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Recherche et Developpement des Cultures Vivrieres dans les Zones Semi-Arides



M I S S I O N R E P O R T

THE EASTERN AFRICA SORGHUM AND MILLET  
COLLABORATIVE RESEARCH NETWORK

24 June - 05 July 1990

NAIROBI, KENYA

By

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## MISSION REPORT

### THE EASTERN AFRICA SORGHUM AND MILLET COLLABORATIVE RESEARCH NETWORK

24 June - 05 July, 1990  
Nairobi, Kenya

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Taye Bezuneh, Director of Research  
OAU/STRC - SAFGRAD, Ouagadougou, Burkina Faso

#### I. THE SEVENTH REGIONAL WORKSHOP OF EARSAM

June 24, 1990

Arrived in Nairobi and was received and briefed by the Network Coordinator on workshop arrangements.

June 25, 1990

Attended the inaugural activities and field tour at Kiboko Station. This sub-station was developed jointly with Kenyan Agricultural Research Institute (KARI) and ICRISAT to serve as dryland station. There were about 150 guests representing farmers from the region, KARI researchers, other government officials representatives from ICRISAT/SADDC programme, SAFGRAD etc. The Directors of KARI, OAU/IBAR; the Director General of ICRISAT, representatives of Science and Technology and SAFGRAD's Director of Research made remarks of their research cooperative efforts in Kenya.

June 26, 1990

During the morning session, ten papers were presented. Four of the papers were on millets research and production in the region. Sorghum is grown in rainfed areas of Kenya on about 200,000 ha. Recent government policy supports research and development on dryland crops including sorghum and millet to be cultivated in semi-arid regions which constitute 75% of the land area in Kenya. The network collaborative research projects to screen sorghum genotypes for drought and Striga were reported by participants from Sudan and Ethiopia. Some suitable varieties were identified. Striga regional yield trials was organized based on collaborative research efforts of the EARSAM - network.

A review paper on genetic diversity and selection response in sorghum improvement effort at ICRISAT seem to indicate of the need for the continuous inflow of genetic material to broaden the genetic base and to sustain increase in yield.

The activities of West and Central African Sorghum Network was presented by the Coordinator, Dr. Melville D. Thomas. Based on the interesting discussions that followed this paper, the participants recommended occasional interactions and exchange of information among NARS scientists and institutions working on sorghum and millet improvement in Eastern and Western Africa.

During the afternoon session, EARSAM cooperative regionals were discussed. The trials consists for low and intermediate highlands. Sorghum trials were send to 17 locations of which results were obtained from 60% of the sites. Finger millet trials included of locations of which results of trials from 5 countries was received. Representatives of NARS in the region expressed that regional trials are useful and may need to be expanded. It was suggested that scientist to scientist interactions should be facilitated to properly evaluate the performance of regional trials.

June 27, 1990

During the morning session, eleven papers in plant protection were read. Some progress was made on screening sorghum cultivars resistant to covered smut, ergot, long smut and panical diseases. The Ethiopian and Sudan programme did identify promising lines of sorghum apparently resistant to Striga. For further evaluation, the network did start Striga regional trials in different ecological sites. Some of the papers also discussed screening sorghum for stalk borer resistance and grain storage losses and its control. The biological control of insect pests and an integrated approach to management of insect pests was emphasized.

From the general discussion of the plant protection papers, the following comments were made:

- a) Striga resistant lines of sorghum should be evaluated at higher inoculum level in different field sites. The need to bring together efforts of Striga research in the region in particular and in the African Continent at large was stressed.
- b) Crop loss assessment survey due to diseases and insects including the post harvest period was recommended.
- c) Exchange of entomological and pathological research methodology and ICRISATs assistance to NARS was commended. Integrated pest management with minimum use of insecticides was recommended.
- d) Suggestion was made to adopt the regional disease screening format being followed in SADDC/ICRISAT programme.



- e) Ergot disease occurs in different altitudes due to prevailing weather conditions. The Ethiopian and Rwandian National research programmes have identified resistant lines which may need to be further evaluated.

