West and Central Africa Cowpea Network
"Réseau Niébé de l'Afrique Centrale et Occidentale"

RENACO

Final Report

Transition Period: April 1 - September 30, 1993

Funded by: The United States Agency for International Development (USAID)

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Preface

A final report synthesizing cowpea improvement research activities coordinated and/or conducted by the International Institute of Tropical Agriculture (IITA) in Semi-Arid Sub-Saharan West and Central Africa covering the period 1978 to March, 1993 has been published. With the scientific breakthrough attained by the IITA-SAFGRAD project through its resident research conducted by IITA scientists and the collaborative research cowpea network by national scientists, prompted USAID to further extend activities of the cowpea collaborative research beyond the initial Project Activity Completion Date of March 31, 1993 to September 30, 1993.

This report covers, thus, activities carried out during the six months transitional period: April 1 to September 30, 1993. The main purpose was to keep the spirit of the network going and to avoid possible disruption of network activities if the network was to wind up on 31 March 1993. It was also to permit ample time to explore new sources of funding to hold the network for the next five to ten years as was recommended by the 1991 USAID-SAFGRAD evaluation team.

It is regretable, however, that the six months have elapsed without a solution to the continuation of the cowpea network, except to wind up, despite its tremendous work done and the significant progress made in cowpea improvement research and production in the region.

The six months extension, however, has permitted us to retrieve the 1992 *Striga* resistance regional trial data, results of which, together with those of 1991 revealed that at least two improved *Striga* resistant cultivars, KVx402-19-1 and KVx402-19-5, have been developed by the network. They can be used in combatting *Striga* infestation in the region. Also 16 new

cultivars with several improved attributes (*Striga*, diseases and drought resistance, insect pest tolerance, wide adaptation and of course high yield) developed by NARS Lead Centers and IITA were transferred to member-countries through regional trials. They are expected to contribute significantly to agricultural development of member-countries.

Acknowledgements

September 30, 1993, being the final and formal Project Activity Completion Date (PACD), the West and Central Africa Cowpea Network (RENACO), wishes to extend its gratitude to the Government and people of Burkina Faso for the support of the network activities. The Network is particularly grateful to the Ministry of Higher Education and Scientific Research and to the Ministry of Agriculture and Livestock, through which the "Institut d'Etudes et de Recherches Agricoles" (INERA) and the "Centres Régionaux de Production Agro-pastoral" (CRPA), provided the needed land at some INERA stations and two CRPA sub-stations for the implementation of the research activities.

The understanding and cooperation of the Director General of the "Centre National de Recherches Scientifiques et Technologiques (CNRST), the Director of INERA, the Heads of the Kamboinse, Saria, Kouare and Farako-Bâ stations, the Leader of the Oil and Grain Legumes Improvment Program of INERA and all cowpea scientists in Burkina Faso is deeply appreciated. The successful execution of the RENACO activities could not have been possible without their concern.

RENACO is grateful for the enthusiastic support from the Directors' of Agricultural Research of NARS member-countries which permitted national scientists full participation in the implementation of network activities which was the result of the positive achievements recorded by the Network.

RENACO commends the efforts and the achievements obtained by its Lead and Associate Centers: Burkina Faso, Cameroon, Ghana, Niger, Nigeria and Senegal and Benin and Mali, respectively. They were highly instrumental in the accomplishment of the network objectives during the last five years.

The coordination role and backstopping provided by IITA is gratefully acknowledged. This permitted the rapid transfer of research methodologies and advanced technologies to NARS, thereby enhancing the efficiency of research output in the RENACO Lead and Associate Centers, especially.

The Organization of African Unity, Scientific, Technical and Research Commission (OAU/STRC), through the SAFGRAD Coordination Office in Ouagadougou, provided immense logistic support and facilitated a free flow of scientific information and movement of scientists from one country to the other, without which the success of the cowpea network could not have been possible.

I wish to take this opportunity to express my sincere gratitude to IITA for having given me the opportunity to serve the SAFGRAD Project. I am also pleased to record here that every minute of my stay here with family has been very pleasant and joyful. My work as breeder/agronomist and physiologist was an interesting and challenging experience.

