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**Proposal for the establishment of a Southern  
African Root Crops Research Network  
(SARRNET)**

**developed by**

**The International Institute of Tropical Agriculture (IITA)**

in collaboration with

**The Southern African Centre for Cooperation in  
Agricultural Research (SACCAR)**

submitted to  
**The United States Agency for International Development  
(USAID)**

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# SUMMARY

In most of the dry and limited resource ecologies of the SADCC region, root crops, especially cassava, are already important staple foods. The area of production are usually those where long drought periods have limited the growth of other crops. Root crops, therefore, have an important role to play as household food security crops in these drought prone areas of the region.

IITA, in association with other national programs and donor agencies, has successfully operated the East and Southern Africa Root Crops Research Network (ESARRN) for the past 5 years. SADCC member countries which are active in the network are Angola, Malawi, Mozambique, Tanzania and Zambia. The participation has had impact on the programs resulting in the release of improved varieties to farmers. Improved germplasm has been generated and program staff members trained to masters level. The network has had a legitimizing effect on their root crops activity and made some of them attractive for bilateral support and increased government input.

The overall-objective of the present network addresses the four priority areas of SACCAR, namely technology generation, germplasm improvement, training and information exchange. The establishment of a fully functioning Southern Africa Root Crops Research Network (SARRNET) would continue with what ESARRN has started but with focus on SADCC countries. ESARRN operates through the NARS and is presently coordinated from within the SADCC/ICRISAT groundnut facility in Malawi. SARRNET would therefore become easily established and sustainable by the SADCC member countries within a reasonable time frame.

The project expiration date of ESARRN is September, 1992. This proposal is seeking funds to consolidate and continue the on-going root crops network activities including its coordination. A budget of one million five hundred and forty-eight thousand nine hundred US dollars (US \$1,548,900) per year for the next five years, totalling seven million seven hundred and forty-four thousand five hundred and sixty dollars (US\$7,744,560) will be needed.

# 1. INTRODUCTION

Throughout many parts of the continent repeated occurrences of drought, diseases and pests cause crop losses which result in severe human suffering. National agricultural programs with very limited resources are often unable to address these problems adequately. This is particularly the case for root and tuber crops in the SADCC countries. Further, weak linkages and limited communications have been factors contributing to the reduced interchange of ideas between countries and the development of more effective approaches to the problems that could arise from regional cooperation. In most of the dry marginal ecologies and humid high rainfall areas of the SADCC region, root crops (and more specifically cassava and sweet potato) are already important staple foods. The areas in production are usually those where long drought periods have limited the growth of other crops. The adaptability of root crops to adverse climatic conditions, their potential under low input management, and the role they play in household food security should rate them high on a list of research priorities. Yet, they have not received much attention from policy makers. Consequently, the allocation of resources for research on them to expand their production has been low compared to the potential gains.

Major bottlenecks to the realization of this potential are

- lack of improved germplasm which is adequately adapted to the mid-altitude ecologies of Southern Africa
- need for trained manpower and processing technologies for root and tuber crops

To address these problems, SACCAR, in collaboration with the national root crops programs and IITA, now proposes to create a formal Southern Africa Root Crops Research Network (SARRNET). It is envisaged that the establishment of a fully functioning network focussing on SADCC will take ten or more years. This proposal is for an initial five year first phase of activities which will consolidate the network already started.

## II THE SOUTHERN AFRICA ROOT CROPS RESEARCH NETWORK PROJECT PROPOSAL

### A. Goal

The overall goal of the project is to increase cassava and sweet potato productivity of the resource poor farmers in Southern Africa through improvement of germplasm adapted to the mid-altitude ecologies and adoption of production, processing and integrated pest management technologies throughout the region.

## **B. Purpose**

This will be a continuation of root of crops networking activities started by ESARRN.

The purpose of the network will be to

- provide a forum for the rapid exchange of technology such as improved varieties, bio-control and agronomic practices and post-harvest processing derived from the participating national programs or other institutions.
- foster collaborative approach to the setting of regional priorities of root crops research and training needs
- minimize duplication of efforts and share complimentary research responsibilities among member NARS based on their respective comparative advantage
- provide technical and some financial support that will enable NARS with lead roles to effectively discharge their responsibilities

The network will collaborate with all interested institutions and organizations that will contribute to strengthen the national programs capacities to address their root crops objectives

## **C. General objectives of the SADCC root crops research network:**

Through the activities of ESARRN, progress has been made towards the realization of some regional root crops research objectives. Within the framework of the Agricultural Research/Food Security sub-sector of SADCC, this project will easily continue and carry out some existing network objectives and address new ones to be ratified by the SACCAR board. The proposed network staffing needed to undertake this activity is shown in table 4.

### **1) Research Objectives**

- a) Originate and introduce improved root crops populations with high frequency of desirable genes to evaluate for resistance to diseases and pests and adaptability to the agro-ecologies of the region
- b) Conduct surveys in the other cassava/sweet potato producing member countries in order to establish a base-line data on root crops production, processing, marketing and consumption trend in the region
- c) Develop the post-harvest technology sector through the establishment of pilot plants to evaluate and demonstrate interventions to post-harvest constraints and other root crops products in order to encourage the diversification of their use in the region.

- d) Establish effective national biological control activities within existing plant protection units of root crops programs
- e) Establish multiplication, distribution, survey and monitoring systems in all collaborating countries in order to hasten the distribution and adoption of improved technology by farmers

Specific network objectives which have been agreed upon by collaboration and approved by the steering committee within the ESARRN framework are in ANNEX A.

## **ii) Training objectives**

An overall objective of the network is to develop manpower resources to provide continuity and improved management of research projects in the various national root crops programs. The training activities of this project would capitalize on existing training facilities and activities of SADCC.

- a) Non-degree, in service training designed for root crops, includes integrated pest management. It is designed to increase capabilities in field plot design, propagation and other appropriate study areas. (Such courses could be done in collaboration with regional resource personnel from IITA and/or national programs)
- b) Masters level degree training in areas consistent with the needs of the national programs and the region. (Degree training will be conducted at various institutions of higher learning, including regional universities, in association with IITA and other regional systems. (Schedule for training shown in table 5)
- c) Visiting scientists to visit IITA, national programs and other research organizations to improve their capabilities in dealing with specialized areas of research in root crops.
- d) Regional workshops, and group field visits and monitoring and evaluation.
- e) Farmers' field days and training

## **D. Rationale for continuing the network**

- Root crops play a significant role in meeting the daily energy and nutritional requirements of a large number of people.
- Both the production and consumption of these crops, particularly cassava, in Southern Africa is increasing and plays a key role in food security.

