

**An Evaluation of  
Regional Research Networks for  
Cassava, Beans, Agroforestry,  
Potatoes and Sweet Potatoes**

**A Collaborative Research Program  
in East Africa  
among National and International  
Research and Development Agencies**

**USAID Project 698-0478,  
Policy, Analysis, Research, and Technical Support**

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# **AN EVALUATION OF REGIONAL RESEARCH NETWORKS FOR CASSAVA, BEANS, AGROFORESTRY, POTATOES AND SWEET POTATOES**

*A Collaborative Research Program in East Africa among National and International  
Research and Developmental Agencies (USAID Project 698-0478, Policy Analysis,  
Research and Technical Support)*

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## TABLE OF CONTENTS

<b>ACKNOWLEDGMENTS</b> .....	v
<b>ACRONYMS</b> .....	vi
<b>EXECUTIVE SUMMARY</b> .....	vii
<b>I. INTRODUCTION</b> .....	1
I.1a.(1) RATIONALE FOR THE PROJECT .....	1
I.1a.(2) SPECIFIC BACKGROUND AND THE CURRENT CONTEXT FOR THE EVALUATION .....	2
I.1b. PROJECT DESIGN .....	2
I.1c. CHARACTERISTICS OF FUNCTIONAL NETWORKS .....	4
I.1d. THE PROJECT MANAGEMENT SYSTEM .....	6
I.1e. THE PURPOSE OF THE EVALUATION .....	7
<b>II. TECHNOLOGY DEVELOPMENT, EXCHANGE AND DISSEMINATION</b> .....	7
II.1a. PRIORITY SETTING AND RESEARCH PLANNING .....	7
II.1b. RECEPTION, SCREENING, AND AVAILABILITY OF TECHNOLOGY ..	14
II.1c. MONITORING .....	18
II.1d. IMPACTS OF REGIONAL COLLABORATION .....	19
II.2a RELEVANCE OF REGIONAL AGENDA TO NARS DEVELOPMENTAL PRIORITIES .....	25
II.2b. TECHNOLOGIES TRANSFERRED ACROSS THE NETWORKS .....	26
II.2c. DEPENDENCE OF NARS ON NETWORK TECHNOLOGIES .....	28
II.2d. TESTING OF TECHNOLOGIES UNDER FARMER CONDITIONS .....	31
II.2e NETWORK CONTRIBUTIONS TO NATIONAL TRAINING AND TECHNICAL NEEDS .....	31
II.3 TECHNOLOGY, BASELINE DATA, RELEASES, AND THE PIPELINE ...	36
II.4. NETWORK PUBLICATIONS .....	38
II.5. COMPLEMENTARITY OF IARC ACTIVITIES AND NARS PROGRAMS	40
II.6 RECOMMENDATIONS .....	44
II.1a. PRIORITY SETTING AND RESEARCH PLANNING .....	44
II.1b. RECEPTION, SCREENING, AND AVAILABILITY OF TECHNOLOGY	45
II.1c MONITORING .....	45
II.2a RELEVANCE OF REGIONAL AGENDA TO NARS DEVELOPMENTAL PRIORITIES .....	45
II.4 COMPLEMENTARITY OF IARC ACTIVITIES AND NARS PROGRAMS	46
<b>III. NETWORK ADMINISTRATION AND MANAGEMENT</b> .....	46
III.1 RESEARCH ADMINISTRATION AND COORDINATION .....	46

