White Composite
Senegal	Sids 8445, Ikenne (1) 8149-SR
Togo	AB 1, AB 12, AB 13

Annex 1:

Table 2. Cowpea varieties adopted by NARS and which are at the various stages of multilocation and on-farm testing or demonstration before their eventual release.

Country	Name of variety
Benin	IT84S-2246, IT84D-513, TVx1999-01F, IT81D-1137, KVx100-21-7, KVx295-124-52
Burkina Faso	KVx30-309-6G, KVx61-1, KVx396-4-4, KVx396-4-5, KVx396-18-10, KVx402-5-2, KVx402-19-5, KVx295-2-124-51
Cameroon	IT81D-994
Cape Verde	IT83D-444
Côte d'Ivoire	CR-06-07, TVx3236, IT87D-1010, IT87D-1627, IT88DM-363, IT84S-2246, IT88DM-361, IT82E-32
The Gambia	IT84S-2049, IT83S-728-13, TVx 3236
Ghana	IT81D-1137, IT83S-818, KVx396-4-2, KVx396-4-4, KVx396-4-5, KVx396-18, KVx30-305-3G
Guinea Bissau	IT85D-3516-2, IT86D-498, IT87S-1390, IT85D-3577, IS86-275N, IS87-41GN, IT86D-373, KVx30-309-6G.
Guinea Conakry	IT84S-2246-4, IT82E-32, IT86D-1048, IT86D-1056, IT85F-867-5
Mali	TN93-80, TN121-80, KVx30309-6G, KVx61-1, Dan Illa, TVx3236
Mauritania	IT86D-472, IT82D-544-4, IT81D-897, IT82D-716, IT82D-927, KVx1948-01F, TVx3236, KB85-18, KVx295-2-124-89, KVx295-2-124-51, IT81D-994
Niger	A18-1-1, A73-1-2, KVx30-309-6G, KVx100-2, KVx30-305-3G, KVx396-4-5.
Nigeria	KVx3236, IT81D-994
Togo	TVx1850-01E, IT81D-985, 58-146, IT83S-818, IT82E-66, KVx 396-4-4.

Ann. 1:

Table 3. Promising Network technologies in the pipeline in 1992.

Attributes	Name of varieties
1. **Extra-early varieties**	(Across 8131 x JFS) x Local Raytiri, CSP, CSP-SR, CSP x Local Raytiri, Pool 27 x Gua 314, Pool 28 x Gua 314, Pool 30 x Gua 314, TZEE-W1, TZEE-W2, TZEE-Y, TZEE-Yellow Pool, TZEE-Y SR, TZEEF-Y, TZEESR-W x Gua 314.
2. **Early varieties**	Across 90 Pool 16 DT, Farako-Bâ 90 Pool 16 DT, Ina 90 Pool &6 DT, Kamboinse 90 Pool 16 DT, Maroua 90 Pool 16 DT, Nyankpala 90 Pool 16 DT, Maka SR, Dorke SR, Syn. E1, Syn. E2.

Ann.1

Table 4. Cowpea cultivars in the pipeline at the network level in 1992.

Attributes	Name of cultivars	Origin
1) Wide adaptation, high yield, Aphid and *Striga* resistant.	KVx426-1, KVx426-2, KVx426-4 and KVx 427-9	Burkina Faso
2) Wide adaptation, high yield, Bruchid resistant	KVx426-2, KVx414-22-21, KVx414-22-92, KVx414-16T, KVx404-22-3 & KVx404-52	Burkina Faso
3) *Striga* resistant cultivars	IT90K-59, IT90K-77 & IT90K-76 KVx397-6-6	IITA/Ibadan IAR/Nigeria Burkina Faso
4) Adaptation to transition zones	IT86D-400, IT86D-534 IT88DM-361, IT87D-2075 IT87S-139	IITA/Ibadan

Annex 2. Utilization of maize technologies obtained through the Network by NARS in West and Central Africa.

