

OAU/STRC JOINT PROJECT 31

SAFGRAD II.

Semi-Arid Food Grain Research and Development

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WEST & CENTRAL AFRICA COWPEA NETWORK  
RESEAU NIEBE DE L'AFRIQUE CENTRALE ET OCCIDENTALE  
(RENACO)

Funded by :

USAID : United States Agency for International Development

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PROGRAM OF RESEARCH

Program of Activity - April 1988-March 1989

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OCTOBER 1988

OMNISTIC JOINT PROJECT 31

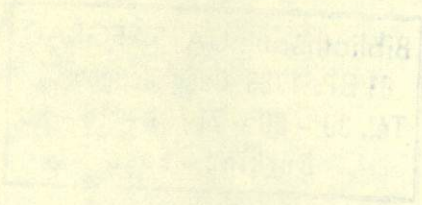
SAFGRAD II

Semi-Arid Food Grain Research and Development

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RESEAU NIEBE DE L'AFRIQUE CENTRALE ET OCCIDENTALE  
(R E N A C O)

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INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE

OT B.P. 185 of 1983

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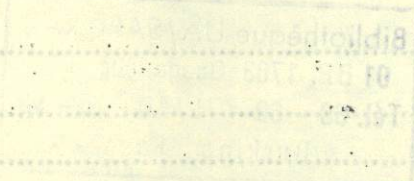
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PART 1

PROGRAM OF RESEARCH

## I. INTRODUCTION

In accordance with the Grant N° 698-0452-G-1C-6024-00IITA, signed between IITA and USAID on August 29, 1986, "A principal program under SAFGRAD II is to develop the capacity and initiative of African scientists who will direct maize and cowpea network themselves". To this effect cowpea scientists from West and Central Africa met in a workshop at Ouagadougou, Burkina faso, in March 1987 under the auspices of IITA and OAU/SAFGRAD. At the workshop, an inventory was made and common production constraints in the sub-region were identified. They also assessed the strength of each national cowpea program and identified strong programs which could serve as lead centres beginning April 1988 when IITA was to wind up its cowpea resident research activities in Burkina Faso. Following national cowpea programs accepted to serve as lead centres for the Western and Central Africa Cowpea Network (RENACO)

### - Burkina Faso :

- . Cowpea breeding for :
  - . Drought, Striga, insect pests and disease resistances.
- . Cowpea entomology
- . Cowpea pathology

### - Nigeria :

- . Cowpea breeding for : Drought, Striga, insect pests and disease resistances.
- . Cowpea agronomy
- . Cowpea pathology
- . Cowpea entomology

### - Niger

- . Cowpea breeding for : Drought, Striga, insect pests and disease resistances.
- . Cowpea agronomy
- . Cowpea pathology : Striga



- Senegal

- . Cowpea breeding for : Drought, insect pests and disease resistances.

- . Cowpea entomology

- Cameroon

- . Cowpea entomology with particular emphasis on storage insect pests control.

In line with the Grant referred to above, IITA wound up its cowpea resident research in Burkina Faso on 31 March 1988 and from here onwards cowpea research within the sub-region covered by RENACO are under the direct responsibilities of lead centres, with IITA as a backstopping role. Lead centres submitted broadlines of their research activities for the 1988-89 crop season to the Steering Committee of RENACO. The research programs were discussed during the November 1987 and March 1988 meetings of the RENACO's Steering Committee. The Burkina cowpea research program, which research work plans were, however, thoroughly discussed and adopted by the Steering Committee. This was due to the fact that the RENACO coordinator was to merge his limited resident research activities with that of the Burkina cowpea research Program.

In order to support research activities of the cowpea lead centres following sums were approved by the RENACO's Steering Committee to be allocated to those centres.

- Burkina Faso

- . Support to national cowpea research US\$ 3,000.00
- . Joint efforts with the RENACO Coordinator's resident cowpea research US\$ 7,000.00

Total US\$ 10,000.00

- Nigeria

- . Support to national cowpea research US\$ 4,000.00

- Senegal

- . Support to national cowpea research US\$ 3,000.00

- Niger
  - . Support to national cowpea research US \$ 2,000.00
- Cameroon
  - . Support to national cowpea research US \$ 2,000.00

This mid-term report covers research activities by lead centres, IITA and activities of the Network Coordinator.

## II. RESEARCH ACTIVITIES IN BURKINA FASO

As stated earlier, RENACO's coordinator has merged his limited resident research activities with those of the national cowpea research program of Burkina Faso. This is not only to strengthen the capacity of the program, but also to improve the efficiency of resource utilisation in achieving a common goal : development of farmers' accepted cowpea production technologies.

During the crop season cowpea research was conducted in the three agro-ecologies of Burkina Faso at the following stations :

- Pobé/Djibo : In the Sahel
- Kamboinse/Ouagadougou : In the Sudan Savanna
- Farako-Bâ/Bobo-Dioulasso : In the Northern Guinea Savanna

Following experiments were conducted :

### 1) Cowpea adaptation studies

#### Objectives :

- To identify areas of adaptation of promising introduced and locally improved cowpea cultivars and lines.
- To identify cultivars or lines minimizing seed yield losses and maximizing seed yield gains during bad and good years, respectively.
- To identify major constraints (drought, diseases and insect pests) to cowpea production in the three ecologies of Burkina Faso, and,
- To identify sources of resistance to the constraints for further use in crossing and selection programs.

### Treatments

- 60 cultivars and lines
- 2 insecticide spraying regimes
  - . No insecticide sprayings
  - . Minimum insecticide sprayings.
- 2 sowing dates; 2 replications and 3 locations.

<u>Locations</u>	<u>Agro-ecology</u>	<u>Sowing</u>	
		<u>Date 1</u>	<u>Date 2</u>
Pobe	Sahel	2/7/88	30/7/88
Kamboinse	Sudan Savanna	15/7/88	8/8/88
Farako-Bâ	Northern Guinea Savanna	15/7/88	10/8/88

### 2) Preliminary Striga Resistance Trial

#### Objectives

- For field evaluation for Striga resistance promising cultivars and lines (previously screened in potculture for Striga resistance).
- To assess seed yield losses due to Striga infestations.

#### Treatments

- 16 cultivars or lines with three checks included : IT 82D-849, B 301 and SUVITA-2.
- Striga sick plot and no Striga sick plot.
- Six replications
- One location : Kamboinse
- Sowing date : 21/7/88

### 3) Sorghum cowpea intercropping

#### Objectives

- To study the effect of cowpea cultivars and densities on the intercropped sorghum.

Treatments

- 3 cowpea cultivars and
- 4 cowpea densities
- 6 replications
- 2 locations

<u>Location</u>	<u>Agro-ecology</u>	<u>Sowing dates</u>
Kamboinse	Sudan Savanna	24/6/88 & 21/7/88
Farako-Bâ	Northern Guinea Savanna	24/6/88 & 24/7/88

Cowpea entomology and pathology studies were also conducted. Seed increase was done at Kamboinse. Details are reported in the 1988 Cowpea Monitoring Tour Report (vide Part 2).

**III. RESEARCH ACTIVITIES IN NIGERIA**

During the 1988 crop season, the cowpea research program of the Institute of Agricultural Research (IAR) of Nigeria was conducting cowpea research in all three ecologies of semi-Arid West Africa as follows :

1) Northern Guinea Savanna

Experiments were conducted at Samaru in :

- Cowpea breeding
- Cowpea pathology : screening for :
  - . Striga resistance and
  - . Resistance to various diseases :
    - + Scab (Elsinoe phaseoli)
    - + Septoria leaf spot (Septoria vignae)
    - + Brown blotch (Colletotrichum capsici)
- Cowpea agronomy

Details of the experiments can be found in the 1988 cowpea monitoring tour ( vide Part 2).

## 2) Sudan Savanna

Experiments were conducted at :

### 2.1.) Kadawa in :

- . Cowpea breeding
- . Cowpea entomology and
- . Cowpea agronomy

### 2.2.) Tomas and Sada in :

- . Cowpea breeding/pathology for Striga resistance.

### 2.3.) Minjibir in :

- . Cowpea breeding
- . Cowpea breeding/pathology for Striga resistance
- . Cowpea agronomy.

Details of the experiments can be found in the 1988 cowpea monitoring tour (Part 2).

## 3) The Sahel

Experiments were conducted at Bakura in :

- . Cowpea breeding and
- . Cowpea breeding/pathology for Striga resistance.

I was not able to visit these experiments.

## IV. RESEARCH ACTIVITIES IN NICOTER

During the 1988 crop season, the cowpea research program of the "Institut National de Recherches Agronomiques du Niger" (INRAN) was conducted in the Sahel ecology of West Africa at :

### 1) Maradi/Magara

- Cowpea breeding
- Cowpea pathology : screening for Striga resistance
- Cowpea entomology

2) Gabagoura

- Cowpea breeding
- Cowpea pathology : screening for Macrophomina spp. resistance.

3) Kollo

- Cowpea breeding
- Cowpea agronomy : millet-cowpea intercropping

Details can be found in the 1988 cowpea monitoring tour ( Part 2).

V. RESEARCH ACTIVITIES IN CAMEROON

During the 1988 crop season, the cowpea research program of the "Institut de la Recherche Agronomique" (IRA) of Cameroon was concentrated in the Sahelo-Soudanian zone and the Northern Guinea Savanna zone at :

1) Maroua

- Cowpea breeding (mostly tests of locally collected and introduced varieties).
- Cowpea entomology
  - + Insecticide tests
  - + Tests of cultivars for Bruchids resistance
  - + Study of cowpea storage methods
- Cowpea agronomy : sorghum-cowpea intercropping and seedbed preparation methods.
- Cowpea pathology : screening cowpea for Striga resistance in a Striga sick plot.

2) Garoua

- Cowpea breeding
- Cowpea entomology

Details of the experiments can be seen in the 1988 report on visit to four countries (Part 3).

## VI. RESEARCH ACTIVITIES IN SENEGAL

During the 1988 crop season, the cowpea research of the "Institut Sénégalais de Recherches Agricoles" (ISRA) was concentrated in the Sahelo-Soudanian agro-climatic zones. Experiments were conducted at the following stations.

### 1) Bambey

- Cowpea breeding
- Cowpea pathology
- Cowpea entomology

### 2) Louga

- Cowpea breeding
- Cowpea entomology

On-farm testing and seed multiplication were also carried out.

Details of the experiments can be seen in the 1988 report on visit to four RENACO countries ( Part 3).

## VII. RESEARCH ACTIVITIES IN IITA

Currently, cowpea improvement is the major activity of the Grain Legume Program (GLIP) of IITA. Research on cowpea is focused on tropical Africa with emphasis on Central and West Africa. Resources are allocated primarily to breeding cowpea adapted to cereal farming systems of the Savanna zones and on host-plant resistance to insect pests and diseases.