III.2. IARC CONTRIBUTIONS TO ADMINISTRATION AND MANAGEMENT .....	48
III.3. EXTENT OF ADEQUATE NATIONAL/BILATERAL SUPPORT .....	52
III.4. NARS PARTICIPATION IN THE NETWORKS .....	52
III.5. INVOLVEMENT OF NARS DIRECTORS IN REGIONAL NETWORK PRIORITY SETTING AND MANAGEMENT .....	53
III.6. NETWORK PRIORITIES IN REGARD TO REGIONAL PRIORITIES ...	54
III.7. COST EFFECTIVE MANAGEMENT APPROACHES .....	56
III.8. ROLES AND RELATIONSHIPS FOR THE NEAR TERM .....	57
III.9. POTENTIAL SUSTAINABILITY OF NETWORKS WITHOUT USAID FUNDING .....	59
III.10. USAID MANAGEMENT BACKGROUND .....	59
<b>IV FINANCIAL MANAGEMENT .....</b>	<b>62</b>
<b>V. CAPACITY BUILDING .....</b>	<b>70</b>
V.1. SUMMARY .....	70
V.2. EFFECTIVENESS OF TRAINING .....	71
V.3. ASSESSMENT OF NETWORK'S IMPACTS ON NARS' CONTRIBUTION TO VARIOUS NATIONAL DEVELOPMENT OBJECTIVES .....	71
V.4. DO THE NETWORKS INCREASE NARS RESOURCES OR SUBSTITUTE FOR THEM? .....	72
V.5. ARE NARS ASSUMING GREATER RESPONSIBILITIES FOR THE NETWORKS? .....	72
V.6. WHAT ARE THE PROSPECTS OF MAINTAINING THE NETWORKS WITHOUT IARC BACKSTOPPING? .....	73
V.7. CONCLUSIONS AND RECOMMENDATIONS .....	73
<b>VI. LESSONS LEARNED .....</b>	<b>74</b>
<b>APPENDICES</b>	
1. SCOPE OF WORK (Terms of Reference) .....	76
2. ITINERARY OF THE AGRICULTURAL EVALUATION TEAM .....	81
3. PERSONS CONSULTED .....	83
4. SAMPLE TRAINING SCHEDULE, PRAPACE, 1995 .....	88
5. MATERIALS AND TECHNOLOGIES INTRODUCED AND DISTRIBUTED ...	89
6. METHODOLOGY .....	96
7. ILLUSTRATIVE MATERIAL REVIEWED .....	97
8. NETWORK RESPONSES TO THE DRAFT REPORT AND COMMENTS ON THEIR RESPONSE (POSTSCRIPT) .....	99

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Unfortunately the time available for the field work did not allow the team to fully utilize all the available assistance. In particular, we were unable to visit the Tree Seed Center, the University of Nairobi, nor ISAR's work in Rwanda. We regret missing these opportunities and, in the case of ISAR, for the breakdown in communication which failed to transmit our earlier apologies and which resulted in their having gone to considerable effort for naught.

The team is also thankful for the support provided by USAID's REDSO/EA, the Global Bureau, the Africa Bureau's Office of Sustainable Development, and the Productive Sector Growth and Environment Division.



## ACRONYMS

AFRENA	Eastern Africa Agroforestry Research Network
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
CD	Committee of Directors
CGIAR	Consultative Group on International Agricultural Research
CIAT	Centro Internacional de Agricultura Tropical
CIP	Centro Internacional de la Papa
CRSP	Collaborative Research Support Program
EABRN	Eastern Africa Bean Research Network
EARRNET	Eastern Africa Root Crops Research Network
ESARRN	Eastern and Southern Africa Root Crops Research Network
FFA	Framework for Action
FOFIFA	Centre National de la Recherche Appliquée au Développement Rural
HQ	Head Quarters
IARC	International Agricultural Research Center
ICRAF	International Center for Research in Agroforestry
IITA	International Institute of Tropical Agriculture
INERA	Institut National pour l'Etude et la Recherche Agronomique (Zaire)
IRAZ	Institut de Recherche Agronomique et Zootechnique
ISABU	Institut des Sciences Agronomiques du Burundi
ISAR	Institut des Sciences Agronomiques (Rwanda)
ISNAR	International Service for National Agricultural Research
KARI	Kenya Agricultural Research Institute
KEFRI	Kenya Forestry Research Institute
NARI	National Agricultural Research Institution
NARO	National Agricultural Research Organisation (Uganda)
NARS	National Agricultural Research System
NBP	National Bean Program
NCST	National Council for Science and Technology
NGO	Non Governmental Organization
NRI	National Resource Institute (Great Britain)
PNAP	Programme National d'Amélioration de la Pomme de Terre
PRAPAC	Programme Régional d'Amélioration de la Pomme de Terre en Afrique Centrale
PRAPACE	Programme Régional d'Amélioration de la Pomme de Terre et de la Patate Douce en Afrique Centrale et de l'Est
R&D	Research and Development
REDSO/EA	Regional Economics Development Support Office
RESAPAC	Réseau pour l'Amélioration du Haricot ( <i>Phaseolus vulgaris</i> ) dans la Région de l'Afrique Centrale
SABRN	Southern Africa Bean Research Network
SACCAR	Southern Africa Centre for Cooperation in Agricultural Research
SADC	Southern Africa Assembly for Development Coordination
SARRNET	Southern Africa Rootcrops Research Network
SC	Steering Committee
SPAAR	Special Program for African Agricultural Research
USAID	U.S. Agency for International Development



