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MAIZ

# West and Central Africa Maize Research Network

## (WECAMAN)



## Proceedings of the Ninth Meeting of the Steering Committee held

4 - 5 November, 1998

*at*

*IITA, Ibadan*

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United States Agency for International Development (USAID)  
International Institute of Tropical Agriculture (IITA)



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## **1.0. OPENING OF THE STEERING COMMITTEE MEETING**

The ninth meeting of the Steering Committee (SC) of WECAMAN commenced on 4 November, 1998 in the Group Training Classroom, IITA-Ibadan.

The Chairman of the SC of WECAMAN, Mr Yallou Chabi welcomed all the participants and wished them fruitful deliberations.

### **1.1. Attendance**

All members of WECAMAN Steering Committee except the representative of Côte d'Ivoire attended the meeting. Also present were representatives of OAU/STRC/SAFGRAD, IFAD and IITA. The full list of participants is attached as **Appendix 1** of this report.

### **1.2. Welcome addresses**

As USAID and UNDP representatives to the meeting were absent, the Chairman of the SC invited the representatives of OAU-STRC/SAFGRAD, IFAD and IITA to deliver their addresses.

#### **1.2.1. Address by the International Coordinator of OAU-STRC/SAFGRAD.**

Dr Mahama Ouedraogo, representing the International Coordinator of OAU-STRC/SAFGRAD, Dr Taye Bezuneh, noted that his presence at the meeting testified to the dedication of SAFGRAD to support the efforts of WECAMAN aimed at developing and sustaining improved maize production technologies for small scale farmers in West and Central Africa.

He exhorted the participants to thoroughly evaluate the technologies released so far and to design new and more effective strategies aimed at strengthening food security through increased maize production in the sub-region.

#### **1.2.2. Welcome address by the representative of IFAD**

In a brief comment on behalf of IFAD, Dr Joseph Yayock expressed appreciation for the opportunity to participate in the SC meeting. He indicated that his particular interest in the Maize Network Steering Committee meeting was not only in terms of the African Maize Stress Project co-financed by IFAD, but also his previous personal involvement with WECAMAN as a former member of the SAFGRAD Council of Directors. Dr Yayock emphasized two aspects of IFAD's expectation from the meeting: to appreciate the broad range and scope of WECAMAN involvement vis-à-vis activities supported by IFAD; and to receive updated progress made so far in the implementation of the African Maize Stress Project. He informed members about the recent signature of the Financing Agreement of the African Maize Stress Project and urged for the early submission of a

comprehensive Annual Workplan and Budget for 1999 covering all approved activities and involving all the stakeholders: IITA, NARS, NGOs and farmers.

### 1.2.3. Welcome address by the representative of the Director of the International Cooperation Division of IITA

Dr A. P. Uriyo, on behalf of the Director of the International Cooperation Division of IITA, Dr M. W. Bassey, welcomed all the participants of the Ninth Meeting of the WECAMAN Steering Committee. He noted that WECAMAN had come a long way and was over twelve (12) years old. It had done a commendable job all along. However, with age, new problems and challenges were coming up.

The first challenge was the need to achieve greater results despite the dwindling resources. This required that priorities were set. It was not possible and there were no resources to do everything.

He pointed out that there was consistent demand that whatever research was done should have immediate impact at the farm level. He called for "Market-oriented research" which meant that research efforts must produce marketable output, the result of which should increase income and improve the welfare of the rural and urban poor.

In order to determine if progress was being made in improving incomes and welfare of farmers, there was a need to measure impact periodically. He asked, "How good is our database? Are we collecting the necessary data as we go along?"

Dr Uriyo called on WECAMAN to exploit the improved communication methods that were becoming available. He asked whether all WECAMAN members were linked on e-mail. If not what was the Network doing? What about the Africa-Link? He advocated for more effective communication links among WECAMAN members to improve their effectiveness in meeting the expectations of the Network. He added that local financial support should be sought to sustain WECAMAN activities, as one should not rely forever on external donor support. He wished the participants successful deliberations.

### 1.3. Adoption of the Agenda

The chairman of the Steering Committee, Mr Yallou Chabi presented the agenda for the meeting (Appendix 2) which was adopted without any modifications.

## 2.0. PRESENTATION OF PROGRESS REPORTS

Progress reports on the 1998 activities of WECAMAN were presented by the WECAMAN Coordinator and the Coordinator of the AMS Project while Dr Menkir presented the report on the seventh meeting of the ad hoc Research Committee of WECAMAN. Thereafter, SC members/National Coordinators presented the highlights of the progress on the 1998 collaborative research activities funded under the AMS and the

USAID Projects. The progress reports on all the projects funded in member countries were presented except that of Mali which unfortunately was not available to the Steering Committee member from Mali. Also, the progress report on Project 4 of Ghana was not available for presentation.

## 2.1. Presentation of the Coordinator's report

The Network Coordinator's report was presented under the following headings:

- Management of the maize network
- Technician training course
- Workshop on farmer participatory methods of on-farm testing and variety evaluation
- WECAMAN monitoring tour to Benin and Togo
- Regional Uniform Variety Trials
- Resident research of the Network Coordinator
- Consultation visits to national maize programs

### 2.1.1. Management of WECAMAN

- a) *Budget and Workplan of WECAMAN for the period 1 October 1998 to 30 September 1999.*

USAID has approved an amount of \$325,000 for WECAMAN activities for the period 1 October 1998 to 30 September 1999. The approved amount represents a budget short fall of \$75,000.00. The breakdown of the approved amount is shown in Table 1, while the proposed workplan for the funding year is presented in Table 2.

**Table 1. Details of budgeted expenses of WECAMAN for the period 1 October 1998 to September, 1999.**

Functional Activity	Amount (\$)
Coordination	130,000
Planning / Evaluation	28,570
Research collaboration	85,000
Training / Institutional strengthening	30,000
Administrative support	51,430
<b>Total</b>	<b>325,000</b>

**Table 2. Proposed Workplan of WECAMAN for the period September 30, 1998 to September 29, 1999**

Date	Activity	Location
October 1998	a) Consultation visits of Network Coordinator and selected members of Steering Committee to national programs	Cameroon, Guinea Chad, Côte d'Ivoire
November 1 – 30	b) Harvesting of trials and breeding materials	Burkina Faso, Ferke, Sinematiali
November 5 – 6	Ninth meeting of SC of WECAMAN to: Cotonou, Benin 1. Review progress on collaborative research projects 2. Plan 1998/99 research activities, training programs and other relevant network activities.	
Dec, 1998- Jan 1999	Establishment of dry season nurseries	Ferke, Sinematiali
February, 1999	National maize workshops and planning sessions of WECAMAN member countries	in-country
March, 29-30, 1999	Meeting of the ad hoc Research Committee Abidjan, C.I.	
April 1-23, 1999	a) Compilation of the 1998 Regional Uniform Variety Trial results b) Harvesting of dry season nursery	Bouake, C.I.
May-June, 1998	a) Packaging and dispatch of 1999 Regional Uniform Variety Trials b) Preparations for 1999 field trials and breeding nurseries in Côte d'Ivoire and Burkina Faso c) Establishment of field trials, demonstrations, breeding nurseries and seed production plots	Bouake/Ferke Ferkessedougou in-country
May, 1998	Regional Maize Workshop	IITA-Cotonou, Benin
July-Sept, 1999	Impact assessment of research on maize production and productivity	Selected Network member countries
July-Nov., 1999	Technician training course	Ferke, Côte d'Ivoire
August 2-13, 1999	Workshop on breeding for stress tolerance in maize	IITA-Ibadan, Nigeria
September 1-30, 1999	a) Consultation visits to selected national maize programs by Coordinator and selected members of Steering Committee b) Preparation of the 1998/99 Annual Report of WECAMAN	Selected network member countries Bouake, Côte d'Ivoire

b) *The Seventh Meeting of the Ad hoc Research Committee of WECAMAN*

The Seventh Meeting of the Ad hoc Research Committee of WECAMAN was held in IITA-Ibadan, Nigeria, 17 - 18 May 1998. Three members of the reconstituted ad hoc Research Committee, namely Dr Taye-Bezuneh, Mr. Yallou Chabi and Dr. A. Menkir were present at the meeting. Also present, as resource person was the Network Coordinator.

During the meeting, the late progress reports on the 1997 collaborative research projects from Nigeria, Cameroon, Mali and Benin were reviewed and funds were allocated. The comments and recommendations of the ad hoc Research Committee on the late submissions were included in the report of the sixth meeting of the ad hoc Research Committee and published. Also 30 proposals submitted by WECAMAN member countries for funding under the African Maize Stress Project were reviewed and funds allocated.

Presented in Table 3 are the proposals submitted by each member country while the projects approved for funding under the African Maize Stress Project in 1998 are presented in Table 4.

Due to the fact that most of the member countries of WECAMAN did not submit proposals for funding by the African Maize Stress Project, the ad hoc Research Committee recommended only few proposals for funding in 1998.

**Table 3. Number of research project proposals submitted by WECAMAN member countries for funding under the Africa Maize Stress Project.**

<b>Countries</b>	<b>STP1</b>	<b>STP2</b>	<b>STP3</b>	<b>STP4</b>	<b>Total</b>
Benin				1	1
Burkina Faso					
Cameroon	1				1
Chad	3		1	1	5
Côte d'Ivoire					
Ghana					
Guinea			1	1	2
Mali					
Nigeria	7	1			8
Senegal		1	1		2
Togo	3				3
<b>Total</b>	<b>14</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>22</b>
STP1:	Development of complementary crop management practices				
STP2:	Strengthening NARS ability to develop stress-tolerant maize				
STP3:	Linking research to development				
STP4:	On-farm testing of improved cultivars and management practices				

**Table 4: Number of project proposals approved for funding in 1998 under the African Maize Stress Project**

Countries	STP1	STP2	STP3	STP4	Total
Benin					
Burkina Faso					
Cameroon	1				1
Chad	1		1	1	3
Côte d'Ivoire					
Ghana					
Guinea			1 (To be submitted)	1 (To be submitted)	2
Mali					
Nigeria	1	1		2	4
Senegal		1	1	1 (To be submitted)	3
					<b>14</b>

*c) Report on the Network Coordinator's visit to Burkina Faso*

The Maize Network Coordinator visited Burkina Faso from 29 May to 2 June 1998 at the invitation of the OAU/STRC SAFGRAD.

The objectives of the trip were to:

- ◆ attend the first Technical Regional Steering Committee meeting of the USAID- funded Technology Transfer and Commercialisation Program (TTCP),
- ◆ participate in the Agricultural Technology Display mounted by IITA-SAFGRAD in connection with the OAU summit in Burkina Faso,
- ◆ prepare the concept note for the Micronutrient Fortification Project.

**Technical Regional Steering Committee Meeting of the TTCP**

The Technical Regional Steering Committee Meeting was attended by two representatives each from the three countries involved in the project, namely Burkina Faso, Senegal and Ghana; the WECAMAN Coordinator and representatives of OAU/ STRC SAFGRAD.

During the meeting, 24 projects pre-screened by OAU-STRC SAFGRAD were submitted to the Technical Committee for review and evaluation for funding. Out of these, 5 projects from Burkina Faso and 4 each from Ghana and Senegal were selected for funding in 1998. Included in the projects selected for funding in Senegal and Burkina Faso were community seed production of early and extra-early maize varieties.

**Agricultural Technology Display**

An exhibition covering the activities and achievements of the IITA-SAFGRAD Project were mounted at the Hotel Silmande in Ouagadougou. Included in the exhibits were

WECAMAN posters and pictures as well as maize exhibits brought in by the National Maize Program of Mali. The national cowpea program of Burkina Faso also mounted an exhibition of the cowpea varieties released through the IITA-SAFGRAD Project as well as a food fair.

Present at the exhibition were OAU Ambassadors based in Ethiopia, Ministers and other dignitaries.

In his opening address during the exhibition, The International Coordinator of OAU/STRC, Dr Taye Bezuneh, acknowledged the contribution of IITA and ICRISAT to the increased maize and sorghum production in the sub-region through the collaboration with SAFGRAD.

On the whole, the exhibition was very successful and the dignitaries who were present were no doubt convinced of the immense contribution of IITA, SAFGRAD and ICRISAT to food self-sufficiency in the sub-region.

#### **Preparation of the concept note for the Micro-nutrient Fortification Project**

The draft concept note for the micro-nutrient project was prepared by a working group made up of Dr Taye-Bezuneh, a consultant engaged by SAFGRAD, Dr Arkloyd and the Maize Network Coordinator. Also, a tentative program for the visit to selected countries in West Africa of a volunteer from the Farmer-to-Farmer Program of Winrock International as well as the formal request for the services of the volunteer were prepared.

#### *d) Report on the Network Co-ordinator's visit to USA*

The Network Coordinator attended the Annual Meeting and Food Expo of the Institute of Food Technologies (IFT) in Atlanta, Georgia, USA, 19-25 June under the sponsorship of the Office of Sustainable Development in the African Bureau of the USAID. Following the meeting in Atlanta, the Network Coordinator was also in Washington from 26 June to 1 July for a visit to USDA and USAID for discussions on the meeting and follow up plans for incorporating lessons learned at the meeting into the activities of WECAMAN.

#### **Annual Meeting and Food Expo of the Institute of Food Technologies**

The IFT meeting was aimed at (i) creating a fora for the exchange of research and technical information (ii) providing opportunities for better understanding of food systems in the U.S. (iii) offering the opportunity for the private sector to penetrate new market channels (iv) enhancing the level of academic and practical training of participants through the exposure to innovative and non-traditional technologies and (v) exposing participants to latest developments in the field of food science and technology.

The 1998 IFT Annual Meeting which had the theme "Unlocking a world of opportunity: The key is IFT", had two main sections - the technical sessions and the food expo. Both sections started on 20 June and ended on 24 June.

On display at the Food Expo were several new innovative products and services, ingredients, processing and new food technologies. Present at the expo were also organisations and businesses from all over the USA. More than 1000 food companies exhibited their products and services. There were representatives of each company to provide information on their products and services and to answer questions.

Of particular interest at the Food Expo with respect to maize utilisation, were food products from maize. These included (i) protein-fortified, puffed, expanded snack -type food produced from 63% corn starch and 37% chickpea flour blends and, (ii) expanded snacks or cereals made by blending oats with corn flour.

The following points which have important implications on the proposed Micronutrient Fortification Project to be submitted to USAID were noted during the technical sessions:

- A study in Ghana to extrude fermented maize blended with amylase and cowpea in order to determine the process and product characteristics showed that the extrusion of maize with amylase enzyme allows the production of low viscous, high-energy protein foods based on maize and cowpea.
- Evaluation of the composition level of certain vitamins and minerals, physical properties and particle size of corn-soy blends donated overseas through USAID showed that there was non-uniform distribution of the added fortificants with significant bag-to-bag variability.
- A study of vitamins A and C in USAID food aid commodities in Haiti and India showed good stability of vitamin C in the dry commodities while the vitamin A losses in the dry commodities during shipping and storage were significant.
- A study of the foliate stability during extrusion showed that natural foliate is destroyed to only a limited extent at low extrusion temperatures. Since added iron did not accelerate foliate destruction, extruded products can be produced from enriched cereal flours for foliate delivery.
- A study to determine the efficiency of xylobiose production from corn husks using Clarex ML, a food grade enzyme preparation derived from *Aspergillus niger* and *Trichoderma reesei*, showed that Clarex ML was capable of rapidly hydrolysing corn husks into xylobiose syrup for formulation of a variety of functional foods and beverages.
- Legumes, such as peanut and soybean, are good sources of tocopherols and may be combined with cereals to produce low-cost, nutritious weaning foods by extrusion cooking. High temperatures (100-200°C) encountered in extruders could however, reduce tocopherol content during processing. Studies on the effect of extrusion cooking on the tocopherol content of cereal/legume blends formulated to provide adequate nutrition to weaning infants in Ghana suggests that though extrusion-cooking has a tendency to decrease the concentration of tocopherol in cereal/legume mixtures, this loss is generally not significant.

- To investigate the potential use of cassava in infant formulations for possible large scale production, three blends mixed in specific proportions of 70:20; 60:20; 50:30 cassava-cowpea, with sesame and either plantain or squash or pumpkin were formulated. Cyanide, viscosity and other nutritional analyses were carried out. The results suggest that cassava can make a good and inexpensive supplement for infants. Also, recommendations for increased proportions of complementary protein is absolutely necessary to meet a child's requirement for protein quality and quantity.
- Micronutrient deficiency is a major problem in the world particularly in developing countries. For example, iron deficiency anaemia (IDA) affects 1.3 billion people (24% of the world population) while vitamin A deficiency affects about 43 million children under 5 years of age (7% of the world's children under 5).