- These crops are well accepted and suited to the environment, and they lend themselves to the farming systems and compound gardening of the region
- Resource allocation to national research programs has been very limited
- For the past five years ESARRN has worked with NARS in the SADCC region encouraging the development of their root crops programs (TABLE 2) This effort has had some impact (APPENDIX I)
- Since this project comes to an end in September, 1992 and since the participating NARS are still too weak to continue it on their own, there will be a need to continue its support
- The network's coordination office is within the SADCC/ICRISAT groundnut facility, occupying 4 offices and screen house space ESARRN also uses the transportation, communication and other services and facilities On account of this arrangement, Malawi, a SADCC member country, is benefiting more directly from the existing regional network It would therefore be of great benefit cost ratio for SACCAR to continue from this base
- IITA provides national programs with improved high yielding, disease and pest-resistant materials, along with improved production technologies and training Similarly, the BCP has provided predators and parasites for CM and training for scientists and technicians Within the framework of a network, this support can intensify
- A few NARS have now reached the stage where they can contribute to the cooperative regional research network.
- IITA, in association with other national programs and donor agencies, has succeeded in operating the ESARRN regional network (Table 3) and is eager to consolidate its current activities for root crops with the SADCC countries
- NARS in the SADCC countries have repeatedly voiced this concern (APPENDIX II)

### **III The SARRNET Project**

The Southern Africa Root Crop Research Network (SARRNET) will serve all the SADCC member countries Most of these countries have common root crops problems, similar ecosystems, and in general, a lack of financial resources and trained manpower for root crops research. However, at the initial stage of the project not all the national programs that will participate in the Network will have equal capabilities The network will therefore differentiate

among national programs and identify the ability of each to address problems of common interest

Consistent with the foregoing objectives, which have addressed priority areas identified SACCAR (generation of germplasm and technology, manpower training and information exchange), the project activities includes research, technology transfer and training Support for these activities will come from

- a) National root crop research programs and SADCC's regional projects
- b) A I D /IDRC's support for regional networking and training activities
- c) Continuing bilateral support for national root crop research programs, as well as projected new support for selected components of the regional networking activities. [Bilateral support already exist for Malawi - IDRC Zambia - SIDA, ANGOLA - CIDA.]
- d) IITA's expertise, its improved technology, training capabilities which will be made available to SARRNET

## **A Project Inputs**

### **1. Inputs from SADCC Donors**

Proposed donor support for the network personnel, training and other costs is detailed in budget tables A-1, A-2, and A-3 In general, the donor will provide the following inputs.

- a) Both long and short-term technical assistance in areas relevant to the SARRNET Programs:
- b) Research and equipment costs for projects assigned to individual national programs in which they will work on behalf of the group and for the operation of their programs.
- c) Educational and instructional materials and supplies, rehabilitation of office and laboratory structures at leading host programs for the project scientists
- d) Travel costs for the coordinator, scientists, researchers on exchange missions, participants of short courses and workshops, evaluation missions, technical assistance teams
- e) Staff benefits and other project associated costs required by international agreements or local laws.

### **2. Inputs from IITA:**

- a) Technical backstopping of the coordinator and scientists based in the region, as well as general administrative support for SARRNET activities

b) Short term consultants of IITA scientists in areas not covered by regional expertise, distribution of genetic materials backstopping by BCP and IIBC for bio-control activities and release of predators and parasites

c) Participation of SARRNET scientists in specialized courses, and collaboration at the annual workshops

### **3. Inputs from Member Countries:**

a) Lead countries will allocate land, office space, personnel, and other resources to establish and/or maintain national root crop research programs intended to fulfill their separate research responsibilities and that of the network

b) SADCC root crops researchers will participate fully in SARRNET activities.

### **IV. Projects Outputs, Accomplishments, and Beneficiaries**

#### **1 Outputs.**

Establishing this network to strengthen and support national root crop research programs, identify research results for dissemination, and promote their utilization will result in.

a) Reduction of duplication by utilizing the talents, expertise, facilities and other resources of the SADCC regional and national programs to tackle common problems,

c) The existence of a forum for determining regional training needs for root crops research.

d) The basis for systematic socio-economic analysis, sharing of research information and the exchange of germplasm and other resources

#### **2. Phase 1 expected accomplishments:**

a) Major changes in attitudes towards root crops in the SADCC region.

b) Exchange of improved population gene pools among national programs in seed and tissue culture form for both sweet potato and cassava

c) Continued selection from population of improved lines that originated from IITA and the region which are adapted to the local conditions

d) Short- and medium-term training of 200 technicians, and up to fifteen M.Sc/Ph.D. degree candidates

- e) Formal and informal exchange of research results, e.g. the evaluation of population from a common source with a view to identify elite breeding lines as parents for specific ecologies.
- f) Varieties selected by farmers based on-farm testing will be introduced into accelerated multiplication systems for diffusion
- g) Preliminary information on the management of healthy planting material, improved processing techniques and socio-economic data based on field testing will be available.
- h) Information on consumers reaction to various forms of root crops products and their marketing potential will be available
- i) Better insight into the progress and impact of the biocontrol on the cassava mealybug and integrated pest management in general
- j) Upgraded root crops research capability and absorptive capacity of national programs

### **3. Benefits to the National Programs of the Region:**

SARRNET will have an impact on national root crops research programs by providing them with a well consolidated regional network. This will bring about a more effective, stronger and cooperating regional community of dedicated root crops scientists who no longer work in isolation from one another and share experiences and material. Direct benefits from the creation of SARRNET include:

- a) Consolidating the network already started in the region by ESARRN
- b) Providing overall guidance and direction in root crops and biological control research throughout the region
- c) Developing a mechanism for attracting additional bilateral donor support for national root crop research,
- d) Building up a continuous flow of useful information and genetic material between international centres and national programs
- e) Stimulating government and potential industrial interest in cassava based agri-business, as well as cottage industries for income generation of rural women.
- f) Building up a momentum of scientific root crops research that will enable the region to deal with various problems of the crops and thus strengthen the food security situation; and

g) Raising the level of expertise of national root crop scientists through in-service and academic training, as well as direct interaction with the regional coordinator and IARCs scientists