# EXECUTIVE SUMMARY

## I The Project Design and Its Current Relevance

The validity of the problems being addressed by the project--the need for regional agricultural research and the creation of an institution to carry out the activities-- remain valid today as they were at the outset of the project in the mid 1980's. The current phase of the project (1993-1997) was approved based upon the commodities having impact potential and that the research management could be institutionalized - that is, being fully managed by African institutions or having made significant progress toward the goal. The management entities are functioning but not yet full "institutionalized." The impacts of the project are now evident and the research continues to hold significant promise from a technological perspective and for cost efficiency in use of international, regional and national resources.

Unfortunately, the project is beginning to deteriorate in terms of the amount of research being conducted and with respect to the ratio of research to management costs. This is due to the reduction of overall funding levels wherein minimum staffing levels are required for maintenance of the project leaving research to be reduced.

Recommendation: That the research budgets be increased for the networks. If this is not possible and only a fixed level of financing is available, then the most productive networks should be supported rather than witness a withering of all four networks.

If additional funding is possible, the orders of magnitude for increase might be in the 60-70 percent range above the base of \$450,000 per network, per year. The funds should be used for research subprojects or activities directly supportive of research, its selection, design and monitoring.

## II Planning for the Next Phase of Network Development

For reasons which were perhaps good and sufficient at the outset of the project, the description of what was to be expected at the end of external support was not set forth. Yet, having such targets would be useful and should now be developed in a participatory fashion- i.e. by the entities involved. A series of planning efforts should explicitly address such items as: a) the current and expected roles and operational models of agroforestry networks and the cassava network(s); b) the relationships, responsibilities and authorities of the networks and their Secretariat--the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA); c) the level and types of research to be conducted under various budget assumptions; and d) the expected structure and financial sources at the end of the next five-year period. Hopefully, this would complete the developmental phase of institutional building, leaving routine operations thereafter.

Recommendation : The project should be prepared to finance the necessary workshops or design efforts needed to specify the institutional objectives for the next five years.

### **III The International Center for Research in Agroforestry (ICRAF) and the East Africa Agroforestry Research Network (AFRENA)**

ICRAF presently records the USAID network grant as multilateral funding and programs its use without the benefit of a network steering committee and, on occasion, without significant input from national program leaders.

Recommendation: That ICRAF and AFRENA segregate the USAID network grant from other financing and program its use collaboratively with its colleagues and generally operate in an increasingly collaborative fashion as do other networks.

### **IV Technology Development and Dissemination**

The project success in technology development and dissemination is best attested to by its significant impacts among farmers (see Section II) and through its improved and more rapid use of limited resources in a very cost effective manner. This is not to say things are perfect. Section II contains a number of recommendations for improving, but not fundamentally altering, the content or approaches of the project.

Recommendations: Given the levels of financing which become available, the project managers should review the specific list of recommendations and address them according to the priorities which they may assign to the problems highlighted in Section II.

### **V Management Structure and Relationships**

With the exceptions of the modifications recommended for the ICRAF/AFRENA network, the management structure and relationships among a relatively complex web (network) of actors is basically satisfactory. The selection of work to be done is relevant and having considerable impacts. It involves the appropriate people and institutions.

Recommendations: Assuming adequate funding becomes available, the project should employ its full staff and continue the devolution of management decisions as is currently being done.

### **VI Financial Management**

The financial management procedures and performances are generally adequate. The exceptions cited in Section I Vare for specific instances not of a fundamental nature. The

project has appropriately moved financial management decisions increasingly closer to the operational entities involved with the use of the funds.

Recommendations: That the basic grant remain with the GG/IARC system and that management of use of the funds continue to be decentralized to the extent the grantees' responsibilities allow this to take place.

## **VII Relative Shifts in Locale of and Responsibilities for Research Endeavors**

The evaluation team found that in the countries visited there is considerable underutilized national research capability--lacking funding to be fully operational. Further, that these resources can be activated at low cost relative to the IARC's or their Regional Operations. And these latter institutions are already constrained in their work due to budgetary limitations. For regional research the implication is that efficiencies may be found in employing more national institutions and relatively less IARC/Regional Office's resources. To the extent the above generalization holds true for "regional research", it may also be relevant for the divisions of work for "national research" done in collaboration with IARCs.