Breeding cowpea adapted to cereal farming systems.

- An IITA/ICRISAT team is currently working at the ICRISAT Sahelian Center at Niamey, Niger, in developing new cowpea varieties adapted to millet based farming system ;

- Another team is initiating work in northern Guinea and Sudan savanna in collaboration with the Institute of Agricultural Research of Ahmadu Bello University, Zaria, Nigeria, in developing new cowpea varieties adapted to sorghum based farming systems.

Host-plant resistance to insect pests and disease work were conducted at Ibadan, Nigeria. To this effect, IITA-GLIP maintains an insect rearing and pathology laboratories, including experimental field plots. A germplasm and virology units also assists IITA-GLIP in introducing, cataloging and continuously making available new germplasm for direct use or incorporation into good agronomic backgrounds.

### VIII. REGIONAL COWPEA TRIAL

Country	Observation Nursery			Trials §			Total
	Bruchids	Virus	Aphids	RCDT	RCST	S/CI	
Cape Verde	-	-	1	-	-	-	1
Ghana	1	-	1	-	-	1	3
Mauritania	2	-	2	3	1	-	8
Benin/INA	1	1	1	1	1	1	6
Togo/Kakaveli	1	1	1	-	-	-	3
Togo/Kara	-	1	-	-	-	-	1
Burkina Faso	1	1	1	-	-	-	3
<b>Total</b>	<b>6</b>	<b>4</b>	<b>7</b>	<b>4</b>	<b>2</b>	<b>2</b>	<b>25</b>

- § RCDT = Regional cowpea drought resistance trial  
 RCST = Regional cowpea Striga resistance trial  
 S/CI = Sorghum/cowpea intercropping trial

### IX. OTHER ACTIVITIES OF THE COORDINATOR OF RENACO

- GHANA : The Coordinator of RENACO attended, upon invitation, the maize/cowpea workshop organized by the Crop Research Institut of Ghana at Kumasi : 16-18 February 1988.



- He attended RENACO's Steering Committee Meeting at Ouagadougou from 28-31 March 1988 ;
- He attended SAFGRAD Oversight Committee Meeting at Nairobi, Kenya 1-3 August, 1988.
- He visited :
  - . Cameroon : 5-10 August
  - . Tchad : 13-16 August
  - . Senegal : 17-20 August
  - . Cape Verde : 20-23 August
- With the RENACO cowpea monitoring tour, he visited :
  - . IITA Ibadan : 5-7 September
  - . Northern Nigeria : 8-10 September
  - . Niger : 11-16 September
  - . Burkina Faso : 17-20 September

IX. OTHER ACTIVITIES OF THE COORDINATOR OF RENACO

GHANA: The Coordinator of RENACO attended upon invitation the maize/cowpea workshop organized by the crop research institute of Ghana at Cometa, 14-18 February 1988.

PART 2

REPORT OF COWPEA MONITORING TOUR  
5-21 SEPTEMBER 1988  
NIGERIA, NIGER AND BURKINA FASO

PART 2

REPORT OF COWPEA MONITORING TOUR  
SEPTEMBER 1978  
NIGERIA, MOZAMBIQUE AND BURKINA FASO

## I. - INTRODUCTION

As part of its efforts in strengthening national cowpea programs in Central and Western Africa, RENACO organizes biennially a cowpea monitoring tour. The 1988 monitoring tour consisted of :

- Three countries toured : Nigeria, Niger and Burkina Faso.
- Ten countries -- Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Guinea Bissau, Guinea Conakry, Mali, Mauritania, Senegal and Tchad-- were invited to participate in the tour. But only six countries -- Niger, Burkina Faso, Cape Verde, Guinea Bissau, Guinea Conakry and Senegal-- were present at the tour. A list of participants is as attachment- 1.

The objectives of the tour were :

- To enable scientists, mainly from weak national cowpea programs, acquaint themselves with different cowpea production constraints and the efforts made to overcome them by the countries visited ;
- To have scientists become familiar with :
  - . New production technologies (i.e., cultivars and agronomic practices which are of potential benefit to their respective countries ; and,
  - . How best to go about solving cowpea production constraints back at their home countries.

The group gathered at Lagos and IITA, Ibadan on September 4 & 5, 1988. The program/schedule of the tour and a brief description of IITA and the countries toured are contained in attachment-2. The group commenced the tour by road according to the schedule, but flew between Niamey (Niger) and Ouagadougou (Burkina Faso).

## II. - IITA - NIGERIA

At IITA, Ibadan, the touring scientists met with Dr. S. R. Singh, Director of Grain Legumes Improvement Program (GLIP) of IITA, who briefed them about IITA-GLIP's objectives, research activities, training and assistance to national cowpea programs. They also interacted with : Dr. B. B. Singh, cowpea breeder ; Dr. L. N. E. Jackai, cowpea entomologist ; Dr. G. L. Hartman, cowpea pathologist ; and Dr. H. W. Rossel, plant virologist. They visited the cowpea pathology lab, cowpea insect rearing lab and virology unit.

## III. NORTHERN NIGERIA

### 1. - Introduction

At Samaru, the visiting scientists were met by Prof. O. Leleji, a cowpea breeder at the Institute of Agricultural Research (IAR). A visit program to Northern Nigeria was prepared and given to the participants (see attachment-3). The program was fully respected, except for the morning of Friday, 9 September 1988 when heavy rains prevented the team from visiting the Kadawa irrigation station, but was only postponed to the next day.

### 2. - Samaru in Kaduna State

#### 1) Visit of ABU and IAR facilities

The Ahmadu Bello University (ABU) and IAR are housed together in the University campus at Samaru, a few km west of Zaria. At IAR, the visitors paid a courtesy call to the Director of IAR, who welcomed the scientists and presented a brief background of IAR and opened their doors widely to us for a fruitful visit. Scientists also met with the IAR Coordinator of grain legume research. They visited the different research departments of IAR as well as of ABU, including the French department.

At ABU, scientists were briefed on the different degree oriented training offered by the University, including the possibility of admission of Francophones to ABU through the French department. The Director of IAR offered a welcome dinner to the touring scientists on the evening of 8 September, 1988.

## 2) Field Visits

### 2.1. Cowpea pathology

Prof. A. Emechebe is in charge of the cowpea pathology program of IAR. After briefing scientists on his program, he led a field visit. Following experiments were conducted :

#### - Striga resistance study

Progeny of a cross (IT 84S 2246x B 301) was tested for Striga gesnerioides resistance and genetic inheritance studies in potculture in the green house. Soil substructure composition, sterilization and preparation ; harvesting Striga plants; seed treshing, seed-recuperation and seed counting methods were described.

#### - Evaluation of IITA cowpea cultivars for disease resistance

The following diseases were also studied at IAR.

- . Septoria leaf spot : caused by Septoria vignae
- . Brown blotch : caused by Colletotrichum capsici
- . Scab : caused by Elsinoe phaseoli
- . Bacterial blight : caused by Xanthomonas vignicola

Artificial inoculations were used to ensure a uniform distribution of disease agents. To this effect, infected plant material (which were grown, to serve as inoculum, six weeks earlier than the sick plots) were brought into contact with seedlings four to five weeks after sowing in each sick plot. A sick plot was established for each studied disease.

#### - Fungicide seed treatment trials

Six fungicides were tested for control of seed transmitted disease. Previous experiments had shown some fungicides, such as benlate controlled seed transmitted diseases for the first four weeks after sowing. That was enough to warrant an acceptable seed yield.

- Assesment of seed yield losses due to Brown Blotch disease

Seed yield responses of two cowpea cultivars : IT 83S-742-11 and IT 83S-728-13 to fungicide spraying rates were studied.

2.2. Cowpea breeding

Prof. O. Leleji after briefing scientists about the cowpea breeding program led a field visit to the following trials conducted.

- IITA Early maturing cowpea trial
- IITA Intermediate maturing trial
- IITA Virus resistance trial
- IITA/SAFGRAD Striga resistance trial (this trial was inadvertently conducted at Samaru, where Striga is not a problem, instead of Bakura).
- IITA/SAFGRAD drought resistance trial
- IAR-Elite variety trials
- Dual purpose cowpea trial.
- IITA/SAFGRAD medium maturing cowpea trial
- IITA/SAFGRAD early maturing cowpea trial

Cowpea plots were planted late (in August) due to protracted rainy conditions.

2.3. Cowpea Agronomy

Dr. Alemo briefed the tour on his cowpea agronomy research program and led us on a field visit.

A millet-double cowpea intercropping experiment was conducted. This means that a long duration millet cultivar was double intercropped with a short duration cowpea cultivar. This experiment generated a very interesting discussion with touring scientists.

2.4. Department of Agricultural Engineering

New machines conceived and manufactured by the Department were exposed to the touring scientists :

The machines included :

- Cowpea pod thresher
- Cowpea whole plant thresher
- Peanut thresher
- Sorghum thresher
- Millet thresher
- Sorghum, millet and wheat threshers
- Solar grain dryer

3) Tomas, Kano State

A SAFGRAD cowpea Striga resistant trial was conducted at this substation in collaboration with extension workers. The trial included following cultivars.

Cultivars

Striga Status

IT 82D-849

Free

TN 88-63

Heavy infestation

Mougne

Light infestation

B 301

Free

Vita-5

Heavy infestation

SUVITA-2

Light infestation (with sick Striga plants, dying before flowering)

IAR-48

Heavy Infestation

Local

Heavy Infestation

4) Kadawa, Kano State

This is an irrigation research station. But cowpea experiments were conducted under rainfed conditions. The crop season was very rainy. Soil got saturated with moisture; some spots in the field experienced water logging conditions. This resulted in poor germination and seedling establishment as well as growth.



### 3. Cowpea Entomology

Dr. C. Amatobe briefed us on his entomology research program and led us on a field visit. Following experiments were visited :

#### - Minimum Insecticide Treatment Trial

This experiment compared : one, two and three insecticide spraying treatments. Its objective was to ensure high and good quality seed yield. Its rationale was based on the following observations: with two sprayings the first at flower bud formation and the second at the beginning of pod filling, it was no longer possible to obtain good quality seeds. Pod sucking bug infestation during pod maturation did not only reduce seed yield, but also seed quality. Pod sucking bugs must, therefore, be brought under control within the minimum insecticide spraying scheme.

#### - Insecticides screening trial

Six insecticides were tested.

#### - Effect of mixture of fungicides and insecticides on cowpea performance

This experiment was requested by progressive farmers. They are interested in an effective and time saving method of limiting seed yield losses caused by fungi as well insect pests. Both fungi and insect pests cause substantial seed yield losses, especially in northern Guinea and Southern Sudan savannas, and in the Sahel during humid years.