On behalf of my family and myself, I wish to thank all those who have made it possible in one way or the other, our stay here so confortable and very interesting.

Finally, but not the least, these achievements would not have been possible without the financial assistance and moral support of the U.S. Agency for International Development (USAID), to whom we are deeply grateful.

Ouagadougou
September, 1993

Nyanguila Muleba
Cowpea Network Coordinator
(RENACO)

Declaration

Mention of a particular pesticide, any other chemical or product in this document does not imply endorsement of, or discrimination against any manufactured product by IITA/SAFGRAD.

Abbreviations

CNRST	Centre National de Recherches Scientifiques et Technologiues.
CRPA	Centre Régional de Production Agro-Pastorale.
IITA	International Institute of Tropical Agriculture.
INERA	Institut d'Etudes et Recherches Agricoles.
NARS	National Agricultural Research Systems.
OAU	Organization of African Unity.
RENACO	Réseau Niébé d'Afrique Centrale et Occidentale. (West and Central Africa Cowpea Network).
STRC	Scientific, Technical and Research Commission.
SAFGRAD	Semi-Arid Food Grain Research and Development.
SCO	SAFGRAD Coordination Office, Ouagadougou.
USAID	United States Agency for International Development.

Executive Summary

The absence of assurance of future funding for the Network created some difficulties in the smooth execution of the Cowpea Network activities. Nevertheless, a certain level of the network spirit was maintained with national programs during the 6 months transition period.

Seed multiplication of 40 new cultivars was carried out in collaboration with the national program of Burkina Faso. A total of 600 kg good quality seed was produced. This permitted the network to put four regional trials together and dispatched in 56 sets to national programs as below:

Name of trial	No of sets
1. Adaptation to northern Guinea savanna	15
2. Adaptation to Sahelian-Sudanian zones	14
3. Adaptation to transition zones	11
4. *Striga* resistance trial	16
Total	56

Among the cultivars distributed, 16 were newly developed with several good adaptation attributes; they were developed by national scientists of RENACO Lead Centers and IITA core scientists in Nigeria.

Research Workplans for the 1993 crop season were received from Burkina Faso, Cameroon and Ghana. Nigeria notified the network coordinator of its intention to reconduct the 1992 research workplans. In Burkina Faso, 64 new promising lines were in the pipeline and will be promoted to advanced yield trials in 1994. Also, 20 new cultivars with high yield, wide adaptation,

Striga resistance and tolerance to insect pests, of which KVx404-22-2 and KVx 414-22-72 were in the pipeline for adaptive and regional trials in 1994.

Funds were earmarked by the Network to support collaborative and adaptive research by national programs. However, as of September 30, 1993, only a few national programs had submitted expenses claim for reimbursement.

New technologies developed and promoted by the network up to date and difficulties encountered in carrying out network activities are discussed in this report.

I. Introduction

Network activities conduted during the transitional period: April 1 to September 30, 1993 were planned mainly to maintain research momentum and keep the network spirit among member-countries, so as to avoid any disruptive effect likely to result in the loss of important material and personnel, if the network was to wind up on 31 March, 1993. They are reported as below:

* Seed increase for regional trial and varietal maintenance;

* Preparation of the 1993 regional trials and their distribution to member-countries;

* Support for collaborative research activities conducted by Network Lead Centers;

* Support for adaptive research activities conducted by all member-countries;

* Miscellaneous matters:

  ° Data collection, analysis and compilation of the 1992 regional trials;

  ° Publication and dispatch to national programs of the results of the 1991/92 trials;

  ° Publication of the 1991/92 collaborative research progress report;

  ° Retrieve from Lead and Associate Centers, research findings of the 1992/93 crop season; draft network collaborative research progress report and distribution to member-countries.

II. Network Activities

2.1. Seed increase

A total of 40 improved cultivars to be included in the 1993/94 RENACO regional trials were increased in a 400m^2 plot each. A field plot of 2 ha was used under irrigation at Loumbila, near Ouagadougou in mid February and harvested in early May, 1993. Good quality seed of about 600 kg in total or an average of 15 kg per cultivar was obtained. They were distributed to member-countries as seed of entries for the regional trials. In addition, the whole cowpea germplasm was renewed. Both activities, seed increase and germplasm maintenance were carried out in collaboration with the INERA Cowpea Program of Burkina Faso.