Recommendations: That (to the extent that it is not already being done) USAID and other external investors in the International/Regional/National research systems assess the types of research likely to be needed for the next decade and levels of investments in various systems with the objective of looking at relative shifts in amounts and levels of investments in the various elements of the overall system.



## **I. INTRODUCTION**

### **I.1a.(1) RATIONALE FOR THE PROJECT**

USAID's strategy for national development has long recognized the importance of exploiting productive agricultural opportunities. Development history supports the conclusion that a highly productive agricultural sector results in enhanced producer and consumer welfare. Economic growth is generally also more rapid than would be the case with slower or stagnant growth in the agricultural sector. USAID's tactics for assisting in development of the agricultural sector have taken many forms. These include production campaigns, agricultural university development, extension projects, agriculture credit efforts and agricultural research projects. The latter has included assistance to national systems. USAID also has used commodity/research efforts wherein existing production opportunities were exploited and then researchable constraints were identified and addressed. Nearly all of these efforts were national projects supported by bilateral missions, for example USAID/Kenya or USAID/Sudan.

In the 1970's and early 1980's, it became evident that a number of newly independent nations needed agricultural development assistance. This was particularly true in Africa. It also became apparent that USAID could not assist each and every country. The need for a more efficient tactic, other than bilateral support, was called for. (Additionally, some USAID officials may not have been enthused about the agricultural sector generally or research in particular). The period coincided with the flow of promising genetic materials and information from the commodity oriented International Agricultural Research Centers (the IARCS) in which USAID was a significant investor.

As a consequence of the factors mentioned, the African Bureau of USAID decided, in part, to promote the generation of improved technology through networks of regional research. The intention was to capitalize upon national research capabilities and the IARC's information and infrastructure. The IARC's had several main stations as well as regional programs in Africa. The research networks were commodity oriented and, in a very informal fashion, linked national programs to one another and to the IARCs. Several national agricultural research systems (NARS) in Africa were still assisted by bilateral projects but less so than in other USAID-geographic regions.

The rationale for the project's networks was essentially efficiency driven. The networks were designed to pool talents across country borders to address shared agricultural problems. This will appear to be somewhat less compelling than addressing a multi-country river basin or situations in which very small countries simply can not afford the "lumpy" large investment required for a full-blown national research system. The rationale for efficiency probably is stronger today than in the 1980's as all public expenditures are under close surveillance.

## **I.1a.(2) SPECIFIC BACKGROUND AND THE CURRENT CONTEXT FOR THE EVALUATION**

The need for an evaluation for the current investments of \$7.2 million for FY 1993-96 has evolved from a series of prior experiences and investments in regional agriculture research which has provided good results. The initial regional work was done under the Strengthening African Agricultural Research and Faculties of Agriculture Project - SAARFA. That effort supported research on twelve commodity or livestock production problems. The overall results of the project were successful, and follow-on efforts were highly recommended.

For work in East Africa, the four most promising candidates for further support were beans, cassava, potatoes and sweet potatoes, and work in agroforestry. These were selected on the basis of potential impacts and a likelihood of early-on management by African institutions and African scientists (Policy, Analysis, Research and Technical Support Project (PARTS) page 34).

The implication of the initial financing was that if the impacts materialized and if significant progress was made toward devolution of management, the networks might then be considered for further financing. Hence, the need to test whether these objectives have been met.

In addition to the evaluation of the project per se, the evaluation might also provide some insights into overall research systems and the relationship among the various national and international agencies involved in the important agricultural sector.

Specifically, the evaluation will ascertain (1) whether the AID/Africa Bureau's Office of Sustainable Development grant's of \$7.2 million for FY 1993-1996 has been a worthwhile investment in terms of meeting its anticipated impacts and institutional development objectives; (2) whether future investments appear warranted; and (3) if additional resources for a further phase are recommended and at what orders of magnitude should these be, and for what general purposes.

## **I.1b. PROJECT DESIGN**

In its present form, the USAID investment in the networks does not have a project format but is a component of a larger multipurpose, centrally funded effort. Nevertheless, this evaluation shall refer to the development effort as the "project". In retrospect, the project's identified problem, goal and purposes were roughly as follows.

**THE PROBLEM:** Productive information and materials are not available to farmers in a timely nor sufficient manner. This problem can be addressed, in part, by better linkages between international research centers, national centers and the agricultural development communities, broadly defined.