#### 3.1 Cowpea breeding

Most of the experiments conducted at Samaru were repeated at Kadawa. Following experiments were conducted in addition :

- Nigeria main variety trial.
- Nigeria preliminary trial.

### 4. Minjibir , Kano State

#### 4.1. Cowpea breeding in collaboration with cowpea pathologist

Following trials were conducted.

**- Striga resistance trial**

14 cultivars were tested. There was a good level of Striga infestation. IT 82D-849 was free of Striga. SUVITA-2, KVx 61-74 did not only delay Striga emergence but also showed low level of Striga infestation. TN 88-63, KVx 183-1, Mougne and SAMPEA-7 (IAR-48) were heavily infested with Striga.

- Extra-early cowpea trial
- Drought resistance cowpea trial
- Medium maturing cowpea trial
- Nigeria main variety cowpea trial
- Nigeria preliminary variety trial
- Seed multiplication

**4.2. Cowpea Agronomy**

Dr. C. Odion, an IAR cowpea agronomist, briefed his program to visiting scientists and led them on a field visit. The following experiments were visited :

**- Millet-cowpea intercropping**

. Two spacing arrangements :

- + Alternating millet-cowpea stands
- + Alternating millet-cowpea rows ; and

. Three insecticide treatments

- + One spray
- + Two sprays
- + Three sprays were tested.

**- Effect of cowpea cultivars on intercropped millet**

. Five cowpea cultivars :

- + TVx 3236
- + IT 81D-1137
- + IT 84S-2246-4
- + Ife Brown
- + SAMPEA-7

. Two millet cultivars :

- + SE 2124
- + Ex Borno, and

. Two cowpea time of sowing

- + Millet and cowpea sown at the same day in June
- + Cowpea sown in mid-July after millet

Cowpea plants were to be sprayed three times.

5. General comments

The Disease incidence was higher, this year than in the previous years in all the three agro-ecological zones : northern Guinea and Sudan Savannas and in the Sahel. The pathologist will score out naturally occurring diseases in cowpea breeding plots at all sites. The same will be done for Striga. The pathologist will also collect Striga and Alectra seeds from major growing areas for greenhouse studies at Samaru.

We did not notice any crosses made throughout our visit. We hope that the cowpea breeding program will soon initiate a crossing program to improve cowpea within the context and conditions of northern Nigeria.

Nigeria is a RENACO's lead centre for cowpea breeding, pathology, entomology and agronomy. Prof. A. Emechebe ; Prof. O. Leleji ; Dr. C. Odion and Dr. C. Amatoke have been invited to attend the Seminar for national scientists from lead centres.

IV. - NIGER

1. Maradi

1.1. Introduction

Mr. Adamou Moutari, cowpea breeder in Niger, and one of the touring scientists, gave a 45 minute talk, briefing his colleagues on the objectives, areas of research, achievements and prospects of cowpea research in Niger.

He also talked about the cooperation between cowpea research program of the "Institut National de Recherches Agronomiques du Niger" (INRAN) with INSAH, SAFGRAD and ICRISAT/IITA.

At the time of our visit, INRAN was having a five year in house review at Maradi. Most of the researchers were beaten down by this activity? However, the Director General who was very pleased with the tour, managed for Mr. A. Moutari and other expert field technicians to be with the visiting scientists. They led us on the field visit.

## 1.2. Field visit to the Tarna Station

### 1.2.1. Cowpea breeding

#### - Cooperative INRAN-IITA/ICRISAT early maturing cowpea variety trial :

- . Ten cultivars from INRAN, IITA/ICRISAT and IITA/SAFGRAD were tested.

#### - Cooperative INRAN-IITA/ICRISAT intermediate maturing cowpea variety trial :

- . Ten cultivars from INRAN, IITA/ICRISAT and IITA/SAFGRAD were tested.

#### - Cowpea pure-stand yield trial

- . Seed yield of a pure-stand cowpea sprayed once with insecticide at 55 days after sowing was under study.

#### - Screening F6 lines from a cross (TN 13-78 x TVx 3236) :

- . Capitalizing on moderate flower Thrip resistance of TVx 3236, an attempt was made to select cowpea lines with acceptable seed yield with only one insecticide spray at 55 days after sowing.

### 1.2.2. Cowpea pathology

Dr. H. Hama, cowpea pathologist, was attending the INRAN in house review but managed to meet the touring scientists and led them on a field visit. The following experiments were conducted :

- Screening of cowpea for Striga resistance

- 24 cultivars introduced from IITA were tested for Striga resistances.

- Screening of local and introduced cowpea cultivars for Striga

resistance

- 42 cultivars were tested. There was evidence of some resistance.

- Advanced Striga resistance test :

- This experiment was conducted at two locations: Tarna (near Maradi) and Magaria.

- 9 cultivars were evaluated.

+ Cultivars B 301 and IT 82D-849 were free from Striga

+ Cultivars SUVITA-2, TN 93-80 and TN5-78 delayed Striga

emergence and had very low level of Striga infestation.

+ Cultivars TN 88-63 and Mougne did not prevent Striga

emergence and had heavy Striga infestation.

According to the technicians and Dr. H. Hamq, some Striga

plants were noticed to have germinated in plots of cultivar B 301, both at

Maradi and Magaria.

- Effect of intercropping cowpea and millet on Striga infestations

on both crops

• Millet crop was susceptible to Striga hermannica and cowpea

crop to Striga gesnerioides.

• Millet plants were fertilized (including N fertilizer).

• Pure-stand treatments of both crops were included.

The objective of this experiment was to find out if intercropping

cowpea with millet would influence incidence of both Striga infestations.

### 1.2.3. Cowpea entomology

Insecticides were tested using electrodyne, ULV and a NAPSACK sprayers and at two dates of spraying. Each insecticide was sprayed only once per plot using one of the three sprayers and sowing dates.

### 1.2.4. General comments

Virus and brown blotch diseases were very high at this station. Some cultivars exhibited a good level of resistance.

## 2. Niamey/Gabagoura Station

2.1. After paying a courtesy call to the Ag. Director General of INRAN, the visiting scientists went to the Gabagoura station, a few km north-west of Niamey. Mr. A. Moutari and the station manager led us on the visit.

### 2.2. Experiment conducted at Gabagoura

The same experiments conducted at Maradi, except the Striga resistance ones, were again repeated at that site, in addition to the following :

- Vegetable cowpea trial
- Observation nurseries of F-9 lines from following crosses :
  - . TF (TVu 1509 x TN 88-63)
  - . TD (TVx 3236 x TN 88-63)
  - . TC (TN 45-71 x TVu 1836)
- Breeding for Bruchids resistance :
  - . Populations of following crosses were advanced in F4 (KNS- TN 88-63); (CB5 x IT 82D-716) and (CB5 x KNS).
  - . KNS is a source of Bruchids resistance locally identified.
- Selection in F-2 populations of following crosses :
  - . Sadore local x IT 82D-716 (many plants were free from diseases).
  - . Dan-ILLA x IT 82D-716 (Bacterial Blight very important)
  - . TVx 4659-03E x TN 88-63 (many plants were free from diseases).

- Screening for Macrophomina spp. resistance

- . A sick plot was identified ;
- . Several lines and cultivars were tested, using two treatments.
  - + Seeds inoculated with Macrophomina
  - + Seeds not inoculated with Macrophomina
- . The two treatments were planted side by side for each entry in a single row plot, 6 m long.
- . The experiment was not replicated.

Resistant entries were those of which seedlings grew profusely in both treatments :

- Effect of defoliation on cowpea seed yield treatments :

- . 3 cowpea cultivars, and
- . Four defoliations
  - (1) at five or six leaves stage
  - (2) fifteen days later than (1)
  - (3) fifteen days later than (2)
  - (4) no defoliation at all

The defoliation treatment consisted of removing fully developed leaves on cowpea plants in all plots.

**3. Kollo Station**

The Kollo station is located at about 20 km south east of Niamey. The following experiments were conducted :

- Adaptation study of cowpea

- . 12 locally improved lines and improved cultivars from IITA/SAFGRAD and IITA Ibadan were compared.
- . Yield trial of local cultivars as an intercropping system with millet.

- . 10 cowpea cultivars
- . Cowpea was planted 15 days after millet

- Yield stability study in a millet-cowpea intercropping system :

Treatments :

- + Two densities : a traditional versus the recommended one.
- + Three N fertilizer levels ; 0, 50, 100 kg of N/ha.

#### 4. ICRISAT Sahelian Centre at Sadore

Dr. B. Ntare, IITA-GLIP cowpea breeder posted to Sadore, Niamey under an IITA-ICRISAT collaborative research agreement, welcomed the visiting scientists. He also briefed them on the objectives, research program, operations in Niger and accomplishments of the IITA- ICRISAT cowpea research program.

In addition, he led us on a field visit. Several experiments were visited. They included :

- All IITA Ibadan international trials.
- IITA/SAFGRAD regional trials.
- IITA advanced trials
- Several segregating populations obtained from the IITA/SAFGRAD cowpea breeding program.
- Collection of local entries and entries introduced from IITA/SAFGRAD.
- IITA/ICRISAT-INRAN cooperative trials
- Evaluation of F4, F5, F8 lines from crosses made at Sadore.
- Study of insect pest dynamic in three cowpea cultivars :
  - + Say local
  - + IT 82E-1-108
  - + TVx 3236
- Yield trial of cowpea cultivars in an intercropping system with millet
  - . Insect pests were not chemically controlled.



- Effect of double cowpea row alternating with a single millet row on intercropped millet and cowpea.

+ 6 cowpea cultivars were used.

Cowpea crops around Niamey, at Gabagoura, Kollo or Sadore, were crippled by Macrophomina spp. disease. It was particularly severe with entries of non Sahelian origine. There was also high incidence of bacterial blight, brown blotch and Septoria diseases.

## V. BURKINA FASO

### 1. Introduction

The visiting scientists were met at the Ouagadougou airport by the entire Burkina cowpea research team (except Dr. G. Konaté who was on an official mission abroad). Dr. Clementine Dabire, the Burkina national cowpea program coordinator, welcomed the visitors and informed them about all the arrangements made for the tour which was to proceed as scheduled :

### 2. Pobe/Mangao

#### 2.1. Introduction

The Pobe/Mangao village is located in the Sahel, at about 200 km north-west of Ouagadougou. Cowpea experimental plots were planted in a farmer's field. After briefing the scientists on the objectives and methodologies of the Burkina research programs, stressing on their multidisciplinary team approach by the cowpea research, Dr. Dabire handed over the visitors to Mr. J. Ouedraogo. Mr. J. Ouedraogo, a cowpea breeder, led us on most of the field visits at the different stations.

