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THE EAST AND SOUTHERN AFRICAN REGIONAL
ROOT CROPS NETWORK
(ESARRN)

REPORT NO. 3

Funded by

**The United States Agency for International
Development - USAID
(REDSO/ESA)**

and

**The International Development Research Centre
(IDRC)**



The International Institute of Tropical Agriculture (IITA)
Oyo Road, PMB 5320, Ibadan, Nigeria

20 OCTOBER, 1987

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February, 1988

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INTRODUCTION

THE EAST AND SOUTHERN ROOT CROPS RESEARCH NETWORK (ESARRN) formally started in 1987, by establishing its headquarters at the Chitedze Agricultural Research Station in Malawi. This move materialized in July after the signing of a Memorandum of Understanding (MOU) between the Government of Malawi and IITA. The network is going through its initial process of establishing some basic infrastructure in Malawi and at the same time gathering strength for the next phase of its activities.

PRIORITIES

The host national program continues to give priority to the cassava mealy bug (CMB) problem which is causing severe crop losses in the affected areas. Steps have been taken to collaborate with the host program to address this problem. Jointly, a proposal has been completed to be presented to donors. Cassava lines with resistance to the major pest and diseases have been introduced from IITA in tissue culture form. These lines are now well established and initial multiplication started. Introduced predators and parasites of the CMB along with other local beneficials are well established and have some impact on the pest population.

Emphasis is also being laid on the incorporation of genetic resistance to both (CMB) and cassava green mite (CGM) to adapted promising varieties. The establishment of primary multiplication sites of healthy planting materials to provide source material for secondary multiplication also continues to receive high priority.

Other areas of activity include the encouragement of national programs. In line with this, some programs have presented proposals to the network. Some action was taken and request for supplemental funding made. Some national programs have also made request for support to have in-country training on areas of interest for their crops activities.

ACCOMPLISHMENTS

Several programs were visited in order to establish a preliminary benchmark situation and to discuss regional activities and plans. Other programs visited since the last report were Mozambique, Burundi and Rwanda.

The Mozambique trip was undertaken along with USAID/REDSO, Nairobi representative, Mr. McColough with the following objectives:

1. To get first hand information on the state of the art on root crops research in terms of government policies, commitments and activities.
2. To identify areas for possible joint intervention (USAID Maputo/ IITA-ESARRN) in support of a Mozambique National Root Crops Improvement Program.

These objectives were accomplished and some short term action plans were drawn up as ESARRN's contribution in support of activities planned by the Ministry in collaboration with other donors. Besides these, a first draft proposal for a national root crops program was also presented to the ministry for input and review. A copy of the proposal is attached.

There has been an increased emphasis on root crops by the Ministry of Agriculture both as food security and cash crop for small farmers. FAO and the ministry have signed an agreement for a rapid multiplication scheme that would ensure the availability of improved and healthy planting material to the farmers. The University is also taking root crops seriously and has recently assigned three staff members to root crops research. Two of these have been invited to IITA for an orientation visit and discussions. This visit will be supported by ESARRN.

OFFICE SPACE, EQUIPMENT AND SUPPLIES

Much progress has been made on the ESARRN's office and laboratory space which is a buy-in with the ICRISAT regional office/laboratory complex at Chitedze. The ICRISAT administrator is presently in the process of drawing up the required agreement and is to send it to IITA shortly. It is expected that this space will be completed by June. For this reason office furniture along with general field equipment and supplies are just being ordered.

TRAINING

Regional Training short course

ISABU in Burundi successfully held its in-country training for root and tuber crops at the Moso Station from 26 October to 6 November 1987. A total of twenty participants representing research technicians, extension agents and teachers took part. The participants expressed much enthusiasm and interest in this course, the first of its type on root crops in Burundi. The network co-ordinator presented some lectures on rapid multiplication and breeding techniques on root crops. (Table 1)

Table 1: In-country training

Date	Country	City/Town	No. of Participants	Duration (Wks)	Cost (US\$)
26/10- 6/1187	Burundi	Bujumbura ISABU	20	2	5,000.00

EXCHANGE VISITS

The exchange visits that were accomplished are summarized as follows:

