

№ 0095

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Organisation de l'Unité Africaine

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SEMI-ARID FOOD GRAIN RESEARCH AND DEVELOPMENT (SAFGRAD)

FIRST OAU/STPC WORKSHOP ON SORGHUM AND MILLET

26 FEBRUARY - 1 MARCH 1980

MOMBASA, KENYA

REPORT AND RECOMMENDATIONS

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J. Osogo, Minister of Agriculture
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19. Report and Recommendations.

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A G E N D A

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1st Day, February 27, 1980

- | | |
|-------------------|---|
| 8.00 - 9.00 am | Registration |
| 9.00 - 10.30 am | Inauguration: Opening Address by His Excellency the Minister of Agriculture |
| | Address of the Executive Secretary of OAU/STRC |
| 10.30 - 11.00 am | Coffee Break |
| <u>SESSION I</u> | Chairman: Mr Akadiri-Soumaila, International Coordinator of OAU/STRC |
| | Rapporteur: Mrs Aminata N'DOYE |
| 11.00 - 11.30 | SAFGRAD Project - Introduction |
| | <u>COUNTRY REPORTS</u> |
| 11.30 - 11.45 | BENIN |
| 11.45 - 12.00 | BOTSWANA |
| 12.00 - 12.30 | Discussion |
| 12.30 - 15.00 | Lunch Break |
| <u>SESSION II</u> | Chairman: Dr Brhane Gebrikan |
| | Rapporteur: Mr Albert Cox |
| 15.00 - 15.15 | CAMEROON |
| 15.15 - 15.30 | CAPE VERDE |
| 15.30 - 15.45 | CENTRAL AFRICAN REPUBLIC |
| 15.45 - 16.00 | IVORY COAST |
| 16.00 - 16.15 | ETHIOPIA |
| 16.15 - 16.30 | GAMBIA |
| 16.30 - 16.45 | GHANA |

.../...

16.45 - 17.00	GUINEA
17.00 - 17.15	Coffee Break
17.15 - 17.30	GUINEA BISSAU
17.30 - 18.00	Discussion

2nd Day, February 28, 1980

SESSION III

Chairman : Dr Rutto

Rapporteur: Mr Louis Akpo

8.00 - 8.15	UPPER VOLTA
8.15 - 8.30	KENYA
8.30 - 8.45	MALI
8.45 - 9.00	MAURITANIA
9.00 - 9.15	NIGER
9.15 - 9.30	NIGERIA
9.30 - 9.45	SENEGAL
9.45 - 10.00	SIERRA LEONE
10.00 - 10.30	Coffee Break
10.30 - 10.45	SOMALIA
10.45 - 11.00	SUDAN
11.00 - 11.15	CHAD
11.15 - 12.15	Discussion
12.15 - 15.00	Lunch Break

SESSION IV

Chairman: Dr J.C. Davies

Rapporteur: Mr M. Boling

15.00 - 15.15	TANZANIA
15.15 - 15.30	TOGO
15.30 - 15.45	ZAMBIA

15.45 - 16.45	ICRISAT Activities in Africa
16.45 - 17.00	Coffee Break
17.00 - 17.30	Discussion

3rd Day, February 28, 1980

SESSION V

↓

8.00 - 8.30

Chairman: Dr House

Rapporteur: Mr Kéré

Study of Regional Varietal Trials
(Ethiopia - ICRISAT)

8.30 - 8.45

Discussion

8.45 - 9.15

Setting up of Working Groups
(in depth study of problems, elaboration
of programmes 1980-1982, special
trials, recommendations)

Group A

Chairman: Dr GEBRIKEDAN

Varietal Improvement of Sorghum

Group B

Chairman: Mr L.M' Ragwa

Varietal Improvement of Millet

Group C

Chairman: Mr L. Nazhani

Agronomy

9.15 - 12.30

Working Session of Groups

12.30 - 15.00

Lunch Break

SESSION VI

15.00 - 18.00

Continuation of discussion and
preparation of Group Reports

4th Day 29 February 1980

SESSION VII

Chairman: Mr C. Charreau

Rapporteur: Mr Marcel Galiba

8.00

Presentation of Group Reports

.../...