The cowpea research team of Burkina includes :

- A breeder, two entomologists, a pathologist, a virologist and a physiologist.

## 2.2. Cowpea research

Following experiments were conducted :

### Cowpea adaptation study.

- . Sixty promising cultivars and lines from IITA-Ibadan, IITA/SAFGRAD, Burkina cowpea research and neighboring countries were tested at two dates of sowing and two insecticide treatments : with and without insecticide sprayings.
- . The experiment was replicated twice
- . The dates used were :
  - + 2 July (optimum sowing date)
  - + 30 July late sowing date (offering about 40 days of reliable rainfall).

The aim of this experiment was to expose cultivars to drought at least during pod filling in late sowing in the event that the crop season is good with well partitioned rainfall. This is important in making progress in breeding for drought resistance: cultivars must be exposed to drought and selections made each year.

The other aim of the experiment was not only to identify high yielding and drought resistant cultivars, but also those yielding equally well or better than local varieties under no insecticide sprays.

- Cowpea preliminary yield trials.
  - + 20 lines and cultivars were tested at two sowing dates.
- Minimum insecticide spraying treatments.

## 2.3. General comments

Bacterial blight, brown blotch and Septoria diseases caused severe damages to cowpea. There was evidence of resistance to these diseases in some cultivars and lines. Some cultivars and lines developed pods under no insecticide spray regime.

### 3. Kamboinse/Ouagadougou

#### 3.1. Introduction

The Kamboinse research station is located in the Sudan savanna zone at about 16 km north of Ouagadougou.

#### 3.2. Cowpea research

The same experiments conducted at Pobe were repeated at Kamboinse in addition to the following :

##### - Striga resistance

+ 16 lines and cultivars were tested in Striga sick plots which were reinfested with new Striga seeds as well as on none Striga infested plots.

- Artificial induction of brown blotch disease epidemic
- Field evaluation of Aphids and Bruchids resistant lines and cultivars from IITA, Ibadan and IITA/SAFGRAD.
- IITA international virus resistance nursery
- Dates of spraying trial.
- Sorghum-cowpea intercropping trials.
- Seed multiplication of promising lines and cultivars.
- Advancement of F5 lines from crosses involving cultivar B 301 (Striga resistant) with TN 88-63, TVx 3236, SUVITA-2, 58-57, KVx 65-114, KVx 61-74 and KVx 30-166-3G.
- Fixation of advanced lines from the KVx 396 cross.

#### 3.3. General comments :

Bacterial blight, Brown blotch and viral diseases caused serious damages in some lines and cultivars. Only a few lines produced some pods in the none insecticide treatment experiments. There were evidence of good level of resistance to the diseases in some lines and cultivars.

#### 4. Farako-Bâ

##### 4.1. Introduction

The Farako-Bâ station is located 10 km south of Bobo-Dioulasso, which is about 360 km south west of Ouagadougou. This station is in the Northern Guinea savanna zone. All experiments conducted at Kamboinse were repeated at Farako-Bâ. No seed multiplication effort was undertaken.

Scab, brown blotch, web blight (caused by Corticium solani) and viral diseases caused serious damages to cowpea. Again, there was evidence of resistance to the mentioned diseases in some lines and cultivars.

#### VI. END OF THE TOUR

The 1988 cowpea monitoring tour ended on the evening of 20 September at Ouagadougou, Burkina Faso. A joint "Institut d'Etudes et de Recherches Agronomiques" (INERA) of Burkina Faso and IITA/SAFGRAD cocktail was organized for the occasion. The participants met with the Director of INERA, the International Coordinator and the Director of Research of SAFGRAD and USAID Officials. Fruitful exchange of view took place during the short period of relaxation. Participants of 1988 cowpea monitoring tour addressed their vote of thanks.

- To IITA, Ibadan and IITA/SAFGRAD for having organized the tour ;
- To the people and the Government of United States of America for their financial support, without which the tour would have not been possible.
- To the people and the Government of Nigeria, Niger and Burkina Faso for their warm welcome and kind hospitality ; and
- To all scientists in the countries visited for their time and availability and the fruitful discussions they had with the touring scientists.

## VII. EVALUATION OF THE MONITORING TOUR : POINT OF VIEW OF THE NETWORK COORDINATOR

As the monitoring tour comes to an end, I will raise a few questions and to have answers in order to assess whether or not the exercise was worthwhile. The ideal approach in this aspect would be to gather the opinion of the scientists who participated and analyze them before any positive or negative appreciation can be made or recommended.

Although, we have already requested the scientists who took part in the monitoring tour, and are again hereby reminded to submit their trip reports to us, including any suggestions they may have for the improvement of future tours, my role as the Cowpea Network Coordinator, offers answers and personal impression to the following few questions.

(1) Were the objective set forth for the tour met ?

Since the group of scientists had the opportunity to inspect the activities of the respective countries they visited, including laboratories experimental plots, discussed the various cowpea production constraints, observed type and farmers' preference of cowpea, saw objectives of research and the methodologies used in new technology development and got acquainted with new technologies, I am highly satisfied that the objectives of the tour were met with great success.

(2) Were there handicaps or drawbacks ?

Visiting scientists would have benefited even a lot more, if they had the opportunity to interact with extension workers and talk to local farmers in the countries visited. This was not possible, basically due to the short schedule of the visit in each country. Nevertheless, the ride by car along the country side of cowpea growing areas was adequate enough for scientists to maintain discussions while appreciating performance of the crops as they drive along.

Visiting scientists would have been much better of, if they had a full day session of discussing and writing their trip reports together at the end of the tour. Although this provision was initially made in the program for the day of 21st September, we had to cut the tour 24 hours earlier in order to meet an airline connection schedule,

otherwise the team would have had to extend the tour another 48 hours, which would have involved unforeseen additional costs.

(3) Did the tour increase or contribute intellectually to the individual or the team of visiting scientists ?

The interest exhibited during the tour, the lengthy and concrete discussions they held with their colleagues of the host countries at each station visited-- including the meeting they had in Niamey, Niger with Mr. E. Atuahene Amankwa, chairman of the Cowpea Steering Committee -- debates by themselves at the hotel and restaurants or by travelling by bus, their interaction with the resource persons, namely Mr. C. Ndiaga, Dr. G. Kingma and the Cowpea Network Coordinator, coupled with their remarks contained in their vote of thanks at a cocktail at the end of the tour, demonstrates that there was an intellectual benefit from the tour.

(4) Will the respective RENACO countries benefit from the tour ?

It is probably too early to answer this question. However, one will expect great improvement or changes in areas where scientists felt they were behind as compared to other countries. Just as the saying goes "You reap what you sow"; one will certainly harvest abundantly, if one works hard, preparing the land well, planting and looking after his or her crop properly. Of course all major natural calamities (drought, insect pests or disease outbreak) put aside.

Consequently, the potential benefit of this tour to the respective countries will depend on the following factors :

- . The initiatives and diligence of the participating scientists ;
- . Their interests in cowpeo research and production ;
- . The level of responsibility they can assume in cowpea research in their home countries ;
- . The degree of liberty they have in effecting cowpea research in their respective countries.
- . The incentives/encouragements to scientists in carrying out their duties.
- . The rate of trained scientists in the participating countries etc.

These factors depend on the decisions of management taken for recruitment, training and promoting scientists in each participating country. Consequently, countries that have made adequate and proper decisions will certainly reap lots of benefits from this tour. Nevertheless, it can be noticed that everything possible was made to bring positive changes in the behaviour of participating scientists with the expectation of improving the efficiency of the cowpea research in the RENACO member states at the end of the tour.

(4) Will the respective RENACO countries benefit from the tour?

It is probably too early to answer this question. However, one will expect great improvement in areas where scientists felt they were lacking, as compared to other countries. Just as the saying goes "You reap what you sow", one will certainly harvest abundantly if one works hard preparing the land well, ploughing and looking after his or her crop properly. Of course all major natural calamities (drought, insect pests or disease outbreaks) put aside.

Consequently, the potential benefit of this tour to the respective countries will depend on the following factors:

- . The initiative and diligence of the participating scientists;
- . Their interests in cowpea research and production;
- . The level of responsibility they can assume in cowpea research in their home countries;
- . The degree of liberty they have in selecting cowpea research in their respective countries;
- . The incentives and motivation to scientists in carrying out their duties.
- . The role of trained scientists in the participating countries etc.

PART 3

REPORT OF VISITS TO FOUR  
NATIONAL COWPEA PROGRAMS  
4-24 AUGUST 1988



## SUMMARY

The Cowpea Network Coordinator visited four national cowpea programs in August 1988. The objectives of these visits were the same as those of 1987, as follows :

- To get acquainted with the realities of National Cowpea Programs.
- To verify on the spot, the veracity of reports presented at the March 1987 Cowpea Network Workshop.
- To meet with national scientists and administrators who did not have the occasion to attend the 1987 cowpea network workshop and to discuss with them about the objectives, activities and advantages of networking.
- To survey research activities of interest to the cowpea network, but not necessarily conducted by national cowpea scientists in the countries visited.
- To discuss with national cowpea scientists on how best to utilize funds allocated by the network in support of their research activities.

The following countries were visited : Cameroon, 5-10 August ; Tchad, 13-16 August ; Senegal, 17-20 August ; Cape Verde, 20-23 August and Togo, 2-5 October 1988.

Northern Togo was actually visited by Mr. J. Ouedraogo, a Burkinabe cowpea breeder, on behalf of the Cowpea Network Coordinator, who for administrative reasons, could not travel at that time.

## C A M E R O O N

### 1) Introduction

Cowpea research activities in Cameroon are concentrated in the Northern regions. The "Institut de la Recherche Agronomique" is responsible for food crop research, including cowpea in Cameroon. The regional station for Ag. research in the northern region is located at Maroua. It has a sub-station at Garoua and several on farm-testing sites. Cowpea research activities are funded through a bilateral agreement between Cameroon, represented by IRA and USAID. The University of Georgia, USA, through its CRISP project, USAID being the executing Agency. The objectives of the cowpea research program in Cameroon is to minimize grain losses during storage. To achieve this, every effort is made to :

- Identify through introduced and/or locally collected cowpea varieties and landraces, those that are resistant to storage insect pests ;
- Devise cheap, peasant farmers' accessible, but effective cowpea storage technologies.

### 2) Cowpea research activities

At the time of my visit to Northern Cameroon, cowpea research activities of IRA consisted mostly of field experiments conducted at Mouda (a new station about 10 km south of Maroua) ; Guering/Maroua station and Ngoundere a sub-station (about 20 km south of Garoua). Experiments conducted at these stations included :

- Insecticide screening (six insecticides).
- Observation of locally collected cowpea varieties or landraces (100 entries) most of them were segregating ; we discussed about single plant selections and fixation tests ; this is crucial to ensure that any Bruchid resistance observed, would be a heritable trait ; we did also recognized the need for training, at least, at technician level, some one capable of doing selection work from segregating populations .
- Advanced test of local varieties collected and observed in previous years (80 entries).