**THE GOAL:** To improve agricultural productivity.

## **THE PURPOSES:**

1. To produce sustainable agricultural technology and promote its utilization.
2. To create an institutional framework enabling participating NARS to finance and manage regional agricultural research.

## **OUTPUTS:** Key outputs expected from the project were as follows.

1. Research information and productive technology.
2. Improved institutional capacity
  - (a) at the research station level
  - (b) at the networking level.
3. Links to the outreach, extension and the agricultural development community, broadly defined.
4. Direct contributions to impacts benefiting consumers and farmers.

## **INPUTS:** Critical inputs were as follows.

1. Availability of national scientists, support staff and research sites.
2. Management systems, including monitoring of results and linkages to support growth.
3. Timely financial assistance.

## The objective of the evaluation is to attempt to assess:

1. The validity of the problem statement and the tactical approach of networking, and
2. Progress towards achievement of the purposes.

## The four commodity networks for East Africa are:

**Beans** - with activities in Uganda, Madagascar, Ethiopia, Mauritius, Kenya, Sudan, Burundi, Rwanda, Zaire, and Tanzania. The official and regionally recognized name of this network is the East and Central Africa Bean Research Network (ECABREN). This network represents the union of the Great Lakes Bean Research Network (RESAPAC in French) which began in 1983

and the Eastern Africa Bean Research Network (EABRN) which began in 1985. The Center for Tropical Agriculture (CIAT), Cali, Colombia, is the International Agricultural Research Center (IARC) backstopping this network. As of 1996, the main regional office of CIAT is located near Kampala, Uganda, at the Kawanda Research Station.

**Cassava** - with activities in Uganda, Madagascar, Kenya, Burundi, Rwanda, and Zaire. The official and regionally recognized name of this network is the East Africa Root Crops Research Network (EARRNET). While this network was formally initiated in 1994, it represents a partial continuation of a USAID-supported network known as the East and Southern Africa Root Crops Research Network (ESARRN). This earlier network started informally in 1984 and continued until 1993. The IARC providing backstopping to all these cassava networks is the International Institute for Tropical Agriculture (IITA), headquartered in Ibadan, Nigeria, with a regional sub-center at Namulonge, Uganda. This IITA regional center, known as the East and Southern African Regional Center (ESARC) was established in 1994.

**Potatoes/Sweetpotatoes** - with activities in Uganda, Ethiopia, Kenya, Burundi, Rwanda, Eritrea, and Zaire. This network's acronym, PRAPACE stands for the French equivalent of the Regional Program for the Improvement of Potato and Sweetpotato in Central and East Africa. The potato thrust of PRAPACE started in 1982; sweetpotatoes were added to it's mandate in 1992. The IARC backstopping is provided by CIP, the International Potato Center, headquartered in Lima, Peru and with a regional office in Nairobi, Kenya.

**Agroforestry** - with programs in Uganda, Kenya, Burundi, and Rwanda. The East Africa Agroforestry Research Network (AFRENA) was started in 1988, with IARC technical backstopping provided by the International Center for Research in Agroforestry (ICRAF), headquartered in Nairobi, Kenya.

When evaluating the impacts of these networks, it is important to emphasize that regional collaboration on beans and potatoes has a much longer history than that on sweetpotatoes and agroforestry. Cassava is in a somewhat intermediary position as USAID supported activities have spanned more than a decade, but the regional character of the efforts is but 2 to 3 years old.

### **I.1c. CHARACTERISTICS OF FUNCTIONAL NETWORKS**

In a May 1992 "Memorandum of Understanding between the Africa Bureau and the Research and Development Bureau to Support Research Networks in Africa", the general characteristics of functional networks were listed in detail (Table 1). The evaluation team broadly used these general guidelines in assessing the performance of the four networks under review.

In assessing particularly the importance of the four networks in the East and Central African region, the evaluation team would also like to highlight that:

- networks can help weak national programs have access to technologies they would

have difficulty developing themselves; and

- they can offer a stability in agricultural R&D, in spite of acute national fluctuations. (That is, networks can help buffer R&D in the region from discontinuity).

Also, from the outset of this report, it should be made clear that the time span of the review (1992-1996) has not been an easy one for several of the network member countries: Rwanda has survived the worst genocide in history; Burundi is still in the middle of a civil war; and Zairian agricultural research is operating in the midst of considerable political instability. That research takes place at all in these countries is partially a tribute to the strengths of the USAID-supported networks.