8.00 - 9.00	<u>GROUP A</u>	Chairman: Dr Gebrikedan Varietal Improvement of Sorghum
9.00 - 9.45		Discussion
9.45 -10.00		Coffee Break
10.00 -11.00	<u>GROUP B</u>	Chairman: Mr Neino Jika Varietal Improvement of Millet
11.00 -11.30		Discussion
11.30 -12.30	<u>GROUP C</u>	Chairman: Mr L. Nazhani Agronomy
12.30 -15.00		Lunch Break
<u>SESSION VIII</u>		Chairman: Mr H. M. Saadan Rapporteur: Mr Sidibe Ousseini
15.00 -15.30		(Continuation Group C) Discussion
15.30 -16.00		ICRISAT's Participation in the Research and Development of Sorghum and Millet
16.00 -16.15		Coffee Break
16.15 -16.45		Discussion
16.45 -17.00		Setting up of Drafting Committee
17.00 -18.00		Consolidated view of the activity of the Working Groups

5th Day 1 March 1980

SESSION IX

8.00 -10.00	Chairman: Dr Rutto Plenary Session
10.00 -10.15	Coffee Break
10.15 -10.30	Closing Ceremony

L I S T O F P A R T I C I P A N T S

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SPEECH DELIVERED BY HIS EXCELLENCY J. OSOGO.
MINISTER OF AGRICULTURE OF THE REPUBLIC OF KENYA

Ladies and Gentlemen,

It gives me great pleasure to be here today to officiate at the formal opening of the First OAU Workshop on Sorghum and Millets. It is similarly gratifying to be here and associate myself with distinguished scientists from all over the continent of Africa and elsewhere. I extend to you all formal welcome to Kenya and especially to this warmer part of my country.

The place of Sorghum and Millets in the Continent of Africa, and indeed throughout the arid and semi-arid lands in the Tropics need not be overemphasized. In Africa alone, these two food items have determined the well being of mankind since time immemorial. Sorghum and Millets alone dominated cereal agriculture in this continent for several millenia. In spite of the recent intervention of cereals such as maize, wheat, oats, etc., a significant majority of our peoples still derive livelihood from sorghum and millets.

It is therefore very gratifying that the Organization of African Unity should place top priority on sorghum and millets on its agenda for feeding its peoples. I am aware of the resolutions of the 27th Ordinary Session in Mauritius in June 1976 which called for a timely assessment of the place of sorghum and millets among other crops, in the nutrition status of the peoples of this Continent.

Today's gathering, here in Mombasa, is a rapid follow up of that

resolution. The 25 OAU Member States represented, of which Kenya is one, will have at the end of this Workshop, correctly defined the role and status of Sorghums and Millets in Africa.

In your deliberations, I throw to you, and myself, the challenge that, whereas ^{an} American farmer produces his food for himself and some 29 other people an African farmer simply produces enough for himself and 1.5 other people. This is where the Workshop should develop suitable technologies, through Scientific research and extension methods in crop production to quickly raise this absurd production proportion.

I know we can do this. Combined efforts in a Continental perspective will quickly re-examine the plant breeding tools to arrive at high yielding plant material that is equally adapted to these arid and semi-arid horizons within the Continent. Plant pathologists will similarly team up with breeders and geneticists to come up with plant material that is both high yielding and disease resistant. Other scientists will go to the milling process and examine the best way possible sorghum and millets should be processed for increased palatability for human consumption. All these items will form a package of abundant and better food for our peoples.

In realizing this fundamental objective we should also remind ourselves of the fact that in so doing we are faced with two opposing forces: the scientific power of food production and the biologic power of human reproduction.

Kenya's current plan for development has placed priority on the development of its arid and semi-arid lands which form some 80% of its land surface. Its plan for agriculture places top priority on the development of these marginal lands through ranching and

crop production activities. In 1977 the sorghum and millets project was launched. The first phase of the project aimed at using high altitude sorghums and millets for forage. The latter and current phase is re-examining sorghums and millets as human food in the marginal lowlands. I hope that our scientists attending this workshop will have time to throw more light in these phases of sorghum and millets research programmes I have just referred to.