In addition to these direct benefits to participating countries, their farmers will benefit indirectly from the improved technologies and varieties generated within the region as a result of network activities

## **V. Project Management**

The approach of this initiative will be based on a continuity of dialogue between IITA/ESARRN and SACCAR in order to identify the strengths and weaknesses of the respective NARS on root crops research

In these discussions compliance with the SACCAR agenda of priorities for action in agriculture research technology delivery will be noted. The organization and structure of the network will comply with the recommendations made by SACCAR for network structure and management. This entails the formation of the following bodies

### **Technical Advisory Panel (TAP).**

This is the highest level of governing authority for the network and essentially functions as an oversight committee. TAP will be comprised of eight members as follows: Director of SACCAR, the Chairman of the Board of SACCAR, the Director General of the executing agency (or a designated representative), Directors of research of four NARS actively participating in network research activities, three internationally recognized scientists in the subject and donor representatives. Each director in TAP will serve as direct link between SARRNET and the agricultural authorities of NARS which are actively engaged in network research. TAP will be chaired by the Director of SACCAR and the directors will act as secretary in rotation.

The main function of TAP shall be as follows

- To set policy and ratify the strategic plan of the network
- To review the scientific and administrative activities of the network by the coordinator and scientists
- To review the annual plan and budget of the network as presented by the coordinator.
- To propose to SADCC through the Board of SACCAR additional regional activities relevant to the network other than those of the regular program and recommend termination of some activities.

It is proposed that TAP meet once a year, preferably held as an extension of the SACCAR's Board meeting (all Directors of Research of SADCC's NARS are members of the SACCAR Board) to minimize additional travel and time expenditures of TAP's members

### **Steering Committee**

This is the executive/technical and management committee whose function is to provide direction to the program, monitor and develop the strategic plan of the network, prepare the annual work program and liaise between the SACCAR directorate and the collaborating programs of the network

The steering committee shall consist of

- representatives from each of the main cassava producers in the SADCC region and the national coordinator for the NARS where the meeting is being held shall serve as chairperson
- a representative of the executing agency (different from coordinator, who shall, serve as secretary)
- representative of the executing agency (different from coordinator, who shall serve as secretary)
- representative of SACCAR, donors, collaborating institutions and scientists working in any of the lead countries shall be invited as observers to steering committee meetings

The steering committee shall have a free mandate to invite any resource person it deems important in the conduct of its activities. It shall meet at least once per year to review and help develop the annual plan of the network activities

**Coordination Office** The coordination office would be located at a place to be determined by the committee. It should be a country where cassava is very important, but does not have a well established program, but at the same time should be relatively accessible to other participating countries

**Executing agency.** It is proposed that the International Institute of Tropical Agriculture (IITA), an organization with long experience in the field of root crops research in Africa and currently the executing agency of ESARRN, be designated the executing agency of SARRNET. As the executing agency, IITA will continue to provide the scientific, training and information resource base for the network. IITA will be an active partner of the network through the coordinator and the team of specialists who will work with NARS scientists. Impact of IITA's networking activities are shown in APPENDIX I

The specific responsibilities of IITA shall continue to be as follows:

- coordination of the network activities (through the network coordinator) including training, study tours, workshops and regional information build-up
- fiscal management of the network
- deployment of the qualified team of experts composed of specialists in crucial area of research to compliment the NARS research as they gradually build their critical mass of technical staff
- provision of genetic materials and other technologies for evaluation and adoption by the network
- provision of a venue for the training of the NARS personnel on root crops research, production and post-harvest technology
- provision of liaison service with other specialized centres, institutions, universities and other external sources of knowledge deemed relevant to the objectives of the network
- provision of technical backstop service for the network's research and training needs

**Network coordinator.** The coordinator shall be responsible for the overall coordination and execution of the network activities as well as continue on-going assistance to national program leaders. The coordinator will help to provide scientific guidance, as well as serve as liaison between the Steering Committee and the implementing units of the network.

He will be assisted by professional support staff (Table 4). Generally, the coordinator/also Chief of Party or senior scientists, will dedicate his time to the support of on-going national root crops research programs and regional networking activities, including training. His efforts will be supported fully by the project. The project staff will work entirely in support of SARRNET and NARS based regional research activities.

The Coordinator will

- a) act as secretary of the Steering Committee
- b) formulate, in consultation with the NARS' head of root crops programs, the network's annual program and budget
- c) coordinate the various collaborative root crops research activities and will have the responsibility to report to donors, SACCAR board and the Steering Committee
- d) assess participating country needs and accomplishments as well as regional developments regarding performance and constraints on generic material, biological control and other factors originating from an IARC or a lead regional centre.

e) as needed, provide technical assistance to ensure that defined national root crops research goals are carried out

The overall project direction will be the responsibility of the steering committee. Participating national program heads, with approval from directors of research, will be involved in planning specific networking activities. Project activities will be jointly monitored by the donors, SACCAR, IITA (TRIPP, BCP, and CP) and representatives of the steering committee.

Duties of the specialists shall be

Breeder/agronomist, Cultivar development and testing with emphasis on adaptability to mid-altitude ecologies of the SADCC region, productivity, disease resistance and consumer acceptability. He will also interact with NARS scientists.

Socio-economist. Compile and analyse survey data, study benefit/cost ratio and impact of farmer adapted technologies, undertake studies on marketing, consumption pattern and consumer preferences.

Entomologist. Monitor and evaluate pest problems and evaluate for pest resistance for use by the breeder.

All specialists will

#work in close partnership with the coordinator

#support and carry out activities aimed to improve the skill and expertise of their counterparts

#to serve as a link with other sources of knowledge in specific areas of their expertise

**Implementing Units:** The national root crops programs are the key players in the implementation of SARRNET's activities. The network will operate taking into account the mechanisms already established within the NARS, in terms of the organizational structure of the root crops programs.