- Effect of cowpea cultivars (ten) ; time of cowpea sowing (two) and insecticide sprayings on intercropped cowpea and sorghum.
- Effect of cowpea cultivars and insecticides sprayings on intercropped cowpea and sorghum.
- Striga resistance study (ten varieties including B 301 and IT 82D- 849
- Cotton-cowpea intercropping study.
- Millet- cowpea intercropping study.
- Extra-early cowpea international trial.
- Medium maturity cowpea international trial.
- Aphid resistant cowpea international trial.
- Vegetable cowpea international trial.
- Virus resistance screening nursery.
- Evaluation of seed yield losses due to field insect pests (with three insecticide sprayings at ten days interval beginning 35 days after sowing).
- On-farm testing was also conducted with five cultivars (IT 81D-985, IT 82D-699; IT 82D-716; IT 81D-952 and Local cultivar).

By the time I visited Cameroon, the cowpea crop had not flowered at all testing localtions; Local varieties at the Guering station were exhibiting signs of virus diseases. Heavy rains experienced during the crop season, resulted in soil erosion and water logging in some experimental field plots.

### 3) Meeting with IRA Officials and Scientists

We met briefly the head of IRA for the northern region. We discussed among other things about the urgency of sending us, as soon as possible, the justification of the 285 000 F CFA sent to them, being first instalment in support to their cowpea research. We also met with some scientists

working on other crops. They included Dr. John Russel and Mr. J. Johnson (the new and out-going crop extension officers). According to Mr. J. Johnson, TVx 3236, in spite of its high seed yield and better adaptation, seems not to meet farmers preferences. It appears to be susceptible to storage insect pests (Bruchids). IT 81D-985 is being released under the name "BR-1". It seems to be preferred by farmers because of its better storability.

#### 4) Cowpea research personnel

The cowpea research program of IRA is headed by Dr. Mofi N'Taama, a Togolese scientist working and assisted by two Cameroonian scientists (Mr. G. Ntoukam and Mr. C. Endondo) for the CRISP Project, with financial support from USAID. I interacted with Dr. Mofi N'Tama and Mr. G. N'Toukam. The latter has been invited to attend the 14-25 November seminar of cowpea scientists from lead centres of RENACO.

## T C H A D

### 1) Introduction

In Tchad, agricultural research is under the "Direction Générale de l'Agriculture" within the Ministry of Agriculture. It is referred to as "Bureau de la Recherche Agronomique".

At the Bureau de la Recherche Agronomique (BRA), I met the following Officials : Mr. Alladourmyngue Nadingar, the Chief of BRA ; Dr. Mohamat Adoum Dyaya, recently appointed to supervise food crop research in Tchad ; Mr. Batedjin Noudjallaye, in charge of seed production ; and Mr. Tamitah Djidingar, seed multiplication Officer. Mr. Maurice Monoye, formerly in charge of food crop, research, had left the "BRA"; whereas Mr. Jagoua Djekoukousse, a scientist with food crop project at Bebedjia (near Moundou) about 600 km south of Ndjamená, could not be reached because of the short duration of my visit, coupled with heavy rain conditions and bad road. Thus, I was not able to meet these two contact persons since March 1987.

Because of the afore mentioned changes in the coordination of BRA-- which took place very recently-- Mr. Dyaya the new coordinator of food crop research was not aware of the SAFGRAD project and its objectives as well as the regional trials which were sent in 1987. I therefore briefed him about the SAFGRAD project ; the cowpea network: RENACO ; its objectives as redefined during the March 1987 workshop ; regional trials ; the 1988 cowpea monitoring tour; RENACO's support to national cowpea programs including Tchad ; the March 1989 workshop to be held at Lome, Togo. A similar briefing was held with Mr. A. Nadingar ; the Chief of BRA.

From these discussions, it appeared that : Agricultural research is being reorganized in Tchad. It will take some time, however, before it becomes fully operational. Currently there is no single scientist devoting 100 % of his or her time on cowpea research in Tchad. Mr. J. Djekoukossé is a part time cowpea researcher; he works also on cotton crop research.

## 2) Bureau de la Recherche Agronomique (BRA)

The BRA has three main stations :

- Gassi in the Sahel
- Deli in the Sudan savanna zone
- Bebedjia near Moundou ; a cotton research station in the Sudan savanna zone.

Each station has a sub-station and seed multiplication centres, as follows :

### - In the Sahel

- Bokoro
- Amadorn

### - In the Sudan Savanna

- Poudoué
- Bekao
- Mussa Foyo

- Transistion

- Am-Timan
- Lac Tchad
- Okanem (Oasis)

3) Research personnel

Research personnel is as follows :

Gossi : 1 Doctorat and 4 à 5 "Ingenieur Agronome"

Deli : 1 "Ingenieur Agronome"

Bebedjia/Moundou (IRCT) : 9 scientists

Mussa Foyo : 1 "Ingenieur Agronome".

4) Needs of the cowpea research program

Currently, the pressing needs of BRA as described by Mr. A. Nadingar are :

- . Office supplies
- . Casual labor
- . Perdiem and transportation costs to visit experiments. (I requested them to submit to RENACO, proforma invoices for possible support to their cowpea research program).

I felt that BRA will render cowpea research more effective in Tchad by assigning at least one full time scientist to cowpea research at the national level. The scientist will have to work with some part time scientists and/or qualified technicians at district level .

5) Visit to the Gossi station

Together with Dr. Dyaya, we visited the Gossi station, about 20 km south of N'Djamena. At this station, experiments were being conducted on millet, sorghum, maize, cowpea and sesame crops under the UNDP and FAO sponsorship. Seeds of some crops were also multiplied. At this station, we found out that : the 1987 SAFGRAD maize and cowpea regional trials were being conducted. They were not conducted in 1987 because of

drought. Cowpea regional trials conducted at this station were :

- Regional Cowpea Drought Resistance Trial ;
- Regional Sorghum-Cowpea Intercropping Trial ;
- Regional Cowpea Observation Nursery.

The trials were planted on flat, on plowed vertisol and under rainfed conditions. The soil has a poor and unstable structure which disintegrated as a result of heavy rain drops and/or abundant rainfall experienced during this season. Stand establishment and crop growth were very poor. The crop would have flourished very well, if the field plots, were ridged and crop planted on the ridges. At the time of our visit, cowpea crops had not yet flowered. We did not observe any major disease problem.

Three cowpea cultivar seeds were being increased for release : TVx 3236, TN 88-63 and KN-1. According to the technicians and FAO supervisors ; cultivar TN 88-63 is highly preferred by peasant farmers in the eastern region. They claim that it has good storability and resist better to storage insect pests than TVx 3236. KN-1 (VITA-7) appears also to have good storability and preference.

#### 6) General Comments

Though Tchad was invited to participate at the September 1988 cowpea monitoring tour, it appears not beneficial to them since a national cowpea research coordinator was not appointed. RENACO is willing and is committed to help Tchad. However, a first step must be taken such as the appointment of a national cowpea research coordinator.

## S E N E G A L

#### 1) Introduction

In Senegal, I met the following Officials : Dr. Moctar Toure, Director General of "Institut Sénégalais de Recherche Agricole" (ISRA); Dr. Lima Moulaye, Director of Food Crop Research of ISRA ; Dr. M. Sonka, Director of "Centre National de Recherche Agronomique" (CNRA) at

Bambey and Mr. C. Ndiaga, Cowpea Breeder. I had discussions with them about the ISRA's 1988 cowpea research ; the judicious use of the 3,000 US \$ RENACO has made available to them to support their cowpea research in 1988 ; Informed them about the 4-20 September 1988 cowpea monitoring tour ; the seminar of national cowpea scientists from lead centres from 14-25 November ; the March 1989 cowpea network workshop and the scientific papers we requested from cowpea scientists. I also urged them to send us as soon as possible the justification of the first instalment of US \$ 1,500 (or 427,500 FCFA equivalent), which RENACO sent to them in July this year.

2) Senegalese cowpea research and visit to Bambey and Louga stations and on farm testing sites.

The cowpea research program in Senegal this year is about the same as that of 1987 (see my 1987 trip report to six countries). Some new additions were, however, observed as follows :

- Control of Macrophomina Diseases

As in Niger, Macrophomina ssp attack is becoming very severe in Central and Northern regions in Senegal. To this effect, research is underway at Bambey where a sick plot was identified. It includes : the use of fungicides to control the disease and screening of cultivars for resistance.

Bambey 21 is susceptible to Macrophomina as well as bacterial blight ; whereas cv 58 -57 is only susceptible to Macrophomina. The objectives of this study is to devise ways and means of minimizing yield losses caused by the disease.

- Evaluation of seed yield losses due to virus diseases

This study includes following treatments :

- . Seeds from infected plants.
- . Seeds from infected plants in addition to protection against vectors.
- . Seeds from non infected plants.
- . Seeds from non infected plants in addition to protection against vectors.



- Screening cowpea for Aphids resistance

A source of Aphids resistance, TVu 36, has been crossed with cv's 58-57, Mougne, IS86-275, IS86-279 and IS86-283. Progenies of the crosses will be screened for Aphids resistance.

It should be noted, however, that at the time of my visit, the IITA international observation nurseries for Aphids and virus resistance had not been received in Senegal.

In Senegal, I visited the Bambey station in the Central region; The Louga station and on farm testing in northern regions ; and on-farm testing in the central and southern regions.

3) General Comments

The crop season this year was good in Senegal, rains were sometimes in excess. Adapted cowpea varieties were performing well. However, germination problems were observed in the Louga regions ; particularly with TVx 3236. On-farm testing revealed TVx 3236 not meeting farmers' preferences, in spite of its good yield. In addition, cv 58-57, identified as Striga resistant in Burkina Faso by the SAFGRAD project, was observed for the first time in Senegal (Mr. C. Ndiaga), to be susceptible to Striga.

Dr. B. A. Bal and Mr. C. Ndiaga will participate at the November 1988 seminar for national cowpea scientists from lead centres. Mr. C. Ndiaga will also serve as a resource person during the September 1988 cowpea monitoring tour organised specially for weak national programs. It is hoped that the experiences of Dr. B. A. Bal and Mr. C. Ndiaga from the tour will contribute a lot in strengthening other national cowpea programs in the network as they would have also learnt a lot by interacting with the other scientists.

CAPE VERDE

1) Introduction

I was met at the airport by Mr. C. Silva, national cowpea coordinator in Cape Verde.