The emphasis of the USAID Food Fortification Program in developing countries is on vitamin A, iron and iodine.

Iron fortification of commonly eaten foods with micronutrients is one of the least expensive and potentially more effective ways per capita of supplying micronutrients to target populations. However, there are questions as to its effectiveness, safety and effect on food quality. The absorption of iron is influenced by several factors and food components. For example tanins in tea and phytates in cereals severely reduce iron absorption. IDA may be caused by:

- (i) The consumption of diets which impair iron absorption; e.g., tea and high fibre.
- (ii) Multiparity
- (iii) Chronic infection
- (iv) Insufficient iron intake

Food vehicles for iron fortification include cereals, flour, salt, sugar, condiments, chocolate drinks, milk, water, etc. The factors to be considered in using iron compounds for fortification include the bio-availability, functional stability/ compatibility of compound and commercial availability.

- e) *Visit to selected countries of West Africa by volunteer from Farmer to Farmer Program of USAID.*

Following the submission to USAID of the concept note on the Micronutrient Fortification Project prepared by OAU-STRC SAFGRAD, WECAMAN and IITA, a volunteer from the Farmer-to-Farmer Program of USAID, Dr Kamal Hyder, visited selected countries in West Africa from August 21 to September 5, 1998 in connection with the project. The objectives of the visits which involved extensive travel to Benin, Nigeria, Ghana and Burkina Faso were (i) to assess the extent of the micronutrient malnutrition in WCA and the opportunities for food fortification, (ii) to identify the potential partners for the project and (iii) to assist in preparing the project proposal.

Dr Kamal Hyder was accompanied by the WECAMAN Coordinator for the visits to Nigeria and Ghana while Dr Bussie Dixon-Maziya accompanied the volunteer during the visit to Burkina Faso and part of the visit to Ghana.

At the end of the visit, the volunteer recommended that in order to combat the micronutrient malnutrition, the following measures should be taken over a 5 year period:

#### **Phase I (First 2 years)**

1. The base line data generated by surveys for the 14 countries of West and Central Africa should be collected to develop the list of deficiencies and set priorities for developing programs similar to the fortification of salt with iodine and vitamin A in sugar.
2. Model countries and initial sites with target population should be chosen for pilot programs to develop fortified products which are affordable and socially acceptable that can demonstrate success in combating malnutrition. Trials for initial data collection for eventually making the program effective in all the 14 countries should be undertaken.
3. Private and public sector support through national and international mandates should be generated. This would involve member countries, institutions actively engaged in crop improvement, nutrition and food science research centers and international organizations involved in poverty alleviation programs.
4. Proposal for initial support and funding of the Phase I of the project should be developed with the help of all the relevant organizations in the region under the umbrella of OAU/STRC-SAFGRAD and submitted to international agencies for funding. The agencies should include local governments, US Agency for International Development, United Nations, World Bank, private universities and foundations.

#### **Phase II (3 years)**

1. Data generated from the pilot programs (Phase I) should be reviewed to set program priorities for all the 14 countries. This would include the type of fortification needed and should define the target areas and the population for expansion into all the affected areas.
2. Prototype fortified products should be narrowed down to acceptable items in all the countries. Newly developed products and innovative ideas should be translated into reality at this stage through extension work, education, training and mass media.
3. Commercialization of the products with and without subsidized ingredients should be launched. Programs to facilitate distribution and affordability should be

instituted to enable the fortified products to reach the target population and to ensure sustainability.

4. Continued support to fine-tune the concepts developed for nutritional intake in diets should be given through incentives to all enterprises in nutrition oriented business, to all organizations involved in community development and poverty alleviation in rural areas where processed foods are not consumed.
5. Evaluation of data and lessons learned from the program should be presented to all those interested in combating malnutrition around the world.

*f) The Sixth Eastern and Southern Africa Regional Maize Workshop*

At the invitation of CIMMYT to share WECAMAN's experience in the community seed production scheme, the Network Coordinator attended the Sixth Eastern and Southern Africa Regional Maize Workshop in Addis-Ababa, Ethiopia, 21-24 September, 1998. A paper entitled "The community seed production scheme of WECAMAN" was presented at the conference by the Network Coordinator.

*g) Publications*

The Five-Year Strategic Plan of WECAMAN was submitted to USAID in July for consideration for funding. In addition, the following reports were published in English and French and distributed to WECAMAN member countries, IITA and other collaborators:

1. Report of the Fifth Meeting of the ad hoc Research Committee of WECAMAN
2. Report of the Sixth Meeting of the ad hoc Research Committee of WECAMAN
3. Report of the Seventh Meeting of the ad hoc Research Committee of WECAMAN
4. Compilation of the results of the 1997 Regional Uniform Variety Trials
5. Quarterly Performance Reports for April-June and July-September, 1998
6. 1997/98 Annual Report of WECAMAN.

2.1.2. Technician Training Course

Lack of adequate skilled research personnel still remains one of the major constraints to the research and production of maize in West and Central Africa. The 1998 technician-training course was therefore organized by WECAMAN to mitigate this problem.

The course started on 5 July at Ferkessedougou, Côte d'Ivoire and ended on 20 November. There were seven participants from WECAMAN member countries (Table 5).

The course is practical oriented and it is designed to upgrade the skills of the participants in the management of field experiments of national maize research programs. The course

takes cognisance of the need to improve the efficiency and effectiveness within the limited financial and infrastructural resources of national maize programs.

Resource persons for the course were drawn from the national maize program of Côte d'Ivoire, IITA, and WARDA.

**Table 5. List of participants of the WECAMAN technician training course**

	<b>Name</b>	<b>Country</b>
1.	Mr Tchimenou Kodjo	Togo
2.	Mr Al-Hassan Ibrahim Zakaria	Ghana
3.	Mr Ibrahima Dioum	Senegal
4.	Allaho-Ndoum Nadlengar Djigui	Chad
5.	Mlle Kingue Mezonko Arlette	Cameroon
6.	Mr Sidaty Mahamane	Mali
7.	Mr Yamoussa Moïse Bangoura	Guinea

The course emphasized field plots techniques, trial management, variety maintenance, seed multiplication, statistical analysis, data interpretation and report writing. Each trainee was assigned a project to manage from planting through harvesting. The practical training was complemented with lectures covering all aspects of maize breeding, agronomy, seed production, weed and pest control, and farm management.

#### 2.1.3. Workshop on Farmer Participatory Methods of On-farm Testing and Evaluation of Varieties

The collaboration of WECAMAN with NARS in West and Central Africa has resulted in the development of new streak resistant, drought tolerant and high yielding maize varieties with a range of maturities, grain color, grain texture and improved agronomic practices (fertilizer rates, time of fertilizer application, population density etc.). However, the adoption of these varieties has not been as high as desirable.

In an attempt to alleviate the constraints of technology transfer, WECAMAN is presently taking a number of measures including:

- strengthening of research - extension - farmer linkage in member countries,
- organizing workshops on technology transfer,
- encouraging and assisting member countries to organize annual maize workshops and research planning sessions which involve extensionists, policy makers and farmers.

These activities have provided the fora for reviewing research findings, grower recommendations and agricultural policies.

Inadequate on-farm testing of WECAMAN technologies has also been identified as one of the major constraints to the adoption of available improved maize technologies. There are a wide variety of methods used for on-farm evaluation of technologies. These range from researcher-managed trials, to demonstration of technologies. The level of

involvement of farmers varies from country to country. Researchers need to have a continuous dialogue with farmers. There is a need for WECAMAN to modify or change the on-farm research approach being used. Farmer participatory approach is an attractive option. For example, farmers may be invited to research stations to evaluate appropriate germplasm and agronomic practices and to select those for testing on their own fields. Breeders can learn from farmers' variety selection and evaluation criteria.

WECAMAN Steering Committee appointed a sub-committee in 1996 to review and develop strategies for the promotion and adoption of improved maize technologies. The sub-committee strongly recommended that a workshop on farmer participatory methods of on-farm testing and evaluation of varieties should be organized for researchers within WECAMAN.

To this end, a workshop on farmer participatory methods of on-farm testing and varietal evaluation was organized by WECAMAN in collaboration with IITA and the Institute of Renewable Resources of Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi, Ghana, 17-28 August, 1998.

The list of the participants who attended the workshop is presented in Table 6.

The areas covered in the course included the:

- use of selected participatory rapid appraisal (PRA) methods to communicate with farmers to identify their constraints and opportunities.
- use of selected PRA methods to identify and prioritize research and extension themes.
- application of appropriate PRA tools to analyze problems at different stages of the research process.

**Table 6** Participants at the workshop on farmer participatory methods of on-farm testing and evaluation of varieties.

	Name	Discipline	Country
1.	Mr Didjeira Akihila	Breeder	Togo
2.	Dr Sanou Jacob	Breeder	Burkina Faso
3.	Mr Mamadou Billo Barry	Agronomist	Guinea
4.	Mr Marshak S.	Breeder	Ghana
5.	Dr Henry Asumadu	Agronomist	Ghana
6.	Mr Kebbi Kongar	Agronomist	Tchad
7.	Mr Amidou Montaharou	Agronomist	Benin
8.	Mr Yallou Chabi	Breeder	Benin
9.	Mr Cheick Alassane Fall	Agronomist	Senegal
10.	Mr S.G. Ado	Agronomist	Nigeria
11.	Mr R. Omolehin	Agronomist	Nigeria

The resource persons for the course were drawn from IITA and the Republic of Benin. The detailed report on the course prepared by the participants is attached as appendix 3 of this report.

#### 2.1.4. Workshop on Maize Quality, Processing and Utilization

An important area in which remarkable progress has been made by WECAMAN is the development of maize varieties with good adaptation to bio-climatic conditions of the semi-arid ecologies and resistance/tolerance to major diseases. Also, improved agronomic practices have been developed for the varieties. The effort has significantly increased maize yields on a sustainable basis. Despite the significant progress that has been made through plant breeding in improving yield, disease and insect resistance of maize varieties, and other improved agronomic practices for farmers, the adoption of the improved varieties by farmers is often not as high as desirable. This is partly due to the fact that some of the improved varieties lack the desired quality for processing. Information regarding the characteristics of maize required for specific end-users is not readily available. The lack of information on the processing and utilization of maize is a constraint to the effective marketing and increased production of maize in the sub-region.

Lack of appropriate post-harvest technologies is considered as a major constraint to the production of maize and is noted as an area that needs urgent attention by WECAMAN. So far, few projects are being funded by the Network on post-harvest technologies and there is a need for more work on storage, utilization, and nutrition. There are on going research and development activities in some member countries that the Network can link up with. In Ghana, Global 2000 is assisting farmers with credit from the Agricultural Development Bank, for the construction of maize cribs. The World Bank and USAID are funding projects on maize transformation and ways of improving maize storage in Mali. It would be appropriate for the Network to link up with these initiatives in order to stimulate dissemination of appropriate post-harvest technologies. In some Network member countries, there is lack of information on available improved post-harvest technologies. There is therefore a need for the exchange of information among the member countries on available methods of processing and utilization. In addition, there is a need for training of national program scientists on the development of appropriate maize storage, processing and utilization technologies.

Technology transfer has been a weak link between WECAMAN and farmers and this is now being addressed through the formation of partnerships among research, technology transfer entities and the private sector. Progress has been made but there is still a lot that can be done in the technology transfer arena. One of the things that has really been lacking, until recently, is an effort to develop partnerships with food technology institutes and food processors to increase the nutritional value of maize products. A high quality protein maize (QPM) (containing high levels of lysine and tryptophan) has been developed in Ghana and has been used to feed school children and swine. Nutritional results from feeding this QPM have been very encouraging. WECAMAN is distributing seed of this QPM to other Network member countries in WCA. The high quality maize could be taken a step further and fortified with other minerals, especially micronutrients.

WECAMAN would like to involve different partners that would have a major role to play in improving the nutritional status of the region's children and lactating mothers. WECAMAN would like to bring together agricultural researchers, extensionists, food

technology institutes, food processors, producers, etc. to work together to produce more food and provide maize products that will improve the nutritional status of the people of the sub-region.

In an effort to achieve these goals, a workshop on maize quality, processing and utilization was organized by WECAMAN in collaboration with IITA and the university of Benin. The workshop was held at IITA-Ibadan, 24 August to 4 September 1998.

The objectives of the workshop were to:

- I) provide a forum for the exchange of information among the WECAMAN member countries on available improved methods of processing and utilization.
- II) train national program scientists in the development of appropriate maize storage, processing and utilization technologies.
- III) provide an opportunity for WECAMAN to link up with the initiatives in member countries such as the World Bank and USAID funded projects on maize transformation in Mali, and ways of improving maize storage in order to stimulate the dissemination of appropriate post-harvest technologies.
- IV) promote improved post-harvest quality with emphasis on mycotoxins, processing and utilization in order to increase the nutritional standards.
- V) establish functional linkages between WECAMAN and post-harvest technologists of WECAMAN member countries in order to promote the expansion in the demand for maize processing and utilization.

The list of the participants of the workshop is presented in Table 7. Resource persons were drawn from IITA and the University of Benin.

During the workshop, Dr Kamal Hyder, a consultant from Winrock International who was visiting selected countries of West Africa in connection with the proposed Micronutrient Fortification Project in West Africa presented to the participants a paper entitled "Micronutrient malnutrition and how to combat it".

The full report on the course prepared by the participants is attached as Appendix 4 of this report.

**Table 7. List of the participants at the Workshop on Maize Quality, Processing and Utilization**

	<b>Name</b>	<b>Country</b>
1.	Mr Ibra Mbaye	Senegal
2.	Mlle Hovenou Reine Lydie	Benin
3.	Elie Daken	Benin
4.	Dr Bailo Sidibe	Guinea
5.	Mr Frank Kofi Nagetey	Ghana
6.	Mr Manful J.T.	Ghana
6.	Mr Sidi-Youre Samon	Togo
7.	Mr Neya Adama	Burkina Faso
8.	Mlle Ouattara Laurencia	Burkina Faso
9.	Mrs D.N. Maigada	Nigeria
10.	Mme Coulibaly Salimata	Mali
11.	Mr Ngoko Zachee	Cameroon
12.	Mr Konan Kouakou Frédéric	Côte d'Ivoire
13.	Mr Ngaroum Assalbaye	Chad

#### 2.1.5. WECAMAN Monitoring Tour to Benin and Togo

A monitoring tour to the Republics of Benin and Togo was organised from September 7 - 18, 1998. The tour to Benin took place from September 7 - 12, while that to Togo took place from September, 13 - 18.

The monitoring team was composed of researchers from WECAMAN member countries and the Network Coordinator. The list of participants of the tour is presented in Table 8.

**Table 8. List of participants of WECAMAN monitoring tour to Benin and Togo**

<b>Name of Participant</b>	<b>Discipline</b>	<b>Address</b>
Ben Ahmed	Economist	IAR, ABU, PMB 1044 Zaria, Nigeria
Roger Kanton	Agronomist	SARI P.O. Boax 52 Tamale, Ghana
Abdou Ndiaye	Breeder	ISRA / S C S , BP 199 Kaolack, Sénégal
Charles Thé	Breeder	IRA Yaoundé, Cameroun
N'Tji Coulibaly	Agronomist	IER, BP 258, Bamako, Mali
Yallou Chabi Gouro	Breeder	INRAB, Ina, Bénin
Gansile Niéba	Agronomist	IRAG, BP 1523, Conakry, Guinée
Youl Sansan	Agronomist	INERA, Kamboïnsé Burkina Faso
Anguété Kouamé	Agronomist	IDESSA,(DCV) 01, BP 633, Bouaké, C.I.
Agbo-Noameshie Afiavi Rita	Agronomist	ITRA, Togo
Toukourou Moïsou	Agronomist	INRAB, Bénin
Baffour Badu-Apraku	Coordinator	BP 2551, Bouaké, Côte d'Ivoire
Yassine Gaye Sena	Agronomist	Station Agron. de Deh BP 26, Moundou, Tchad

The objectives of the monitoring tour were to:

- discuss constraints to maize production and productivity,
- discuss research activities in Benin and Togo and methods adopted to address the major constraints to maize production,
- learn at first hand how research, extension and production of maize is organised and the research-extension farmer linkages in place to promote the transfer of technology,
- provide a forum for interaction among the participating national scientists with respect to maize research, extension and production,
- allow the monitoring of progress on WECAMAN collaborative research projects so as to provide feedback to the ad hoc Research Committee.