Agronomic research results on intercropping, fertilizer requirements and seed production practices of sorghum and millet were summarized. Marketing constraints and economic aspects of sorghum production were also discussed. A follow up discussion on the major related issues indicated :

- a) Sorghum and cowpea intercropping gave good economic return in Kenya.
- b) Grain sorghum production in Sudan under irrigation covers close two million ha. Although, Hageen Dura-1, an hybrid gave high yield under irrigated condition, it has acceptance problem by farmers. Furthermore, the production of food grain is constrained since government policies to use inputs (fertilizer) in Sudan and other countries is for cash crops or major food crops (cotton, etc.).
- c) Labour is the major constraint to food grain production also in Eastern African region.
- d) Global 2000 success in promoting maize and sorghum production in Tanzania was noted. Concern was expressed of the sustainability of the success beyond the project life.

June 28, 1990

The utilization aspect of sorghum and millet was considered. The use as staple food, livestock feed, breweries etc. It was reported that extraction rate of sorghum could vary from 40-75%. Local or traditional cultivars tend to have low percentage of extraction rate. Potential use of sorghum for industrial breweries suggested the need for the development of suitable varieties. It was reported that finger millet is highly priced for its quality porridge and being nutritious food for children (as some experience showed in Kenya).

Towards the end of the morning session, the workshop participants were briefed on the status of the Networks Strategic Plan. The discussion focussed on the future research activities, training programmes and increased role of NARS scientists and institutions in the region in the coordination and management of networks.

Finally, four Working Groups in the area of sorghum and millet improvement (breeding), agronomic and farming system research, crop protection and utilization were organized in order to develop relevant conclusions and recommendations. The deliberations of

# ELECTION OF THE STEERING COMMITTEE

the Working Groups are the summarized in Annexes 1, 2, 3 and 4.

4.

The outgoing chairman of the Steering Committee of EARSAM outlined the procedure and guideline for electing new members of SC in particular and implementation of the network programme in general. Based on the recommendation of SC meeting that was held in Sudan (1989), each participating country was allowed to nominate a candidate for SC membership. After lengthy discussion, the following NARS Scientists were elected as SC members.

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See File AYC  
cc Director IARI  
Vat

GM/IAR

Director IARI

It must be 500 as soon as possible

5.

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to his Director  
Write re-elected  
Support for <sup>files</sup> millet aspect  
of EARLAM

June 29, 1990

STEERING COMMITTEE MEETING OF EARSAM

The newly installed members elected Drs G.M. Mitawa (Tanzania) and B.N. Mitaru (Kenya), as chairman and secretary of the SC respectively. Among the immediate issues that the committee deliberated upon were:

1.0. Collaborative Research Activities

Only few progress reports of technical nature were received by the Network Coordinator from Lead NARS centers. The committee discussed the extent of fund that could be available during 1990/91. As reported earlier close to \$3,500 is allocated for each collaborative research support. The Coordinator suggested this fund can be easily disbursed if the network could purchase research supplies and minor equipments according to requests of each NARS. Alternatively, the above allocation is transferred to researcher concerned through the respective NARS Director of Research.

2.0. Training

On breeding technique and data management is planned to take place in Kenya in 1991. Participants for the course would be from 8 countries in the region.

Final  
decision?



- 3.0. Next Steering Committee Meeting and Monitoring Tour is Scheduled to take place 10-20 October 1990 in Kenya and Ethiopia respectively.

## II. PERSONS AND INSTITUTIONS CONTACTED

### 1.0. East and Southern Africa Farming System Network.

I had the following discussion with Dr. P. Anandajayasekera<sup>a</sup> CIMMYT Regional Economist. For the last two decades CIMMYT has taken the leadership to provide training in FSR involving NARS research programmes and National Universities. It was reported the activities of the CIMMYT FSR programme include collaborative research, networking, assist universities to introduce FSR into their curriculum and institutionalization of FSR within the national research and educational system. Some of the Universities involved in FSR training are Makerere, Agricultural Universities of Ethiopia and in Tanzania and the University of Zimbabwe. FSR training at a regional level is provided at the University of Zimbabwe.

Research - extension - administrative policy issues are also addressed through specialized workshops. The network also produces quarterly bulletins, newsletters, and workshop proceedings. Two technical workshops and a programme review workshop are held each year.