The first workshop, I believe, will provide a forum for exchanging ideas, views and expertise on sorghum and millets. It will also examine the past and future trend in both research and usage of the crops. It will also bring together new channels of scientific communication among the member states and a beginning to a lasting solution in improving sorghums and millets for the betterment of our people in the Continent.

We cannot be alone in this task. I acknowledge collaborative efforts mounted by local and international institutions in this research for better foods. I recognize with honour the roles played by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) for their excellence in handling sorghums and millets for the entire Tropical World; the International Centre of Insect Physiology and Ecology (ICIPE), here in Kenya, for their close attention to the pests of sorghum, especially the sorghum shoot fly; the International Institute of Tropical Agriculture (IITA); the French Agricultural Research Institute, the Purdue University in the United States, and many others.

.../...

I also acknowledge the roles played by friends, parties, missions and Governments, within and outside Africa that are lending us both finance and expertise.

With these remarks I again extend to you a warm welcome to Kenya and Mombasa, and have the honour to declare the First OAU Sorghum and Millets Workshop here in Mombasa, officially open.

ADDRESS DELIVERED BY THE EXECUTIVE SECRETARY

OF OAU/STRC MR. A.O. ODELOLA

Honourable Minister,
Distinguished Invitees,
Distinguished Delegates,
Ladies and Gentlemen,

I bring you the sincere best wishes of the Secretary General of the OAU, H.E. Mr. Edem Kodjo. As you are all aware, Africa is at present on the boil politically - he is therefore fully committed to other urgent problems of the moment.

Mr. Minister, the OAU General Secretariat is proud to commend once again, SAFGRAD JP 31 to several Member States. This is particularly so because of the nagging problem of shortage of food in the third world, and in particular, in Africa. By means of this project the Heads of State of Africa have agreed since 1976 that joint and cooperative research efforts should be undertaken by agronomists of various disciplines in Africa at the national, regional and international level with a view to increasing the productivity of our agriculture. In this particular instance, the intention is to increase the productivity of grains viz maize, millet, sorghum, cowpeas, groundnuts and other grain legumes. To this end, it was agreed that african research workers with active cooperation of International Research Institutes and the financial and technical friendly donor agencies should aggressively pursue the cereal research priorities as follows:-

1. Breeding for disease and insect resistance.
2. Breeding for improved yield, nutritional consideration and season adaptability.
3. Breeding for resistance to environmental stress, especially drought.
4. Cropping system research including inter-cropping, rotations, minimum cost packages.
5. Social and agro-economic research to provide data on constraints of farming systems with a view to improving them.
6. Research on small scale farm implements and use of animal traction.
7. Maintenance of soil fertility for long-term sustained yield including research on bush-burning.
8. Research on soil water management and irrigation agronomy for small scale farming including erosion control and water conservation.
9. Ecological studies directed towards quantifying crop/environment, inter-action and greater utilization of different natural resources.
10. Germ-plasm collection.
11. Plant protection research to include insects, rodents, and birds as well as storage pests.

Mr. Minister, the General Secretariat of the OAU is extremely satisfied with the modest progress made in these various aspects of the research work in the past couple of years as you can see from the second edition of the OAU JP 31 SAFGRAD Newsletter now in

circulation. Nonetheless there is no room for complacency in development activity in Africa. We have just started the activity on research and development of grains required by the teeming population in Africa. We are yet to provide for sufficient storage facilities first at the level of the small farmers then by the cooperative efforts within each Member State and at national level in every OAU State. The most insecure type of existence to which man can subject himself is a situation whereby there is no stock of food for a rainy day. We shall therefore ensure through SAFGRAD JP 31 that productivity of our grains reaches such a pleasurable measure that storage would be done without tears by the small farmer, at the district level and at the national level whenever there is bumper harvest.

Mr. Minister, may I now return to the purpose of the meeting of today, namely, the workshop on sorghum and millet which is a follow-up of the maize and cowpeas workshop organized by the Coordination Unit of the OAU JP 31 SAFGRAD in Ouagadougou earlier this month.