### **Report on the visit to Benin**

The visit to Benin started on September, 7, 1998 with a courtesy call on the Director General of the National Institute of Agricultural Research of Benin (INRAB), Dr Houssou Moïse in Cotonou.

The National Coordinator of WECAMAN in Benin, Mr Yallou Chabi Gourou introduced participants of the tour to Dr. Houssou who then welcomed the participants to Benin and wished them a fruitful visit. The Coordinator of WECAMAN, Dr Badu-Apraku also briefed Dr. Houssou on the objectives of the monitoring tour. The Director General then highlighted the importance of maize research and the role of maize in ensuring food security in the region. He also stressed the need for the maize research activities of the CORAF and WECAMAN to be harmonized.

### **Visit to the food processing plant at Ouando**

After the courtesy call on the Director General, the team travelled to Ouando, a suburb of Porto Novo, to visit an infant weaning food processing plant. The participants were accompanied by the following national scientists: Gbehounu Gualbert (Weed specialist), Amidou Moutaharou (Agronomist), Dossou Romuald A. (Breeder), Sanni-Ogbon Abou (Entomologist), Gele Mellon (Seed Technologist), Dossou -Sognon Codjo (Technician), Hinvi Jonas (Agroeconomist) and Nonfon Richard (Agronomist). At Ouando, the participants were conducted round the plant by the Plant Engineer. He explained that maize, soybean and sorghum were used in the infant food formulation in the proportion of 50% maize, 20% soybean and 15% sorghum. Sorghum and soybean were used to provide two essential amino acids lysine and tryptophan which were lacking in the maize varieties being used at the plant. He also pointed out that local varieties were very hard and not floury. He explained that there were storage problems due to high humidity at harvest of maize in Southern Benin which made the maize to go mouldy, and hence unsuitable for human consumption. An underground maize storage metallic structure was also shown to the participants.

After the visit to Ouandou the team travelled to Parakou, the capital of the Borgou Region. At Parakou, the participants called on the Regional Director of CARDER (Centre d'Actions Régional de Développement Rural) and visited on-station and on-farm trials sponsored by WECAMAN as well as some maize trials funded by the National Maize Programme. The trials visited were the following:

**i. Studies on different methods of production of farm yard manure (FYM).**

The objective of this trial was to determine the most appropriate method of making FYM at Ina Station. The following treatment combinations were evaluated :

1. Manure placed in a hole without turning
2. Manure plus straw in a hole without turning
3. Manure applied on soil surface without turning
4. Manure placed in a hole and turning from time to time
5. Manure placed on soil surface and turning from time to time

Manure was applied at the rate of 7 t/ha plus urea topdressed at the rate of 46 kg N/ha. The test crop was an extra-early maize variety.

**ii. Effect of sowing date of a legume (*Aeschynomene hystrix*) in association with maize on the biomass production of the legume and maize grain yield at the Ina Station.**

The objective was to determine the optimal sowing date of the legume in the association.

- *Treatments* : 5 sowing dates were studied
  1. Sowing of maize 2 weeks after sowing the legume
  2. Sowing the maize 3 weeks after sowing the legume
  3. Sowing the legume 2 weeks before maize
  4. Sowing the legume 3 weeks before maize
  5. Sowing maize and legume on same date
  6. Sowing maize without legume

**iii. African Maize Stress Project**

*Striga* screening trials were visited at Guéné and Angaradébou. The objective was to screen maize varieties from IITA and WECAMAN for resistance / tolerance to *Striga hermonthica*. Nine varieties were screened using artificial infestation at the rate of 2,000 viable seeds of *Striga* /hill. There were four-row plots with the 2 central rows infested with *Striga*. Fertiliser was applied at the rate of 40 units of N/ha.

The low Emergence Pool C1 was screened under *Striga* infestation at Ina

**iv. Breeder seed and Foundation seed production at the Ina Station.**

The objective was to provide sufficient breeder and foundation seed to maize growers. Six maize varieties were multiplied. These are : TZEEW-SR ; Kamboinse 88 Pool 16 DT ; DMR- ESRW ; TZPB-SR ; Obatanpa SR and TZBSR.

However the group visited only the field of TZEEW SR. The half-sib system was adopted using the 1 : 2 male to female ratio.

**v. Regional Uniform Variety Trials (RUVT)**

RUVT-early and RUVT-Extra early were visited at Ina, Angaredebou and Guene stations.

**vi. Influence of date of sowing and plant population density on maize productivity**

The objective of the trial was to determine the interaction of sowing date and plant population density on maize yield.

• *Treatments :*

Main plot treatments :

1. 0.60 x 0.50m 2plants/hill, 66,667 plants/ha
2. 0.60 x 0.40m 2 plants/hill, 83, 333 plants/ha
3. 0.75 x 0.30m 2 plants/hill, 88,888 plants/ha
4. 0.75 x 0.40m 2 plants/hill, 66,667 plants/ha
5. 0.75 x 0.20m 1 plant/hill, 66,667 plants/ha
6. 0.80 x 0.20m 1 plant/hill, 62,500 plants/ha
7. 0.80 x 0.30m 2 plants/hill, 83,333 plants/ha
8. 0.80 x 0.40m 2 plants/hill, 62,500 plants/ha
9. 0.90 x 0.20m 1 plant/hill, 111,111 plants/ha
10. 0.90 x 0.20m 2 plants/hill, 55, 555 plants/ha

Subplot treatments : Sowing date

11. 25 th. June
12. 10 th. July
13. 25 th. July
14. 9 th. August

The test crop was the maize variety TZEEW-SR. The design was a split-plot with 4 replications. Plot size was 6 rows and 5m long. NPK was applied 2 weeks after planting at 100 kg/ha and urea was used for topdressing at 25 days after sowing at the rate of 100 kg/ha.

The trials were sited at Angaredebou and Guene on-station and on-farm at Guene.

**vii. *Striga* control using trap crops in rotation with maize**

The objective was to test promising trap crops on farmers' field at Guene and Kandro and to recommend promising ones to farmers.

- *Treatments:*

1. Cowpea variety TVX 1850.01F
2. Farmer's groundnut variety

#### **viii. Soil fertility maintenance trial at the Guéné Station**

The objective of this trial was to determine the best fertilizer formulation for extra-early (TZEEW-SR) and early (DMR-ESRW) maize varieties.

- *Treatments* were :

- 3 levels N 0 - 60 -and 80 kg/ha
- 4 levels P 0 - 20 - 40 - 60 kg/ha
- 3levels K 0 - 15 and 30 kg/ha

#### **Meeting with Farmers Group at Tobre and Tiélé**

At Tobre, in Atacora Region, the participants met with a farmers' group that had been involved in the WECAMAN Community Seed Production Project for the past four years. The group was made up of 18 women and 11 men. The maize variety grown was DMR-ESR-W. The group had cultivated 12 hectares of maize, 5 ha of mucuna and 4 ha of groundnuts. The average maize yields for the previous years ranged from 1.6 t/ha to 2.0 t/ha. The group benefited from WECAMAN in the form of foundation seed and fertilizer.

In response to a question on the profitability of maize seed production, the group stated that maize seed was more profitable than production of cotton and also posed fewer hazards to the environment.

At Tiélé, a meeting with WECAMAN sponsored Community seed growers was held, as the participants could not visit the maize field due to heavy rain which had rendered the access road to the farm impassable.

The farmers benefited from WECAMAN and Farmers Cooperative (USDP) in the form of seed and fertilizers with the CARDER providing extension services in seed production. The group indicated that seed production was not profitable due to the low prices paid for seed maize. The group produced 10 tons of maize in 1996 and again in 1997. The farmers indicated that 1kg of seed maize in 1996 was purchased at 110 FCFA and in 1997 1kg maize seed was sold for 165 FCFA. The farmers felt that it would have been profitable to them if they could sell 1 kg maize seed for 200 FCFA. They appealed for more training from the extension agents.

A meeting was held in Natitingo on September 11 with the farmers of the UDP and members of the research and development team at Atacora. In the team leader's address, he indicated that the major constraints to agricultural production in the Atacora region were: low soil fertility, water erosion and *Striga* in cereals. He stated that even though maize was new in the region, it had almost caught up with cotton as a cash crop compared to millet

and sorghum which were traditional crops. Lack of fodder for both cattle and small ruminants in the region was also a major constraint.

The General Secretary of USDP pointed out that the problem faced by farmers in selling their seed maize was due to the fact that the union was young and had not got enough funds to purchase seed maize from farmers. Some of the farmers who produced seed maize in 1997 had to sell it as grain because of lack of market. The General Secretary also noted that farmers were unwilling to buy improved seeds and preferred to use their own seed.

#### **Observations:**

1. The tour to Benin was quite successful as it offered participants a fair idea of maize research and development activities in Benin. The tour involved visits to representative samples of projects funded by WECAMAN as well as selected projects funded by the national government. There were visits to the research stations of INRAB at Ina, Angaradébou and Guéné, as well as on-farm trials at Guéné, Malanville, Angradébou, Kantro, Tobré and Kandi. Visits to Illorin, Nodi and Tiélé could not come on as planned due to excessive rains which had rendered the roads to these villages impassable. However, discussions were held with Extension Services (CARDER) staff, Farmer Groups and Cooperatives supporting seed growers in these villages.
2. The trials visited during the tour were generally well executed and the recommendations of the Research Committee had been respected in most cases.
3. Serious erosion was observed in some of the plots in the on-station trials at Guéné and Angaradébou.
4. Seed maize growers were generally very enthusiastic and expressed willingness to continue with seed production despite the low price offered.
5. The rate of manure (7 t/ha) and nitrogen applied (46 units) was rather too high and did not come anywhere near what farmers could afford.
6. The number of treatments evaluated in the plant density and sowing date trials were too many. The treatments used in these trials seemed to suggest that no previous work had been done in this research area whereas WECAMAN had conducted in depth studies on the subjects and had come up with recommendations which had been adopted in several member countries.
7. Most of the agronomic trials visited had too many treatments and were complicated which may make data collection and analysis rather difficult.
8. It was also observed that a groundnut variety that had not been screened as a trap crop for *Striga* control was being used as one of the treatments in on-farm trials for *Striga* control.
9. The price offered for seed maize was too low and the lack of data on cost of production made it impossible to determine the profit levels for seed maize production.
10. During discussions with maize seed growers and cooperatives, it came to light that the cooperatives arrived at prices of seed maize through dialogue with the farmers.
11. Farmers indicated that maize seed production was more profitable than cotton production and had less workload.

12. Farmers cultivated extra-early and early maize varieties in preference to the late varieties.

### **Recommendations:**

The following recommendations were made by the participants of the tour at the end of the visit to Benin:

1. There is the need to test improved maize varieties for characteristics desired for the weaning food industry in Cotonou.
2. Quality protein maize (QPM) could be used in place of sorghum to provide additional source of lysine and tryptophan in weaning food.
3. To resolve the high humidity at harvest, the weaning food industry should be advised to purchase maize from the north of Benin where maize is usually harvested during the dry season and is usually drier.
4. The agronomist needs to have a second look at his choice of treatments for the agronomic trials because he is working as if nothing has already been done.
5. Trap crops that have not been tested in the laboratory and/or on-station should not be taken on-farm.
6. Selection of experimental sites should be carefully done to ensure that erosion does not wash away *Striga* seeds so that uniform *Striga* field infestation could be achieved for the selection of resistant genotypes.
7. Promotion of seed maize marketing outlets such as small kiosks by the roadside should be encouraged and promoted.
8. The number of farmers involved in the community seed production scheme should be gradually reduced to a few good farmers who should be well trained in seed production techniques so as to ensure the production of good quality seed.
9. Researchers, extensionists cooperatives and other stakeholders should ensure reasonable prices for seed maize.

### **Report on the visit to Togo**

The participants of the monitoring tour arrived in Kara, Togo in the evening of 13 September 1998. They were joined in the morning of 14 September by the National Co-ordinator of WECAMAN for Togo, Mr Edah Komi and Dr. Abebe Menkir of the IITA Maize Program. A courtesy call was paid on the Director of the Agronomic Research Center for the Dry Savanna (CRA / SS), Mr. Tchami Tchambi Tchakpro. Mr. Tchami presented an overview of maize extension in Togo. He indicated that Togo may be divided into 4 agroecological zones namely: (i) Littoral zone, (ii) Forest zone, (iii) Humid savanna and (iv) Dry savanna zone. The dry savanna zone, he indicated, covers about 40% of the land area of Togo. The major crops grown in the zone are: sorghum, millet, groundnut and cowpea. Livestock is also raised extensively in the savanna. Maize has recently been introduced into the region and is fast replacing sorghum and millet which are the major staple crops in the zone. Maize is grown in both the rural and urban areas. It is consumed mostly by urban dwellers and because of this it is sold mostly in urban areas. The Director of Extension Services for the Northern Region, Mr Pitcholo Akla-Eso presented the maize

extension activities in the region. Mr Pitcholo informed the team that maize now ranked second after sorghum in terms of the area of production. Maize production has increased by about 100% between 1996 and 1997 while the area under maize has increased from 26% in 1996 to 31% in 1998. He said maize was the commonest cereal in the market in the area and was now consumed by both rural and urban people while sorghum the competing crop with maize was mainly used for making local beer. The major constraints to maize production in the zone include: low soil fertility, soil erosion and high *Striga* infestation particularly on late planted maize. Mr Pitcholo stated that a low percentage of farmers (10%) use improved seeds, however frantic efforts were being made to solve these problems.

On the 16 September 1998, the team paid a courtesy call on the Regional Director of Agriculture, Livestock and Fisheries (Mr Douty Nalouara) at Sokode. During the visit, a brief background of the agricultural activities in region was presented by Mr Douty. He said out of 44,000 tons in 1997, maize alone was 26,000 tons and stressed the importance of maize in the farming system in the region. Mr Douty informed the team that maize production was sponsored by a credit system operated by Farmer Groups and Non-Governmental Organisations (NGOs). He said the total amount given as credit in 1997 was 2, 222 millions CFA and was used in the purchase of fertilizers and seeds for distribution to farmers. Mr. Douty indicated that the technologies generated and transferred in the area were mainly on livestock production and the use of animal traction. The only technology transfer on maize was the introduction of the maize variety Ikenne (1) which had been highly adopted by farmers in the area. Mr. Douty complained about the lack of a national seed service in the country and said this had left seed production and sales in the hands of farmers. This was not satisfactory due to the poor quality seed and serious problems with seed distribution and marketing.

### **Visit to seed producers**

#### **Farmers at Assere**

A farmer who specialises in seed maize production was visited at Assere on 14 September, 1998. The farmer, Mr Kabre Tchonka Kaomy has been producing seed maize for the past three years. In 1998, he cultivated 10 ha of maize out of which 0.5 ha was for seed. In 1997 he produced 6.5 tons of grain maize and 5-6 tons of seed maize. His main complaint was the difficulty in marketing his seed maize and the poor price offered. This, according to him, was due to the fact that many farmers were not aware of (i) the importance of improved seed, (ii) the need to renew the seed at least once in every two or three years and (iii) the fact that when improved seed is used, the yields are higher. He observed that seed production will not be profitable for a small scale farmer unless the problem with the uncertainty of market and the low price were resolved.

### **Land Pozan Seed Production Association**

This association was also visited on 14 September. It was made up of a men's group and a women's group. The groups started as a social association before going into farming as a business. This year the association cultivated 43.5 ha of crops out of which maize covered 11.5 ha. The association operates individual farms as well as a common farm. The association has set aside specific days during which they work in their private farms and their common farm. Saturdays and Mondays are for the work in the common farm. The main constraints of the group were *Striga* infestation, poor market for seed maize and termite damage. The women's group was also involved in processing of maize into products such as kouli kouli, abolo and local drinks. These farmers were familiar with only the improved white maize varieties. Yellow maize was not grown because they did not use it for food in the area. However, they were advised by the participants to consider the use of improved yellow varieties which could be used for making their local drinks or could be sold. The major constraint of the women's group were lack of *Striga* resistant varieties, credit, processing equipment and low price of grain maize.