Country	Germplasm Development	Adoption/On-Farm Trials
1. Benin	Farako-Bâ 85 TZSR-W-1, TZB-SR DMR-ESRW, Pool 16 DR, TZPB-SR, EV 8328-SR, SEKOU 85 TZSR-W-1	Pirsaback 7930-SR, TZESR-W, DMR-ESRW, SEKOU 81 TZSR-W-1
2. Burkina Faso	EV 8322-SR, Pool 16 DR, EV 8330-SR, EV 8331-SR, Maka	22-SR (= EV 8322-SR), SAFITA-2, KPB (= 30 SR), KPJ (= 31 SR), Maka
3. Cameroon	(a) Pool 16 DR, Maka, CSP, DMR-ESRY, TZEF-Y (b) Uses Tied and Simple ridges for selecting for drought resistance.	CMS 8806 (= DMR-ESRY), Pool 16 DR.
4. Cape Verde	-	Maka
5. Chad	-	TZESR-W, TZB-SR, CMS 8602 (= 31SR)
6. Côte d'Ivoire	TZSR-Y-1, Maka, Pool 16 DR	Pool 16 DR, Maka
7. Ghana	(a) Pool 16-SR, 31-SR, 43-SR 49-SR (b) Screening techniques for streak resistant varieties	SAFITA-2, Dorke-SR (= 31 SR) Abeleehi (= 49-SR), Okomasa (=43-SR)
8. Guinea	DMR-ESRY, Pool 16 DR CSP Early, DR Comp Early	Ikenne 83 TZSR-Y-1
9. Guinea Bissau	-	TZESR-W,TZESR-Y
10.Mali	-	SAFITA-2, DMR-ESRY, TZEF-Y
11.Mauritania	Maka, Capinopolis 8245	CSP Early, CSP Early x L. Raytiri
12.Niger	Pop 31-SR, J.F. Saria, Maka, Pool 16 SR	Maka, Pop 31-SR, TZESR-W
13.Nigeria	TZB-SR, TZSR-Y-1, DMR-ESRW, DMR-ESRY	TZB-SR, TZSR-Y-1, DMR-ESRY DMR-ESRW, TZPB-SR
14.Senegal	Pool 16 DR, Maka	Ikenne(1) 8149-SR Maka, Pool 16 DR
15. Togo	(a) Ikenne 8149-SR, EV8443-SR TZESR-W x Gua 314, Pool 16 DR, Maka (b) Screening techniques for streak resistant varieties.	EV 8443-SR, Ikenne 8149-SR

Annex 3. Maize Varieties made available to NARS through the Network.

i) Late and intermediate maturing varieties (110-120 days) for Northern Guinea Savanna Zone.

Variety	Origin
Abeleehi	Ghana
Aburotia	Ghana
AB 22	Togo
CSM 8710	Cameroon
Okomasa	Ghana
Dobidi	Ghana
EV 8422-SR	CIMMYT-IITA
EV 8428-SR	CIMMYT-IITA
EV 8435-SR	CIMMYT-IITA
EV 8443-SR	CIMMYT-IITA
EV 8444-SR	CIMMYT-IITA
EV 8449-SR	CIMMYT-IITA
FARAKO-BA 85 TZSR-W-1	IITA
FARAKO-BA 85 TZSR-Y-1	IITA
NDOCK 8701	Cameroon
LOUMBILA 84 TZUT-Y	IITA & Burkina
TZB-SR	IITA
TZPB-SR	IITA
Golden Crystal	Ghana
Composite 4	Ghana
Zm10	Senegal
Synthetic C	Senegal
BDS	IRAT/Senegal
AB22	Togo
CJ1	IRAT/Benin
Staha	Tanzania
IRAT 100	IRAT/Burkina Faso
IRAT 102	IRAT/Burkina Faso
IRAT 178	IRAT/Côte d'Ivoire
NH2	IRAT/Benin
Elite x Early Mexican Composite	Ghana

ii) Early maturing (90-100 days) and/or drought tolerant varieties for Sudan savanna.