Several donors and international organizations are involved in the development of FSR in East and Southern Africa. For example, FAO (through Swedish funding) is known to support FSR research and development in Botswana, Kenya, Zambia and Tanzania.

The stage of FSR development in the region seem to suggest the formal establishment of FSR Network in the East and Southern African region. Rationale and objectives:

- . To broaden the scope of FSR in the region by coordinating the efforts of national, bilateral and international organizations engaged on-farm research and development;
- . To facilitate the exchange of technical information, based on regional FSR data base that would be developed by the network;
- . To enhance interactions among FSR practitioners and their respective institutions;
- . To serve as secretariat for all FSR networking activities (workshops, training, publication of newsletters);

- . To sustain NARS FSR activities in the region;
- . To enhance the development FSR curriculum and training at Universities in the region.

### R E C O M M E N D A T I O N

*write to SACCAR* *cc Amanda*  
*- Jemie*  
*- ISRC*

- a) The realization of FSR Networks in East and Southern Africa involves NARS and regional organizations in the region. It is recommend that SAFGRAD and SACCAR take the initiative. Committee comprised of CIMMYT, SACCAR and SAFGRAD could elaborate a working document.
- b) The working document prepared by the committee would be presented at the annual FSR general workshop for discussion and formalization of the network.
- c) SAFGRAD and SACCAR will jointly solicit donors for the FSR Network support.
- d) Liaison office under OAU umbrella may be established to coordinate networks activities, provide administrative and logistic network services also to the other networks in the region.

June 29, 1990

#### 2.0. Meeting with Dr. Nene, Deputy Director General, ICRISAT

The USAID/SAFGRAD Senior Project Advisor and myself held special meeting with Dr. Nene, in order to streamline Sorghum and Millet Networks activities in Eastern Africa.

General concern was expressed how to strengthen the EARSAM Network activities. These include :

- i) Regional trials - As indicated by representatives of NARS, there is urgent need to diversify the germplasm of the cooperative trials along major stress production factors i.e drought, Striga etc. It was agreed that this activity would also be pursued by ICRISAT regional Sorghum Breeder.
- ii) Network scheme need to be emphasized in order for the Lead NARS centers fully participate in the generation and evaluation of the germplasm.
- iii) Increased support and focus by the coordinator to enhance finger millet research in the region.

*Page to write*



- iv) It was agreed that the implementation of collaborative research projects at Lead NARS centers would be pursued by the Network Coordinator.
- v) It was agreed that the Network Coordinator would prepare Financial report of the Network for the next SC. meeting.
- vi) The Coordinator would prepare network activity report for SC. meetings

### 3. Dr. Masiga, Director OAU/IBAR

On behalf of SAFGRAD, this office provides the political and legal umbrella and diplomatic previllages for the EARSAM Network in Kenya. The entire ICRISAT/SAFGRAD project in Kenya was also provided office within the OAU facilities. The director indicated that he was not happy the manner the Coordinator moved the office to another site. After lengthy discussion on the matter, the Director assured us that OAU-services to SAFGRAD project (through his office) would continue. He, however, stressed that the ICRISAT/SAFGRAD project legal presence in Kenya being under OAU, its services should have been recognized. At separate meeting, the Network Coordinator (Dr. Vartan) was advised to amicably resolve the issues promptly.

### ACTION RECOMMENDED

The International Coordinator of SAFGRAD is advised to write a letter of appreciation to the Director of OAU/IBAR indicating the following points:

- i) Appreciation of the services provided
- ii) That SAFGRAD Project is of long term activity. The diplomatic services provided under the auspices of OAU/IBAR should continue.
- iii) Being an OAU-project, the Director of IBAR represents SAFGRAD in Kenya and likewise the Network Coordinator should occasingly brief him on the project activities.

July 2, 1990

### 4. Meeting at Kenyan Agricultural Research Institute (KARI)

Dr. C. Ndiritu, Director of KARI was briefed on SAFGRAD activities. It was pointed out that unlike, the previous years,

KARI should actively participate in SAFGRAD project. The Director suggested that all communication pertaining to agricultural research, could be forwarded to KARI in order to facilitate the participation of Kenyans research administrators and scientists in SAFGRAD. He pointed out that the SAFGRAD project through EARSAM has been sensitive to the research needs of the national programme. Large portion of Kenya being arid and semi-arid, research on sorghum, millets, and on-grain legumes suitable to dry sites is given much importance. A number of scientists currently, are on training to improve the research capabilities of KARI.