Table 1. Characteristics and Benefits of Functional Networks

General characteristics of functional research networks:

- they cross national boundaries;
- they focus efforts on research problems/themes unique to the particular eco-regional area;
- they serve as a conduit for the exchange/flow of the international body of knowledge and technology relevant to a particular research problem/theme;
- they serve as a means for, and do achieve, collaboration among different countries in a region on issues of common interest;
- they serve as an important source of information to assess the impacts of investments in research on the development and utilization of higher yielding technology.

Benefits from a networking activity accrue when it:

- accelerates the process of technology development;
- facilitates spill over from technology development efforts from one country to another;
- reduces duplication of effort among NARS;
- provides a forum for peer review of technical findings; and
- improves the performance and productivity of scientists and NARS.

Source: Anon, 1992.

#### **I.1d. THE PROJECT MANAGEMENT SYSTEM**

The project management system consists of a grant, based upon the grantees having demonstrated to USAID that they are fully capable of managing a grant and that such a grant is in the best interest of USAID's developmental objectives. The USAID grant is passed through the Consultative Group on International Agricultural Research (CGIAR) secretariat in the World

Bank to the IARC's Regional Offices in East Africa and then it is utilized for project objectives. In the early years of the project funding, management decisions for each network were often under the control of an IARC Regional Officer who served as the Commodity Network Research Coordinator (a.k.a. Regional Coordinator). This key person became the major accountable officer for the grantee although decisions of what was to take place rested with a regional committee.

The approval of what research and training activities are to take place and invitations to join the networks rest with the Committee of Directors (CD), that is, the national directors of the research systems - the NARS. The technical proposals are reviewed and recommended by a governing committee for each network, variously known as the Steering Committee, Executive Committee or the Technical Committee. Proposals are reviewed against various strategic objectives viz the commodities and the nature of commodity problems. (The technical oversight specifics are discussed in detail, by network, in sections. II. 1a through II. 1c).

Over time, management and ownership of the project have shifted by varying degrees to the stakeholder institutions. This building of institutional capacity is a major objective of the project. The degree of change in management will be addressed in detail in the body of this report.

### **I.1e. THE PURPOSE OF THE EVALUATION**

The evaluation of the project will assess whether the project is making a significant contribution to its objective at the goal level (improving agricultural productivity), at the purpose level of generating improved farming technology, and at the institutional level of creating an improved capacity for continued technology development and for identifying and carrying out regional agricultural research (networking on a multi-country basis). The evaluation team will subsequently make recommendations for improving project performance.

## **II. TECHNOLOGY DEVELOPMENT, EXCHANGE AND DISSEMINATION**

### **II.1a. PRIORITY SETTING AND RESEARCH PLANNING**

#### **Priority Setting**

Each network has engaged in a priority setting procedure to identify the research areas in which to concentrate efforts. The procedures used varied among networks but formed the basis for planning of the research activities in which each has been engaged.

**AFRENA (Agroforestry network)** Prior to 1994, research priorities within the AFRENA network were established by evaluating each major technology under investigation against 12 criteria. These criteria related to the adoption potential of a technology, it's researchability, and

it's potential impact. On the basis of these criteria, technologies were rated from high to low potential. Constraints within the high potential group were targeted to receive greatest attention, although sites of lower priority but of site specific interest were not totally excluded. In 1994, needs and constraints were reviewed by AFRENA for the East Africa region. Based on an analysis of six sites in the four countries belonging to the network, four issues were identified as priorities: soil fertility and productivity on flat to gently sloping land, soil conservation/fertility on sloping land, wood production, and fodder production. Each of these issues was designated to be a "flagship theme" and one or more of the six sites were assigned lead responsibility for research and synthesis on it. Themes in addition to the flagship theme assigned to the site could be pursued if relevant to the site and country.

**EARRNET (Cassava network)** Priorities within EARRNET were established by ranking the importance of 5 constraint themes on a country by country basis and adopting the sum of the resulting ranking scores as the regional priority ranking. Thus, the constraint theme "multiplication and distribution of clean planting material" which received the top priority ranking in each country also received top priority at the theme level. Additional themes considered were genetic improvement, post-harvest technology, plant health, and agronomy, and were ranked from 2 to 5, respectively. Further, each theme was divided into subtopics which were ranked to permit identification of country specific constraints within a theme and to provide guidance in the research planning process. These themes plus "technology transfer and technology assessment" are the topics of collaborative regional research; one or more countries have assumed a lead role in addressing each of the regional research topics on behalf of the network with the expectation that the results from such activities will have a regional impact. The process described above is also agro-ecologically biased.