Table 2: Exchange visits

Date	Country	Name	Program visited	Activities accomplished
Oct. 1-6 1987	Rwanda Root Crops team	G. Ndamage J. Mulindangabo	Kenya National Root Crops Improvement	Joint evaluation of cassava germplasm in Malindi and sweet potato at Machakos. Review of the Kenya root crops Improvement Program Proposal.
Oct 27- 30/87	Kenya sweet potato breeder	A. Kiarie	Rwanda Root Crops Improve- ment Program	Orientation to sweet potato breeding strategy, rapid mul- tiplication scheme. Obtain improved sweet potato and cassava population (10,000 of each).
Nov 24- 27/87	Burundi Root crop coordi- nators	J. Sakubu and P.Ndayiragige	Rwanda Root Crops Improve- ment Program	Orientation to sweet potato breeding strategy, rapid mul- tiplication scheme. Set up for in-country training and germplasm.

These orientation visits have proven quite effective and most appreciated by those who have participated. It serves as a forum for in-the-field first-hand exchange of information and experience. Furthermore, it has been quite fruitful for the visiting scientist to specify specific germplasm characteristic or techniques of special interest to his/her own program.

GRADUATE TRAINING

The network is proceeding with its post-graduate training objectives and has identified the first three post-graduate students as outlined below: (Table 3):

Table 3 List of Post-graduate Fellowships

Country	Candidate	Discipline	Crop	University
Burundi	M. Ntimpirangeza	Breeding	Sweet Potato	University of Nairobi
Malawi	G.S.N. Phiri	Integrated Pest Management	Cassava	University of Malawi Chancellor College
Kenya	G. Githunguri	Crop Agronomy	Cassava	University of Ibadan

The Burundi student has registered and is now attending classes. The other two students have been approved by their governments and are in the process of registering for the next session.

MEETINGS AND WORKSHOPS

Two ESARRN Steering Committee meetings, under the chairmanship of the Co-ordinator, and one heads of program meeting were held this year. The first steering Committee meeting held at IITA was for the approval of the participating programs budget and the second hosted by Rwanda was for the formulation of a proposal submitted to SPAAR. The heads of program meeting was held during the 3rd regional root crops workshop and focused mainly on review of objectives and workplans. It was agreed that it was necessary to stick to the objectives already laid out and to complete them before making changes.

The co-ordinator participated in: the CIBC/IITA regional Biocontrol workshop held in Malawi in October. This workshop examined the state of the art of the cassava mealybug problem in Malawi; the Root and Tuber crops germplasm exchange workshop with special reference to sweet potato and organized by CIP in Nairobi; and the African Bureau for Agriculture, Natural Resources and Rural Development Workshop also held in Nairobi and sponsored by USAID.

The third Eastern and Southern African Regional Root Crops Workshop was successfully held in Mzuzu, Malawi from December 7-11, 1987. The turn-out for the workshop was excellent with 70 root crops researchers representing 12 countries. It consisted of a full field day and tour, four full days with nine sessions and a station visit.

The objectives of the workshop were:

1. To identify the roles of root and tuber crops in low input agriculture helping to meet regional food self-sufficiency and to draw up the recommendations to assist policy makers in their plans to attain self sufficiency in food.
2. To review and evaluate together the root crop research results and achievements made by root crops scientists in the region.
3. To exchange the latest research information among the root crop scientists within the region.
4. To plan together the future collaborative research among the root crops scientists within the region and to make proposals and recommendations to donors, national governments and IITA.

These objectives were duly addressed and attached are the resolutions and recommendations. The proceedings will be available shortly. The establishment phase of the network in Malawi has taken up much time but progress is being made. For the smooth operation in the future it will be important to establish a system that will hasten the transfer of operation funds to the network office.

SUMMARY

The network provided some continuity of linkage and fulfilled the need of breaking the feeling of isolation among the regions scientists. During the workshop joint planning was made, problems were shared to avoid duplication and there was much sharing and exchange of information.

During the Bio-control workshop the group had a better insight into the progress of the Bio-control of the cassava mealybug. More surveys are being done to have a better idea of the impact.

Exchange of improved population gene pools is continuing and Rwanda is making good progress in supplying these.

The objectives of the training component are being accomplished. Although many of the objectives for this period are being fulfilled, the scope for greater achievements is being limited by the capacity and resources of participating national programs. High priority is therefore being delegated to encourage and provide support to national programs.