I spent most of my time with him visiting cowpea cropping areas and experimental plots in this islands. I paid a courtesy call to the Director General of "Instituto Nacional De Investigaçao Agraria" (INIA) and visited different research departments of INIA and related research laboratories.

With the Director General of INIA I briefed her on RENACO's objectives, and functions, the program of activity for 1988/1989. Also we talked about the US \$ 580 RENACO's being made available to Cape Verde's cowpea research programs and the expected justifications.

## 2) Cowpea research in Cape Verde

Cape Verde is rather unique in West Africa in that : it has a high population density : 75 persons per square kilometer on the average ; maize grain legumes intercropping widely spread with four maize plants, one or two cowpea plants, one Phaseolus vulgaris plant and one pigeon pea plant grown at the same time in a single-hill ; no crop rotation is practiced and very little chemical fertilizers are used. Fortunately the soils of the Island originated from basic volcanic mother rocks maintaining soil fertility, although low, yet an acceptable level of a continuous cultivation system.

Average cowpea seed yield is  $\pm$  200 kg/ha. The preferred cowpea grain type is smooth, rather small and brown or red. Maize seed yield is  $\pm$  700 kg/ha and flint types grains are preferred.

Drought ; insect pests, particularly Aphids ; mixed cropping ; and traditional farming systems are major cowpea production constraints. Cowpea research activities in the Islands of Cape Verde were initiated in 1981 under FAO's funding. They aim towards intensifying maize-grain legumes productions. To this effect the following research activities are being conducted.

- . Collection of local maize germplasm ; introduction of exotic maize germplasm from IITA/SAFGRAD, CILSS and CIMMYT ; and their evaluation for adaptation and yielding ability.
- . Collections of local cowpea germplasm ; introduction of exotic cowpea germplasm from IITA/SAFGRAD and CILSS ; and, their evaluation ;
- . Study of maize-grain legume mixed cropping ;

- . Study of plant population densities ;
- . Study of spatial plant distribution in mixed cropping ;
- . Study of fertilizer levels ;
- . Regional IITA/SAFGRAD cowpea Aphids resistance trial. At the time of my visit, the experiment was at the vegetative growth stage. One cultivar, KVx 146-27-4 had poor stand due to poor germination. No Aphids infestation was recorded.

In Cape Verde, insecticide sprayings are not used in cowpea production, whether experimental plots or farmers' fields.

### 3) Agricultural Research and Infrastructure

INIA was established in 1985 under the Ministry of Rural Development.

It has two Directions :

- . Direction of Agricultural Research, and
- . Direction of Human resource development.

The Direction of Research is sub-divided into following departments.

- Department of Natural Resources with two divisions :
  - . Div. of soil and water management
  - . Div. of Botany
- Department of Agro-climatology and Hydrology
- Department of food crop research with four divisions :
  - . Div. of crop protection
  - . Div. of rainfed
  - . Div. of irrigated crop production
  - . Div. of food crop processing and quality control (including conservation and marketing).

- Department of non food crop research

- . Tobacco
- . Jojoba
- . Castor oil plant
- . Coffee plant

- Department of forestry

- Department of Animal production

- Department of Social sciences.

4) General Comments

Of the introduced cowpea cultivars, KN-1, Mississippi silver, IT 83D-442 and TN 88-63 are highly preferred by farmers because of their earliness, short cooking period and good taste. Yields are not higher than that of local varieties. With the exception of KN-1, these cultivars are still to "go on farm-testing" before their extension to farmers. KN-1's seeds are highly in demand by farmers.

The food crop protection division is laying more emphasis on an integrated pest management approach than on merely chemical protection. To this effect, biocontrol is highly promised. In this area they have successfully brought under control following :

- Damages caused by Plutella xylostella (L.) in cabbage.
- Damages caused by Sesamia nonagrioides in maize.

They are planning to initiate Aphids biocontrol in cowpea since this is a major insect pest in Cape Verde.

5) Research personnel

- Rainfed food crops : Mr. Carlos Silva : Agronomist
- Food crop protection :
  - . 3 national scientists (entomologists)
  - . 2 expatriate entomologists
  - . 5 technicians.

Mr. C. Silva has been invited to participate at the Cowpea Monitoring Tour from September 4-24.

## T O G O

### 1) Introduction

This was a follow-up visit to the one made in 1987. I discovered viral diseases causing serious damages to cowpea in the Kara region of Togo. Most of the promising cowpea cultivars tested up to 1987 had shown high susceptibility to the diseases. RENACO sought IITA assistance on this matter and a new virus resistance nursery was sent to the region for observation. A visit to northern Togo involving Dr. Rossel, an IITA virologist, Dr. G. Konate, a Burkinabe virologist and Dr. N. Muleba, RENACO's Coordinator, was scheduled for the last week of August 1988. Owing to conflicting schedules on the part of IITA scientists, the visit was postponed to mid-September. During this period neither Dr. G. Konate, Dr. N. Muleba nor the Togolese research team at Kara were at post to join and interact with the team of IITA scientists. It was found necessary therefore, that an experienced cowpea breeder/agronomist should visit Kara before the end of the crop season and interact with the Togolese research team on behalf of the RENACO Coordinator who could not travel at that time due to administrative reasons.

Mr. J. Ouedraogo, who was entrusted this responsibility, visited the Kara region from 2-5 October 1988. He met Mr. Renaud, the Accelerated Crop Production Officer (ACPO) of the SAFGRAD project in Togo, and Mr. Toky Payaro, the Togolese Assistant ACPD at Kara. With the latter officer, they visited the Broukou station and the Kitangbao substation. The following were their observations :

### 2) Broukou

Following experiments were visited at this station.

- Sorghum-cowpea intercropping :

- . Sorghum and cowpea were sown the same time.
- . Cowpea reached maturity under protracted rainy and cloudy weather. This resulted in cowpea seed rot.
- . The advantage and disadvantages of this planting system was discussed.

- Cowpea resistance nursery :

- . At the time of Mr. J. Ouedraogo's visit, the cowpea virus resistant trial had already been harvested.
- . According to Mr. Toky, however, all tested cowpea cultivars, except IT 84D-448 and IT 818-1137, exhibited a good level of virus resistance.

3. Kitangbao

Following experiments at the substation were also visited.:

- Early maturing cowpea trial
- Medium maturing cowpea trial
- Bruchids resistance cowpea trial

With the exception of IT 82D-699 and IT 81E-16, all tested cultivars showed high susceptibility to viral diseases : (cowpea yellow mosaic virus and cowpea Aphid-borne mosaic virus perhaps ?), bacterial blight, web blight and brown blotch.

Cultivar IT 82D-699 had exhibited good disease resistance at Minjibir, Nigeria ; Maradi and Niamey, Niger ; Pobe, Kamboinse and Farako-Bâ, Burkina Faso.

4. General Comments

Mr. J. Ouedraogo discussed with the northern Togolese cowpea research team about the Burkina's cowpea research strategy, methodologies used and research results. They also discussed about financial support to the Togolese cowpea research team which can be obtained from RENACO and the usefulness of scientific exchange visits like this one and the need to make them more frequently in the future.

ATTACHMENTS

ATTACHMENT-1 : LIST OF PARTICIPANTS

<u>Name</u>	<u>Research Discipline</u>	<u>Countries</u>
Mr. Adamou Moutari §	Cowpea breeder	Niger
Mr. Sereme Paco	Plant pathologist	Burkina Faso
Mr. Cisse Ndiaga*	Cowpea breeder	Senegal
Mr. Carlos E.P. Silva	Agronomist	Cape Verde
Mr. Fode Laye Guilavogui	Cowpea entomologist	Guinea Conakry
Mr. Malam Sadjo	Cowpea agronomist	Guinea Bissau
Dr. G. Kingma	USAID-SAFGRAD Project Manager	Netherland
Dr. N. Muleba	IITA/SAFGRAD Cowpea Network Coordinator	Zaire

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§ Sponsored by the IITA/ICRISAT project, Niamey, Niger

\* Resource person to the monitoring tour.



ATTACHMENT-2 : COWPEA MONITORING TOUR

INTRODUCTION

Dear Colleagues,

I welcome you with pleasure to the 1988 SAFGRAD/IITA Cowpea Monitoring Tour.

In our attempt to solve agricultural production problems within the Semi-Arid Zone, we have :

- To be fully aware of the needs, conditions and production constraints of the farmers that we serve.
- To identify farmers' current production technologies, their capacity and/or fall shorts.
- To learn or know about new improved production technologies in neighboring countries and elsewhere, the methodologies used in developing them, their capacity and/or fall shorts.

The evaluation of a wide range of improved technologies (i.e., new cultivars and agronomic practices) along with farmers' technologies, through properly planned and carefully executed experiments conducted both on experimental stations and under farmers' field conditions ; and under scientists as well as farmers' management constitutes not only the best bet in identifying high performing technologies, but also those accepted by farmers. This relates the fact that, in planning experiments, scientists would have in mind the farmers' needs and conditions. Also having farmers participating in planning, conducting and managing on-farm testing, the latter would have an idea of his or her input which will determine the best technologies --i.e., those meeting their needs and suitability to their conditions.

Cowpea monitoring tours, organized biennially by RENACO, are part of its training activities. The current objectives are :

- . To enable scientists, mainly from weak national cowpea programs, acquaint themselves with different cowpea production constraints and the efforts made to overcome them by the countries visited ;
- . To have scientists become familiar with :

- (i) New production technologies (i.e., cultivars and agronomic practices), which are of potential benefit in their respective countries ; and
- (ii) How best to go about solving cowpea production constraints back at their home countries.

Countries to be toured this year include :

- Nigeria
- Niger and
- Burkina Faso.

There will also be two resource persons as detailed below :

- Mr. Cissé N'DIAGA : Cowpea breeder ( Senegal)
- Dr. N. MULEBA : RENACO Coordinator

The tour schedule is as follows :

Sunday,	4 September 1988	Arrival of participants at IITA, Ibadan, Nigeria
Monday,	5 September 1988	Visit IITA, Ibadan
Tuesday,	6 September 1988	
Wednesday,	7 September 1988	Departure to Zaria, Northern Nigeria
Thursday,	8 September 1988	Visit Institute of Agricultural Research, Zaria
Friday,	9 September 1988	
Saturday,	10 September 1988	
Sunday,	11 September 1988	Departure to Maradi, Niger
Monday,	12 September 1988	Visit INRAN, maradi
Tuesday,	13 September 1988	Departure to Niamey, Niger
Wednesday,	14 September 1988	Visit INRAN and INRAN/ICRISAT/ IITA programmes
Thursday,	15 September 1988	
Friday,	16 September 1988	Departure of Ouagadougou, Burkina Faso
Saturday,	17 September 1988	Visit INERA Cowpea research at Pobé
Sunday,	18 September 1988	Visit INERA Cowpea research at Ouagadougou Departure to Bobo-Dioulasso
Monday,	19 September 1988	Visit INERA cowpea research at Farako-Bâ Return to Ouagadougou
Tuesday,	20 September 1988	End of Monitoring Tour Return of participants

Below is a brief presentation of IITA and the three countries to be visited. We hope that this information will be useful to you during the tour.