Variety	Origin
Across 86 Pool 16DT	IITA-SAFGRAD
Across 87 Pool 16SR	IITA
Across 88 Pool 16DT	IITA-SAFGRAD
BDP-SR BC3 F3	Benin-SAFGRAD
DMR-ESRW	IITA
DMR-ESRY	IITA
DR Comp. Early	IITA-SAFGRAD
Early 86 Pool 16DT	IITA-SAFGRAD
EV 8730-SR	CIMMYT-IITA
EV 8731-SR	CIMMYT-IITA
Farako-Bâ 86 Pool 16DT	IITA-SAFGRAD
Farako-Bâ88 Pool 16DR	IITA-SAFGRAD
FBC 6	Burkina Faso
Ikenne 88 BU-ESRW	IITA
Kamboinse 88 Pool 16DT	IITA-SAFGRAD
Kawanzie	Ghana
Maka-SR	Mauritania-SAFGRAD
SAFITA-2	IITA-SAFGRAD
TZE Comp. 3 x 4	IITA
TZESR-W	IITA
TZESRW-SE	IITA

Mexican 17 Early	Ghana
Jaune Dente de Bambey	Senegal
MTS	IRAT/Côte d'Ivoire

iii) Extra-early maturing varieties for Sudan savanna and to bridge hunger gap in other zones. No international centre worked on this maturity group.

Variety	Origin
(Across 8131 x JFS)x Local Raytiri	IITA-SAFGRAD
CSP	CIMMYT
CSP-SR	IITA-SAFGRAD
CSP x Local Raytiri	IITA-SAFGRAD
Pool 27 x Gua 314	IITA-SAFGRAD
Pool 28 x Gua 314	IITA-SAFGRAD
Pool 30 x Gua 314	IITA-SAFGRAD
TZEE-W1	IITA-SAFGRAD
TZEE-W2	IITA-SAFGRAD
TZEE-White Pool	IITA-SAFGRAD
TZEE-WSR	IITA-SAFGRAD
TZEE-Y	IITA-SAFGRAD
TZEE-Yellow Pool	IITA-SAFGRAD
TZEE-YSR	IITA-SAFGRAD
TZEF-Y	IITA-SAFGRAD
TZESR-W x Gua 314	IITA-SAFGRAD

iv) Improved agronomic practices

a. Tied ridges for soil moisture conservation in Sudan Savanna.

b. Better seed treatment chemicals for improved plant establishment and grain yield.

c. Increased plant population for higher grain yield of early and extra-early varieties.

d. Earlier date of fertilizer application (top dressing) for increased yield of early and extra-early varieties.

Annex 4. Research methodologies and new technologies developed by the IITA-SAFGRAD cowpea research team in Burkina Faso prior to 1987 and extended by RENACO and accepted by NARS.

Description of research methodology or new technologies	Country applying them	Year of first application
- Use of sowing dates in screening cowpea for adaptation to semi-arid zones.	- Burkina Faso	1988
	- Niger	1990
	- Nigeria	1991
- Use of single seed descendant method for advancement of lines from F1 to F6 in less than 3 years and for the development of new varieties in less than 7 years.	- Burkina Faso	1988
- Minimum insecticide to protect cowpea against insect pests	- Benin	1990
	- Burkina Faso, Cameroon	1988
	- The Gambia, Guinea Conakry, Senegal and Togo.	Prior to 1987
	- Niger, Nigeria	1989
- Maize-cowpea relay cropping and cereals-cowpea intercropping	- Benin, Cameroon, The Gambia Ghana, Nigeria	Prior to 1987
	- Burkina Faso, Guinea Bissau, Guinea Conakry, Chad and Togo	1988
- Bio-test for screening cowpea for bruchids resistance	- Cameroon, Ghana	Prior to 1987
	- Burkina Faso	1988
	- Guinea Conakry, Mali and Togo	1989
- Bio-test for screening cowpea for aphids resistance	- Burkina Faso	1988
	- Ghana	Prior to 1987
- Tied ridges technique	- Cameroon and Mali	Prior to 1987
	- Burkina Faso	1988
- *Striga* resistance methodology	- Mali, Niger and Nigeria	Prior to 1987
	- Burkina Faso	1988
	- Benin, Ghana, Senegal and Togo	1990

*Mali, Niger and Nigeria developed independently *Striga* resistance methodologies but have also adapted those developed by the IITA-SAFGRAD research team in Burkina Faso.