ESARRN PLAN OF WORK 1988

Project Month	Project
January - February	<ul style="list-style-type: none"> a) In-country training - Rwanda b) Start compiling network research results for analysis c) Preparation for report and regional news update d) Compiling editing of regional workshop papers.
February - March	a) In-country training, Zambia
March - April	<ul style="list-style-type: none"> a) Steering committee meeting/monitoring tour b) Submission of report c) Quarterly financial vouchers due d) Identify candidates for M.Sc. Research projects on root crops. e) Elaborate collaborative projects with other organizations
April - May	<ul style="list-style-type: none"> a) Complete and ready for distribution workshop proceedings. b) Prepare semi-annual progress report
J u n e	a) Quarterly financial vouchers due
June - July	a) Preparatory activities for mid-term evaluation
A u g u s t	a) Mid-term evaluation

- S e p t e m b e r** a) Quarterly financial vouchers and progress report due
- September - October** a) In-country training Kenya
b) Monitoring of mealybug infestation, Bio-control impact and other control measures
- November - December** a) Plans and announcements for for heads of program meeting

b) Steering Committee to react to evaluation results.

ESARRN

1987 BUDGET REQUEST FROM USAID

<u>ITEMS</u>	<u>AMOUNTS (US \$)</u>
<u>Wages and allowances</u>	
- support staff	14,000.00
<u>Office space/equipment</u>	
- Office structure	36,000.00
<u>Research expenses</u>	
- Supplies and expenses	4,000.00
- Vehicle clearance and Insurance	3,000.00
- Vehicle operation and maintenance	10,000.00
<u>Travels</u>	
- International/Regional travel	20,000.00
- Local travel	4,000.00
<u>Publications and Communications</u>	
- Editing and publishing workshop proceedings	5,000.00
- Newsletters	5,000.00
- Subscription to Journals	3,000.00
- Telex, telephones, cables etc.	2,000.00
<u>Consultancies</u>	
- Consulting services with regional experts	8,000.00
<u>Training and meetings</u>	
- M.Sc. Fellowships	9,000.00
- Group meetings	15,000.00
<u>Regional support</u>	
- Laboratory equipment and facilities for quarantine services	15,000.00
- Operations and supplies for regional collaborative research	70,000.00

ESARRN

1988 BUDGET REQUEST FROM IDRC (US \$)

<u>ITEMS</u>	<u>AMOUNT</u>
<u>Office space/Equipment</u>	
- Laboratory and field supplies	5,000.00
- Office supplies	3,000.00
- Collaborative national research	5,000.00
<u>Collaborative National Research Expenses</u>	
- Support to collaborating programs	49,000.00
<u>Training</u>	
- Regional Training short courses	11,800.00
- Postgraduate Fellowship	17,100.00
- Fellowships for visiting scientists	8,000.00
- Bio-control monitoring	5,500.00

ESARRN'S

EXPECTED EXPENDITURES FOR NEXT 180 DAYS

<u>ITEMS</u>	<u>AMOUNT (US \$)</u>
<u>Wages and allowances</u>	
- Support staff	3,500.00
<u>Research expenses</u>	
- Supplies and expenses	3,000.00
- Vehicle clearance and insurance	3,000.00
- Vehicle operation and maintenance	2,500.00
<u>Travels</u>	
- Regional travel	5,000.00
- Local travel	1,000.00
<u>Publications and communications</u>	
- Editing and publishing of workshop proceedings	5,000.00
- Newsletters	2,000.00
- Telex, telephones	500.00
<u>Training, meetings and consultances</u>	
- Group meetings	5,000.00
- Regional in-country short courses	5,000.00
- Visiting scientists	2,000.00
- Consulting services with regional experts	<u>2,000.00</u>
Total	41,500.00 =====

Table 4: Regional Training short courses

Date	Year	Duration (Wks)	Country	City/Town	No. of Participants	Cost (US\$)
26/10- 6/11/87	1	2	Burundi	Bujumbura ISABU	20	5,000.00
8/2 - 26/2/88	"	2	Zambia	Mansa	20	5,000.00
Jan. 1988	"	2	Rwanda	ISAR Rubona	30	-
14/3 - 25/3/88	2	2	Ethiopia	Nazareth	20	5,000.00
17/10 - 28/10/88	2	2	Kenya	Mtwara (Mombasa)	20	5,000.00