**ECABREN (Bean network)** ECABREN results from the union of two bean networks, RESAPAC which operated in the Great Lakes Region and EABRN which operated in Eastern Africa. To identify the major constraints to production, both groups used an analytical approach known as "Participatory Planning by Objectives" (PPO) which first elaborates a 'tree of problems' and then a comparable 'tree of research strategies' for possible solutions. The current network's priorities represent an amalgamation of priorities of both groups and were updated in 1995. Categories of priorities include biotic, abiotic, and socio-economic and policy constraints, each of which is subdivided with prioritization at both the theme (constraint) and subtopic level. In contrast with the procedure of EARRNET, identification of constraints was carried out on an agro-ecological zone basis rather than a country-by-country basis. An underlying expectation in this approach is that technologies developed by one participant will likely transfer to another in a similar agro-ecological zone independent of national borders. Research activities are approved on the basis of the cooperating institution's interest and capability to perform the work.

**PRAPACE (Potato and Sweetpotato network)** In PRAPACE, constraints were identified for different agro-ecologies in the region. Priority research agendas related to them were established among the network countries as regional mandates. The mandates were based upon the importance of the problem at the research site, the availability and capacity of human resources to conduct the research and the overall likelihood of success. Each country was expected to

accept one or more mandates of relevance to its production situation. Results obtained in one country were expected to be easily adaptable to similar agro-ecologies elsewhere in the region.

**Recommendation:**

- 1. The actual procedures used for priority setting should be revisited to assure that the research program is not simply technology driven or driven by the subjects already being explored. As suggested by Prof. Mukiibi, Director of the Ugandan NARO and Chair of ASARECA, the priority setting process itself needs to "become more scientific". The "Planning by Objectives" (PPO) approach offers one comprehensive tool, which looks at problems and the interrelationships among problems.**

**Activity Planning**

Steering Committee

Technical coordination in each of three networks reviewed is provided by a group composed of the national commodity program leaders and the network's coordinator. This group is named Steering Committee (SC) in the case of EARRNET and ECABREN and Executive Committee (EC) in the case of PRAPACE. In each network, this technical body generally serves to review the results of completed research as well as that in progress, invite and evaluate new research proposals, and decide on allocation of resources among network activities, including activities such as training. The size of the group varies with network since only one person attends from each member country (two in the case of PRAPACE since two crops are covered, eg. potatoes and sweetpotatoes). This person is usually the head of the national commodity program in question. The meeting schedule is once per year for EARRNET and ECABREN and twice for PRAPACE. Recommendations of each of these groups are forwarded to a board comprised of directors of the member institutions (known as the 'Committee of Directors') for final approval

AFRENA has not had a SC since 1994 when a Regional Steering Committee consisting of the Directors of the national agriculture and forestry institutions, as well as the AFRENA Regional Coordinator and representatives from ICRAF, was abandoned. Even though this SC will be revived in 1997, it may not be comparable to the SCs of the other networks which are essentially technical in composition. Technical oversight in this network appears to come from a body denominated the Regional Technical Committee consisting of country agroforestry research leaders, leading AFRENA national scientists and ICRAF outposted AFRENA scientists and Programme Coordinators from ICRAF/AFRENA. It's composition was much more weighted towards IARC (ICRAF) representation than is that in the other networks; also, the committee provides for limited involvement, if any at all, of NARS scientists in the allocation of network resources. (In early 1997 after the field work of this report, the ICRAF/AFRENA Technical Committee has been reinstated - see Appendix 8.)

Composition of the technical guiding groups has been a concern in the commodity networks.

At least in the first years following formation of each network, breadth of disciplinary representation tended to be limited, with breeders being the predominant group. Positive steps have been taken to provide for technical diversity. In the case of EARRNET, a by-law was passed by its SC which authorizes the coordinator to invite attendance of persons in addition to the traditional membership at annual meetings. Theme leaders, policy makers, university scientists, extension personnel, industrialists, and representatives of non-governmental organizations attended the 1996 meeting of the network. Composition of current network SCs is given in Table 2. Plant breeders and crop protection specialists still dominate the SCs but broader participation of thematic groups (see below) should help provide a balanced perspective. A noteworthy feature of the disciplinary distribution of members of the SCs is the absence of economist and socio-economist, this in spite of the increasing emphasis on issues related to farmer adoption which are almost always economic/social related.