Each country with leadership role on the network will appoint a SARRNET research leader (member of the steering committee), who will continue to function within his national program but in addition will take on regional responsibilities on behalf of the network. SARRNET will provide support services so that the leader can effectively carry out the regional and national tasks. The NARS to which a lead role has been designated, will be backed up by a specialist in that special area. It is expected that such "local-point NARS" will

- provide leadership in their respective collaborative research area
- collaborate with other NARS scientists in carrying out the network activities.

- advise the coordinator on matters related to the research and activities undertaken on behalf of SARRNET
- to report on the results obtained as part of their regional activities

### **Legal, Political and Logistic Support**

**SACCAR**, the research arm of SADCC, shall provide the legal and political umbrella for SARRNET. SACCAR's main task will be to facilitate the provision of support services and coordination of activities as may be necessary in order to assist the coordinator and the NARS leaders in the design, planning, monitoring and implementation of the network's program.

The responsibilities of SADCC/SACCAR will be as follows:

- to serve as a base for the governing body (TAP) of the network
- to participate through representatives in the oversight committee (TAP) and the executive/technical committee (Steering Committee) in the overall planning, programming, budgeting and monitoring of the network
- to draw up the memorandum of understanding (MOU) among all parties involved (SACCAR, IITA, NARS) to formally establish the network and enable its effective functioning
- to provide assistance for obtaining donor support where required
- to secure, in close interaction with IITA, the coordinator, and NARS, the overall political support of the regional network activities, particularly workshops, seminars and other activities which will help promote the rapid and continuous interchange and utilization of scientific and technical information in the SADCC region

**Table 4. PROPOSED NETWORK STAFFING**

DISCIPLINE	YEAR				
	1	2	3	4	5
<b>INTERNATIONAL/SADCC</b>					
Coordinator/Principal Scientist	1	1	1	1	1
Breeder/Agronomist	1	1	1	1	1
Socioeconomic	1	1	1	1	1
Entomologist	1	1	1	1	1
<b>SADCC</b>					
Administrator	1	1	1	1	1
Monitoring Evaluation/ Documentation specialist	1	1	1	1	1
Secretaries	1	1	1	1	1
Drivers	2	2	2	2	2
General Services Staff	4	4	4	4	4

**Table 5 Proposed network training schedule**

Category		year				
		2	3	4	5	
in-service training IITA and or regional institutes	10	10	10	10	10	
In-country training	50	50	50	50	50	
Msc degrees	3	3	3	0	0	
PhD degrees	2	2	2	0	0	

## 2 Training

Although great strides have been made by IARCS in improving the productivity of root crops, a large production gap still remains at NARs. Constraints which have been identified by researchers within the region, limiting better research on these crops are

- insufficient training
- inadequate funding
- poorly equipped research facilities and lack of basic research
- weak support staff

The importance of education and training for sustainable growth and acceptability of these crops as potential contributors to improving the quality of life is being slowly recognized. This has been duly stated by SADCC "The great shortage of professional manpower in national research, extension and training structures in the region, and especially the lack of personnel with higher degrees able to assume leadership roles, are a major bottleneck in better exploiting the agricultural potential of the SADCC countries". Both formal and informal training activities are proposed to develop the manpower necessary for strong national root crops research programs and for building an effective network within the region. Several levels of training are planned (Table 5) which make increased use of regional resource people and institutions and also increase the training skills of the national organizers.

Given the five year life of project, training beyond the Masters level will be undertaken in consultation with the existing manpower development projects of SACCAR. It is planned that a total of 15 persons will receive degree training. Another 300 persons will receive short-term

training at IITA or regional centres. They will participate in appropriate activities to enhance the technical competence of regional root crops scientists. Thus students will take advantage of existing programs in management and administration.

IITA, in collaboration with SACCAR, will coordinate degree training to be pursued at regional centres of specialization or other institutions. IITA and SACCAR will also be responsible for the coordination and provision of short-term in-service and technical training for the research staff and for field visiting scientists.

### **3 Research Activities**

The SARRNET project staff will be responsible for coordinating collaborative field research activities in the region. Provision will be made for regular consultation with the appropriate (IITA/SACCAR) scientists through field visits and other appropriate levels of interaction.

Selected material which have been adapted to the major agroecological zones and have shown high stable performance can be rapidly multiplied for distribution to farmers. These lines will also be used as parent material for population improvement. Such an improved population consisting of regionally-adapted germplasm with a high level of desirable genes will be shared with other national programs for cyclic selection and recombination to upgrade the breeding population.

### **4. Technical Reporting**

Technical reporting on training and regional research activities will take the form of semi-annual narrative reports and annual technical reports to the donors and participating national program directors. Such reports will be reviewed during the evaluation.

All publications emanating from the project shall be subject to the approval of all the parties involved. Recognition will be given to the funding agencies.

### **5. Consultants**

IITA/SACCAR will assist in the selection and recruitment of consultants. The appointment of short-term consultants will be the responsibility of SARRNET in consultation with the donors.

### **6. Financial Management**

#### **a) Management of Network Funds**

All funds for network activities will be managed and accounted for by the International Institute of Tropical Agriculture and the Coordination Office. Funding in support of national program development will be disbursed directly to participating countries. Disbursements will be made according to the approved budget and in tranches, following receipt of financial statements.

on expenses previously incurred or by other forms that would be recommended by the committee and approved by SACCAR. Reimbursement from the donors will be requested accordingly.

*b) Management of Research Funds*

The network coordinator will be responsible for the day-to-day management of operating and research funds of the coordination base by means of an impress account based on the submission of expense claims.

IITA will replenish the funds. The preparation and submission of financial statements will be the responsibility of the IITA staff. The program accountant will handle salaries and allowances for project staff.

*c) Management of National Program Funds*

*Funds allocated to the national program research activities will be disbursed directly to the recipients by IITA. Disbursements will be made according to the approved budget and in tranches following receipt of financial statements or expenses incurred. Recipients will account for expenditures to IITA and the steering committee.*

**7. Program Evaluation and Audits**

At least two evaluations will be conducted during the five year life of the project. A mid-term in-house review will assess progress on the work plan. It will be shared with donors and national program directors. A final evaluation will be conducted by donor and IITA representatives or designers, in conjunction with participating country officials. This review will assess project accomplishments and determine the capability of the national programs to assume a larger role in the network. To the extent practicable, the evaluation will assess the impact of research and networking activities on crop production.