Table 5: Exchange Visits

Date	Country	Name	Program visited	Activities accomplished
Oct. 1-6, 1987	Rwanda root crops team	G.Ndamage J.Mulin-dangabo	Kenya National Root Crops Improvement Program	Joint evaluation of cassava germplasm in Malindi and sweet potato at Machakos. Review of the Kenya Root Crops Improvement Program Proposal.
Oct. 27 - 30, 1987	Kenya sweet potato breeder	A. Karie	Rwanda Root Crops Improvement Program	Orientation to sweet potato breeding strategy, rapid multiplication scheme. Obtained improved sweet potato and cassava population (10,000 of each).
Nov. 24-27, 1987	Burundi root crops coordinators	J. Sakubu and P.Ndayiragige	Rwanda Root Crops Improvement Program	Orientation to sweet potato Breeding strategy, rapid multiplication scheme. Set up for in-country training and exchange of germplasm.
Feb. 16-23, 1988	Mozambique Directors of INIA, AO Project Leader	M. Morais and J. Castro	Rwanda Root Crops Improvement Program	Orientation visit to clean planting material, rapid multiplication and distribution. The setting up of an improvement program.
March 1988	Mozambique University entomologists and root crops scientists	L.A. Santos and A.L. Dotto	IITA/TRIP Program	Orientation visit to IITA for research, planning and discussions.

Table 6: Graduate Fellowship

Year	Candidate and country	Discipline	Crop	University
1	Burundi M.Ntimpirangeza	Breeding	Sweet potato	University of Nairobi
1	Malawi G.S.N. Phiri	Integrated Pest Management	Cassava	University of Malawi Chancellor College
1	Kenya C. Githunguri	Agronomy	Cassava	University of Ibadan
2	Ethiopia	Crop Protection	Sweet potato	-
2	Uganda	Postharvest Technology	Cassava	-

RESOLUTIONS AND RECOMMENDATIONS OF THE
THIRD EASTERN AND SOUTHERN AFRICAN ROOT
CROPS WORKSHOP

The Third Eastern and Southern Africa Regional Root Crops Workshop took place at Mzuzu, Malawi from December 7 - 11, 1987.

RESOLUTIONS:

Participants at the Third Eastern and Southern Africa Regional Root and Tuber Crops Workshop Meeting in Mzuzu, Malawi, December 7 - 11, 1987 resolved as follows:-

1. Considering the resolutions contained in the the Lagos Plan of action calling African countries to to be self-sufficient in food security by the 1985, the Third Eastern and Southern Africa Root Crops Workshop noted with great concern that despite the passage of the target time, famine and food shortages still prevails in many countries in this region; the workshop noted that because of their special qualities, root crops (cassava, sweet potato, yams and cocoyams) can play an important role in alleviating food shortages. For this reason, governments are urged to establish and strengthen national root crops improvement programmes. This will enable efficient identification of problems and priorities in improving production and utilization of root crops and enable effective use of the available limited resources. These programmes should collaborate within the framework of ESARRN.

2. Noting the increasing spread and losses caused by pests and diseases and the lack of improved techniques in postharvest technology, governments are urged to support both research and extension programmes to reduce the pre- and postharvest losses.
3. Recognizing that there are inadequate trained manpower in root crops research and production, and realizing that without adequately trained manpower, little progress can be made in research and production of these crops, governments are urged to embark on both short and long-term programmes of manpower development and technology transfer. International centres and development organizations are urged to assist national governments in these endeavours.
4. Special thanks are extended to the government of Malawi, to IDRC, USAID and IITA for their continued encouragement and support to root crops activities within the region and look forward to continued support. This workshop, having reviewed progress made during the past years, and identified areas for future action, hereby recommend the following:

RECOMMENDATIONS

1. National Governments should establish and support development of sound national root crops programmes and should allocate more resources for the development of sound multisectorial national programmes. They should, further strengthen the existing programmes by soliciting more support from international donors.

2. National programmes should develop appropriate policies that encourage good management, motivate root crops personnel and ensure high staff retention.
3. In order to change the general low image of root crops, national programmes are urged to make full use of information about the crops from International Agricultural Research Centres and other sources, collaborate with extension and other agencies to provide positive and relevant information to policy makers, potential users and the public at large so that root crops can realize its proper role in food self-sufficiency.
4. Surveys of the distribution of diseases and pests of cassava and sweet potato be carried out comprehensively and should involve the participation of both research and extension experts in countries of the region.
5. Systemised studies to establish crop losses caused by pests, diseases and weeds should be continued and the methodologies be standardized across countries of the region.
6. Collection, maintenance and evaluation of exotic and local germ plasms for desirable host-plant resistance and high yield should be encouraged and continued.