### **Visit to an integrated crop and livestock farm**

There was a visit to an integrated crop and livestock farm belonging to a retired Professor of Literature, Mr. Charles Bawewa. The focus of this farmer was reclamation of degraded land through the use of organic manure such as compost obtained from his livestock, crop residue, and other plant materials such as cover crops. The leguminous cover crops cultivated by the farmer were : mucuna, pigeon pea and *Stylosatnes* to rejuvenate degraded soils. The farmer practised crop rotation using cereals and legumes. He said that it took him three years to regenerate a degraded land. Mr. Bawena in response to a question as to how much compost he applied per hectare on his farm, said he applied about 31 t/ha which the participants considered to be rather too much and unnecessary. The farmer transforms all products and by-products into useful products for sale to the local people. His wife was also making bread called "mama" from the by-products of cereals such as maize. Maize is the main cereal crop grown by this farmer. The farmer had established training facilities to train farmers for a fee.

### **Visit to maize seed farm at Tamonga.**

The farmer, Mr Naubon Lancodjo, cultivated 7 ha of maize and other crops. The maize varieties cultivated were: Ikenne 8149, Amen and La Posta but he preferred the Ikenne variety. He obtained the variety six years ago and was not aware of recently released varieties.

### **Visit to seed producers at Tchamba**

The group is made up of 10 associations with a membership of 159 members and had been in existence since 1977. They are involved in producing maize through savings mobilized from members. They receive extension advice from DRAEP. The average yield of seed maize was 2 tons/ha.

### **Visit to farmer group at Rhincami**

This farmer group at Rhincami produced Ikenne variety (4 ha). They obtained foundation seed from DRAEP and were trained in seed production in 1997. The major constraint was lack of market for the seed maize. The farmers felt that in order to make seed maize production profitable, the price of maize seed should be 240 - 245 CFA /Kg.

### **Visit to Sotoboua seed farm**

The farm was established in 1954 but later abandoned for lack of funds. It was reactivated in 1977 during the green revolution campaign. It has 300 ha of land and produces 300 tons of cereal seeds annually. In 1998 about 23.5 ha was planted to the following maize varieties: Poza Rica, AB11, Amen, NH-11 and Pirsabak. The foundation seed was sold for 710 CFA /kg and certified seeds for 260 CFA/Kg. The average yield was 2 - 2.5 tons /ha. During discussions with the staff of the farm it came to light that they had been producing their own breeder seed. This was strange to the participants who suggested that the researchers should be responsible for that. The team also visited the seed cleaning, sorting and grading plant of the seed farm.

### **Visit to CERAD**

CERAD, a Non-governmental Organisation (NGO) was involved in the transfer of technology to farmers. The NGO assisted about 8 farmer groups consisting of both men and women groups of about 120 people. The NGO provided the groups with fertilizer, foundation seed and packaging bags. The farmers bought the foundation seeds at 710 CFA/kg and sold the certified seed at 400 CFA/kg. The major constraints faced by the farmers were insufficient fertilizer and lack of storage facilities.

### **On-farm demonstrations**

#### **1. Maize- pigeon pea demonstration at Bafilo and Baga**

The demonstration consisted of maize in association with pigeon pea in a 4 to 1 row ratio respectively. The objective was to prevent soil degradation by improving the fertility of the soil. The demonstration was in its third year. After harvest, soil samples would be taken from all the plots for analysis.

At Baga the soil was so poor in the first year that none of the crops could grow. However the fertility level had improved considerably judging from the vigorous growth of the crops when the participants visited the demonstration plot.

#### **Maize utilization demonstration at Dapaong**

A group of women involved in processing and production of commercial baby food made from maize and soybean and fortified with minerals and vitamins was visited at Dapaong. The group started with 17 members but only three remained at the time of visit, due to low profit levels and the departure of the NGO that was supporting the group. The group realised about 60,000 CFA monthly from the sale of their products. The trade name of their

product was "Vita-plus". The product has been marketed up to Lome and exhibited in Burkina Faso and Benin. The group is constrained by poor marketing outlets and lack of funds to set up the processing plant.

### **Participation in Farmers' open day at Kong**

The participants attended farmers' open day at Kong. The District Director of Agriculture, Livestock and Fisheries indicated that the northern region is about 70% self sufficient in cereal production. The production of maize has increased from 2,200 ha in 1983 to about 28,967 ha in 1993. By 1997, more than 30% of the cultivated land was devoted to maize, out of which 15% of the production was maize in association with cowpea. Maize has virtually replaced millet and sorghum in the region.

### **Visit to the Food Technology Laboratory at Cacaveli**

Two infant weaning foods are produced in this laboratory for 3 to 6 months old babies and another for 6 months old and above. Maize constitutes about 25% to 63% of the cereals used. About 2,000 packets of 500 g of each baby food type are produced monthly. Other local products made from maize include: couscous, tortilla and liha local drink. The main constraints of the laboratory are lack of storage facilities and equipment for commercial production.

### **Observations:**

1. Maize technology transfer is poorly organized with most of the Network maize varieties (early and extra-early) not yet available to farmers
2. There are poor research, extension and farmer linkages and this needs to be strengthened
3. Farmers do not renew their maize seed as frequently as desired
4. Little is being done in testing new varieties either at the on-station or on-farm level
5. Seed production by farmer groups lacks the necessary organisation and skills
6. The seed farm at Sotoboua has no proper supervision
7. The maize seed market as well as the grain market are poorly developed
8. The researchers do not seem to be very aggressive in seeking donor funds for their work
9. In spite of the serious *Striga* problem, no trial on *Striga* was shown to the participants
10. Groups involved in maize processing and utilisation lack adequate support from the government.

### **Recommendations of participants based on the visit to Togo**

1. The maize technology transfer needs to be properly organised
2. New early, extra-early and *Striga* tolerant varieties should be tested and promoted.
3. Campaign should be mounted to create awareness on the need for farmers to use new seed or renew their seed every 2 to 3 years
4. Researchers should intensify on-station and on-farm variety evaluation
5. The community seed production project should be overhauled with a view to selecting well-trained farmers
6. The seed farm at Sotoboua should be placed under the research unit
7. There is a need for the Government to organise and promote maize seed and grain marketing
8. The researchers should show more dedication to work
9. Trials involving *Striga* tolerant varieties should be initiated as a matter of urgency in view of the seriousness of the damage caused by *Striga* in Togo
10. The government should provide logistic support to groups involved in maize utilisation and processing.

#### 2.1.6. Regional Uniform Variety Trials

A total of 38 sets of RUVT-early and 37 sets of RUVT-extra early were packaged and dispatched by the Network Coordinator to both network member and non-member countries based on requests. The number of sets of each trial and the countries involved are presented in Table 9.

An amount of \$2000 was released to the national maize program of Togo in support of the RUVT conducted in Togo in 1998. Togo had not conducted the regional trials for the past three years due to financial problems. As a result, it had not benefitted from the new maize varieties that have been released in several network member countries through the collaborative efforts of WECAMAN.

In addition to the RUVT, maize seed was dispatched to the NARS on request as shown in Table 10.

**Table 9. Number of sets of Regional Uniform Variety Trials dispatched to WECAMAN collaborators in 1998**

Country	Number of trials	
	Extra-early	Early
Mali	3	3
Ghana	3	3
Côte d'Ivoire	3	3
Cameroon	2	2
Togo	3	3
Senegal	2	2
Nigeria	4	5
Guinea	0	2
Tchad	2	2
Benin	3	3
Sierra Leone	0	1
Eritrea	3	3
Cape Verde	2	0
Burkina Faso	3	2
IITA-Ibadan	2	2
IITA-Côte d'Ivoire	2	2
<b>Total</b>	<b>37</b>	<b>38</b>

**Table 10. The list of varieties and amount of seed dispatched to the NARS on request in 1998**

Country	Name of variety	Amount of seed Dispatched (kg)
Côte d'Ivoire	CSP SR BC <sub>5</sub>	20
	DMR ESR-Y	14
	TZE Comp 4	12
	TZESR-W x Gua 314	65
Tchad	95 TZEE-Y <sub>1</sub>	5.0
	TZE Comp <sub>4</sub> C <sub>2</sub>	3.0
	DMR ESR-Y	1.5
	TZEE-Y SR BC <sub>5</sub>	5.0
	TZEE-W SR BC <sub>5</sub>	5.0
Senegal	Kamb 88 Pool 16 DT	1.0
	DMR ESR-Y	1.0
Mali	TZEF-SR	10.0
Guinea		
Nigeria	95 TZEE-W1	50.0
	95 TZEE- Y1	50.0
Benin	TZE W-Pop	5.0
	TZE Y-Pop	5.0
	TZEE-W Pop	5.0
	TZEE-Y Pop	5.0
	98 Syn WEC STR	0.2
	EV DT-W 97 STR C <sub>1</sub>	3.0
	EV DT STR Co	2.0
Total		249.7

#### 2.1.7. Consultation visits to National Maize Programs

To promote the cross fertilization of ideas and experiences, the Network Coordinator and IITA maize program scientists paid consultation visits to national maize programs in 1998 as shown in Table 11.

**Table 11 Consultation visits to national programs in 1998**

National Maize Program visited	Date of visit	Visitor
Côte d'Ivoire	1-2 Oct	Network Coordinator
Tchad	14-21 Oct	Network Coordinator
Cameroon	August	J. G. Kling
Senegal	August	A. Menkir
Burkina Faso	October	A. Menkir
Guinea	October	S. O. Ajala

A) *Consultation visit by the Network Coordinator to the national maize program of Côte d'Ivoire, 1-2 October, 1998*

The Network Coordinator paid a consultation visit to the national maize program of Côte d'Ivoire, 1-2 October, 1998. The specific objectives of the visit were to monitor the progress on the collaborative research projects funded by WECAMAN in Côte d'Ivoire in 1998 and to afford the participants of the WECAMAN technician training course the opportunity to learn at first hand how the community level seed production project of WECAMAN and the on-farm tests are organized in Côte d'Ivoire. The visits to the community seed production projects sites were conducted after Mr Anguété Kouamé, the seed technologist in charge of the project, had presented a two-hour lecture on the community seed production scheme of WECAMAN.

Accompanied by the seven technicians attending the training course at Ferke, the Network Coordinator visited the on-farm trials (project 1) around Ferke and Nielle, the community seed production (Project 2) sites in Ouangolodougou and the *Striga* breeding materials and trials as well as the RUVT-Early and RUVT-Extra early at the CNRA station at Ferke. The team was conducted around the various sites by Messrs René Akanvou, Anguété Kouamé and the technician of Madam Akanvou, Mr Meya. Madam Akanvou could not participate in the visit as originally planned due to unforeseen circumstances beyond her control. The activities visited and the observations and recommendations made based on the visits were as follows:

#### **Activities visited and observations**

a) On-farm trials

On-farm trials were visited near Ferke and at Nielle. The on-farm trials were initiated near Ferke in 1995 because farmers had expressed interest in early and extra-early varieties due to the fact that these varieties fit very well into the farming system such as maize-cowpea and cotton-maize cropping systems. For example, a farmer visited on-farm near Ferke indicated that he planted an early maize variety at the onset of the rains in the valley bottom and after harvesting had planted rice. At Ferke, there were 3 early on-farm variety trials and 2 extra-early on-farm variety trials while at Nielle there were 3 each of the early and extra-early trials.

The on-farm trials involving early varieties had at the beginning of the project in 1999, four entries (AB11, Pool 16 DT, DMESR-Y and TZE Comp4) but after years of testing the farmers had selected two varieties, DMESR-Y and TZE Comp 4. These two early varieties were being evaluated near Ferke and Nielle. Each variety was planted to about 0.25 ha. There was no check this year because farmers do not have any early varieties and the researcher did not want to use the available intermediate variety as the check. The extra-early variety tests involved CSP SR and TZESR-W x Gua 314. Each variety was once again planted to 0.25 ha and there was no check.

It was noted that the recommendation of the ad hoc Research Committee that the varieties which had proven promising on-farm during the past two years in Côte d'Ivoire should be demonstrated in large plots in 1998 and that steps should be taken to release formally these varieties had not been respected. Mr Akanvou explained that the recommendation had not been respected because of the restructuring of the national research system which had made the execution of the projects very difficult this year. For example, it had not been possible for funds to be released for the project activities because of the restructuring. It was pointed out by the Coordinator that it was still not too late for Mr Akanvou to arrange field days so as to bring farmers to see the performance of the varieties. He was also advised to take the necessary steps to organize the release of the early and extra-early varieties with proven performance in early 1999.

The role of the extension services in the on-farm trials was not evident even though the researcher had indicated that the extension services, ANADER, was involved in the planning session organized just before the beginning of the planting season. No extension agents had visited any of the trials and no effort had been made to bring other farmers to see the trials.

It was evident that the funds released for technology transfer was not commensurate with the work done in 1998. It is therefore anticipated that enough funds would remain at the end of the season to enable the scientists to organize the formal release of the varieties of proven performance on-farm at the beginning of 1999.

b) Visit to the community seed production project

Samples of the community seed production fields were visited in Ouangolodougou. Two early varieties (TZE Comp 4 and DMRE-SR-Y) and two extra early varieties (CSPSR BC<sub>5</sub> and TZESR-W x Gua 314) were used in the community seed production projects.

It was noted that the seed agronomist was working very closely with the extension services, ANADER in the project. Also, attempts had been made for the farmers involved in seed production to be organized into groups and to do block farming. Very unfortunately, in some cases the land allocated for the community seed production was not the best with the result that some of the seed fields were not good and in some few cases they had been poorly managed. Also, in few cases no fertilizer was applied to seed production fields. Nevertheless, the prospects look good, particularly if the communities

could be convinced of the need to allocate good land for the community seed production projects.

There was no evidence of the establishment of a revolving fund. Also no breeder and foundation seed production was evident at the time of the visit.

The seed agronomist should be commended for the effort made to get the seed production project going despite very difficult working conditions.

c) Visit to the *Striga* control project and variety trials

The following materials identified in 1997 were being screened for *Striga* tolerance at the Ferke station under artificial infestation. The materials included:

- I) Seven early S<sub>6</sub> inbreds extracted from 86 Pool 16 DT
- II) AC 94 TZE Comp 5-Y, TZE Comp 5 C<sub>5</sub>
- III) Intermediate maturing inbred lines (S<sub>6</sub>)
- IV) Late open pollinated varieties.

In addition to the above materials, two *Striga* observation trials, M 9809, involving late and intermediate varieties and M 9810 involving early varieties were being evaluated for *Striga* tolerance under artificial infestation with *S. hermonthica*.

The *Striga* infestation was not uniform making it very difficult to discriminate *Striga* tolerant and susceptible materials. Also, there were no border rows planted for the materials being screened. The field execution of these trials was generally very poor and needs to be improved.

A set each of the RUVT-Early and RUVT-Extra early were planted at Ferke. These trials were well managed and usable data are expected.

There was no evidence of enough activity conducted in 1998 to justify the amount of \$4,000 allocated to this project.

### **Recommendations based on the visit to the national maize program of Côte d'Ivoire**

- I) The on-farm agronomist should explore the possibility of working with the extension services, ANADER in the technology transfer project as it is being done with the community seed production project.
- II) The formal release of the varieties DMRE-SR-Y, TZE Comp 4, CSP SR BC5 and TZE SR-W x Gua 314 should be organized during the early part of 1999. The seed technologist should have enough foundation seed of the four varieties. There should also be enough commercial seed in the system for farmers in 1999 through the community seed production scheme. The maize breeders, seed technologists and the on-farm agronomist should therefore get together, establish breeder seed

plots of the four varieties in Bouaké under irrigation and plan the formal release of the varieties. WECAMAN should provide the necessary support to the scientists.

- III) It is very important that the on-farm agronomists work very closely with ANADER to demonstrate the four varieties very widely in 1999 and organize field days for farmers so as to publicize the varieties.
- IV) There is a need for the maize breeders to be actively involved in the community seed production project. The breeders should take the direct responsibility for the breeder seed production while the seed agronomist, assisted by the breeders, should take direct responsibility for the production of foundation seed. The seed agronomist should work with ANADER and farmers to produce the commercial seed. There is a need for team work to ensure the success of the project.
- V) The seed production team should take all the necessary steps to ensure that land allocated by communities for seed production are good and not land which has been abandoned because it has been overused.
- VI) There is a need to continuously screen and weed out bad seed producers so that only serious and good farmers would be retained for the project.
- VII) A revolving fund should be established in 1999 to ensure sustainability of the project.
- VIII) There is a need to review the activities of the *Striga* control project to ensure that the project is on track and that enough progress is being made.
- IX) The artificial *Striga* infestation should be improved to allow discrimination of *Striga* tolerant and susceptible materials.