The Director further noted that, the ICRISAT/SAFGRAD project being under the OAU/umbrella is the most preferred arrangement compared to the other IARCs agreements in Kenya.

#### Action Recommended

✓ The International Coordinator of SAFGRAD is advised to send letter of appreciation of the KARI support to EARSAM. Previous reports of NARDS meeting and that of the Oversight Committee Meeting deliberations, SAFGRAD Newsletters, and other relevant publications should also be forwarded to KARI headquarters. ?

#### Meeting with Deputy Director for Crops and Soils (Mr. Rutto)

Mr. Rutto outlined the research mandate of KARI. It covers all food, feed, fiber, animal, and vegetable crops research except coffee and tea. Specialized laboratories such as special services in plant protection, soil-water management, veterinary services etc. The major research station have regional mandate. Being one of the senior scientists that participated in EARSAM, Mr. Rutto is fully aware of the SAFGRAD activities. With regard to food grain research, he suggested that SCO should facilitate interactions, and exchange of technical informations among scientists and institutions of East and Western Africa.

#### 5. Meeting at IDRC

- Mr. Andrew Kerr, Agricultural Officer
- Dr. L. Navarro, Agr. Economist

The regional office at IDRC provides financial support to large number of research projects including FSR. The officers of IDRC were briefed on SAFGRAD networks both in West, and Eastern Africa. Since IDRC has interest to assist in the formalizing the FSR network in the region, the officers were also briefed on the outcome of the previous discussion that I had with the CIMMYT regional economist. Mr. Kerr indicated that his office would like to be kept informed on the follow-up action for the establishing the FSR network in the region.

July 3, 1990

6. Meeting at ICRISAT/SAFGRAD Regional Office

The office is located at new premises. There are adequate office and storage spaces. The meeting was attended by Dr. G. Kingma, Senior Project Advisor SAFGRAD; Dr. S. Mukuru, Principal Regional Sorghum and Millet Breeder ICRISAT; Dr. Vartan Guiragossian, Network Coordinator and Dr. Taye Bezuneh, Director of Research, SAFGRAD.

Issues discussed :

- i) Sustaining good linkages with OAU/IBAR Office - The Network Coordinator was advised to reconcile administrative and related issues with the Director of OAU/IBAR Office. It was stressed that the ICRISAT/SAFGRAD activities in Kenya is under the auspices of OAU/IBAR office. Formal linkages should be maintained.
- ii) Programme of visits for the Network Appraisal Team- was discussed and finalized.
- iii) Follow-up of the Recommendations of the Workshop. It was suggested that the Coordinator should sort-out the main points to be addressed during the next SC. Meeting.
- iv) Progress report on Network Collaborative Research projects. It was suggested that Network Coordinator to pursue the matter and to prepare technical report at the end of the current season.

7. Meeting at REDSO/EAST Africa Office

We were received by Dr. Richard J. Edwards, Agricultural Economist, USAID/REDSO, Eastern Africa. Dr. G. Kingma and myself briefed him on the outcome of EARSAM workshop and how the SAFGRAD Networks operate in West and Central Africa. He reported tha REDSO is monitoring the activities of the following networks largeley funded through USAID :



<u>Networks</u>			<u>Implementing IARC</u>
a)	Bean	-	CIAT
b)	AFRINA	-	ICRAF
c)	Potato	-	CIP
d)	Root and tubercrops	-	IITA
e)	PEST - Network	-	ICIPE
f)	FSR	-	CIMMYT

The oil crops network in Eastern Africa is financed by IDRC.

It was also reported that on-farm research activities with emphasis on crop management is being developed at Egerton College, in Kenya through USAID financial support.

It is apparent that most of the above network are implemented largely by the respective IARCs.