Financial audits of the project will be held as required by the donors.

# ANNEX A

## Objectives addressed by ESARRN

Realizing the early stage of root crops research programs in the region, the following networking objectives have been agreed upon within the ESARRN framework:

- a) To collect, evaluate, maintain, and exchange genetic material, or more specifically
  - 1) Collect, introduce and maintain cassava, sweet potato and yams genetic materials
  - 2) Generate and improve populations with desirable agronomic characteristics and make them available to all members
- b) To improve post harvest technology of cassava, or more specifically
  - 1) Identify and develop interventions for the processing constraints
  - 2) Improve on the existing utilization aspects and biological value of cassava with emphasis on composite flour for human consumption
  - 3) Develop the best methods for the large scale storage of cassava at main centres and cassava products in rural areas.

# SARRNET LOGICAL FRAMEWORK

## NARRATIVE SUMMARY

### Program Goal

To increase cassava and sweet potato productivity of resource poor farmers in Southern Africa through improvement and adoption of technologies, which stabilise production and optimise the productivity of inputs while sustaining the resource base

## OBJECTIVE VERIFIABLE INDICATORS

### Measures of Goal Achievement

- Sustainable and measurable increase in agriculture increase in agricultural productivity
- Cadre of well trained root crops researches
- Adoption of improved root crops technologies

## MEANS OF VERIFICATION

- Production statistics
- National programs policy statements
- NARS annual reports

## IMPORTANT ASSUMPTIONS

- Supportive government policy towards roots and tuber crops
- Appropriate inputs

### Project Purpose

To develop research collaboration among NARS and facilitate the exchange and adoption of improved technologies for cassava and sweet potato production/utilisation. To support collaborative research and training for NARS

### Conditions that will indicate purpose has been achieved

End of project status!

- Root crops research planned with a regional perspective minimizing duplication
- Active root crops programs in network countries making use of SARRNET and its strategies
- Increased allocation of NARS and donors resources to root crops research

- Regional/Network Research
- report
- NARS Root Crops reports
- Evaluation reports
- NARS Root Crops reports
- Leaders of national root crops programs

- Pledged assistance for collaboration will be provided
- National institutions are willing to continue to collaborate

**INPUTS**

- 1) Technical Assistance Staff
- 2) Consultants for Benchmark Data Base and Technology Adoption Surveys
- 3) Technical Training in-country and at IITA
- 4) Network Coordination and functions
- 5) Operational supplement to NARS for regional research
- 6) NARS support of regional research in-kind
- 7) End of project evaluation
- 8) IITA and CIP technical support

**Implemented Target**

- 1) Coordinator Scientist and, support staff in place August, 1991
- 2) Benchline data survey conducted during 1993  
Technology adoption surveys completed in 1994
- 3) 250 technicians trained in-country 50 participants trained at IITA, 5 visiting Scientists at IITA
- 4) Steering committee meets biannually, conference/workshops meet biennially  
Monitoring tours held annually
- 5) Ensure NARS have minimal operation support for regional trials annually
- 6) NARS provide staff and facilities to do regional research
- 7) Evaluation completed at intervals required
- 8) IITA and CIP provide technical advice, consultation and genetic materials as requested in annual work plans

**Means of Verification**

- Semi-annual SARRNET reports
- Steering Committee minutes reports and proceedings
- Conference/Workshop
- Proceedings
- Evaluation Report
- Budget Reports
- Survey and Data Base publication
- Increase in NARS technical capability

**Important Assumption**

- Donors funding available
- Adequate technical budget stop
- NARS will provide adequate staff for regional activities
- Countries cooperate for exchange of germplasm

<u>OUTPUTS</u>	<u>Magnitude of Output</u>	<u>Means of Verification</u>	<u>Important Assumptions</u>
1) An effective collaborative regional research systems supported by NARS in SADCC	1) - Regional research strategy and program articulated and implemented - Increased National support and participation in regional forums and research strengthened through training and communication	- Semi-annual SARRNET reports - Steering Committee minutes - Conference/Workshop Proceedings - Evaluation Report	- NARS will continue training staff in root crops research - National support for exchange of germplasm and information - Research facilities and some available for regional programs - Collaboration by research and extension staff within National Programs
2) Generation of useful germplasm and improved varieties regionally adapted and acceptable to farmers/consumers	2) - Disease and insect resistant varieties demonstrating stable yields, regional adaptability  - Demonstration of on-farm cost-benefits for new technologies adopted		
3) Benchmark data base for cassava and sweet potato production, cropping systems and production technologies	3) - Production and root crops technologies surveys of pilot villages in target regions of six countries  - Socio-economic surveys characterizing root-crops based farming systems and marketing patterns		
4) Characterization of post-harvest handling, rural processing and utilization of cassava with focus upon "better" varieties.	4) - Socio-economic surveys of cassava processing technologies and utilization in target areas  - Acceptability of simple improved processing techniques		
5) Effective transfer of germplasm and multiplication of varieties in the region, and promotion of farmer adaption	5) - Operational tissue culture units established in 2 regional centres  - Trained scientists and technicians in each country multiply and distribute new varieties rapidly		
6) Effective use of integrated pest management in the region	6) Ability for mass-rearing of beneficial organisms for IPM		