B) *Consultation visit by the Network Coordinator to the National Maize Program of Tchad, 14-21 October, 1998*

A consultation visit was paid to the national maize program of Tchad by the Network Coordinator, 14-21 October, 1998. The objectives of the visit were to:

- I) learn at first hand the major constraints to increased maize production and productivity and the research activities aimed at removing the constraints;
- II) find out the potential role of maize in helping to contribute to food self-sufficiency in Tchad and the potential of the Sudanian zone as compared to the Sahelian zone in contributing to the food self-sufficiency;
- III) see the research, extension and farmer linkages in place to ensure effective transfer of maize technology;

- IV) find out how Tchad could be fully integrated into WECAMAN and to strengthen the collaboration between WECAMAN and the national maize program of Tchad;
- V) Monitor the RUVT-Early and RUVT-Extra early and the progress on WECAMAN collaborative research project funded in 1998 under the AMS project.

The visit started in N'djamena on 15 October with a courtesy call on the Director of Agronomic Research, Dr Tamitah. During the meeting, the Coordinator explained that Tchad was not a member of WECAMAN during the period 1993-1997 because it did not meet the criteria used to select 8 countries as members at the termination of SAFGRAD Phase 2. The criteria used were the annual maize production (200,000 tons or more per annum), the importance of maize, and the potential impact of the Network in the respective countries. However, more funds had been made available to WECAMAN since November 1997 under the AMS Project and hence the membership of the Network has been expanded from 8 to 11 to include Tchad, Senegal and Guinea.

The Director expressed his satisfaction at the new development and explained that the decision to exclude Tchad from the Network based on the criteria outlined was wrong. This was because he felt that even though Tchad was not producing as much maize as the other 8 selected countries the potential impact of Tchad on the network, and the importance of maize in Tchad could not be overemphasized. He supported his argument with the fact that large quantities of maize produced under irrigation around Lake Tchad in N'djamena is exported to Nigeria and Cameroon.

Following the courtesy call, 3 days each were spent in the Sudanian zone and the Sahelian zone visiting research, extension and production activities. The activities visited, observations and recommendations made based on the visits were as follows:

a) Visit to the Sudanian Savanna Region

Accompanied by the National Maize Coordinator of WECAMAN, Mr Dabi Mabissoumi and the maize breeder based in the Sudanian region, Mr Yassine Gaye, the Network Coordinator visited the National Office of Rural Development (ONDR) at Moundou and the Agronomic Station of Deli.

The following points were noted during the visit to the Deli Agronomic Research Station and the meeting with the acting Director of ONDR, Mr Tchilgne Youle and the head of the extension wing of ONDR at Moundou:

- About 45,500 ha of maize was produced in the Sudanian Savanna region in 1997. The improved varieties used by farmers include CMS 8501, Mexican 17 Early and CMS 8704 which were released through the SAFGRAD Project. Some farmers do grow the local variety. The officials indicated that they were aware of the need to replace some of these varieties but this had not been possible because they had not

been exposed to the available new varieties of WECAMAN. They therefore hoped that through the new collaboration with WECAMAN this would be possible.

- The national maize program had started conducting the RUVT and it was hoped that the collaborative effort would result in the release of new higher yielding varieties.
- Maize is the third most important cereal in the Sudanian region, after Sorghum and Millet. The average yield of maize is 900-1000 kg/ha.
- While early varieties were doing very well in the region, extra-early varieties had never been tried. It was the feeling of the team that extra-early varieties could play a very important role in filling the hunger gap in July and should therefore be evaluated and promoted for adoption.
- A project, funded by the World Bank (Projet des Services Agricoles et Pastoraux, PSAP) was involved in technology transfer in the Sudanian region. There was some form of collaboration between the national maize researchers and ONDR in on-farm seed production through this project but there is no formal relationship. About 30 tons of maize seed was produced in 1997 through PSAP. There is no on-farm maize testing program.
- Before the civil war in 1987, a national agricultural conference was organized annually by the Ministry of Agriculture. During this annual conference, researchers, extensionists and policy makers assembled, exchanged ideas and deliberated on agricultural issues of national importance. Since the war, this conference had not taken place. At present, the project PSAP organizes an annual planning session for the seed producers, NGOs, extensionists and researchers involved in the seed production activities of the project.
- A project funded by ADB (Projet de Production Cottonnière et Vivrière en Zone Soudanienne) is based at Moundou. This project is mainly involved in seed production of soybean, millet, maize, sorghum and sesame. Through this project funds are provided to two farmer groups, each with 10 producers to engage in the seed production of groundnut, cowpea and sesame. No seed of sesame was produced in 1998 because the seed production had been found to be uneconomic.

Commercial maize seed production of the project is carried out by the staff of the station who obtain foundation seed from CIRAD-CA.

About thirteen hectares of commercial seed maize were planted in 1998 using the following varieties:

CMS 8501 - 8 ha  
Mex 17 Early - 4 ha  
CMS 8704 - 1 ha

Very unfortunately breeder seed production and varietal maintenance had not been carried out for these varieties with the result that the breeder seed source had not been renewed since the varieties were released. However, the scientists had initiated steps to get fresh seed from Cameroon.

By the time of the visit, all the commercial seed fields had been harvested except 1.0 ha of CMS 87504 which was still in the field. The seed germination was very poor with the result that not much seed can be harvested. The situation had been worsened by severe *Striga* infestation.

The visit to the seed barns where the harvested commercial seed was stored revealed that no selection had been done during harvesting in the field and even during drying of the seed. All the rotten ears and off-types had still not been eliminated. The need for the training of the staff in the seed production project was evident.

- Very unfortunately the RUVT-Early, RUVT-Extra early and the IITA *Striga* observation trials involving the intermediate varieties conducted at the station had been harvested about 3 days prior to my arrival at the station even though the maize breeder was aware of my visit. It was therefore not possible to evaluate the trials in the field.

Severe *Striga* infestation was observed in all the harvested maize fields and it was apparent that the yield of the entries in the various trials were very low due to the *Striga* damage.

- Discussions with the maize breeder and other staff of the maize program revealed that there were no simple equipment such as weighing scales and moisture meter as well as harvesting bags, tags, etc. The only car at the station was in deplorable condition as well as the 60-km road from Moundou to the Deli Station. Nevertheless, the Sudanian zone has high potential for maize production if the major constraints which include *Striga*, low soil fertility and lack of financial support for the research station could be tackled. The rainfall in the zone is adequate (1000-1400 mm) and intermediate, early and extra-early varieties can be successfully grown in the zone.

b) Visit to the research activities at the Sahelian Region.

(I) Visit to the research activities at Walia.

In N'djamena, the Network Coordinator, accompanied by Mr Dabi visited field trials at Walia. At this location, the RUVT-Early and RUVT-Extra early as well as seed multiplication fields of TZE Comp 4, DMR-ESR-Y, TZEE-W SR and TZEE-Y SR BC<sub>5</sub>

and Obatanpa were visited. Furrow irrigation was used for the trials and seed multiplication plots at the site.

The entries in the RUVT Early and Extra-early were each separated 2 m away from the other and the arrangements of the plots were not properly done thus spreading out the blocks and not allowing proper comparison of the entries. Also the irrigation of the plots was not uniform thereby confounding the results.

There were big problems with the isolation of the seed multiplication plots. For example, the TZE Comp 4 and the DMRESR-Y plots were planted on the same day but the isolation distance was not more than 5 m. Also, Obatanpa was planted on 2 September while the TZE Comp 4 and DMRESR-Y were planted on 8 September and yet the isolation distance between the latter two and Obatanpa was less than 100 m. Similarly TZEE-W SR BC<sub>5</sub> and TZEE-Y SR BC<sub>5</sub> were planted the same day on the same plot. There were no facilities available for hand pollination. The breeder was therefore advised to discard all the seed multiplication plots except that of Obatanpa, so that fresh seed of the other varieties could be sent to him for multiplication later.

There were two seed production plots of CMS 8704 and TZEE W SR BC<sub>5</sub> planted on 8 August which were adequately isolated and reasonable quantities of seed were expected.

## (II) Visit to the Gassi Station.

The Gassi seed production Project funded by FAO was also visited. The Network Coordinator was informed that the major constraints to maize production in the Sahelian zone are the problems of irrigation, lack of appropriate varieties and termite damage.

About 2000 ha of land has been made available by the Government for the seed production activities of the project. Out of this only 300 ha has been developed for use by the project.

The project which was established by UNDP and executed through FAO in 1965 terminated in 1995 and since then the Government of Tchad has taken over the funding of the project with occasional support from UNDP.

The varieties used in the seed production program since 1993 include the following:

- I) EV IB 84A 202
- II) CMS 8602
- III) Kouri
- IV) Across 9128

The seed of these varieties had never been renewed. IITA sent the project about 20 varieties including hybrids for testing in 1996. After a year of testing, the following 3 varieties were identified as promising but there was no seed for further testing:

- I) Across 9128
- II) Kamb 90 Pool 16 DT
- III) Ikenne 88 TZSR

The officer in charge of the project expressed the desire to have the seed of these varieties for further testing.

The team was shown around two trials composed of early and intermediate varieties received in 1993. Yield of the varieties was low and the degeneration of the varieties was apparent.

The officer in charge of the project indicated that they worked with 4 seed contract growers in 1998. Each of the farmers produced 1 ha of seed of the variety given to him. The project prepared the land for the farmers, provided inputs, including seed, and supervised the activities of the farmers. At harvest, the farmers reimbursed the cost of land preparation and inputs. Both the staff of the project and the contract growers had never received any training in seed production.

### **Recommendations**

- I) The need for improvement in trial field execution was evident at both Deli and Walia. It is therefore recommended that the two breeders should benefit from the upcoming course in breeding for stresses in maize.
- II) There is a need for updating the skills of the personnel involved in breeder, foundation and commercial seed production with particular reference to the isolation distances, various isolation methods, measures to ensure seed purity and the organization of community seed production. The farmers involved in seed production project also need to be trained.
- III) Small field equipment and supplies such as weighing scales, moisture meters, hand shellers, pollination and shoot bags should be provided by WECAMAN to the national maize program.
- IV) Arrangements should be made to make available fresh seed of all the old varieties and on-farm testing of new varieties at both the Sahelian and Sudanian zone should commence.
- V) Deli Station could be a very good site for *Striga* screening in view of the severe infestation in the area. However, there is a problem of lack of mobility, facilities which would need to be solved to make work on *Striga* possible.
- VI) There is a need to test the extra-early varieties in the Sudanian and Sahelian regions.

C) *Consultation visit by Dr Abebe Menkir to the national maize program of Senegal, 24-27 August, 1998*

*Background and Objective of the visit*

Based on the recommendation made by the ad hoc Research Committee of WECAMAN, the African Maize Stress (AMS) project provided funds to Senegal to develop and/or improve a screening site for drought tolerance and for operational expenses at this site. The AMS project also disbursed additional funds to carry out on-farm trials and community seed production of improved maize varieties. The specific objectives of this trip were to (i) learn about the maize research and extension activities of the national maize program, (ii) monitor progress on the improvement and/or development of the drought screening site, (iii) visit on-farm trials and seed multiplication farms and (iv) explore means of strengthening collaboration between the national maize improvement program and a drought research center in Senegal.

Accompanied by Dr Ndiaye, the National Maize Program Leader and the soil scientist, several trials and the drought screening site at Nioro were visited on August 25. The second day was spent visiting eight on-farm trials distributed in different villages. The third day was devoted to visiting the Bambey Research Center, Centre d'Etudes Régionales pour l'Amélioration de l'Adaptabilité de la Sécheresse (CERAAS), and ISRA headquarters. The observations made during the visit are presented below:

*The National Maize Program*

The maize program has been engaged in conducting collaborative trials from various institutions to identify varieties adapted to the maize growing areas of Senegal. This season, three international maize trials from IITA (M9806, M9807, and M9810) and two regional trials from WECAMAN (RUVT-Early and RUVT-Extra Early) were planted at Nioro research station. Since planting was done in mid July, it was not possible to assess the potential of the entries in these trials. The maize program does not seem to have extensive breeding activities to develop source populations for varieties, inbred lines and hybrids. As one of the major responsibilities of the drought screening site will be to develop germplasm useful for West and Central Africa, this aspect of the program needs to be strengthened. I, therefore recommend that Dr Ndiaye should come to IITA as a visiting scientist to develop his breeding strategies in close collaboration with the maize scientists at IITA.

*Development and/or improvement of the drought screening site*

The Kaolack Research Center received a check from the AMS project for developing and/or improving a drought screening site in June. Although this check was deposited in the bank on June 5, the fund had not yet been transferred to the center to enable the scientists to initiate the improvement work on the screening site by the time of the visit. This problem was brought to the attention of the Director of ISRA who promised to expedite the transfer of the fund to the Kaolack Research Center.

The drought screening site is located at Niore research station which is operating under the Kaolack Research Center. This station has a 20 hectare irrigable land for experimentation. A suitable area (4 ha) has been identified for screening maize germplasm under managed drought stress during the dry season based on soil properties using GIS. This area will be fenced as soon as funds are released to the research center. The Niore station also has a good sprinkler irrigation system and a reliable source of water to support the drought research.

#### *On-farm testing of improved varieties*

Two sets of variety trials were organized for on-farm testing. The first set consisted of six improved white maize varieties, while the second set was composed of improved yellow maize varieties. The check varieties included in these trials were improved varieties released by the national program about seven years ago. An agricultural economist and a sociologist have formulated questionnaires which will be administered to farmers to evaluate the suitability of the maize varieties for production in their farms. More than half of these farms were visited. Most of them were managed very well. The only concern was that the varieties included in the two sets of trials were very old. Dr N'diaye agreed to include new sets of early maturing varieties selected based on WECAMAN trial results in his 1999 on-farm trials.

#### *Multiplication of seed of improved varieties*

Dr Ndiaye had identified three promising maize varieties, SYN 9243, BABUNGO 8331, and SW1 C9 for seed multiplication and final release on the basis of the 1997 on-farm trial results. Four farmers were multiplying these varieties in isolation blocks of 0.25 ha each. Each farmer received 2 kg seed of the improved variety and adequate quantities of fertilizer to carry out the seed multiplication. The farmers were expected to pay back in-kind the cost of fertilizer. The Kaolack Research Center would buy the remaining seed from the farmers for on-farm testing. These farmers would have the necessary skills to be involved in future seed multiplication activities.

More than 30 local early maize varieties were being increased for screening under induced drought stress during the dry season. Furthermore, the best varieties identified from the 1998 on-farm trials, TZE COMP3 C<sub>1</sub>, TZE COMP4 C<sub>2</sub>, and other outstanding early varieties would be multiplied during the dry season so that more on-farm trials could be carried out in 1999.

#### *Forging collaboration between centers*

Senegal has a regional research center, CERAAS, for improving varietal adaptation to drought stress. This center has the state of the art equipment to measure drought induced physiological responses of plants and a good number of well-trained national and expatriate staff. Most of the researches in this center concentrate on pearl millet, groundnut and cotton. During the visit, there was an opportunity to discuss with the

Acting Director of the Center, Dr Benoit Sarr, and a few scientists about the possibility of working together to develop germplasm and management systems to mitigate the effects of drought on maize in Senegal. Both the Acting Director and the scientists expressed their willingness to initiate a collaborative work with the maize program. Considering the difficulty in measuring most of the physiological parameters on a large number of genotypes, CERAAS scientists agreed to evaluate few promising entries selected from screening trials and nurseries under managed drought stress for their physiological responses, root and morphological characteristics. Such detailed information could be combined with agronomic characters to identify the best drought tolerant genotypes for on-farm testing and release. The Kaolack Research Center and CERAAS will work out the modalities for collaboration in due course.

## **2.2. Progress report on the African Maize Stress Project by Dr S. O. Ajala**

The Coordinator of the AMS Project, Dr S. O. Ajala presented the progress report on the AMS Project under the three main objectives of the project as follows:

### **Objectives 1: Develop stress-tolerant maize varieties and complementary crop management practices**

#### *Exchange of stress-tolerant germplasm*

##### ***Striga***

- Regional trials of early- and late-maturing open-pollinated varieties with resistance to *Striga* spp. were distributed to countries in the sub-region on request.
- Thirty S<sub>3</sub> lines from ACR 94 TZE Comp 5-Y were being evaluated in Benin under artificial infestation with *S. hermonthica*.
- 181 S<sub>1</sub> lines from the Low Emergence Pool derived from African landraces are being evaluated in Nigeria, Benin and Cameroon under artificial infestation with *S. hermonthica* or *S. aspera*.