7. Basic and applied studies on the biology and ecology of the major pests (cassava mealybug, cassava green mite and sweet potato mosaic, cassava bacterial blight, sweet potato mosaic virus and tuber-rot in sweet potato) and weeds; and their natural enemies should be conducted in order to generate information leading towards identification and development of appropriate integrated control measures.
8. In-country and regional training for research and extension staff be organized more often and use made of locally available resource personnels and institutions. Special consideration should be given to Mozambique to develop a long term lasting solution to their manpower problems.
9. International centres like IITA etc. should organize more specialized training for extension personnel, researchers and technicians. Higher degree training in the fields of pests and disease management and postharvest technology of root crops be given urgent considerations. Schools, universities and institutions of higher learning should introduce root crops in their curricula.
10. Training for farmers and administrators be organised more often and use made of farmers training centres, fields days, radio, TVs and phamphlets.

11. ESARRN should develop short and long term training for root crops staff within the region and seek assistance for financial support from international centres and development agencies.

12. National programmes should embark on studies to understand and improve on the locally available methods of storage, processing and utilization of root crops in the region. They should also carry out effective demand and market acceptability studies and accordingly develop suitable processing and preservation technologies in order to extend the shelf-life and encourage wider utilization of root crops.

IITA DRAFT PLAN FOR MOZAMBIQUE NATIONAL ROOT CROP IMPROVEMENT PROGRAMME

I. Introduction

Cassava is of major importance in Mozambique with two-thirds of the population dependent on the crop for 60 percent of their caloric intake. Sweet potato is also widely grown throughout the country and is of critical importance in the central provinces. Cassava, in Mozambique, is severely affected by cassava mosaic disease, cassava bacterial blight, green spider mite, and root-knot nematodes as well as the cassava mealybug. As a result of these pests and disease problems yields of cassava are very low, averaging from 1 to 3 tons per hectare (African continent average yield is about 10 tons per ha.). The cassava leaves, which are a source of vegetable protein, are often too badly affected by mealybugs to be utilized.

II. Background

During a November visit by Dr. M.N. Alvarez, the IITA coordinator for the East and Southern Africa Root Crops Network (ESARRN), it was reconfirmed that the understandings reached in 1985 by IITA/Root and Tuber Program scientists and the host government were still valid and the need is even more urgent to deal with constraints limiting the yield of root crops. It was also agreed that the research and training cooperation between Mozambique and IITA should be strengthened as a part of a national root crops program as well as increased participation in ESARRN by local technicians.

Cassava and sweet potatoes are important staple food crops which are well suited to various ecosystems and have a vital role to play in increasing the country's food self-sufficiency objectives and in reducing the level of basic food imports.

Despite the importance and great potential of these crops, in Mozambique, little research or investigation at the national level has been made towards the solution of urgent production problems. Another constraint that requires immediate attention is the lack of trained personnel assigned to root crop production.

It is in dealing with these problems that the Government of Mozambique, especially the Ministry of Agriculture and the University, desires to establish with IITA/ESARRN a joint Root Crops Improvement Program (MRCIP).

1. Overall Objectives: The overall objective is to strengthen national research capabilities by improving the existing research structure and increasing the available manpower capacities to support a selection, testing and dissemination program for the major root crops in Mozambique.
2. Research Objectives: The major research needs for root crops in Mozambique are [a] the development of improved varieties [b] the introduction of cultural practices appropriate for soils, climatic and socio-economic conditions prevailing in Mozambique and [c] to evaluate postharvest technologies which could be easily adopted by rural and urban families.

3. Extension Objectives: Rapid multiplication and distribution of selected or improved lines to farmer clients.

4. Program Objectives:
 1. Cassava
 - [a] To increase cassava yields by improving resistance to diseases and pests (cassava mosaic, bacterial blight, spider mites, mealybug, and nematodes are among the main factors reducing cassava yield) as well as the introduction of predators and parasites for the biological control of the CMB.

 - [b] To develop economically viable production technologies including rotation practices appropriate to the various cropping systems for cassava (this may be for mono, multiple or alley cropping systems). Under FAO/MOA program and the Netherlands University project, Farming Systems Research will continue to include root crops.