Reading the first two newsletters issued so far one is compelled to express the profound thanks of AFRICA to the various donor agencies particularly the USAID, FAC and others who promise us support before long for the research and development of these grains. Similarly the General Secretariat of the OAU is highly appreciative of the active role of the international research institutes like ICRISAT, IITA, IRAF, PURDUE Institute of Agriculture,

ABU Institute of Agriculture, BAMBEY National Institute of Agricultural Research and KAMBOINSE Research Station for their cooperation and exceptional devotion to the objectives of the project. These Institutions have operated in contractual status to the OAU to ensure that the research work is done in a cooperative and concerted manner.

I should also like to remind all member states of the OAU that the training content of this project offers great opportunity for young agronomists both at the middle and post graduate levels. The International Coordinator, Mr. K.O. AKADERI-SOUMAILA with the active co-operation of Mr. McSWAIN of the USAID will gladly discuss the ways and means of securing these training facilities for our youths with any delegate at any time. Similarly I sincerely hope that every Member State will designate an A.C.P.O. who will liaise with the OAU International Coordinator in our activities.

In conclusion, I thank his Excellency President ARAP MOI, the President of the Republic of Kenya, the Government and People of Kenya for the excellent facilities placed at our disposal for this important technical meeting. I understand that the International Coordinator with the assistance of his other colleagues have divided the business of the meeting into scientific sessions to facilitate the reaching of conclusions which will be applicable in every OAU States co-operating in this research.

I hope that the conclusions of this meeting as well as the meeting held earlier this month in Ouagadougou, will assist in

accelerating the tempo of research and development of grains in Africa.

I thank you.

REPORT AND RECOMMENDATIONS

1. INAUGURAL SESSION

The First OAU/STRC Workshop on Sorghum and Millet organized under the Joint Project 31 SAFGRAD was held at the Oceanic Hotel, Mombasa, Kenya, from 26 February to 1 March 1980.

The meeting was chaired by His Excellency J. Osogo, Minister of Agriculture. In his opening address, the Minister warmly welcomed the participants and emphasized the importance of sorghum and millet in the African diet. He urged participating scientists to develop suitable technologies to quickly raise the absurd proportion in Africa's agricultural production.

After the Minister's speech, Mr. A.O. Odelola, Executive Secretary of OAU/STRC extended to the delegates the sincere greetings and best wishes of OAU's Secretary-General, His Excellency Edem Kodjo. He explained that the Secretary-General could not personally attend the meeting because of other political commitments.

Speaking on behalf of OAU's General Secretariat, the Executive Secretary expressed satisfaction at the progress made by the SAFGRAD Project during the two years of its inception. He emphasized the importance of post-harvest operations (storage and storage protection) among farmers and subsequently at national and regional levels.

2. PARTICIPATION

Representatives from 13 Member States of OAU and 9 International Organizations attended the Workshop. A full list of participants is

attached to this report.

3. SECRETARIAT

The Secretariat comprised Mr. A.O. Odelola, Executive Secretary of OAU/STRC (Chairman) ; Mr. Akadiri-Soumaila, International Coordinator of OAU/STRC (Rapporteur) and Drs. C. Charreau and J. Davies of ICRISAT (Members).

4. PROCEEDINGS

a) At the opening session, participants adopted the Workshop programme as presented. However, the considerable number of Member States absent made it necessary to slightly modify Session III: Wednesday morning 27 February. The representative from the Institute of Sahel therefore presented his paper on the Institute's activities that morning.

b) COUNTRY AND INTERNATIONAL ORGANIZATION REPORTS

Delegates reported on the present state of agricultural research on Sorghum and Millet in their various countries. Lively and fruitful discussions ensued the presentation of each paper. Recommendations drawn up on the basis of these papers follow this report.

c) The representative from the Institute of Sahel briefly outlined the background of the Sahelian Project for Millet, Sorghum and Cowpea Improvement. There are two phases to this project. The first one is entitled "Consolidation of the National Research Structures of Member States of CILSS" and the second "Applied Research". It was apparent from the discussions that duplication of efforts between CILSS and

SAFGRAD could be avoided. A closer collaboration would however be necessary in fulfilling their duties towards the 8 States belonging to both SAFGRAD and CILSS.