## A-1 SUMMARY BUDGET FOR THE COORDINATION OFFICE (US\$000'S)

ITEMS	1	2	3	4	5	Total
1 Salary, Wages & Allowances						
1 1 Principal staff						
1 1 1 Coordinator	95	89	93	98	102	477
1 1 2 Breeder/Agronomist	95	89	93	98	102	477
1 1 3 Socio-economist	95	89	93	98	102	477
1 1 4 Entomologist	95	89	93	98	102	477
1 1 Subtotal	380	356	372	392	408	1908
1 2 Support staff						
1 2 1 Administrative Office	15	18	21	24	27	105
1 2 2 Accountant	12	15	18	21	24	90
1 2 3 Secretary	8	11	14	18	21	72
1 2 4 Technical assistants	24	26	28	30	32	140
1 2 5 General workers	10	12	14	16	18	70
1 2 Subtotal	69	82	122	122	122	477
2 Equipment						
2 1 Vehicles	250					250
2 2 Laboratory equipment	20					20
2 3 Field equipment	30					40
2 4 Office equipment	15					15
2 5 Nursery facilities	10					10
2 6 Furniture & appliances	50					50
2 Subtotal	375					385
3 Operational expenses						
3 1 Vehicle insurance operation & maintenance	12	15	15	20	20	82
3 2 Laboratory supplies	5	5	5	5	5	25
3 3 Data base collection & documentation	40	40	10			90
3 4 Office utility	3	3	3	3	3	15
3 5 Office supplies	5	5	5	5	5	25
3 6 Communication	10	10	10	10	10	50
3 7 Research operation	15	20	20	20	20	95
3 8 Casual labour	10	10	10	10	10	50
3 Subtotal	100	108	78	73	73	432
4 Travel						
4 1 International						
4 2 Local	60	60	60	60	60	300
4 Subtotal	15	15	15	15	15	75
	75	75	75	75	75	375
5 Subtotal	999	621	647	678	678	3577
6 Central Services Cost (18%)	179 82	111 78	116 46	122 04	122 04	652 14
7 Contingency (20%)	199 8	124 2	129 4	135 6	135 6	724 6
8 Grand total	1378 62	856 98	892 86	935 64	935 64	4953 74

## A - 2 SUMMARY BUDGET FOR NETWORKING ACTIVITIES (US\$000's)

ITEMS	1	2	3	4	5	Total
1 Training & workshop						
1 1 In-service training with region & IITA	20	20	20	20	20	100
1 2 In-country training	15	15	15	15	15	75
1 3 Collaborators meeting	15	15	15	15	15	75
1 4 Degree training	60	60	36	24	24	204
1 5 Visiting scientists	10	10	10	10	10	50
1 6 Regional workshops	5	30	5	30	5	75
1 7 Farmers' training & field days	10	10	10	10	10	50
1 8 Specialized shor. courses & surveys	5	5	5	5	5	25
1 Subtotal	140	165	116	104	104	629
2 Consultancies						
2 1 Steering committee meetings & monitoring	12	12	12	12	12	60
2 2 Head of programs planning meetings	15	15	15	15	15	75
2 3 Consulting services with regional experts & universities	15	15	15	15	15	75
2 Subtotal	42	42	42	42	42	210
3 Publications						
3 1 Journal Subscription	3	3	3	3	3	15
3 2 Newsletter	5	5	5	5	5	25
3 3 Information services	5	5	5	5	5	25
3 Subtotal	13	13	13	13	13	65
4 Audit & evaluation						
4 1 Evaluation		10		10	10	30
4 2 Auditing		5	5	5	5	20
4 Subtotal		15	5	15	15	50
5 Subtotal	195	235	176	174	174	954
6 Central services cost	35.1	42.3	31.68	31.32	31.32	171.72
7 Contingency (20%)	39	47	35.2	34.8	34.8	190.8
8 Grand total	269.1	324.3	242.88	240.12	240.12	1316.52

## A-3 SUMMARY BUDGET FOR REGIONAL COLLABORATING RESEARCH PROGRAMS(US\$000)

ITEMS	1	2	3	4	5	Total
1 Collaborating national research expenses possibly from bilateral support						
1 1 Angola	50	30	30	30	30	170
1 2 Botswana	15	15	15	15	15	75
1 3 Lesotho	10	10	10	10	10	50
1 4 Malawi	20	20	20	20	20	100
1 5 Mozambique	50	30	30	30	30	170
1 6 Namibia	20	20	20	20	20	100
1 7 Tanzania	50	30	30	30	30	170
1 8 Zambia	20	20	20	20	20	100
1 9 Zimbabwe	20	20	20	20	20	100
1 Subtotal	255	195	195	195	195	1035
2 Central Services cost (18%)	45.9	35.1	35.1	35.1	35.1	186.3
3 Contingency 20%	51	39	39	39	39	207
4 Grand total	351.9	269.1	269.1	269.1	269.1	1428.3
<b>5 OVERALL GRAND TOTAL</b>	<b>1999.62</b>	<b>1450.38</b>	<b>1404.84</b>	<b>1444.86</b>	<b>1444.86</b>	<b>7744.56</b>

**Table 2 ROOT CROPS WORKSHOP IN SADCC COUNTRIES**

<b>Year</b>	<b>PLACE</b>	<b>No. of Participants</b>	<b>THEME OF WORKSHOP</b>	<b>COUNTRIES/INSTITUTES</b>	<b>SPONSORS</b>
1985	CHITEDZE MALAWI	15	Role of regional network in addressing root crops constraints	Burundi, Ethiopia, Kenya, Malawi, Rwanda, Tanzania, Uganda, Zambia, IDRC, USAID, IITA	USAID, MALAWI, IDRC, IITA (ESARRN)
1987	MZUZU MALAWI	72	Root Crops and low-input agriculture helping to meet food self-sufficiency goals in East and Southern Africa	Burundi, Ethiopia, Liberia, Malawi, Mozambique, Rwanda, Sudan, Tanzania, Uganda, Zambia, Zimbabwe	USAID, MALAWI, IDRC, UNICEF, UNDP, IITA (ESARRN)
1988	MWANZA	29	Review of ESARRN Activities	COSCA, Ethiopia, Kenya, Malawi, Rwanda, Uganda, Zambia	USAID, IDRC, TANZANIA (ESARRN)
1986	ZOMBA MALAWI	30	Strategy for integrated pest management for the control of CM	Burundi, Kenya, Malawi, Rwanda, Uganda, Tanzania, Zambia	IDRC, IIBC, IITA
1990	MANSA ZAMBIA	85	Role of crops in meeting food security and sustainability	Angola, Burundi, Ethiopia, Kenya, Malawi, Mozambique, Zambia, Zimbabwe, IITA	USAID, IDRC, IITA, SIDA, ZAMBIA (ESARRN)

**Table 3: Projects assigned to collaborating National Root Crops Programs and amount allocated US\$**

Country	Title of Project	Objective	US\$
Angola	Rapid Multiplication system for the production and distribution of healthy planting material	Establish multiplication system and management techniques needed for the maintenance of material vigor, health rapid growth and distribution	18,000
Malawi	Generating improved root crops population	Generate improved populations of both sweet potato and cassava from recombination of selected clones with specific desired characteristics	23,600
Tanzania/ Zanzibar	Improvement of cassava - based intercropping systems	Identify cassava-based intercropping systems which are economically profitable in the region	37000
Mozambique	Technology transfer	Establish a system for root crops technology dissemination to farmers	18000
Angola	Post-harvest technologies of cassava	Identify efficient cassava processing methods and design efficient drying systems Improve on its utilisation by developing suitable composite flours (cassava/malze or sorghum or millet.	
Zambia	Cassava screening for meal;bug resistance and impact of damage on farmers	Identify cassava varieties with resistance to CMB and monitor the impact of CMB on farming system in affected areas	26800

## APPENDIX I

Status of achievement of ESARRN in SADCC region.