2.2. RENACO 1993 Regional Trials

Since the biennial regional workshop was not held in 1993, only four regional trials were assembled based on research progress reported by RENACO Lead Centers: Burkina Faso, Benin, Cameroon and Nigeria including IITA, Ibadan. A total of 56 sets of the trials were dispatched in mid-June upon request as shown in Table 1. They were as follows:

Name of trial	No of sets
1. Adaptation to northern Guinea savanna	15
2. Adaptation to Sahelian-Sudanian zones	14
3. Adaptation to transition zones	11
4. *Striga* resistance trial	16
Total	56

In addition, the following countries had requested and were supplied with 300g each of the cultivars listed below for further testing or seed multiplication.

* **Central African Republic:** KN-1, Lesso Local, Dembo Local, KVu55 and KVu69;

* **Chad:** IT81D-994, IIT31D-985 and KVx60-P04-1;

* **Zaire:** KN-1, Dembo Local, KVu55, KVu69, KVx61-1, KVx396-18-19, KVx396-4-5-2D, KVx402-5-2, VYA and NI86-650-3.

It should be noted, however, that the total of 56 sets distributed in 1993 was below the usual average. This is due to the fact that national scientists' request for regional trials is based on the performance of the technology that the trial may contain. The national program that developed the technology has to present the relevant supporting data at a workshop before a technology can be accepted by participating scientists for regional trials. This was not the case this year; hence the low number of NARS requests for regional testing in 1993.

Table 1. Regional Trials dispatched to member-countries in 1993

Country	Adaptation to				
	Northern Guinea savanna	Sahelo-sudanian zones	Transition zone	*Striga* resis-tance	Total
Benin	2	2	2	3	9
Burkina Faso	1	1	1	2	5
Cameroon	1	1	1	1	4
Cape Verde	0	0	0	0	0
Central. Afr. Republic	2	0	1	0	3
Chad	1	1	1	1	4
Côte d'Ivoire	1	1	0	0	2
Gambia	1	1	1	0	3
Ghana	1	0	0	1	2
Guinea Bissau	1	1	1	0	3
Guinea Conakry	2	0	1	0	3
Mali	0	2	2	2	6
Mauritania	0	1	0	0	1
Niger	0	0	0	0	0
Nigeria	1	1	0	3	5
Senegal	0	2	0	2	4
Sierra Leone	0	0	0	0	0
Togo	1	0	0	1	2
	15	14	11	16	56

2.3. Collaborative Research

Collaborative research activities are conducted by six RENACO Lead Centers: Burkina Faso, Cameroon, Ghana, Niger, Nigeria and Senegal. They cover all aspects of cowpea improvement. Two countries: Benin, and Mali are Associate Lead Centers; they conduct validation tests with emphasis on *Striga* resistance.

As of 30 September, workplans for the 1993 crop season had been received only from Burkina Faso, Cameroon and Ghana. Nigeria indicated its intention to reconduct the 1992 research workplans; Nigeria serves a key role to the network in cowpea pathological research. It has been very active in identifying new sources of multiple disease resistances, especially the combination of *Septoria* leaf spot and scab resistance and *Alectra* and *Striga* resistances.

The national cowpea program of Burkina Faso is also pursuing cowpea improvement research with vigor. Several new crosses have been made with the objective of combining *Striga*, multiple diseases and drought resistance and insect pest tolerance. Over 64 new promising lines are in the pipeline; they will undergo advanced yield trials in 1994. Also, over 20 new promising cultivars, of which KVx404-22-2 and KVx414-22-72, are in the pipeline for regional and/or adaptive testing in 1994. The latter two cultivars, not only were they widely adapted with high yield, but were also tolerant to insect pests in the Sahel and Sudan Savanna, at least.

Research worplans for the 1993 crop season were received from only Mali, an Associate Lead Center. Its plan of work included RENACO regional trials and national adaptive trials, including on-farm testing.