SORGHUM BREEDING GROUP

CONCLUSIONS AND RECOMMENDATIONS

I. EARSAM REGIONAL TRIALS AND FOLLOW UP

We recommend that

1. Genotypes selected from observation nurseries grown <sup>and evaluated</sup> at appropriate locations should comprise the entries for the Regional Yield Trial.
2. Based on genotype performance and available meteorological data the sorghum growing environments should further be classified
3. Specialized nurseries (diseases, drought, insect, Striga etc) be organized when possible.
4. Interaction among NARS scientists with similar environments should be encouraged.
5. Wherever possible occasional consultancy should be provided by coordinators or selected NARS scientists to regional yield trial cooperators through on sight visits.
6. NARS ought to be encouraged to take up steps to move the better varieties to the farmers fields.

## II. ORGANIZATION OF WORKSHOP

1. The network coordinator should elaborate the purpose of the workshop, network accomplishments and its research programme at the beginning
2. Emphasize specific topics (themes) for coverage at each workshop. These should form the lead papers with more presentation time.
3. Encourage more research papers and reduce the number of overview or status papers.
4. Compile and circulate copies of summaries of papers to be presented to improve level of technical interactions. However regional trial results should be circulated to cooperators and not wait for proceedings.
5. Continue to encourage interregional and international participation at workshops.
6. Structure the field visit in such a way that all concerned could take advantage of it.



### III. GUIDELINES FOR BREEDING EMPHASIS (PRIORITIES)

1. Encourage integration of other disciplines (pathology, entomology, physiology) <sup>by agronomists, utilization</sup> into breeding for sorghum improvement.
2. Provide further support for a targetted and well-focused breeding project to identify and incorporate striga resistance in sorghum.
3. Emphasis should be placed on techniques and concepts of breeding for grain mold/ weathering, and drought resistance as well as utilization of photosensitive material and indigenous cultivars.
4. Adopt breeding strategies that give due consideration to production under minimum inputs (eg. fertilizer)
5. Recognize the need to develop experience in breeding for seed parents and development of hybrids.
6. Provide extra assistance from regional program or elsewhere for millet as regional expertise has not been sustained.

RECOMMENDATIONS OF THE AGRONOMY AND FARMING SYSTEM GROUP

1.0: On the organization of the workshop; quality and relevance of of the papers presented.

1.1: On the organization of the workshop:

Generally the organization of the workshop was good although the following areas could be improved:

- (a) Time allocated for each paper was rather short, more time should have been given to each paper. Furthermore, the time for the workshop was also not enough.
- (b) Organization of the order of presentation should be as follows:
  - (i) Breeding
  - (ii) Agronomy and farming systems and agro-climatology
  - (iii) Plant protection
  - (iv) Marketing and utilization
  - (v) Technology transfer
- (c) Papers should be made available to participants before the presentation so as to facilitate active discussion.
- (d) There is need to invite a special guest speaker to present a leading paper in each of the areas mentioned in (b) above.
- (e) Putting participants in a hotel is good but provisions should be made for them to get access to town after the meetings.

1.2: On quality of papers:

In general the quality of the papers was good although the following observations were brought up:

- (a) Papers should be related to actual research work done, and data presented should be the highlights only. Other information should be confined only to the introduction.
- (b) That tables which contain more data than possible to discuss should be eliminated and visual aids should only be used for the highlights of the presentation.

1.3: On Relevance of the papers to the workshop

Most of the papers were relevant.

1.4: On areas not fully carried

- (a) that socio-economic aspects of sorghum and millet should have been given due emphasis as well as extension and marketing.
- (b) papers on water and soil management and mechanization should be included in the workshop.
- (c) that experiences on technology transfer should be made available to the workshop participants.

2. Future Strategies

On future strategies the following were suggested:

- (a) Economists should be included in the research projects at an early stage so that they can have an input in the design process.
- (b) That socio-economic surveys should be encouraged in the region so that the technology generated is relevant to the problems at the farm level.
- (c) More on-farm research should be encouraged with the participation of administration people, extensionists, researchers and farmers.
- (d) That agronomic packages which are passed to farmers should be relevant and simple within the resource base of the farmer.
- (e) The following specific areas of research were identified and recommended:
  - (i) Rotation and intercropping aspects for soil improvement.
  - (ii) Water conservation and utilization efficiency through using suitable cultivars of sorghum and millet, water harvesting techniques, early planting dates etc.
  - (iii) Crop physiology studies should be encouraged so as to understand the mechanisms behind drought tolerance and drought escape and also yield advantages etc.