#### Low nitrogen

- A trial containing promising low N-tolerant varieties from CIMMYT as well as locally adapted varieties was planted in Ghana and at two sites in Nigeria under three N levels.
- S<sub>1</sub> families (100) from the Low N Pool C<sub>0</sub> are being evaluated under N stress in Ghana and at IITA's site in Mokwa, Nigeria.
- Collaborators at ABU, Samaru have evaluated 180 full-sib families from the Low N Pool C<sub>1</sub>.

## *Development of stress-tolerant germplasm*

### Drought

- Screening of germplasm for drought tolerance was carried out during the dry season under controlled drought stress at IITA from 16 days before anthesis until harvest. Some inbred lines, improved open-pollinated varieties, landraces and hybrids with high yield, shorter anthesis-silking interval, and higher number of ears per plant under stress were identified from these screening trials.
- These genotypes will be tested further at IITA and at the two screening sites in the national programs to confirm their reaction to drought during the 1999 dry season.
- A total of 200 promising S<sub>1</sub> lines with good levels of tolerance to drought were derived from five CIMMYT populations and an IITA population which had been improved for drought tolerance. These S<sub>1</sub> lines were crossed to inbred testers in the first season of 1998 for evaluation under drought stress.

### Low nitrogen

- ACR 8328 BN C<sub>7</sub> from CIMMYT was crossed to the low N-tolerant pool for further improvement. Three other varieties improved for tolerance to low N at CIMMYT were multiplied for further evaluation and crossing in West and Central Africa.
- 180 full-sib families from the Low N Pool C<sub>1</sub> were evaluated at two N levels at Mokwa.

### *Striga*

- Screening for resistance to *Striga* in seven adapted populations continued at Abuja and Mokwa, Nigeria.
- Inbred lines adapted to the midaltitudes (36) were screened under artificial infestation with *S. hermonthica* at Mokwa and Abuja.
- S<sub>1</sub> (181) and S<sub>2</sub> (162) lines from a *Striga* resistant pool developed from African landraces were screened under *Striga* infestation at Mokwa and Abuja, in 1998.

### Stem Borers

- Backcross progenies derived from East African materials resistant to *Chilo partellus* and crossed to genotypes with local adaptation, were evaluated under artificial infestation with *Sesamia calamistis*. Selfed genotypes obtained from the evaluation are now at the S<sub>4</sub> generation of inbreeding.

- An *Eldana* resistant synthetic (TZBR *Eldana* 1 C<sub>7</sub>) derived from unadapted germplasm was crossed to nine adapted populations with varying levels of resistance to *Eldana saccharina* and/or *Sesamia calamistis*. Products from the crosses were backcrossed to TZBR *Eldana* 1 C<sub>7</sub>. S<sub>1</sub> lines extracted from the backcrosses will be evaluated in an effort to develop new resistant experimental populations.
- S<sub>1</sub> recurrent selection continued in three stem borer resistant populations. Furthermore, a total of 150 stem borer resistant S<sub>4</sub> lines were evaluated in different sets of topcross trials.

#### *Increase screening efficiency*

- The potential for using anthesis-silking interval, number of ears per plant, and leaf senescence scores as secondary traits to improve tolerance to drought was assessed.
- Selections made for tolerance to low soil N in 1997 were evaluated at Mokwa, Nigeria to assess root pulling strength as a secondary trait for improving tolerance to drought and low N in addition to lodging resistance.
- Cut roots from 75 selected S<sub>2</sub> families derived from *Zea diploperennis* were evaluated in petri dishes to assess this method for screening maize genotypes for low *Striga* stimulant production.

#### *Development of complementary crop management practices*

- Proposals for developing complementary crop management practices were solicited from WECAMAN member countries and screened by the ad hoc Research Committee of WECAMAN. Funds will be allocated to Cameroon, Tchad, Nigeria and Togo in 1999 pending resubmission of revised proposals.

#### *Design/conduct farmer participatory breeding approaches*

- Activities under this objective were initiated during the WECAMAN workshop on farmer participatory research methods held from August 17 - 28, 1998. In association with NARS collaborators, steps are being taken to apply these methods to the greatest possible extent in breeding stress tolerant germplasm and in developing complementary crop management practices.
- On-farm trials of resistant varieties were initiated with ten farmers near the IITA *Striga* screening site at Mokwa.

## **Objectives 2: Strengthen NARS' ability to develop stress-tolerant maize**

### *Development of key screening sites*

- Key stress tolerance/resistance screening sites were selected by the ad hoc Research Committee on competitive basis:

Drought - Senegal and Burkina Faso

Low-N - Nigeria and Ghana

*Striga* - Cameroon

- Funds for developing these screening sites were distributed in early June 1998.
- Funds for operations at the sites were distributed in August 1998.

### *Prepare/present short course/workshops related to project activities*

- A short-course on farmer participatory methods for on-farm research was conducted in Ghana from August 17 - 28, 1998. Eleven representatives from eight WECAMAN member countries attended this course.
- Technicians from the new WECAMAN member countries of Tchad, Senegal and Guinea participated in the 4-month maize technical training course organized by WECAMAN in Ferké, Côte d'Ivoire.

### *Train African researchers in stress breeding through Visiting Scientist Fellowships and opportunities for hands-on experience in stress breeding at key sites*

- A maize breeder from D. R. Congo was invited to work with maize breeders at IITA for a period of six months in 1998 but was unable to utilise the fellowship due to personal reasons. A new candidate from Senegal was being considered to work on drought screening techniques during the off-season (December 1998 to March/April 1999).
- Collaborating scientists working on low-N and *Striga* visited IITA screening sites for low-N and *Striga* from 16 to 20 August 1998.
- Dr J. G. Kling who is responsible for backstopping low-N and *Striga* research activities visited the low-N site in Nigeria in June 1998 and the *Striga* site in Benin and Cameroon in August 1998.
- The scientist backstopping drought screening activities, Dr A. Menkir, visited Senegal at the end of August and Burkina Faso at the end of October, 1998.

- A joint visit to stem borer hot spots in South-Eastern Nigeria was undertaken by the Project Coordinator and the national maize scientist responsible for stem borer research activities in Nigeria from 22 - 26 September, 1998. During these visits, screening and testing sites for stress research were identified and/or research plans elaborated as appropriate.
- A meeting of maize researchers to prepare a regional plan of action for stem borer work was to be held on 6 November, 1998.

*Strengthen regional maize network (ASARECA, CORAF, PAMA)*

- Guinea, Senegal and Tchad became new members of WECAMAN through funding provided by the AMS Project. Representatives from these countries attended the Seventh and Eighth WECAMAN Steering Committee meetings in Bouaké, Côte d'Ivoire and IITA-Ibadan, respectively.
- IITA maize scientists paid consultation visits to each of the new member countries to share experience and strengthen maize research activities in these countries.
- IITA maize scientists participated fully in the WECAMAN Strategic Planning Workshop in May 1998. The meeting drew up a five-year strategic plan for an expanded WECAMAN.
- The research agenda of the AMS Project Coordinator for West and Central Africa is directly related to stress breeding for the forest ecology and is expected to provide germplasm for the region.
- The WECAMAN Coordinator is an IITA staff member and conducts research which is relevant to the AMS project, especially for drought prone areas. Increased technical support provided through this project will further strengthen the Coordinator's research program.

*Increase NARSs' institutional capacity to sustain research and technology diffusion*

Activities initiated included:

- Community based seed production program
- Consultation visits of IITA maize scientists to national maize programs.

**Objectives 3: Initiate the transfer of research outputs to farmers and promote linkages with development projects**

*Assist in on-farm testing of improved cultivars and management practices*

- The ad hoc Research Committee approved funds for on-farm trials in Nigeria, Guinea and Senegal (Table 12). Tchad is expected to resubmit its proposal. Due to the late arrival of funds from the donors, the unspent funds for this activity will be carried over to 1999 to enable more countries to conduct reasonable numbers of on-farm trials.

*Promote seed production of stress-tolerant cultivars*

- With the exception of Guinea which is expected to resubmit its proposal, funds from the AMS project were released to each of the new member countries to participate in the community seed production scheme.

**Table 12. Fund allocation for the Collaborative Research Projects of WECAMAN under the African Maize Stress Project.**

Countries	STP1	STP2A	STP2B	STP3	STP4	Total
Benin		5,500	4,800			10,300
Burkina Faso		5,500	4,800			10,300
Cameroon	2,500*	5,500	4,800			12,800
Chad	2,500*			3,000	2,000*	7,500
Ghana		5,500	4,800			10,300
Guinea				3,000*	2,000	5,000
Nigeria	2,500*	5,500	4,800		1)2,000 2)2,000	16,800
Senegal		5,500	4,800	3,000	2,000	15,300
Togo	2,500*					2,500
<b>Total</b>	<b>10,000</b>	<b>33,000</b>	<b>28,800</b>	<b>9,000</b>	<b>10,000</b>	<b>90,000</b>
STP1:	Development of complimentary crop management practices.					
STP2A:	Strengthening NARS ability to develop stress tolerant maize - Development of screening sites.					
STP2B:	Strengthening NARS ability to develop stress tolerant maize - Operational support for screening sites.					
STP3:	Linking research to development.					
STP4:	On-farm testing of improved cultivars and management practices.					

\* Funds to be released for the activities in 1999 after re-submission of proposals based on the recommendations of the Ad hoc Research Committee.

Some countries are yet to re-submit their proposals therefore, activities are being delayed until the early season of 1999. Furthermore, only \$1000 was allocated to carry out stem borer control activities on-farm in Nigeria because activities were initiated in two sites.

### 2.3. Progress reports on collaborative research projects funded in WECAMAN member countries in 1998

Progress reports on collaborative research projects funded in Network member countries in 1998 were presented by all member countries except Mali.

From the highlights of the reports presented it was evident that most of the activities funded in member countries had been successfully carried out. Harvesting and data processing were in progress in most countries and it was anticipated that full reports on the collaborative projects would be presented during the Third West and Central Africa Regional Maize Workshop to be held 3-7 May 1999 in Cotonou, Benin.

### 2.4. Highlights of the Maize Improvement activities at IITA in 1998

The highlights of the maize improvement activities carried out in IITA was presented by Dr J. G. Kling. The salient points noted during the presentation were as follows:

#### a) *Performance tests of hybrids*

- ◆ Several hybrids developed for the savanna and mid-altitude ecologies were evaluated in 1998. Some of the hybrids involving new inbred lines consistently produced grain yield of at least 10 t/ha at each savanna location. These hybrids were superior to the available single-cross commercial hybrid checks as shown below:

**Mean grain yield (kg/ha) of selected hybrids tested at three locations in Nigeria, 1998**

	<b>Bagauda</b>	<b>Zaria</b>	<b>Saminaka</b>	<b>Mean</b>
A9801-1	10.8	10.2	10.7	10.6
A9801-9	11.4	9.9	12.7	11.3
A9801-10	11.6	10.8	11.3	11.2
Oba Super I (check)	9.8	9.9	10.2	10.0
A9802-15	13.2	14.0	12.2	13.1
A9802-17	12.8	11.5	13.2	12.5
Oba Super I (check)	11.6	9.3	8.8	9.9
A9803-22	12.4	11.5	12.6	12.2
A9803-33	10.7	10.0	12.6	11.1
Oba Super I (check)	9.9	6.8	11.4	9.4
A9806-2	10.3	10.0	12.3	10.9
Oba Super II (check)	8.8	7.9	11.1	9.2

b) *Breeding for resistance to Striga*

- ◆ *Striga* Low Emergence Pool C1 S<sub>1</sub># and C0 S<sub>2</sub> have been developed from African Landraces and improved STR germplasm that supported lower numbers of emerged *S. hermonthica* plants. Initially this pool had poor agronomic type and was susceptible to lowland diseases, but these traits have been improved to some extent.
- ◆ *Z. diploperennis* BC<sub>4</sub> S<sub>3</sub>-S<sub>4</sub>, and their testcrosses evaluated per se and in crosses with 1368, 9030, 9450 and MMB90 as checks showed lower *Striga* emergence and *Striga* damage as shown below:

**Performance of S3-S4 lines derived from *Z. diploperennis* BC4 under *S. hermonthica* infestation in Abuja in 1998**

Pedigree	<i>Striga</i> Damage (1-9)	Plant aspect (1-9)	<i>Striga</i> emergence plant <sup>-1</sup>	Index
472-2-3-2	3.0	3.0	0.78	9.66
472-2-3-4	3.5	3.0	0.38	8.53
(TC 87)-1-#-1-1	3.0	4.0	0.10	8.15
282-5-2-2	3.5	3.5	0.34	7.42
472-2-3-1	3.0	3.5	0.50	6.93
472-2-2-1-4	3.0	3.5	0.35	6.84
262-1-1-#-2	4.5	3.5	0.48	6.34
282-4-1-#-2	3.5	4.0	0.97	6.27
472-2-2-1-1	3.5	4.5	0.10	6.19
472-2-2-1-2	3.5	4.5	0.64	6.06
472-2-2-1-5	4.0	4.0	0.29	5.36
282-4-1-#-1	3.5	4.5	1.00	5.30
262-1-1-#-1	3.5	3.5	1.03	5.17
9450	5.0	5.5	0.42	0.31
9450	5.5	6.0	1.56	-3.34
1393	5.5	5.0	4.46	-5.06
1393	5.5	6.0	4.87	-9.28
<b>Mean</b>	<b>4.8</b>	<b>5.2</b>	<b>1.49</b>	<b>0.00</b>

c) *Early and extra-early varieties for the semi-arid zone*

- ◆ Four *Striga* resistant populations have been developed using 1368 STR and Tzi 25 STR as donors and screening under artificial *Striga hermonthica* infestation and drought conditions. These are:

TZE-W Pop STR (Early white)  
TZE-Y Pop STR (Early yellow)  
TZEE-W Pop STR (Extra-early white)  
TZEE-Y pop STR (Extra-early yellow)

- ◆ Experimental varieties extracted from these populations are in preliminary evaluation trials:

EV DT-Y 98 C0  
EV DT-W 98 C0  
EV 98 TZEE-W  
EV 98 TZEE-Y

- ◆ Two STR Synthetics have been developed from inbred lines extracted from 86 Pool 16 DT. These include:

EV DT-W 97 STR C1 - in 1988 RUVT  
98 Syn WEC STR - in preliminary evaluation trials

- ◆ S<sub>4</sub> lines extracted from TZEY-Y and TZEE-W SR BC<sub>5</sub> were under evaluation for *Striga* resistance

**d) Mapping genes for resistance to *Striga hermonthica***

- ◆ A three-year project was being funded by the Rockefeller Foundation to map genes for resistance to *Striga hermonthica*.
- ◆ Three selected S<sub>2</sub> lines from *Z. diploperennis* BC<sub>4</sub> had consistently low *Striga* emergence in Nigeria and Kenya. F<sub>2</sub> mapping populations have been developed for screening in 1999.
- ◆ A. Melake-Berhan of the IITA Maize Program visited the Applied Biotechnology Laboratory at CIMMYT-Mexico for six weeks. He was developing the facilities needed in the IITA Biotechnology Laboratory to screen the mapping populations.

**2.5. Discussions on the progress reports**

The following points were noted during the discussions that followed the presentation of the various progress reports:

- I) Some AMS collaborative research project were approved in 1998 but funds were not released for various reasons. For such projects, it was advised that the project proposals could still be re-submitted to the Network Coordinator for implementation in 1999 provided that the necessary modifications as requested by the ad hoc Research Committee were made.

- II) On the question of release of funds allocated to Nigeria for technology transfer in 1997 the Network Coordinator explained that both the funds for 1997 and 1998 had been released. Similarly, the cheque for the projects funded under the AMS project had been handed over directly to the Director of IAR by Dr J. G. Kling. Prof. A. O. Ogungbile was advised to check this with the Director of IAR.
- III) Asked about the status of the impact assessment studies funded by WECAMAN in Mali and Burkina Faso, the National WECAMAN Coordinators indicated that the studies had been conducted and that the reports would be available soon. The Mali report should be available by 12 December 1998.
- IV) Asked why the national maize program of Senegal had used old varieties in the on-farm trials instead of the available new and superior varieties, Dr Ndiaye explained that this was due mainly to the relocation of the scientists involved in the on-farm activities which did not allow them enough time to go through the reports to select the new varieties. He promised that this will be taken care of in 1999.
- V) To prevent delays in the release of funds by IFAD for the AMS Project, it was highly desirable that the Annual Workplan be sent to IFAD in due course.
- VI) On-farm trials were being conducted in Tchad though in an informal way contrary to the observation of the Network Coordinator that there was no on-farm maize testing program in the country.
- VII) Asked about the weight given to OPV's vis-à-vis the hybrids, Dr Kling indicated that 30% of the IITA resources allocated to maize varietal development was for inbred and hybrid development. She also pointed out that the inbreds served not only for hybrid development but also as source germplasm for the development of OPV's.
- VIII) Prof. Dr Ogungbile observed that some new hybrids were performing better than Oba Super I. He therefore wanted to know when these superior hybrids were going to be released. He also wanted to know the links that existed between the IITA Maize Program scientists and the seed companies in Nigeria. In response, Dr Kling stated that several second generation white hybrids were ready to go out. She added, that the interaction with the seed companies was constant but there was so far no yellow hybrid available with outstanding superiority over Oba Super 2.