The eminent researchers from ICRISAT gave a clear and concise outline of their activities in Africa and their desire to support national, regional and other programmes. In the opinion of Dr. Charreau, ICRISAT Coordinator for West Africa, it was necessary to consolidate operations and that in spite of how the countries concerned were regrouped, ICRISAT wished to participate in their development.

Three Working Groups (A, B, C) were set up to look into Varietal Improvement of Sorghum, Varietal Improvement of Millet and Sorghum/Millet Agronomy respectively. Members of the three groups were:

GROUP - A - VARIETAL IMPROVEMENT OF SORGHUM
 =====

CHAIRMAN	:	B. GEBRIKEDAN
MEMBERS	:	L. AKPO
	:	A. Z. BARBOSA-AKALA
	:	M. BOLING
	:	J. CHANTEREAU
	:	M. DABI
	:	S. DIATTA
	:	M. FOBASSO
	:	S. M. FUNNAH
	:	L. R. HOUSE
	:	R. G. KERMALI
	:	I. M. KONATE
	:	L. K. MUGHOGHO
	:	C. M. PATTANAYAK
	:	K. V. RAMAIAH
	:	B. S. RANA
	:	J. F. SCHEURING

.../...

GROUP - B - VARIETAL IMPROVEMENT OF MILLET

=====

- CHAIRMAN : M. L. R. MRAGWA
- MEMBERS : M. CABELL OWEN GWATHMEY
- M. A. V. DAVID KERE
- Dr. PETER LAWRENCE
- Mrs. AMINATA N'DOYE
- Dr. S. O. OKINOR
- Dr. B. B. SINGH
- Dr. N. V. SUNDARAM
- Dr. R. J. WILLIAMS

GROUP - C - AGRONOMY

=====

- CHAIRMAN : M. MAZHANI
- MEMBERS : Dr. C. CHARREAU
- Dr. P. CHRISTENSEN
- A. COX
- D. RACHELER
- J. K. RUTTO
- O. SIDIBE

A Special Drafting Committee Comprising

=====

- CHAIRMAN : Mr. AKADIRI-SOUMAILA
- RAPPOORTEUR : Dr. C. CHARREAU
- Dr. DAVIES
- Mrs. AMINATA N'DOYE
- MEMBERS : Dr. BRAHANE
- Dr. M'RAGWA
- Mr. NAZHANI
- Dr. RANA
- Mr. SIDIBE

recast the reports of the Working Groups and presented them as recommendations adopted by the first OAU/STRC Workshop on Sorghum and Millet.

The second Workshop on Sorghum and Millet will be held in Gaborone, Botswana in 1981.

RECOMMENDATIONS

Vote of thanks to the Host Government

The OAU/STRC JP 31 SAFGRAD First Sorghum and Millet Workshop wishes to express its sincere thanks to the Government of Kenya, the Department of Agriculture, and to the people of Kenya for the excellent facilities provided for the meeting at Mombasa, and for the hospitality and friendliness shown to delegates.

Vote of thanks to the Donor Agencies

The workshop also wishes to express its gratitude to the Donor Agencies which have supported the SAFGRAD Project, especially the United States Agency for International Development for their strong financial and technical support.

1. Annual Workshop

The workshop proved very effective in bringing together active sorghum and millet scientists concerned with research and production in Africa and enabled them to formulate detailed plans for future cooperative research. It was therefore recommended that:

- the workshop should be an annual event for the next five years so that the interest generated can be sustained and progress evaluated ;
- that SAFGRAD should make the necessary funding available for this and should choose a venue for the next workshop in 1981.

.../...

2. Strengthening National Programs and Training

The workshop drew particular attention to the need to strengthen national programs by all appropriate means, especially through increased training in the various disciplines in sorghum and millet improvement and commended the scholarships opportunities provided by SAFGRAD. It recommended:

- that governments identify and propose suitable candidates for training as a matter of priority;
- that SAFGRAD make provision for visits by specialist scientists to national programs to assist with research and training in sorghum and millet improvement, on request.

3. Collaboration With Other Organizations

The workshop noted the activities and programs of the different national, regional (such as C.I.L.S.S. and SAFGRAD) and International Organizations (such as ICRISAT) working in Africa on sorghum and millet improvement, and recommended;

- that agreed research programs be mutually supportive and complementary.