Annex 5: *Striga* Resistant Cowpea Varieties in West and Central Africa

Name of variety	Origin	Country having identified or confirmed the resistance to *Striga*	Country in which the resistance to Striga hold	National programs incorporating the resistance in good agronomic backgroung
- B301	Botswana	Burkina Faso IITA-SAFGRAD)	Burkina Faso, Mali, Senegal, Niger, Nigeria, Benin	Burkina Faso, Mali, Niger, Nigeria
- TN93-80	Niger	Niger (INRAN)	Burkina Faso, Mali, Senegal, Niger, Nigeria	Burkina Faso
- TN121-80	Niger	Niger (INRAN)	Burkina Faso, Mali, Senegal, Niger, Nigeria	Burkina Faso
- KVx61-1	Burkina Faso	Burkina Faso (IITA-SAFGRAD)	Burkina Faso, Mali	Burkina Faso
- KVx61-74	Burkina Faso	Burkina Faso (IITA-SAFGRAD)	Burkina Faso, Mali	Burkina Faso
- IT81D-994	IITA-Ibadan	Burkina Faso (INERA)	Burkina Faso, Nigeria	Burkina Faso
- KVx100-21-7	Burkina Faso	Benin	Benin	-
- KVx295-124-52	Burkina Faso	Burkina Faso (INERA)	Benin, Burkina Faso	Burkina Faso
- KVx291-47-222	Burkina Faso	Burkina Faso (INERA)	Benin, Burkina Faso, Mali	Burkina Faso

Annex 6: New cultivars with good attributes identified by NARS beginning 1987 upto date.

Type of attribute	Cultivars	Country in which it was identified or developed
Drought resistance		
	- Gorom Local, KVx30-305-3G, KVx396-4.	Burkina Faso (IITA-SAFGRAD)
	- KVx402-5-2, KVx402-19-5	Burkina Faso (INERA)
	- B89-504N, IS86-275N	Senegal (ISRA)
	- KB85-18	Niger (INRAN)
Cultivars adapted to drought and excess moisture conditions		
	- KVx396-18-10, KVx396-4-5-2D, KVx402-5-2,	Burkina Faso (INERA)
Multiple disease resistant cultivars		
	- IT86D-1056, IT83D-213, IT85D-3517-2, IT85D-3516-2, IT85D-3577 and IT83D-219	Nigeria (IAR)
Aphids resistant cultivars	- IT82E-25, IT83S-742-2, IT86D-3577	IITA, Ibadan (Nigeria)
	- KVx295-2-124-51	Burkina Faso (INERA)
Bruchids resistant cultivars	- IT84S-275-9, IT84S-2246-4	IITA, Ibadan (Nigeria)
	- KVx30-6467-5-10K, KVx295-2-124-51	Burkina Faso (INERA)
Dual purpose cowpea varieties: (fodder and seed yield)		
	- IAR7/180-5-1, IAR/180-4-5	Nigeria (IAR)

Annex 7. Cultivars released or in use by farmers since 1987

Country	Name of cultivar	Year first used by farmers
- Benin	- TVx1850-01F	1987
	- IT82E-32	1988
	- IT81D-1137	1990
- Burkina Faso	- TVx3236; Suvita-2 (Gorom Local)	1987
	- KVx396-4-4, KVx396-4-2 and	
	- KVx396-4-5-2D	1991
- Cape Verde	- Local Santiago	1987
	- KN-1	1988
- Ghana	- Vallenga (IT82E-16), Asontem (IT82E-18)	1987
	- Bengpela (IT83S-818) and Brown eye (IT81D-1137).	1991
- Guinea Bissau	- IT82E-9	1988
	- IT83S-889	1990
- Guinea Conakry	- IT338-1	1989
	- IT85F-867-5 and IT84S-2246-4	1990
- Mali	- Suvita-2	1987
	- KVx61-1	1990
- Mauritania	- IT83S-343-5-5, Suvita-2 and KVx256-K17-11	1988
- Nigeria	- Sampea-7 (IAR-48)	1987
- Senegal	- IS86-275	1990
- Togo	- VITOCO (IT81D-985) and 58-146	1988

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