## **2.6 Report on the Seventh Meeting of the ad-hoc Research Committee**

The report on the Seventh Meeting of the ad-hoc Research Committee of WECAMAN was presented by Dr. A. Menkir on behalf of the Committee. Dr. Menkir reported that the Seventh Meeting of the ad-hoc Research Committee was held 16-17

May, 1998 in IITA-Ibadan. All members of the committee (Dr. Taye Bezuneh, Mr. Yallou Chabi and Dr. A. Menkir) were present at the meeting. Also present as resource persons were Dr. J.G. Kling and the WECAMAN Coordinator.

The purpose of the meeting was to review the progress reports which were not submitted during the Sixth Meeting of the ad-hoc Research Committee and to review the research proposals submitted for funding by the African Maize Stress Project.

### **Progress reports on 1997 collaborative research projects.**

The committee reviewed 12 progress reports on collaborative research projects and funds were allocated for 1998. During the meeting, the ad-hoc Research Committee scored each progress report based on the criteria established in 1995. The committee gave the following recommendations after scoring the reports.

Recommendations	Number of Projects
Accepted	5
Resubmit	5
Rejected/Suspended	2

### **Some general comments on the collaborative research projects.**

The ad-hoc Research Committee made the following general comments on some of the collaborative research projects reviewed:

- ◆ Economic analysis in some cases were inappropriate.
- ◆ Lack of background information on the cropping systems prevailing in the target area to introduce the project to the reader.
- ◆ No presentation on earlier work that led to the initiation of some of the studies.
- ◆ Failure to include country maps showing test sites used for study in some few countries.
- ◆ Poorly presented materials and methods (lacked details).
- ◆ No treatment structure and experimental design provided in some cases.

### **Review of project proposals for funding by the African Maize Stress Project**

The committee reviewed 27 project proposals submitted for funding by the African Maize Stress Project. Before reviewing the proposals, the committee grouped them into the following four categories:

- ◆ **STP1:** Development of complimentary crop management practices
- ◆ **STP2:** Strengthening NARS's ability to develop stress-tolerant maize
- ◆ **STP3:** Linking research to development
- ◆ **STP4:** On-farm testing of improved cultivars and management practices

The committee reviewed the projects based on the criteria established in 1995 for collaborative research projects of WECAMAN and made specific comments on each project. The committee approved only few proposals for funding in 1998 based on the scores and the technical merit.

**Common problems encountered during the review of project proposals which were not accepted.**

- ◆ use of very general titles.
- ◆ lack of strong argument to justify projects.
- ◆ inadequate review of similar work (limited background information).
- ◆ absence of clear and specific plans (methodologies) to successfully carry out the work.
- ◆ lack of focus in approach.
- ◆ in-appropriateness of treatments for applicability of research results.
- ◆ unreliable methods for measuring treatment responses.
- ◆ the similarity of the project with an existing project funded by WECAMAN.
- ◆ in-appropriateness of test locations (experimental sites).

### **3. RECOMMENDATIONS FOR 1999 ACTION PLAN**

The proposed workplan and budget of WECAMAN for the period 1 October 1998 to 30 September, 1999 were discussed and approved by the SC.

The major activities approved for 1999 included:

I) Collaborative research projects

National maize scientists were expected to submit to the WECAMAN Coordinator, latest by 8 March, 1999 progress reports on collaborative research projects funded in 1998 under the AMS Project, end of project reports for the collaborative research projects funded under the USAID grant as well as proposals for the collaborative research projects to be funded under the new phase of WECAMAN and the AMS Project. In case a scientist wished to continue an on-going project funded by WECAMAN through the USAID funds, he/she was to justify the reasons, outline the methodology and submit the budget.

The justifications for funds allocated in 1998 to the USAID-funded and AMS collaborative projects were also to reach the WECAMAN Coordinator by 28 February, 1999.

The guidelines for the preparation of the proposals for the new projects to be funded by USAID and AMS projects were to be sent to the NARS scientists by the end of November 1999.

A meeting of the WECAMAN ad hoc Research Committee was planned for 15 March, 1999 in Abidjan, Côte d'Ivoire, to review the progress/end of project reports as well as proposals for the new collaborative research projects and to allocate the 1999 funds.

II) Resident research of the Network Coordinator

The resident research of the WECAMAN Coordinator would continue in Côte d'Ivoire and Burkina Faso.

III) Regional Uniform Variety Trials (RUVT)

The data for the 1998 RUVT were to be submitted to the WECAMAN Coordinator by 31 December, 1998. National maize programs and International Centers which had new entries to nominate for the 1999 RUVT were to send 7 kg of seed of the variety along with the data supporting the nomination. The IITA international trials and the RUVT would be announced in due course.

IV) Third West and Central Africa Regional Maize Workshop

The Third West and Central Africa Regional Maize Workshop was scheduled for 3-7 May, 1999 in Cotonou, Benin. Final reports on collaborative research projects funded by WECAMAN during the past three years as well as scientific papers on maize research and development would be presented.

The call for abstracts was to be out soon after the Ninth Meeting of the WECAMAN SC. Sponsorship of participants to the workshop by WECAMAN was to be on competitive basis.

V) Technician training course

A technician training course to be funded by the USAID and the AMS projects was planned for Ferkessedougou, July-November, 1999.

WECAMAN member countries which did not benefit from the 1998 course (Benin, Côte d'Ivoire, Burkina Faso and Nigeria) would be able to nominate a technician each. The new member countries (Chad, Guinea and Senegal) would also be given another chance to send a nominee each for the course.

VI) Workshop on breeding for stress tolerance in maize.

A workshop on breeding for stress tolerance in maize to be funded by AMS project was held 9-21 August, 1999, in IITA-Ibadan, Nigeria. Drs Ajala and Badu-Apraku were tasked to look into the duration of the workshop and other details in order to minimize the disruption of research activities of NARS scientists due to the period selected for the workshop.

## VII) National maize workshops and planning sessions

In order to promote the adoption of improved maize technologies and to strengthen the links between researchers, extensionists and farmers, the Network started in 1994 to provide modest financial support to national maize programs to organize workshops and planning sessions in countries where these were not being held. The support which is a one-time event would be provided next year particularly to new member countries. A budget proposal indicating the interested country's financial contribution towards the workshop or planning sessions was to be submitted to the WECAMAN Coordinator for consideration for funding.

## VIII) Impact assessment of research on maize production and productivity in selected network member countries

WECAMAN member countries, namely, Burkina Faso, Mali and Nigeria who were allocated funds to conduct impact assessment studies in 1998 were to submit the reports to the WECAMAN Coordinator as soon as possible.

## IX) Membership of the ad hoc Research Committee

The SC of WECAMAN decided during the Eighth Meeting in IITA-Ibadan that there should be a representation of CORAF on the WECAMAN ad hoc Research Committee. Following this decision, a request was made to the Chairman of CORAF, Dr M. Houssou for nomination of a senior NARS scientist to serve on the ad hoc Research Committee. Up to the time of the Ninth SC meeting, there had not been any response from the CORAF.

### **3.1. Meeting of the Steering Committees of WECAMAN and the CORAF Maize Network**

In November 1997, there was a consultative meeting between the CORAF and IITA in IITA-Ibadan, Nigeria. During the meeting, it was decided that CORAF should have only one maize network and that the two existing networks (CORAF Maize Network and WECAMAN) should be renamed and operated as projects under a single CORAF Network. It was agreed that there should be a single Steering Committee although each project would have to operate under appropriate management procedures that comply with the current contract with donors.

During the Ninth Meeting of the SC of WECAMAN, members endorsed the decisions of the IITA and CORAF consultative meeting. Following this, the SC appointed a five-man committee made up of Prof. O. A. Ogungbile, Drs N'diaye, Sanou Jacob, Messrs Dabi Mabissoumi, Yallou Chabi and the Network Coordinator to attend the meeting with representatives of the CORAF Maize Network SC to discuss the issues relating to the merger of the two existing networks. The five-man sub-committee was mandated to deliberate on the new name of WECAMAN within the CORAF Network.

A meeting of the representatives of the SC of WECAMAN and the CORAF Maize Network was held on 6 November 1998 in IITA-Ibadan. During the meeting, the representatives of the two networks endorsed the decisions of the IITA-CORAF consultative meeting on the merger. The structure of the new CORAF Maize Network was discussed in detail and drawn up.

The report of the meeting of the representatives of WECAMAN and the CORAF Maize Network is to be prepared by Dr Sanou Jacob who served as the secretary for the meeting. The report is to be circulated to the WECAMAN and the CORAF Maize Network Coordinators, B. Badu-Apraku and Charles Thé, respectively for approval.

#### **4. ANY OTHER BUSINESS**

The question of WECAMAN allocating funds to the National WECAMAN Coordinators to cover in-country coordination expenses was discussed at length. A member was of the view that it was sometimes difficult to find funds to pay for faxes, DHL etc sent to the Network Coordinator. It was explained that with the dwindling resources of WECAMAN it was even more important than ever for the NARS to show commitment to the Network by bearing the in-country coordination expenses as their contribution to the sustainability of WECAMAN. Moreover, in all the projects approved for funding by WECAMAN in member countries, there were line items to cover postage, preparation of documents, DHL etc. These funds were meant to cover the in-country coordination expenses and there was no need to set aside additional funds meant for collaborative research projects for in-country coordination expenses.

#### **5. RECOMMENDATIONS OF THE STEERING COMMITTEE**

The following recommendations were made by the participants of the Ninth Meeting of the SC of WECAMAN.

1. WECAMAN National Coordinators are responsible for coordinating the activities funded by WECAMAN in the respective member countries and presenting the progress reports on the collaborative research activities funded by WECAMAN at the SC meetings. It is therefore obligatory for leaders of the various collaborative research projects funded by WECAMAN in each country to make available to the WECAMAN National Coordinators the progress reports on the collaborative research projects each time they have to attend the SC meeting so that they could present the reports of their countries at the meetings.
2. The WECAMAN Coordinator is responsible for implementing the decisions of the SC. Any major deviations from the decisions of the SC should receive prior approval of the SC before its implementation.

**Appendix 1: LIST OF PARTICIPANTS OF THE NINETH MEETING OF  
THE STEERING COMMITTEE OF WECAMAN,  
4 - 5 NOVEMBER, 1998, IITA-Ibadan**

**Benin:**

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**Appendix 2: AGENDA OF THE NINTH MEETING OF THE STEERING COMMITTEE OF WECAMAN, IITA-IBADAN, NIGERIA, 4 - 5 NOVEMBER, 1998**

**Wednesday, 4 November**

**OPENING SESSION**

**Chairperson:** Chairman of WECAMAN Steering Committee, Mr Yallou Chabi

- 8:00 - 8:30 Registration of participants  
8:30 - 8:40 Welcome address by the Chairperson  
8:40 - 8:50 Remarks by the International Coordinator of OAU/STRC SAFGRAD - Dr Taye-Bezuneh  
8:50 - 9:00 Remarks by the representative of USAID  
9:00 - 9:15 Remarks by the representative of UNDP  
9:15 - 9:30 Remarks by the representative of IFAD  
9:30 - 9:45 Welcome address by the Director of the International Cooperation Division of IITA - Dr M. W. Bassey  
9:45 - 10:15 Group photograph and coffee break

**SESSION I**

**Chairperson:** Chairman of the WECAMAN Steering Committee, Mr Yallou Chabi

- 10:30 - 10:50 Adoption of the agenda  
10:50 - 11:20 Network Coordinator's report - B. Badu-Apraku  
11:20 - 11:50 Progress report on the Africa Maize Stress Project - Dr S. Ajala  
11:50 - 12:10 Report on the Seventh Meeting of the ad hoc Research Committee - Dr A. Menkir  
12:10 - 12:30 Discussions

**SESSION II** Presentation of Progress Reports on 1998 Collaborative Research Projects of WECAMAN

**Chairperson:** Dr Ouedraogo Mahama

- 13:30 - 14:00 Cameroon - Dr Titus N'goumou  
14:00 - 14:30 Benin - Mr Yallou Chabi  
14:30 - 14:50 Côte d'Ivoire - Mr Anguété Kouamé  
14:50 - 15:20 Burkina Faso - Dr Sanou Jacob  
15:20 - 15:30 Coffee break  
15:30 - 15:50 Togo - Mr Edah Komi

15:50 - 16:10 Mali - Mrs Sidibé Salimata  
16:10 - 16:40 Nigeria - Prof. O. A. Ogungbile  
16:40 - 17:10 Discussions

**Thursday, 5 November**

**SESSION II (cont'd)** Progress reports on collaborative research projects of WECAMAN

8:00 - 8:20 Chad - Mr Dabi Mabissoumi  
8:20 - 8:40 Senegal - Dr Abdou N'diaye  
8:40 - 9:00 Guinea - Mr Gansile Nieba  
9:00 - 9:30 Ghana - Dr J. B. Naab  
9:30 - 10:00 IITA  
10:00 - 10:15 Coffee break  
10:15 - 11:00 Discussions

**SESSION III** Reports on WECAMAN Workshops and Monitoring Tour to Benin and Togo

11:00 - 11:20 Report on WECAMAN Monitoring Tour to Benin and Togo - Dr Abdou N'diaye  
11:20 - 11:40 Report on the workshop on Farmer participatory methods of on-farm testing and varietal evaluation - Dr Sanou Jacob  
11:40 - 12:00 Report on workshop on maize quality, processing and utilization - Mrs Salimata Sidibé

**SESSION IV** Discussion of WECAMAN-CORAF Maize Network relationship

12:00 - 12:20 Update on the IITA-CORAF Maize Network meeting of 1997  
12:20 - 13:00 Proposed relationship of WECAMAN with the CORAF Maize Network<sup>1</sup>

**SESSION V** Recommendations for 1999 Action Plan

**Chairperson:** Chairman of the WECAMAN Steering Committee

14:00 - 15:30 Proposed workplan and budget of WECAMAN for the period 1 October, 1998 to September 30, 1999

- (I) Collaborative research projects
- (II) Resident research of the Network Coordinator
- (III) Regional trials
- (IV) Third West and Central Africa Regional Maize Workshop
- (V) Technician training course
- (VI) Workshop on breeding for stress tolerance in maize
- (VII) National maize workshops and planning sessions
- (VIII) Impact assessment of research on maize production and productivity in selected WECAMAN member countries
- (IX) Ad hoc Research Committee Meeting

- 15:30 - 15:45 Coffee break  
15:45 - 16:45 Any other business  
16:45 - 17:15 Recommendations of the Ninth Meeting of the Steering Committee

### **CLOSING SESSION**

**Chairperson:** Chairman of the WECAMAN Steering Committee

17:15 - 17:40 Report and recommendations of the Steering Committee meeting

17:40 - 18:10 Closing remarks

- Chairman of WECAMAN Steering Committee
- IFAD
- UNDP
- USAID
- Director of CID.

### **Appendix 3: REPORT ON THE WORKSHOP ON FARMER PARTICIPATORY METHODS FOR ON-FARM TESTING AND EVALUATION OF VARIETIES, IRNR, KUMASI, GHANA, 17 - 28 AUGUST, 1998**

#### **Introduction**

Under the auspices of WECAMAN, IITA in collaboration with Institute for Renewable Natural Resources (IRNR), University of Science and Technology, Kumasi-Ghana, organized a training workshop on *Farmer participatory methods for on-farm testing and evaluation of varieties* in Kumasi, Ghana from 17 to 18 August, 1998. Eleven representatives from eight countries in West and Central Africa namely Benin (2), Ghana (2), Nigeria (2), Burkina Faso (1), Guinea (1), Senegal (1), Tchad (1) and Togo (1) participated in the workshop.