4. Birds

Birds, particularly Quelea, were recognized as a serious menace to increased sorghum and millet production in Africa. Noting the difficulties of breeding plant cultivars resistant to migratory birds, the workshop recommended:

- that Governments study means to implement Panafrican Programs of Quelea control and supplement existing programs such as the Common Organization for Insect and Bird Control, (O.C.L.A.L.A.V.).

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5.. Sorghum Specific Recommendations

It was recommended:

- that a regional sorghum trial program should be initiated in the 1980/81 season:
- that two trials should be instituted:
 - i) the first would include early maturing (80-100 days) lowland (1,500 m.) cultivars for the 500-600 mm rainfall zone where soils are deep, and on the ~~same~~ rain fall zones where soils are shallow;
 - ii) the second trial would consist of later maturity (100-120 days) cultivars, for the 600-800 mm rainfall zone.

Fifteen countries and ICRISAT agreed to conduct one or both of the proposed trials, and since there are countries with suitable entries for inclusion it was recommended:

- that for each cultivar entered five kg of seed should be provided by each country ;
- that this should be forwarded as soon as possible to:
International Coordinator, OAU/STRC JP 31 SAFGRAD Coordination Office, B.P. 1783, Ouagadougou, Upper Volta, together with the necessary phytosanitary certificates;
- that cooperators forwarding seed should also provide details of pedigree and agronomic and physiological traits of entries in their countries of origin;
- that Dr. C.M. Pattanayak should prepare the seeds, planting plans, data books and trial instructions for the May 1980 sowings.

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6. Special Trials

The Workshop further recommends:

- that special trials e.g. Striga, disease and insect pest, etc continue to be furnished, as in the past, by ICRISAT to country cooperators requesting them. It was recognized that to maximise benefit from these trials they should be grown in previously identified "hot spot" situations.

7. Priorities

The workshop identified the following areas as priorities for research in sorghum and recommended:

- that breeding efforts should be intensified to correct the major weaknesses of traditional cultivars, which are usually late maturing, tall and low yielding;
- that moisture stress be given highest priority in varietal development since it is a major constraint to yield increase;
- that increased effort be concentrated on striga, insect pests and diseases in breeding cultivars with resistance to these yield reducers;
- that a fully integrated multidisciplinary approach be adopted to strengthen sorghum improvement programs in Africa.

8. Regional Coordinator for sorghum

Noting the current imbalance in the location of staff in the SAFGRAD program, the Workshop recommended:

- that steps be taken to create a post for a Regional Coordinator for sorghum improvement in Eastern Africa, to facilitate

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the growth of research in this region and to assist in full coordination of the proposed regional trials in the area of SAFGRAF's concern.

9. Specific Recommendations on Millet Improvement

After discussing the main agricultural development problems in countries represented at the meeting the Workshop recommended;

- that every member country be given the possibility to choose material that can solve its immediate problems. The 1st workshop considered that materials with a wide range of genetic variability were the only guarantee of progress in plant improvement and environmental security and recommended:
- that national research should have access to existing gene banks and that collecting missions be undertaken in the non prospected areas to give special attention to African cultivars.

In order to particularly fulfil millet cultivation intensification objectives of Member States, the Workshop recognized the importance of the following criteria in the choice of material to be integrated into the regional trials:

- productivity
- tillering capacity
- height (average to tall)
- parasite (mildew, ergot, smut, striga), drought and lodging resistance.

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Three main rainfall zones were defined on the basis of the ecological diversity of the continent:

Zone 1 : less than 500 mm for varieties taking less than 50 days to flower.

Zone 2 : 500 to 800 for varieties taking less than 50 days to flower.

Zone 3 : 800 to 1200 mm, the type of material for this zone was not discussed.

This classification may be modified following the date on which the rains begin.

It was recommended:

- that only synthetic varieties and composites that have been pre-tested for at least two consecutive years in national programs and have performed well should be included in the regional trials;
- that hybrid varieties be provisionally excluded in the regional trials because of difficulties in the seed distribution network for farmers;
- that although pearl millet is the major millet species of concern in JP 31 SAFGRAD member countries, Setaria italica and eleusine coracana are important in some countries. It may therefore be necessary to conduct regional trials on these species.