- Table 6 - Steering Committee meetings
- Table 7 - ESARRN sponsored exchange visits
- Table 8 - Root crops in-country training courses held in SADCC countries.
- Table 9 - ESARRN sponsored root crops training in SADCC member countries
- Table 10 - Status of root crops research personnel in Southern Africa and collaborating with ESARRN.

## APPENDIX II

### Status of achievement of ESARRN in SADCC Region

#### 1 Collaborative planning

- The project activities implemented under this subjective include steering committee meetings, head of root crops program meetings, training, exchange visits, workshops and collaborative research projects

Table 6

#### A. Steering Committee Meetings

Years	Location	Dates	Observing Organisations	Programs represented	No Present	High Light of Meeting
1987	IITA	April 11-12	IITA	Rwanda Tanzania Uganda	5	Evaluation of collaborative program and approval of budget
1988	Dar-es Salaam	March 14-18	IITA USAID FAO	Uganda <u>Tanzania</u> <u>Malawi</u>	6	Evaluation of programs and ESARRN workplan update on SPAAR
1988	Mwanza Tanzania	August 24-25	IITA USAID	COSCA  <u>Malaw.</u> Rwanda <u>Tanzania</u> Uganda	7	Approval of collaborators budgets, discussion of <u>Mozambique program</u> approval of collaboration with CIBC, COSCA
1989	IITA	June 12-14	IITA USAID	<u>Malawi</u> Ethiopia Rwanda Uganda <u>Tanzania</u> <u>Zambia</u>	9	Terms of reference for steering committee, Disbursements of collaboration funds, training issues
1989	Kenya	October 13-14	CIP USAID	Ethiopia  Rwanda <u>Tanzania</u> Uganda Kenya	8	Membership of CIP to steering committee, ESARRN workplan and phase 1 extension proposal

1990	Mansa	March	USAID	CIP	8	Quarantine facility for germplasm
	Zambia	26-27	IITA	<u>Rwanda</u> <u>Ethiopia</u> <u>Zambia</u>		exchange, CIP's backstopping to ESARRN, Phase I extension quarantine facility
1990	Mansa Zambia	October 29-31	USAID IITA COSCA	<u>Ethiopia</u> <u>Malawi</u> <u>Zambia</u>	12	Report of visit to <u>Angola</u> by <u>ESARRN Consulting team</u> in-country training
1991	Nairobi Kenya	April 15-17	USAID IITA IDRC Rockefeller Foundation IIBC	<u>Kenya</u> <u>Malawi</u> <u>Rwanda</u> <u>Tanzania</u>	13	Update on ESARRN activities, Presentation of CIP, staff criteria for technical audit of ESARRN, future of ESARRN

- Note that ESARRN has always taken up the concerns of the SADCC countries in discussing and addressing its root crops problems.

## Appendix 1

**Table 7**

**ESARRN Sponsored exchange visits of SADCC Collaborating Scientists**

<b>Country</b>	<b>Number of Scientist</b>	<b>Program(s) visited</b>	<b>Activities Accomplished</b>
Angola	2	Kenya, Malawi Zambia, IITA	Orientation to program structure and developments in post-harvest activities and multiplication scheme
Angola	4	Mozambique	Participants to in-country training
Angola	4	Angola root crops program	ESARRN team of scientist evaluated the program & made recommendations
Malawi	3	Tanzania, Zambia IITA	Observation of IITA programs and orientation to bio-control activities
Malawi	4	Malawi program	Bio-Control monitoring and release of predator parasites for CM
Mozambique	4	Rwanda root crops program and IITA	Orientation to program structure and multiplication scheme
Tanzania	4	Kenya, Zambia, IITA	Resource persons in in-country training and discuss collaborative research with IITA
SADCC/PFIAU	1	IITA, Mozambique Angola	Orientation to developments in post-harvest activities and resource person to in-country training
Zambia	2	Malawi, IITA Angola	Post evaluation and orientation to multiplication scheme

## Appendix 1

**Table 8**

Root crops in-country training courses held in SADCC countries

Country	Year	No of participants	Duration	Resource persons represented	Collaborating Contributions
Malawi	1986	20	2 wks	ESARRN, IITA, Min of Agric University of Malawi	Agricultural development divisions
	1990	30	2 wks	ESARRN, IITA, CIP IIBC, University of Malawi, FAO	Ministry of Agriculture
	1991	28	2 wks	FAO, ESARRN	
	1991	6	1 wk	ESARRN, Malawi Root Crop Program, UNICEF	Ministry of Agriculture
Mozambique	1989	18	2 wks	IITA, ESARRN, UNICEF Edwards Mondlane University of Mozambique, INIA	INIA, Foundation Rockefeller UNICEF
Zambia	1988	21	2 wks	Tanzania, ESARRN ZARDEP	Ministry of Agriculture Zambia root crops program
Tanzania	1986	20	2 wks	IITA, Root Crops Program	Tanzania Agricultural Research Organisation

## Appendix 1

**Table 10**

**Status of Root Crops Research Personnel in Southern Africa and collaborating with ESARRN**

Status of country	Level of training				In-training
	Bsc	Msc	Phd	Other	
Angola	1	1	-	4	
Malawi	2	2	1	14	
Mozambique	1	-	-	3	1 Bsc
Zambia	-	1	2	7	1 Ph D 2Bsc
Tanzania	2	-	1	7	1 Ph D
Zimbabwe	1	1	-	3	
<b>Total</b>	<b>7</b>	<b>5</b>	<b>4</b>	<b>38</b>	

1 The two MSc root crops researchers in Malawi were trained with support from ESARRN.

2. The two PhD root crops scientist in the region are on short term consultancy One in Malawi on FAO support as chief technical advisor and one in Zambia as project leader for the Zambia program with bilateral support from SIDA.