 - [c] To develop rapid mass multiplication techniques to ensure availability of improved cultivars for distribution to farmers.

 2. Sweet Potato
 - [a] To increase yield of sweet potatoes to optimum economic yield levels by improving resistance to major insect pests such as the sweet potato weevil, and to virus and fungal diseases.

- [b] To develop varieties with high carotin content
- [c] To develop pest management practices which incorporate host plant resistance and other appropriate control measures against the major pests and diseases.
- [d] To develop rapid mass multiplication techniques to ensure timely availability of improved cultivars for distribution to farmers.

3. Training

- [a] To develop a well trained and motivated cadre of Mozambican nationals who will assume overall responsibilities for the MRCIP in the shortest time possible.
- [b] To provide in-service short courses in production technology and improve the crop production skills of national technicians, using as efficiently as possible the several sources of donor and government training funds.
- [c] To offer degree training to the Master of Science level in selected Universities in association with thesis research work at IITA, in topics consistent with the needs of the national program.

[d] To provide participation in regional conferences, seminars and workshops.

[e] To develop and implement an in-country training program.

3. Extension

[a] To coordinate activities and resource allocations between the several donor projects such as: the Netherlands, FAO, IITA and the GOM to assure that rapid multiplication of high-yielding lines is achieved and that planting materials are available for farmer clients in a timely manner.

5. Strategies and Implementation Plans

1. First Year

[a] Continue to evaluate local and IITA introduced germplasm of cassava and sweet potato. Evaluation and selection will be for resistance to diseases, pests and other important agronomic or climatic factors.

[b] Adapted improved lines, selected from the evaluation process, will be rapidly multiplied at the experiment stations in major producing areas (as described in detail in the INIA/FAO document GCP/MOZ/036/AFG). In this first year sweet potato multiplication and

distribution can be made. Initial base multiplication of cassava and sweet potatoes are now taking place from the Umbeluzi station and will continue.

- [c] Root crops technicians from INIA and the University will visit IITA headquarters for orientation and special training courses, for periods of four to six weeks.
- [d] Active participation in the ESARRN network program will continue.
- [e] Special in-country and regional courses will be organized for MOA technicians in areas of root crops technology and rapid multiplication techniques.
- [f] FSR work will continue to identify production constraints and suggest research agenda.
- [g] Explore the possibility of introducing predators and parasites for the biological control of the cassava mealybug.

2. Second Year

- [a] Continue the evaluation of selected cassava and sweet potato lines in other MOA locations and increase on-farm FSR validation trials. The best lines selected will also be used as parent material to generate new improved populations.

- [b] Start the evaluation of postharvest techniques which could be widely used throughout the country.
 - [c] Increase the multiplication of more widely accepted cassava and sweet potato lines for further distribution to farm families. Where possible, as outlined in the FAD/INIA plan, secondary multiplication and demonstration sites will be started.
 - [d] Continue the FSR work and evaluate improved tuber production practices for different cropping systems.
 - [e] Root crop scientists and technicians assigned to the national program will attend research and production training courses in the region and at IITA.
 - [f] MOA/MRCIP research technicians and extension agents will participate in in-service training with a main focus on the key constraint parameters in root crop production.
3. Third Year:
- [a] Continue the propagation and distribution of preferred improved lines of cassava and sweet potatoes.
 - [b] Better lines that have been selected will be used as parents for continued recombination activities.

- [c] Introduce at the farm level the modified production practices tested previously at research stations, or by FSR teams, for further evaluation.
- [d] Continue to popularize the most applicable post-harvest and processing methods.
- [e] Participate in regional ESARRN networking and training activities.

6. Coordination Plans

1. Staffing: Considering the possible staffing assistance that MRCIP may obtain from other donor sources, it is suggested that one full-time program coordinator be considered. This person should be an agronomist/breeder and donor supported through an IITA contract.
2. Consultancies: Funds are provided within ESARRN and other projects for short term visits of IITA staff, or other experts, to Mozambique for reviews and consultation over the life of the project.

7. Justification

Cassava and sweet potatoes are major sources of carbohydrates for Mozambique. These crops are presently plagued with diseases and pests with resulting yields far short of attainable levels. Furthermore, most of the lines grown by farmers are of low

genetic yield potential. During the last several years new germplasm has been introduced by IITA and significant yield increases have been recorded. The Government has realized the potential of root crops as a means to improve the basic food supply and provide household food security and has agreed to support a National Root Crops Program.