The need for a coordinator to specifically organize the regional millet trials in collaboration with researchers from national programs was recognized. The Coordinator will have responsibility to:

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- make an inventory of all varieties available in Member States;
- plan seed multiplication , preparation and distribution;
- prepare data recording and scoring systems;
- analyse results to facilitate rapid decisions.

10. Beginning of Millet Trials

It was recommended:

- that regional millet trials should not be started before 1981 because of:
 - i) the absence of a coordinator; and the
 - ii) relatively short time to gather material for 1980;
- that a meeting of millet researchers to prepare the 1981 trials be held in November 1980;
- that all the necessary means - material and equipment- be put at the disposal of host countries in the execution of the trials;
- that special importance be attached to the training of national since it is the only means of ensuring the perennality of activities undertaken under OAU/STRC's JP 31 SAFGRAD.

11. Sorghum and Millet Agronomy

It was recommended:

- that results from agronomic trials being always site-specific, a regional network of simple trials could usefully contribute to millet and sorghum research in Africa. The objective of this regional trials would not be to arrive at specific agronomic recommendations for the different countries, but rather to demonstrate and attract attention to difference and variety responses between local and improved types as a result of agronomic management factors.

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12. Proposed Trials

It was recommended:

- that all the trials proposed:

i) compare two contrasted types of varieties:

- one local tall and photosensitive

- one improved short statured and non-photo-sensitive.

ii) be suitable both for on-station and on-farm testing
(using fewer replications in the latter case);

iii) be modified by cooperators where necessary to meet
conditions in various ecological zones.

13. Plant Density Trial (RAT 1 and 2)

It was recommended:

- that two trials be conducted on crop management:

(a) varieties x plant density interaction (RAT-1) this trial
would combine two varieties: one local (tall, photosensitive)
and one improved (short, non-photosensitive) with two
densities (low and high).

(b) variety x date of planting interaction (IRAT-2) this trial
would combine two varieties (as above) with three dates of
planting.

14. Soil Type Trials (RAT-3)

It was recommended:

- that one type of trial look into the interactions:
varieties x fertilization x soil types (RAT-3).

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- This trial would combine: two varieties (same as above) with two levels of fertilization (none and an addition of NP fertilizers corresponding to what can be used by farmers);
- that in order to study the interactions with different soil types, several replications of this trial be set up on two or more sites along the toposequence or two distinctly different soil types in the same location;
 - that detailed information on soil types and climatic data at sites should be collected and made available to SAFGRAD.

15. Studies on Other Agronomic Aspects

It was recommended:

- that other agronomic aspects related to sorghum and millet cultivation, such as the use and efficiency of rock phosphate, the comparison of different techniques for weeding control and land preparation, intercropping and rotations be discussed in the future SAFGRAD meeting on farming systems, as most of these problems have to be studied in long term experiments.

16. Coordination of Trials

The above proposed regional trials could only be implemented effectively if a well qualified, full-time coordinator were available to organize, to visit, to collect and interpret data and to report to the various national programs. Because of considerable heterogeneity in ecological conditions in Africa it was recommended:

- that the SAFGRAD agronomic activities be divided into regional sub-units to facilitate the interpretation and coordination of regional trial results.

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17. Recommendations on Agronomic Trials

Results from agronomic trials being always site-specific, it was recommended:

- that in setting up regional trials this should be recognized and trials should be modified by cooperators if the environmental conditions so required;
- that it cannot be the aim of the regional program to arrive at specific agronomic recommendations for different countries based on these trials;
- that the objective is rather to demonstrate and to attract attention to differences in variety responses between local (generally tall, photosensitive materials) and improved varieties (short, non photosensitive materials) as a result of agronomic management factors e.g. plant density planting date fertilizer and soil type.
- that for ease of handling the proposed trials should be small and combine generally only two factors. As such the trials would be suitable both for on-station and on-farm testing (using fewer replication in the latter case).