3.0 On Training

3.1: That training beyond the level of researchers should be encouraged to include extensionists and farmers through field days.

3.2<sup>2</sup> That information dissemination within the region and between the regional networks should be enhanced through visits and publications such as newsletters and national journals.

7TH EARSAM SORGHUM AND MILLETS WORKSHOP

CONCLUSIONS AND RECOMMENDATIONS

CROP PROTECTION GROUP

A. ORGANISATION OF THE WORKSHOP:

The workshop was well organised, well attended and the papers presented diverse. The venue was good and the field trip exposed participants to work in progress. We wish, however, to note and suggest the following:-

1. Abstracts of presentations should be provided to participants at the start of each session.
2. Papers presented before a discussion were often too diverse and so many, and this reduced the degree of involvement of participants in the discussions.
3. A field trip be organised in the middle of the workshop to ease the pressure and expose participants to work going on in a country.
4. Papers be grouped, presented and discussed on the basis of subjects or themes covering all the problem areas.
5. Papers be received early and screened for relevance.
6. Papers should reflect continuity and progress.

B. FUTURE STRATEGIES

1. Strategies already adopted be sustained through effective programme support and coordination.
2. Experts in the region be given due recognition and encouragement by strengthening their programmes and involving them in consultancy work.
3. Develop methodologies and initiate yield loss assessment studies as a basis for prioritizing crop protection work.
4. Strengthen work on host plant resistance through germplasm collection, and introduction and testing of promising materials throughout the region.

5. Initiate and support studies of plant virus diseases and their vectors.
6. Study biotypes of important diseases of the region.
7. Work be started to develop integrated 'pest' management and crop production packages for various cropping systems and ecological zones.

#### C. ESTABLISHMENT OF HOTSPOTS

Hot spots should be established for rigorous testing of materials that show promising levels of resistance to pests and disease. With specific sites to be identified by host countries, the hot spots could be established as follows:-

- |                                |                        |
|--------------------------------|------------------------|
| 1. Downy mildew                | - Tanzania and Rwanda  |
| 2. Striga                      | - Sudan, Ethiopia      |
| 3. Viruses                     | - Kenya and Uganda     |
| 4. Covered smuts               | - Somalia and Kenya    |
| 5. Ergot                       | - Rwanda and Ethiopia  |
| 6. Long Smut                   | - Sudan and Burundi    |
| 7. Borer/ ..                   | - Ethiopia and Somalia |
| 8. Head blast of finger millet | - Kenya Uganda         |
| 9. Shoot flies                 | - Uganda and Tanzania  |
| 10. Anthracnose                | - Ethiopia, Tanzania   |



RECOMMENDATIONS BY DISCIPLINES

UTILIZATION GROUP

1. Recommendation on papers and workshop organization.
  - 1.1. The group appreciates inclusion of utilization aspects in the program. We would like to encourage continuous recognition of the role of utilization in sorghum and millet development.
  - 1.2. Grouping of papers was satisfactory, however the time allocated for each paper was relatively short. We recommend the following for future workshops:-
    - (a) - A workshop theme should be chosen and agreed upon in good time.
    - (b) - There is need for a few key papers addressing the theme and these papers should be given 30 minutes.
    - (c) - Identical papers should be discussed immediately after presentation. This is thought to improve the subject matter discussion as opposed to discussion of all papers at the end of session.
    - (d) - Papers should be distributed to the participants prior to presentation but in case of higher expenditure, abstracts and principal tables need to be provided.

2. Guidelines for future strategies on utilization.

- 2.1. In sorghum and millet improvement programmes, there is a need for a multidisciplinary approach at the planning stages.

A food/feed system approach is strongly recommended. This should involve collaboration with production, marketing and economic inputs with a view towards practical application for both industry and small-scale uses.

- Industrialists should be invited to attend. This will help in the adoption and extension of the research products.
- Open day to show products.

- 2.2. Collaborative studies in the region should be further encouraged and improved to include exchange of visits, samples and information among the participating researchers.
- 2.3. In the spirit of system approach to the development of sorghum and millet in the region, we recommend the consideration of utilization discipline representation in the steering committee.

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