Funding for the course was provided through the African Maize Stress Project.

**General objective:** The course was aimed at enabling participants to acquire skills in Participatory Rapid Appraisal (PRA) in order to select and evaluate maize cultivars on-farm and to train other researchers and extension staff in the use of the method.

**Specific objectives:** Participants were expected at the completion of the workshop to:

- use selected PRA methods to communicate with farmers to identify their production constraints and opportunities;
- use the methods to identify and prioritize research and extension themes;
- apply appropriate PRA tools to analyze problems at the different stages of the research process and
- train other staff in selected participatory rapid appraisal methods needed for working effectively with farmers.

#### **Organization of the Workshop**

Due to the participatory nature of the course, resource persons were recruited to offer the course simultaneously in both English and French. The participants were therefore divided into two groups such that each language group had two resource persons. The two anglophone resource persons came from IITA Training Program while two francophone resource persons came from INRAB (Institut National de la Recherche Agricole du Benin). The workshop was run in 2 stages:

1. Theoretical training to familiarize participants with the principles, concepts and tools of PRA.
2. Practical application of the method in the field.

For the theoretical training, the contents was based on the following program

- Key concepts and principles of PRA
- PRA versus other research methods
- Diagnostic survey techniques: questionnaires, informal/formal interviews
- Selected PRA tools for System analysis - Venn diagrams, resource maps, social maps, seasonal calendars, system diagrams, transect walks, historical profiles, time lines;
- Selected PRA tools for technology evaluation - matrix scoring, preference ranking, pairwise ranking, piecharts
- Communication and training skills: verbal, written, visual communication; demonstration techniques
- Applications of PRA: exploratory and thematic (general analysis of a specific problem or topic), project identification and prioritization (choice of technologies for testing), needs assessment, evaluation of results, research planning.

Practical training mode was based primarily on familiarization of participants with the use of the methods and the specific tools. Participants were thus able to use many tools by simulating the real situation in the field. This practical phase was organized in two stages:

- Preparation for field work in the village
- Execution of the work in the village.

- **Preparation for field work**

During the process of conducting the PRA training in the classroom and considering the objectives of the workshop, two types of PRA approaches were identified for work in the village.

- ◆ PRA for general diagnostics
- ◆ Thematic PRA on maize breeding.

Consequently, each group had to identify the themes for each type of PRA, the corresponding objectives and the appropriate tools to use in the field. Each group prepared a checklist (Table 1) of questions to be asked and a team contract to guide team members in their collective interaction with the farmers.

**Table 1. Checklist for diagnostic survey of Nkawkom village in Ghana**

	Themes	PRA Tools		Themes	PRA Tools		
1	Size	Physical	5	Inputs	Availability & use	S.S.I., D.O., K.I., T.L.	
		Census: Population			S.S.I., D.O., 2 <sup>0</sup> d	Types	S.S.I., D.O., K.I., 2 <sup>0</sup> d
		Demographic					
		Religion	S.S.I., D.O., P.C.	6	Crop disorders	<b>Stress</b>	
		Population structure	S.S.I., D.O., 2 <sup>0</sup> d			Biotic	D.O., K.I., 2 <sup>0</sup> d
		Occupations	S.S.I., 2 <sup>0</sup> d, D.O.		Abiotic	D.O., K.I., 2 <sup>0</sup> d	
	Migration	2 <sup>0</sup> d, K.I.S.S.I.		<b>Period</b>	D.O., K.I., 2 <sup>0</sup> d, S.S.I., T.L.		
2	Geographic	Climate	7	Crop Performance	<b>Distribution</b>	R.M., D.O., T.L., S.S.I.	
		Soil			2 <sup>0</sup> d, D.O., Resource map (R.M) Tr, S.S.I., K.I.	Yield history from different systems	K.I., D.O., S.S.I.
		Vegetation			R.M, D.O, K.I, S.S.I.		
3	Infrastructure	Markets	8	Storage & Processing	Structures	D.O., S.S.I., K.I.	
		Schools			S.S.I., D.O., K.I.	Methods	D.O., S.S.I., K.I.
		Health centres			S.S.I., D.O., K.I.	Crop products & diversification	D.O., S.S.I., K.I.
		Roads/water supply			S.S.I., D.O., K.I.	Livestock	D.O., S.S.I., K.I.
			8 1/2				
4	Cropping patterns & land use	Major crops & ranking	9	Socio-economic features	Marketing	D.O., S.S.I., K.I.	
		Land availability			K.I., D.O., S.S.I.	Labour	D.O., S.S.I., K.I.
		Farm Size			K.I., D.O., S.S.I.	Source, availability, cost	D.O., S.S.I., K.I.
		Fallow			K.I., D.O., T.L.		
		Irrigable land			S.S.I., K.I., D.O., 2 <sup>0</sup> d		
		Cropping system					
		Crop association			T.L., cropping calendar, Ven Diag; D.O. K.I. S.S.I.		
Cropping history	2 <sup>0</sup> d, K.I., S.S.I., P.C.						
Farm operations	S.S.I., K.I.						
Crop calendar	D.O.						
Spatial arrangement	D.O., S.S.I., K.I.						
					Foot notes:		
					Secondary data (2 <sup>0</sup> d), Key Information (K.I.), Direct observation (D.O.), Semi structured interview (S.S.I.), Pie Chart (P.C.), Transect (Tr), Time line (T.L), Resource Map (R.M).		

## **Execution of the field work**

The PRA field work was done in Nkawkom village situated 25 km from Kumasi. Maize is the predominant crop grown by farmers in this village (Fig. 1). Field visits to this village was in three phases, each phase representing a day as follows:

- 1<sup>st</sup> day        The teams visited the village for a general diagnostic survey of the area and to acquaint themselves with the situation on the ground.
- 2<sup>nd</sup> day        Thematic PRA on maize breeding and cultivar evaluation was carried out with the farmers participating and team members only facilitating.
- 3<sup>rd</sup> day        The whole of the third day was devoted to providing feedback to the farmers and obtaining verification of PRA findings from the farmers.

The findings of the field work in the village are the object of two reports prepared by the anglophone and francophone groups, respectively. These reports will eventually be used in the production of a training manual that can be used to conduct further farmer participatory researches in the region.

From the interaction with farmers, it was obvious that the use of PRA was pleasing to both the farmers and the extension staff of the area in that

- ◆ It was a significant departure from the traditional ways of doing things but yet it provided an in-depth understanding of the socio-economic circumstances of farmers in the village.
- ◆ The findings obtained by the farmers using the tools were very interesting and denoted good understanding and mastery of PRA in practice by both participants and villagers.
- ◆ The farmers and the District Extension Officer expressed their satisfaction with the training received particularly the richness and depth of information obtained through the methods.

It was also obvious that selecting and/or involving farmers in cultivar evaluation will enhance its adoption potential. For example, Obatanpa was the most commonly mentioned cultivar by both donors and researchers in Ghana but in this particular village, it was ranked third behind Abelehi and Mamaba. It was actually ranked in the same category as Asante, a local variety (Fig. 2). However, using another PRA tool to triangulate this finding revealed that it could be the second but definitely not the most preferred variety (Fig. 3).

## **Application of PRA for cultivar selection and on-farm research**

The different stages in cultivar selection and breeding were discussed. These included the breeding process itself, preliminary and advanced yield trials and finally, on-farm testing of selected cultivars. The major point for discussion in participatory breeding centered on the stages at which PRA can be adopted to aid breeding. After exhaustive brainstorming aided by the newly acquired knowledge of PRA by the participants, it was concluded that PRA has to be done in phases.

## Relative importance of crops at Nkawkon village

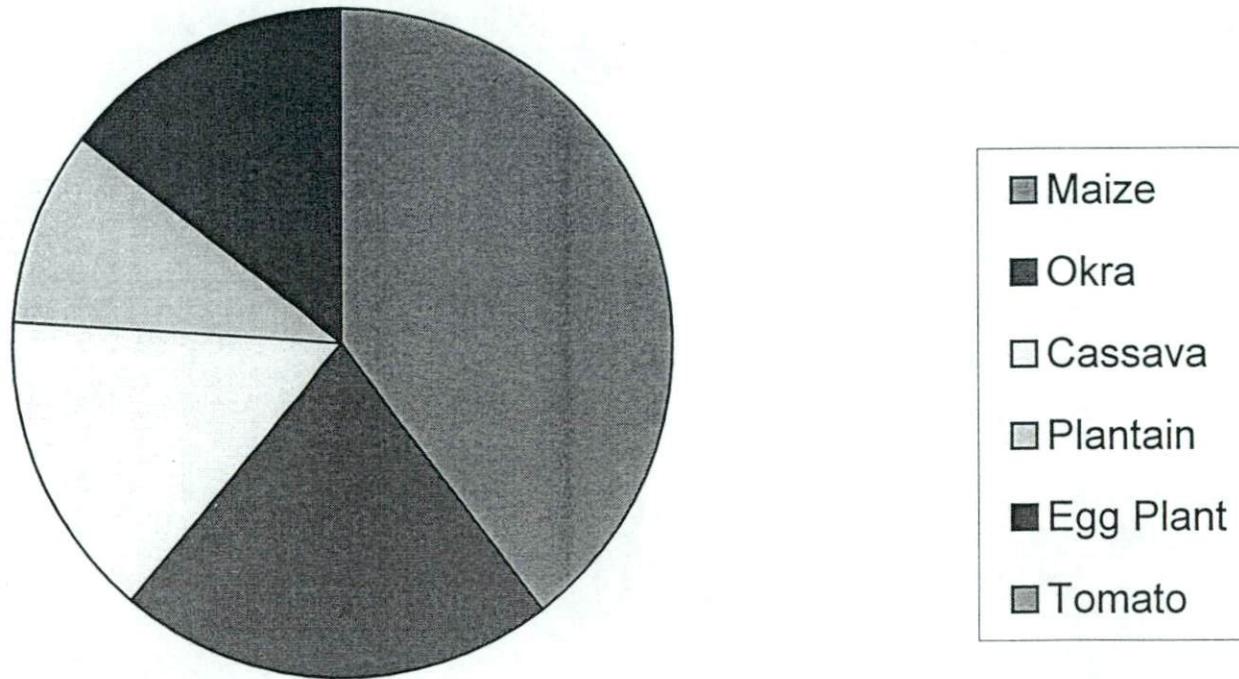


Fig 1

**Fig. 2 Matrix Ranking of Maize Varieties Grown in Nkawkom Village  
25 August 1998**

	ABELEHI	OBATAMPA	ASANTE	ANGWUNA	OKOMASA	MAMABA
<b>Drought Resistance</b>	• • • • •	• • • •	• •	• •	• • •	• • •
<b>Taste</b>	• • • •	• • •	• • • • •	• • • • •	• •	• • • •
<b>Yield</b>	• • • • •	• • •	• • •	• •	• • •	• •
<b>Appropriate Height</b>	• • • • •	• • •	•	•	• •	• • • •
<b>Storability</b>	• • •	• •	• • • • •	• • • • •	• •	• •
<b>Appropriate Maturity</b>	• • • • •	• •	•	•	• •	• • •
<b>Total</b>	27	17	17	16	14	18
<b>Rank</b>	1	3	3	5	6	2

**Fig 3:** Pairwise Ranking of Maize Varieties Grown in Nkawkom Village  
25 August 1998

	ABELEHI	OBATAMPA	ASANTE	ANGWUNA	OKOMASA	MAMABA
ABELEHI						
OBATANPA	ABELEHI					
ASANTE	ABELEHI	OBATAMPA				
ANGWUNA	ABELEHI	OBATAMPA	ASANTE			
OKOMASA	ABELEHI	OBATAMPA	OKOMASA	OKOMASA		
MAMABA	ABELEHI	OBATAMPA	MAMABA	MAMABA	OKOMASA	
Total	5	4	1	0	3	2
Rank	1	2	5	6	3	4

- Phase 1. PRA with farmer should be adopted at the beginning of the program to set national and specific breeding objectives.
- Phase 2. Farmers involvement would again be required at the Preliminary Yield Trial (PYT) stage to confirm that the set objectives have been achieved in breeding the varieties.
- Phase 3. The last involvement of farmers before the on-farm trials should be at the national performance trial stage where the relative performance of varieties across locations are assessed (G x E evaluation) to aid the development of varieties for different areas of a country.

For the role of PRA in on-farm evaluation of cultivars, a matrix matching stages of on-farm evaluations with different PRA tools was developed and used for the collective identification of appropriate tools to use at each stage (Table 2).

### **General comments on the workshop**

The Kumasi workshop on Farmer Participatory Methods for On-farm Testing and Evaluation of Varieties was quite successful. The participants showed by their output that they acquired good mastery in the use of PRA and that they will be able to train others in the use of PRA. They can also apply the knowledge and skills gained in their research activities especially with farmers.

### **Evaluation of the workshop**

The workshop was evaluated using a participatory evaluation tool. Participants developed the evaluation criteria and did evaluation of the workshop on a daily basis. Apart from the theoretical and practical aspects of the course, the logistic and administrative aspects were also evaluated. There was a final global evaluation of the workshop on the last day. The findings are graphically presented in the Fig. 4. The general appreciation of the workshop ranged from very good to excellent. Specifically, the academic aspects of the course both in terms of theory and practical and course delivery were rated from good to excellent. Local coordination and organization by the NRI officials had very poor to poor ratings as exemplified by ratings for accommodation, reception (welcome) and administrative organization. Feeding consistently had poor ratings until alternative arrangement was made at least for lunch by the IITA facilitators.

**Table 2. Matrix of the pertinent PRA tools for farmer participatory research**

<b>METHODS</b>	Semi-structured Interviews	Matrix Ranking	Pairwise Ranking	Resource maps	Social maps	Venn Diagram	System Diagram	Flow Diagram	Pie Chart	Transect	Seasonal Calenders	Historical Profile	Secondary data
<b>STAGES</b>													
Sites Selection	X			X	X					X	X	X	X
Exploratory Diagnostics	X												X
Thematic Diagnostics	X	X	X										
Planning of research activities	X												
Identification of farmers groups	X												
Experimentation	X												
Monitoring	X												
Evaluation	X	X	X										
Feedback	X												

#### **Appendix 4: Report on Maize Quality, Processing and Utilization Workshop 24 August - 4 September, 1998 IITA, Ibadan, Nigeria**

A WECAMAN/IITA training workshop on Maize Quality, Processing and Utilization was held at IITA, Ibadan, Nigeria from August 23 to September 4, 1998.

Thirteen participants from 11 countries attended the workshop. The participants were made up of food technologists, agronomists and plant pathologists from Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Ghana, Guinea, Mali, Nigeria, Togo, and Tchad. The resource persons came from the university of Ibadan (Nigeria), Cotonou (Benin), Montpellier (France) and IITA (Nigeria).

After the opening ceremony, each participant was given the opportunity to present the status of maize research and development in his/her country.

The workshop was divided into two major sessions each lasting about a week. During the first week, discussions were on the transformation and utilization of maize at the rural and industrial levels. The practical part involved the preparation of various snacks and food with 100% maize by the participants.

Data collection for socio-economic analysis was of major importance. The participants learnt how to collect and use these data to promote new product at the local and international market. Four proposals were initiated and submitted to Dr Maziya-Dixon, the coordinator of the course.

During the second week the participants were instructed on different toxigenic fungi that infect maize grains. *Aspergillus* sp and *Fusarium* were the most prevalent. Toxins produced by these pathogens constitute a health hazard for animals and human beings. From the samples collected from Ibadan market, the participants learnt several techniques: sorting, incubation, and identification of pathogen, qualitative and quantitative analysis of aflatoxins.

#### **Recommendations**

The time allocated was too short for the two different topics. The participants suggested that in future courses should be organized separately for such two different themes so as to afford adequate time for each topic.

Participants also pointed out that WECAMAN activities were not known in member countries because the country representatives were sometimes selfish. They suggested that WECAMAN should develop a more appropriate communication strategy with all NARS scientists. The participants appreciated the work done by Dr Maziya-Dixon, Dr Badu-Apraku, Dr Cardwell and Mr Osinubi to facilitate their stay at IITA, but they also felt that WECAMAN should have freedom to decide on the stipend, and the venue

for the meetings. They believed that the per diem and transportation within Nigeria and abroad was not good enough.

The participants also noted with satisfaction that this was the first time, scientists, other that breeders and agronomists were meeting under the umbrella of WECAMAN. They appreciated this new development and hoped for the better in the near future.

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