There has been a severe shortage of trained manpower in Mozambique, a small start has been made in training several INIA technicians at IITA, it is assured that even more will be trained through the INIA/FAO programs and from IITA/ESARRN funds. Strengthening the capabilities of the MOA will greatly improve research management and general extension.

For the past ten years IITA has been engaged in the improvement of root crop germplasm. These improved planting materials, which show strong disease and insect resistance and are high-yielding, are being made available to Mozambique. The benefits of the IITA research programs and the ESARRN regional project have been exploited by other African countries for the establishment of strong national root crop programs. There is an urgent need for this technology to be refined and applied in Mozambique. IITA, in association with other donors and the host government, can through a national root crops program make an impressive contribution towards alleviating the pressing food problems of this country.

8. Conclusions

The implementation of a national program will provide an opportunity to rapidly establish and consolidate a strong root crops research base which is urgently needed as a backup and support system for various projects already initiated. This program will sustain linkages with all participating agencies and organizations concerned with improving root and tuber crops, promote development and training of manpower for root crops research in Mozambique. It will also insure that the research momentum and direction is sustained, while at the same time encourage the optimal utilization of all resources available.

9. IITA Action Plan

<u>Activity</u>	<u>Persons/Agency</u>	<u>Date</u>
1. Invite four root crops researchers/technicians to participate in 3rd regional ESARRN workshop	J. Fernandes F. Bata I. Mugabe M. Ferrao - INIA	1-14/12/87
2. Orientation visit of director fo INIA and FAO team leader to see the organization of clean planting material multiplication and distribution in Rwanda.	M. Morais - INIA J. Castro - FAO	16-23/2/88

- | | | |
|---|---|-----------------|
| <p>3. Orientation visit of UEM entomologist and root crops scientists to IITA for planning and discussions with IITA's research team.</p> | <p>L.A. Santos
A.L. Dotto - UEM</p> | <p>4/88</p> |
| <p>4. Participation of three INIA staff in root and tuber crop production training course at IITA</p> | | <p>05-07/88</p> |
| <p>5. Organize intensive two week in-country training on the latest root crops technology.</p> | <p>20 participants</p> | <p>10/88</p> |

Table 1: The Proposed Staffing

<u>Station</u>	<u>Discipline</u>	<u>Year</u>		
		<u>1</u>	<u>2</u>	<u>3</u>
Northern Region	Agronomist	1	1	1
" "	Plant Protection Specialist	1	1	1
" "	Research Technicians	2	2	2
Maputo Area	Agronomist	1	1	1
" "	Plant Protection Specialist	1	1	1
Maputo Area	Research Technicians	2	2	2

Table 2: Proposed Trainees Schedule

<u>Category</u>	<u>Year</u>		
	<u>1</u>	<u>2</u>	<u>3</u>
In-service training at IITA	4	4	4
In-country training	20	20	20
Degree-related training	-	1	-

Table: 3 Program Budget for 3 Years

<u>Opening Costs (In US \$'000)</u>	<u>YEAR</u>		
	<u>1</u>	<u>2</u>	<u>3</u>
<u>Salary, wages and allowances:</u>			
- 1 Professional staff scientist	80	80	80
- Short-term consultancy	8	8	8
<u>Equipment:</u>			
- Tractor and accessories	20	-	-
- Vehicles (1)	10	-	-
- Nursery facilities	5	2	2
- Rapid multiplication facilities and equipment		FAO	
- Irrigation system and accessories		FAO	
- Furniture and appliances	8	-	-
<u>Research expenses:</u>			
- Off-station trials	5	5	5
- Field supplies	3	3	3
<u>Miscellaneous expenses:</u>			
- Supplies and expenses	5	5	5
- Vehicle, tractor operation and maintenance	6	6	6
- Rent, housing	10	10	10
<u>Training and workshops:</u>			
- In-service training at IITA	10	10	10
- In-country training	5	5	5
- Post-graduate (M.Sc. Fellowship)	-	20	-
- Workshops	4	4	4
<u>Travel:</u>			
- International	6	6	6
- Local	2	2	2
Total	187	166	146
Overhead @ 18%	33.6	29.8	26.3
Contingency @ 20%	37.4	33.2	29.2
Total	258.0	229.0	201.5
Grand total		688.5	
		=====	