18. Division of SAFGRAD's Agronomic Activities

The workshop recognized a great deal of heterogeneity in ecological conditions in Africa and recommended:

- that the agronomic activities of SAFGRAD be divided into regional sub-units to facilitate interpretation and coordination of regional trial results.

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19. Agronomic Problems Considered

The workshop agreed that the discipline of agronomy best be discussed under five subject areas, namely:

- 1) Crop Management
- 2) Fertilization
- 3) Soil x Variety Interaction
- 4) Land Preparation
- 5) Cropping Systems

With reference to each individual subject the following points were made:

- 1) Crop Management (under three sub-headings)
 - a) spacing
 - b) planting date
 - c) cultivation (weeding)

It was recommended:

- that trials on cultivation should be considered by SAFGRAD Farming Systems Workshop in January 1981;
- that the spacing and date of planting trials should be undertaken by the sorghum and millets cooperators and a Regional Agronomy Trial - I (RAT - I) - dealing with the variety x plant density interaction as well as a regional Agronomy Trial - II (RAT-II) on the variety x date of planting interaction be made.

2) Fertilization and Soil Types

The workshop recommended:

- that the fertilization x soil type x variety interaction be treated in one trial (Regional Agronomy Trial III RAT - III)

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and the choice of soil type be left to the discretion of the cooperator;

- that to the extent possible, the cooperator should choose two or more sites along a toposequence or two distinctly different soil types in the same location;
- that details information on soil types and climatic data at sites should be collected by the cooperator and made available to SAFGRAD.

3. Land Preparation and Cropping Systems

The workshop discussed the desirability of trials on cropping systems, land preparation and use of rock phosphate and since these trials would involve long term management aspects it was recommended that they be considered again by the Farming Systems Workshop scheduled for January 1981.

20. Description of proposed "Regional Agronomy Trials"

1. Variety x plant density interaction (RAT-1)

Crop: Sorghum and/or millet

Varieties: a) Local, tall photosensitive

b) Improved, short non-photosensitive

Densities: low density (20,000 pl/ha for millet or 30,000 pl/ha for sorghum)

high density (120,000 pl/ha for both crops)

It was recommended:

- that each of the varieties be planted at its optimum planting date that is : early for the local photosensitive material and somewhat later for the non-photosensitive material. Four replications were recommended.

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2) Variety x date of planting interaction
(RAT - II)

Crop : Sorghum and/or millet

Varieties: same varieties as above

Date of planting - a early (first or second rain of season

- b 10 to 15 days later

- c 25 to 30 days later than a)

The actual planting dates will always depend on local conditions e.g. frequency of early rains and must be decided upon by the cooperator. It was recommended:

- that a slip plot design be used with varieties as main plots and a large plot size to overcome border-effects (from tall on short varieties). Four replications were recommended.

3) Variety x fertilizer x soil-type interaction
(RAT - III)

Crop: preferably millet and sorghum

Varieties: for both crops : -local, tall photosensitive

Fertilizers: none

: NP (40 kg N/ha and 30 kg P₂O₅/ha)

Soils : drought sensitive soil (e.g. shallow or sand of Upper Volta slopes)

soils with good moisture availability (e.g. deep loamy soils often on lower slopes).

It was recommended:

- that fertilizer should be applied before planting;
- that the type of fertilizer should depend on local

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availability;

- that levels of fertilizer should be chosen to provide a clear contrast with the check plots while staying relatively close to farmers conditions;
- that half nitrogen may be applied as side dressing three weeks after planting;
- that the experimental design should basically be a split-plot with soil type as main plot;
- that minimum of three replications (on each soil type) should be made to evaluate the interactions with soil type.

21. The Workshop Recommended:

- 1) That where necessary the trials should be modified by cooperators to meet conditions in various ecological zones.
- 2) That during the first year only locally tested (adapted) varieties should be included; at a later stage promising improved varieties identified in SAFGRAD sorghum and millet trials could be included to be tested against the local material.
- 3) That the above proposed regional trials could only be implemented effectively if a well qualified, full time coordinator were available to organize, to visit and to report to the various national programs.

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SEMI-RRID FOOD GRAIN RESEARCH AND DEVELOPMENT (SAFGRAD) FIRST OAU/STRC WORKSHOP ON SORGHUM AND MILLET

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