## I. - I I T A

### 1.1. Background

Established in July 1967 as the first major African link in an integrated network of international research and training centers located throughout the developing regions of the world, the International Institute of Tropical Agriculture (IITA) is an autonomous, nonprofit corporation with headquarters on a 1,000 hectare experimental farm at Ibadan, Nigeria. Its location facilitates research in three ecological zones - humid forest, transitional, and savanna - representative of climate and soil conditions in many areas of Africa. In addition, research is conducted in many areas of Africa in cooperation with regional and national programs.

### 1.2. Mandate and Objectives

The "geographic mandate" of IITA includes the humid and subhumid tropical regions of the world, but the Institute concentrates its research and training activities primarily on the needs of sub-Saharan African countries. The central objective, in cooperation with national programs, is to undertake research which will make it possible to increase food production, employment, and income in those countries. A food crisis in many of them has been building up over the years as rapid population growth, drought, and lagging agricultural production have brought about a chronic food deficit.

Four out of five of the research programs of IITA are crop centered : Grain Legume Improvement, Maize Research, Rice Research, and Root and Tuber Improvement. The fifth is the Resource and Crop Management Program. Specifically, the objectives of these and other segments of the Institute are to :

- Develop farming systems, including soil and crop management practices, that will provide viable, stable, and sustainable alternatives to traditional systems of shifting cultivation in Africa ; the major emphasis centers on increasing the productivity of fragile tropical soils while still maintaining effective conservation in ecologically balanced environments.

- . Develop and implement research programs which lead to improved varieties of cowpeas, yams, and sweet potatoes.
- . Conduct research in Africa in cooperation with other international centers and national institutes, to develop and improve cassava, maize, rice, soybeans, plantain, and cocoyams ; here the practical emphasis is on the distribution of improved plant materials to national research programs to assist them with their plant breeding work and the adaptation of improved varieties to fit local conditions.
- . To transfer new technologies, and skill, through training, to scientists, technicians, and extension workers from developing countries.
- . Arrange and conduct conferences, symposia, seminars, and workshops to review new research, consider current problems, and discuss needs for the future.
- . Publish and widely disseminate research findings to scientists, policy makers , national research programs, development and extension personnel, and others.
- . Provide an information center and library with a comprehensive collection of world literature on tropical agriculture for use by scientists and scholars.

### 1.3. Cowpea Improvement

Currently, cowpea improvement is the major activity of the Grain Legume program (GLIP) of IITA. Research on cowpea is focused on tropical Africa with emphasis on West Africa. Resources are allocated primarily to breeding cowpea adapted to cereal farming systems of the Savanna Zones and on host-plant resistance to insect pests.

Breeding cowpea adapted to cereal farming systems :

- An IITA/ICRISAT team is currently working at the ICRISAT Sahelian Center at Niamey, Niger, in developing new cowpea varieties adapted to millet based farming system ;
- Another team is initiating work in northern Guinea and Sudan Savanna in collaboration with the Institute of Agricultural Research

of Ahmadu Bello University, Zaria, Nigeria, in developing new cowpea varieties adapted to sorghum based farming systems.

Host-plant resistance to insect pest : IITA/GLIP has a team of entomologists working at Ibadan, Nigeria together with cowpea breeders, pathologists and virologists in the development of new high yielding varieties, insect pests and disease resistant. To this effect, GLIP maintains insect rearing and pathology laboratories and experimental field plots. A germplasm unit and a virology unit also assist GLIP in introducing, cataloging and continuously making available new germplasm for direct use or incorporating their genes in good agronomic backgrounds.

To achieve these objectives, which are to develop new technologies suitable to peasant farmers, staff both at IITA headquarters in Ibadan, Nigeria and several locations in other countries, interact closely with national scientists as equal partners. Some of the key "outreach" locations and their major research thrusts are :

- Burkina Faso --coordination of SAFGRAD's Western and Central Africa Cowpea Network (RENACO). An IITA scientist seconded to SAFGRAD coordinates the activities of RENACO, assists national programs in cowpea research with emphasis on cowpea resistance to Striga (a noxious parasitic weed) and drought as well as identifying suitable cereals for cowpea mixed cropping.
- Niger -- Cowpea adapted to millet based cropping system, and dual purpose cowpeas for grains and fodder with minimum inputs for the Sahel region.

IITA/GLIP also organizes and distributes yearly, upon request by national programs, regional cowpea trials. Regional cowpea trials are research ventures involving IITA and National Programs. They also serve as useful tool for a quick transfer of improved germplasms among research partners.

#### 1.4. International Cooperative Program

The International Cooperative Program of IITA has a unique and very important goal : to strengthen the capacity of national agricultural research systems (NARS). To achieve this goal ICP carries out :

i) IITA outreach research activities based on bilateral or multilateral agreements with donors and host countries. These short or medium term technical assistances for agricultural commodity research are carried out in order to strengthen NARS through :

- Research program building as well as,
- Generation of new technologies meeting the needs and suitability to conditions of farmers in the countries concerned.

ii) Coordination of collaborative research networks that are of interest to IITA's mandate and objectives ;

iii) Training of national scientists :

Several types of training activities are provided by IITA :

- Short courses in crop commodity production
- In-service training
- Degree related training
- Post doctoral fellowships and,
- Sabbatical leave for senior national scientists.

### 1.5. IITA Achievements

Several improved cowpea cultivars have been developed. They include high yielding extra-early, early and intermediate maturing ; multiple diseases, Aphid, Bruchid, Striga and drought resistant cultivars. Details of these, and other cultivars and seeds can be obtained upon request either to :

- IITA/GLIP, PMB 5320, Oyo Road, Ibadan, Nigeria ; or
- SAFGRAD/IITA, B.P. 1495 or 1783, Ouagadougou, Burkina Faso.
- IITA/ICRISAT, ICRISAT Sahelian Center, B.P. 12404, Niamey, Niger.

IITA has also produced a large body of literature which is useful to cowpea scientists as well as technicians. This literature can be obtained from IITA/GLIP, Ibadan, Nigeria.

## II. - N I G E R I A

### 2.1. Background

In 1985, Nigeria had a human population of about 95 million. Its cowpea grown area was about 4,120,000 ha, with a total production of 900,000 tons, representing an average seed yield of 200 kg/ha.

Cowpea is a most important grain legume consumed in all parts of Nigeria. As dry grain, it contributes to more than 57 % of the total protein from legumes in Nigerian diet. Its fodder is also an important feed for livestock in semi-arid zones, where 75 % of the total cowpea in Nigeria is produced.

Nigeria has the following ecologies : humid and sub-humid as well as semi-arid tropics. In the Northern Guinea, Sudan and the Sahelian Savanna agro-ecologies, cowpea is grown all over.

Eleven northern states of Nigeria are located completely or partially in the semi-arid zone. The Institute of Agricultural Research (IAR) located at Ahmadu Bello University at Zaria, in Kaduna, has the responsibility of conducting agricultural research for major crops, including cowpea.

During the last two decades, cowpea production in Nigeria has been experiencing large rainfall deficits, specifically erratic and/or poor distribution. The situation is further aggravated by the prevalence of unadapted and photo-sensitive varieties, diseases, insect pests and parasitic weeds ; inadequate extension services and agricultural credit facilities ; and the prevalence of traditional farming system. The research team is also suffering from severe shortage of well trained support staff (field and laboratory technicians and scientists), which reduces the effectiveness of research activities.

### 2.2. Objectives of Research

- Further test promising lines throughout the semi-arid regions of Nigeria.
- Identify sources of diseases, viruses, insect pests, Striga, Alectra, drought and heat resistant or tolerant materials ;

- Incorporation of identified sources of resistance/Tolerance into good agronomic backgrounds and good seed quality, and development of new, high yielding, widely and better adapted cultivars ; and
- Development of better agronomic practices compatible with peasant farmers' conditions and maximising grain yield ; minimising seed yield losses during rainy and dry years, respectively.

### 2.3. Areas of Research

#### i) Cowpea Breeding

- In collaboration with a plant pathologist, identify new sources of resistance to diseases, Striga and Alectra.
- In collaboration with an agronomist, identify new sources of appropriate maturity groups which are tolerant to drought and heat stress ;
- Through appropriate crosses, incorporate different sources of valuable genes so identified into good agronomic backgrounds and good seed quality and development of better adapted high yielding cultivars.

#### ii) Cowpea pathology

- Collect Striga and Alectra seed from farmers' fields for artificial inoculation in pot culture (screenhouse) ;
- Screen breeding materials (up to about 300 lines) for Striga and Alectra resistance in pot culture (screenhouse)
- Artificial inoculation of Striga and Alectra sick plots for further evaluation of breeding materials under field conditions ;
- Screen breeding materials for resistance to fungal and bacterial diseases of the northern Guinea savanna : Elsinoe phaseoli ; Septoria vignae ; Colletotricum capsici ; Xanthomonas compestris p.v. Vignicola.
- Screen breeding materials for resistance to diseases of the Sudan Savanna : Macrophomina blight ; Xanthomonas compestris p.v. Vignicola.



## 2.4. Location of Project

The bulk of the crosses, early generation testing, screening for resistance to various diseases, Striga, and Alectra are carried out at Samaru. While evaluation of various technologies in addition to Samaru, are done at Bakura (Sokoto State), Minjibir, Tomas and Kadawo (Kano State).

## 2.5. Research Personnel

<u>Names</u>	<u>Qualifications</u>	<u>Crop Research Areas</u>
Ono Leleji	Cowpea breeder (Ph.D)	Cowpea breeding
A.A. Zaria	Cowpea breeder (M.Sc)	Cowpea breeding
A.M. Emechebe	Cowpea pathologist (Ph.D)	Cowpea pathology
E.C. Odion	Cowpea agronomist (M.Sc)	Cowpea agronomy
C. Amatobe	Cowpea entomologist (Ph.D)	Cowpea entomology

## 2.6. Research Achievements

In spite of limited funding by the Nigerian Government, the Institute of Agricultural Research (IAR) has developed promising lines (such as SAMPEA 7, IAR 335 and IAR 353 etc) ; identified sources of resistance to major diseases (such as : scab, brown blotch etc) ; and in collaboration with IITA/SAFGRAD, sources of resistance to the Nigerian Striga strain has been identified.