## APPENDIX 1

**Table 9**

**IITA/ESARRN sponsored root crops training in SADCC Member countries**

<b>TYPE OF TRAINING</b>	<b>DURATION/ Year</b>	<b>LOCATION</b>	<b>No of Participants</b>
In-service	6 weeks	IITA	3
Tanzania	1989		
Zambia			
In-country	2 weeks	Mansa	21
	1988	Zambia	
In-country	2 weeks	Maputo	18
	1989	Mozambique	
In-country	2 weeks	Malawi	40
	1990		
In-service Malawi	6 weeks	IITA	4
Tanzania			
Zambia			
In-service	6 weeks	IITA	4
Angola	1991		
Tanzania			
In-country	2 weeks	Mansa	20
	1990	Zambia	

## **APPENDIX II**

### **Workshop Recommendations**

# **RESOLUTIONS AND RECOMMENDATIONS OF THE WORKSHOP ON ENHANCING THE CONTRIBUTIONS OF CASSAVA TO FOOD SECURITY**

**MZUZU, MALAWI, 1988**

The participants of the cassava processing and utilization workshop have made the following

## **RESOLUTIONS**

- 1 That member countries should increase cassava production to improve household food security;
- 2 That member countries should improve the storage, processing and utilisation of cassava products for human, animal and industrial use, and
- 3 That member countries should place more emphasis on policies which encourage national cassava development, including seeking technical and financial assistance from international institutions and donors,

## **RECOMMENDATIONS**

- 1 The SADCC Food Security Programme should approach SACCAR to facilitate the organisation of a workshop to assist in the urgent control of the cassava mosaic virus and cassava mealybug.
- 2 SADCC should explore the formation of a root and tuber production programme to strengthen national research and extension activities
- 3 SADCC (PFIAU) should form a committee to coordinate post harvest research and extension activities in the region.
- 4 National programmes should identify pilot projects for small scale cassava processing and fresh tuber storage, for possible funding through SADCC
- 5 National programmes should develop and indicate to SADCC (PFIAU) their short and long term training requirements in post harvest technology
- 6 SADCC should explore with IITA the possibilities for providing training to the Portuguese speaking countries of Angola and Mozambique.
7. SADCC should recommend to IITA that it increases its level of support to the SADCC countries
- 8 ESARRN should explore the possibilities of expanding its mandate to include funding of national programs in its member countries

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

The third Eastern and Southern Africa Region-1 Root Crops Workshop took place in 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 resolve as follows -

1. Considering the resolutions contained in the Lagos Plan of action calling African countries to be self sufficient in food security by the year 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. The 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 post harvest technology, governments are urged to support both research and extension programmes to reduce the pre-and post harvest losses

3 Recognizing that there is 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 centers and development organisations are urged 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 their 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, 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 and other 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 realise 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 within the region

- 5 Systemised studies to establish crop losses caused by pests, diseases and weeds should be continued and the methodologies be standardised 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 weevil), diseases (cassava mosaic, cassava bacterial blight, sweet potato mosaic virus and tuberrot 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 pest management systems
- 8 In-country and regional training for research and extension staff be organised 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.

### **RESOLUTIONS AND RECOMMENDATIONS OF THE THIRD EAST AND SOUTHERN AFRICA HEADS OF ROOT CROPS RESEARCH PROGRAMS MEETING**

Participants to the third meeting of the East and Southern Africa Heads of Root Crops Research Programs in Mwanza, Tanzania from August 22 - 25, 1988 resolved the following -

1. Considering the growing concern for the root crops, especially cassava and sweet potato and the role they play in helping to meet food self sufficiency and food security and considering the resolutions of the Malawi workshop of 1987, which called upon governments and international organisations to recognise, approve and support the Network, the third meeting of the East and Southern African Head of Root Crops Improvement Programs and to use the Structure and linkages (already) established by the East and Southern Africa Root Crops Research Network (ESARRN) for efficient utilisation of regional resources
2. Noting the encouraging progress the collaborating programs have made in their respective Network projects (with limited resources), collaborators are urged to continue their efforts to address root crops problems of both national and regional interests.
3. Recognizing the very severe shortage of manpower in implementing national research programs this meeting urges national governments and donors to put special emphasis on manpower development within the region
4. Realising the need for base-line information on cassava in Africa, the participants welcome the IITA/CIAT cassava socio-economic study and urges member countries to give it the necessary support
5. The government of Tanzania is specially thanked for hosting the meeting. The donors and all contributing government are also thanked for their support and encouragement.

This meeting having reviewed the progress made by the Network during the past year, has identified the following measures necessary to strengthen ESARRN activities:-

1. All ESARRN research activities should be critically evaluated in order to ensure that target objectives are achievable within the given limited time frame, so as to avoid undue strain on the collaborating program
2. To increase the number of in-country and regional training for researchers and extension staff with special consideration to less endowed programs
3. To identify means which will expedite disbursements and other inputs to recipient programs so as to expedite reports on expenditures and progress
4. To exploit appropriate means, within quarantine regulation to facilitate the collection and increase in exchange of valuable germplasm material within the region for further evaluation and exploitation
5. In order to increase the availability of improved and healthy planting material to farmers, national programs should establish basic multiplication plot and internal national Networks to facilitate distribution of planting material
6. To strengthen the linkages among collaborators within and between the region through the use of the ESARRN Newsletter, exchange visits and other appropriate measures.
7. ESARRN should address with urgency and strengthen its long term training plans in order to focus on the weak areas of specialization within the region especially in the field of post-harvest technology. IITA should increase its support to post-harvest activities of national programs especially in their efforts to understand and improve on local processing, storage methods and utilization of root crops
8. In order to intensify efforts in addressing the cassava mealybug problem, IITA is encouraged to consolidate its bio-control activities by locating an entomologist in the region. National programs should strengthen their strategies of integrated approach (Biological control, host-plant resistance, cultural practices as well as supply of healthy planting material) for the control of the pest.
9. To intensify efforts in collecting and analyzing all meaningful data that will constitute relevant base-line information for ESARRN's future activities.