With regard to RENACO financial support to national programs, only Burkina Faso, Ghana and Mali had submitted their expenses claims as of 30 September, 1993. Unfortunately, the Mali claim could not be processed because the invoices were sent by Fax and the figures don't appear to be clair enough to garantee their authenticity. Furthermore, Mali did not submit its 1991 and 1992 Annual progress reports to merit disbursement of its support funds.

2.4 Adaptive Research

The network had encouraged adaptive research in all member-countries by sending to them timely, regional trials (Table 1) and informing them about funds put at their disposition by the network in support of adaptive research in 1993. As of September 30, 1993, only Togo had submitted expenses claim for the 1993 crop season. It should be noted that: because of the slow pace taking of NARS bureaucracy, cost incurred for any particular research activity is made available to national scientists around the end of December or at the beginning of the next crop season.

This could be the cause of the delay in sending expenses claims by national programs.

2.5. Miscellaneous

The six months transitional period enabled the network to retrieve the 1992/93 regional trial data from NARS for analizing and compilation of the research findings. Other reports that have been published included: (1) 1991/92 RENACO Regional Trials: Preliminary results; (2) 1992 RENACO Regional *Striga* resistance and supplements of other trials; (3) SAFGRAD Maize and Cowpea Collaborative Research Networks' for West and Central Africa: Annual Reports: 1991/92 and 1992/93.

III. Network Achievements

During the transitional period, a total of 16 new cultivars developed through the network effort were distributed to member-countries through regional trials. They are provided in Table 2. They were develeloped by Burkina Faso, Benin, Cameroon, Guinea Bissau and IITA core programs in Nigeria. Technologies developed by the Network and distributed to member-countries and their present status for release are provided in Tables 3-7.

Table 2. New promising cultivars developed by NARS through the nework effort and IITA to be tested in regional trials in 1993.

Cultivar	Origin	Characteristics
1. KVx426-1	INERA, Burkina Faso	*Striga* resistant and adapted to Sudan-Sahelian zones & northern Guinea savanna.
2. KVx426-4	- do -	- do -
3. KVx4O4-22-3	- do -	Better adapted to Sahelian-Sudanian zones & northern Guinea savanna
4. KVx4O4-52	- do -	- do -
5. KVx414-16T	- do -	- do -
6. KVx414-22-21	- do -	- do -
7. KVx397-6-6	- do -	- do -
8. IT9OK-76	IITA, Ibadan	Better adapted to Sudan & Guinea savannas
9. IT89KD-374	- do -	- do -
1O. IT89KD-245	- do -	*Striga* resistant, better adapted to Sudan & Guinea savannas
11. IT9OK-59	- do -	- do -
12. IT9OK-77	- do -	- do -
13. NI86-65O-3	Benin	*Striga* resistant
14. Waongo-1	Niger/IITA/BF	- do -
15. VYA	Cameroon	Better adapted to Sudan & Guinea savanna
16. Ploplilon	Guinea Bissau	Resistant to diseases of Guinea savanna.

Table 3. Research methodologies and findings extended by RENACO and accepted by NARS.

Description of research methodology and findings	Country applying it
- Use of sowing dates in screening cowpea for adaptation to semi-arid zones.	Burkina Faso, Niger and Nigeria
- Use of a 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
- Minimum insecticide to protect cowpea against insect pests	Burkina Faso, Cameroon, The Gambia, Ghana, Guinea Conakry, Niger, Nigeria, Senegal.
- Maize-cowpea relay cropping and cereals-cowpea intercropping systems	Benin, Burkina Faso, Cameroon, The Gambia, Ghana, Guinea Bissau, Guinea Conakry, Nigeria, Tchad, Togo
- Bio-test for screening cowpea for bruchids resistance	Burkina Faso, Cameroon, Ghana, Guinea Conakry, Mali, Togo.
- Bio-test for screening cowpea for aphids resistance	Burkina Faso, Ghana.
- Tied ridges technique	Burkina Faso, Cameroon, Mali.
- *Striga* resistance methodology	Benin, Burkina Faso, Ghana, Mali, Niger, Nigeria, Senegal, Togo.