In addition, a number of agronomic practices (including cheap and safe insecticides and number of insecticide sprays) have been developed and recommended to farmers.

### III. NIGER

#### 3.1. Background

In 1985, Niger had a human population of about 6,115 million. Cowpea is the only crop for which the growing area and production have substantially increased since Niger's independence : 360,000 ha in 1960, against 1,600,000 ha in 1986 and grain yield of 40,000 T in 1960 against 300,000 T in 1986. It has become, therefore, the second major crop, after millet for which production has doubled ; i.e. 700,000 T in 1960 against 1,400,000 T in 1986. Sorghum is the third major crop but its production has hardly increased --300,000 T in 1960 against 360,000 T in 1986.

The current cowpea yield average, 320 kg/ha, is still a significant increase compared to 120 kg/ha in 1960. Cowpea crop is still crippled by the following production constraints : insufficient, poorly distributed and erratic rainfall ; high air and soil temperatures, high wind velocity, sand blasts, various damages (caused by insect pests ; fungal, viral and bacterial diseases ; and Striga) ; poor infrastructures, inadequate agricultural research fundings and traditional farming systems practiced by the majority of farmers.

#### 3.2. Objectives of Research

- To develop high yielding cowpea cultivars better adapted to semi-arid zones together with diseases, insect pests, and Striga resistances ;
- To protect cowpea crop against insect pests by use of cheap, safe and effective insecticides ; and
- To develop appropriate production practices for increased cowpea production.

#### 3.3. Areas of research

##### i) Cowpea breeding

- Screening of local and introduced materials for adaptation ; resistance to diseases, insect pests (including storage insects) and Striga ;

- Incorporation of various sources of resistance into good agronomic backgrounds and development of new, better adapted, high yielding cultivars of farmers' preference.

ii) Cowpea agronomy

- Studies of appropriate production practices including millet-cowpea intercropping.

iii) Cowpea protection

- Study of biology of Bruchids insects, and
- Study of the biology of two disease agents : Xantomonas vignicola and Macrophomina phaseolina

### 3.4. Location of Project

Experiments are conducted at Kolo and Maradi main stations and at Chikal, Konni, Bengou and Magaria sub-stations and at the University of Niamey.

### 3.5. Research Personnel

<u>Name</u>	<u>Qualifications</u>	<u>Crop Research Areas</u>
Abdoulaye Borkoula	Cowpea breeder (B.Sc)	Cowpea breeding
B. Ntaré	Cowpea breeder (Ph.D) (IITA/ICRISAT Tech. Assist)	Cowpea breeding
Maman Nouri	Agronomist (B.Sc)	Cowpea agronomy
Abdel Berrada	Agronomist (B.Sc)	Cowpea agronomy
Ahmadou N'Diaye	Entomologist (B.Sc)	Cowpea entomology
Adam Toudou	Phytopathologist	Cowpea pathology
Hassane Hama	Phytopathologist (B.Sc)	Cowpea pathology
Alzouma L.	Entomologist (Ph.D)	Cowpea entomology
Oumarou Moussa	Seed technologist (B.Sc)	Cowpea seed technology

### 3.6. Research Achievements

Several cultivars have been developed : TN 88-63 is one of them.

## IV. BURKINA FASO

### 4.1. Background

In 1985, Burkina Faso had a human population of 6,942 million. Its area grown on cowpea was about 475,000 ha, with a total production of about 177,000 tons, representing an average yield of 373 kg/ha.

Cowpea is a most important grain legume crop widely grown in Burkina. Its cultivation is particularly concentrated in the central plateau, commonly known as "Plateau Mossi". Cowpea dry grain and young leaves are consumed daily by over 85 % of the people of this area. This makes cowpea a very important source of cheap and good quality protein for rural and low-income urban families. Cowpea fodder is also an important feed for livestock in the Sudan Savanna and the Sahelian zones. Several factors handicap cowpea production in Burkina Faso. They include : insufficient, poorly distributed and erratic rainfall ; several field and storage problems, insect pests ; fungal, bacterial and viral diseases, Striga infestation ; poor varieties ; inadequate infrastructures, extension services, agricultural credit and research facilities, and traditional farming.

### 4.2. Objectives of Research

- To develop high yielding cowpea cultivars better adapted to semi-arid zones together with diseases, insect pests and Striga resistances ;
- To protect cowpea crop against major insect pests by use of cheap, safe and effective insecticides ;
- To develop proper production practices and to devise effective storage methods compatible with peasant farmers conditions.

### 4.3. Areas of Research

#### i) Cowpea breeding

- Multilocation testing of promising lines and introduced cultivars ;
- Observation and screening of early generations for resistance to insect pests, Striga, drought and heat stress ;
- Preliminary and advanced yield trials of advanced generation lines ;

- Evaluation of introduced cultivars for resistance to insect pests, diseases, Striga, drought and heat stress.
- Crossing and backcrossing programs for incorporating and transferring disease, Striga, insect pests, drought and heat resistance into local prostate daylength-sensitive varieties.

ii) Cowpea agronomy-physiology

- Adaptation studies for identification of better adapted introduced materials, for use in cowpea breeding program, and promising lines, for their possible release to farmers ; these studies will include pure as well as mixed cropping.
- Studies of spacial arrangements and time of planting cowpea and cereals in mixed cropping systems.
- Soil and soil water management studies.

iii) Cowpea entomology

- Evaluation of lines and introduced cultivars for resistance to Aphids, Bruchids and possibly to Thrips.
- Identification of lines and introduced cultivars for better response to insecticide spray, but also performing equally or better than local varieties without sprays. Such cultivars are seriously needed for release to peasant farmers.
- Identification of lines and introduced cultivars, which can be stored with and/or without pods with equal or less damages than farmers' varieties.
- Studies of naturally occurring substances and different structures for improvement of traditional storage systems.
- Studies of the biology of major insect pests.

iv) Cowpea pathology

- Evaluation of local varieties, lines and introduced cultivars for resistance to fungal, bacterial and viral diseases prevalent in different ecologies.

- Study of the biology of major diseases of cowpea, Colletotricum, capsici will be considered first in Sudan Savanna and the Sahel ;
- Isolation and identification of major viruses infesting cowpea in Burkina Faso.
- Studies of the biology of the viruses and their mode of transmission.

#### 4.4. Location of Project

The headquarters of the Burkina Cowpea research is based at the Kamboinsé research station, near Ouagadougou. But out-reach activities are conducted at :

- Farako-Bâ and Niangoloko in Northern Guinea Savanna ;
- Gampela, Fada and Saria, in Sudan Savanna and,
- Djibo, Dori and Ouahigouya in the Sahel.

On-farm testings is also conducted throughout the country

#### 4.5. Research Personnel

<u>Name</u>	<u>Qualifications</u>	<u>Crop Research Areas</u>
Issa Drabo	Cowpea breeder (M.Sc)	(On-Ph.D Study leave)
Clémentine Dabire	Cowpea entomologist ( Dr. 3ème C)	Cowpea entomology
Jérémy Ouédraogo	Cowpea breeder/Agronomist (B.Sc) IITA/SAFGRAD	Cowpea breeding
Seydou Traoré	Entomologist (Dr. 3ème)	Cowpea entomology
Guillaume Sessouma	Physiologist (Dr. 3ème)	Cowpea physiology
Paco Sérémé	Phytopathologist (Dr/Ing)	Cowpea pathology
Gnissa Konate	Virologist (Dr. d'Etat)	Cowpea virology

#### 4.6. Research Achievements

Several high yielding and better adapted cultivars have been identified or developed. They include :

- Multiple disease resistant :
- Aphids and/or Bruchids, and/or Striga resistant
- Drought tolerant

Improved agronomic practices, such as: sowing dates, plant population phosphorous fertilizer levels, seedbed preparation including tied ridges, mulching maize-cowpea-relay cropping, cereal cowpea intercropping have been developed.

V. - CONTACT PERSONS

**NIGERIA**

Prof. Ono Leleji  
IAR, Ahmadu Bello University  
P.M.B. 1044  
Zaria  
Nigeria

**NIGER**

Mr. Hassane Hama  
Malherbologist  
INRAN, B.P. 240  
Maradi  
Niger

Mr. A. Bonkoula  
Departement des Recherches  
Agricoles  
B.P. 429  
Niamey  
Niger

**BURKINA FASO**

Dr. Clémentine Dabire  
Entomologist  
INERA Station de Kamboinse  
B.P. 7192  
Ouagadougou  
Burkina Faso

ATTACHMENT - .3.

PROGRAM OF VISIT BY SAFGRAD MONITORING TEAM  
TO IAR COWPEA PROGRAMME  
8TH - 10TH, SEPTEMBER, 1988

Thurs., 8th Sept. 1988

9.00 a.m.	Courtesy Call on Director
9.30 a.m.	Courtesy Call on Programme Leader (Legumes and Oilseeds) Field Tours
10.00 a.m.	Plant Pathology Trials
11.00 a.m.	Entomology Trials
12.00 noon	Breeding Trials
13.00 p.m.	Agronomy Trials
13.30 p.m.	Break for lunch
15.00 p.m.	Agric. Engineering
15.30 p.m.	French Department
16.00 p.m.	Drive through A.B.U. Campus (Fine Art Department) and end of Official activities for the day
19.30 p.m.	Dinner (Courtesy Director IAR and Programme Leader, Legumes and Oilseeds).

Friday, 9th Sept. 1988

8.00 a.m.	(Visit to Samaru Cont.)
8.20 - 8.30 a.m.	Plant Science
8.35 - 8.45 a.m.	Dean Faculty of Agriculture
8.50 - 9.00 a.m.	Animal Science
9.05 - 9.15 a.m.	Soil Science
9.20 - 9.30 a.m.	Crop Production



9.35 - 9.45 a.m. Agronomy  
10.00 a.m. Leave Samaru for Kadawa  
11.30 a.m. Visit Entomology Trials  
12.00 noon Visit Breeding Trials  
Leave Kadawa for Kano  
13.30 p.m. Lunch at Central Hotel  
15.00 p.m. Visit Striga Trials at Tomas  
16.30 p.m. Visit Striga Trials at Sada  
Overnight at Central Hotel Kano

Sat. 10th Sept. 1988 Minjibir

10.00 a.m. Visit Agronomy Trials  
11.00 a.m. Visit Breeding Trials  
13.00 p.m. Back to Hotel for lunch and visit  
to places in Kano  
Overnight at Kano

Sunday, 11th Sept. 1988

8.30 a.m. Leave Kano for Katsina en route to  
Marodi in Republic of Niger.

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Department of Rural Economy and Agriculture (DREA)

African Union Specialized Technical Office on Research and Development

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# PROGRAM OF RESEARCH, Program of Activity - April 1988-March 1989 (RENACO)

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