Table 4. *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 resistace to *Striga* hold	National programs incorporating the reistance in good agronomic background
- B301	Botswana	Burkina Faso (IITA-SAFGRAD)	Burkina Faso, Mali Senegal, Niger, Nigeria, Benin	Burkina Faso, Mali, Niger, Nigeria
- IN93-80	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	IITA-Ibadan	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

Table 5. 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)
	- IB85-18	Niger (INRAN)
Cultivars adpated 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)
	- IVx295-2-124-51	Burkina Faso (INERA)
Dual purpose cowpea varieties: (fodder and seed yield)	- IAR7/180-5-1, IAR/180-4-5	Nigeria (IAR)

Table 6. Cultivars adopted by NARS since 1987 and which are in the various stage of multilocation trials and on-farm testing and demonstration before their eventual release.

Country	Name of Variety
Benin	IT84S-2246; IT84D-513; TVx 1999-01F; IT81D-1137; KVx 100-21-7; KVx295-124-52.
Burkina Faso	KVx 30-309-6G, KVx 61-1, KVx 396-4-4; KVx 396-4-5; KVx 396-18-10; KVx402-5-2; KVx402-19-5; KVx295-2-124-51.
Cameroon	IT81D-994
Cape Verde	IT83D-444;
Côte d'Ivoire	GR-06-07; TVx3236; IT87D-1010; IT87D-1627; IT88DM-363; IT84S-2246; IT88DM-361; IT82E-32.
The Gambia	IT84S-2049; IT83S-728-13; TVx3236.
Ghana	IT81D-1137; IT83S-818; KVx396-4-2; KVx396-4-4; KVx396-4-5; KVx396-18; KVx30-305-3G.
Guinea B.	IT85D-3516-2; IT86D-498; IT87S-1390; IT85D-3577; IS86-275N; IS87-416N; IT86D-373; KVx30-309-6G.
Guinea C.	IT84S-2246-4; IT82E-32; IT86D-1048; IT86D-1056; IT85F-867-5.
Mali	TN93-80; TN121-80; KVx30-309-6G; KVx61-1; Dan Illa; TVx3236.
Mauritania	IT86D-472; IT82D-544-4; IT81D-897; IT82ED-716; IT82D-927; TVx 1948-01F; TVx3236; KB85-18; KVx295-2-124-89; TVx295-2-124-51; IT81D-994.
Niger	A18-1-1; A73-1-2; KVx30-309-6G; KVx100-2; KVx30-305-3G; KVx396-4-5.
Nigeria	TVx 3236; IT81D-994.
Togo	TVx 1850-01E; IT81D-985; 58-146; IT83S-818; IT82E-66; KVx 396-4-4.

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

Country	Variety
- Benin	IT82E-32; IT81D-1137; TVx 1850-01F.
- Burkina Faso	TVx 3236, Suvita-2; KVx396-4-4; KVx396-4-2; KVx396-4-5-2D.
- Cape Verde	KN-1; Local Santiago
- Ghana	Vallenga (IT82E-16); Asontem (IT82E-32).
- Guinea Bissau	IT82E-9; IT83S-889.
- Guinea Conakry	IT85F-867-5; IT83D-338-1; IT84S-2246-4.
- Mali	Suvita-2, KVx61-1.
- Mauritania	IT83S-343-5-5; Suvita-2; KVx 256-K17-11
- Nigeria	Sampea-7 (IAR-48)
- Senegal	IS86-275
- Togo	58-146

IV. Difficulties encountered in executing project activities

The insufficient and uncertainity of continued funding for the Cowpea Network did not make it possible for certain important activities of the network to be carried out. These included the holding of the cowpea streering committee meeting, the biennial workshop, monitoring tours, etc. As a result, national scientists became not only discouraged but also lost their enthusiasm with which they normally participate in network activities. This was reflected in the significant reduction in their requests for regional trials and feedback returned for collaborative and adaptive research activities.

1993-09

RENACO Final Report Transition Period: April 1 - September 30,1993

AU-SAFGRAD

AU-SAFGRAD