Table 2: Composition of Network Steering Committees

Network	Breeders	Pathologists/Crop Protection	Agronomists	Post-Harvest Specialists	Socio-Economists
PRAPACE	5	2	5	1	0
ECABREN	3	2	1	1	0
EARRNET*	1	2	2		0
AFRENA	No Steering Committee until early 1997				

\* Recognizing that technical oversight might be needed beyond their specific disciplines, the EARRNET SC has passed a by-law to allow them to draw on additional disciplinary expertise when conducting Steering Committee meetings and reviewing proposals. As of 1996, this SC also invites Theme Leaders

### Recommendations:

1. **All networks should have a functional Steering Committee which can give technical oversight.**
2. **Technical oversight should be directly linked to financial allocations (through sub-projects, mandates or specific activities). This suggests that Steering Committees should also make the research budget allocations, perhaps with veto power remaining with the Committee of Directors.**
3. **Steering Committees, which give technical oversight, might consider how to develop mechanisms to assure that a good disciplinary breadth is available when screening specific proposals. In particular, the lack of socio-economic representation should**

**be addressed.**

### Thematic Groups

Theme leaders should become important participants in the planning process in all networks. In EARRNET, theme leaders are being identified to oversee national thematic activities. This procedure should provide for unity on a discipline basis and more rapid professional development. Thematic groups are meeting regularly in some countries, e.g. the cassava post-harvest group in Uganda meets during the first week of each month, but no region wide meetings of thematic groups have been held for EARRNET participants. Thematic groups working in ECABREN meet once every three years to evaluate progress towards objectives, reconsider priorities and plan future research. Results of these meeting are provided to the SC for use in it's annual planning meeting. Current thematic groups within ECABREN represent the disciplines areas of breeding, pathology, entomology, and soil constraint management. (A single meeting was also held on seed systems). At this point, PRAPACE had no formalized thematic group structure, although its Annual Workshops normally focus on a single in-depth theme of which Late Blight is a recent example. AFRENA tends to promote in-depth discussion on themes (here referred to as Flagship" themes) in the context of its "Annual Review" for sharing of research results. Recognizing the need to intensify discussion on Flagship Themes, scientists at the recent Annual Review recommended that at least "one day to spared for meetings by flagship theme (for example, soil fertility) across the sites (Atta-Krah and Waku, 1996).

Meetings of these thematic groups would appear to be extremely useful for providing an in-depth disciplinary perspective to research planning. Because of this, the review team considers that thematic groups meet at least once every two years. The possibility of across commodity thematic groups should also be considered, particularly in disciplinary areas which are not crop specific or in which there are currently too few trained scientists to meet single commodity needs (e.g., socio-economists).

### **Recommendations:**

- 1. The development of thematic groups should be encouraged in each network, with meetings to be held every two years.**
- 2. The development of cross-network thematic groups should be explored for themes which are not necessarily technology specific, for example socio-economics (including impact and adoption) and soil fertility management.**

### Multi-disciplinary Meetings

As budgets have been gradually decreased, there has been an increased tendency to hold fewer multi-disciplinary meetings (that is, of all the commodity researchers within a network). ECABREN now holds them but every three years; PRAPACE no longer holds them, and

EARRNET will have its first in 1997. In contrast, AFRENA's Annual Reviews seem to unite all their researchers--although the size of the pool, 25-30 people, is substantially different from ECABREN's 100. For the bigger networks, some of the IRAC researchers suggested that a three-year interval was sufficient (especially given the considerable logistical challenges of getting such a crowd together). However, many NARS scientists, who have less chance to travel, strongly felt that a two-year interval (that is, 1 to 4 seasons, depending on the crop) was more appropriate. Multi-disciplinary meetings are the sole venue for encouraging vigorous debate across disciplines and should be strongly encouraged. It is in these kind of fora that station-based researchers exchange views with those working on-farm and that 'technical' scientists are most often confronted with the questions of whether a technology is indeed 'farmer-acceptable' and, if so, 'for which farmers'.

### **Recommendation:**

- 1. Multi-disciplinary meetings should be encouraged within each network and should probably be held every two years.**

The evaluation team recognizes that increased budgets will be needed to increase the frequency with which multi-disciplinary meetings are held. As this activity is key for a) encouraging inter-disciplinary work and b) developing and strengthening a cohort of regional commodity scientists, the team feels that increased investment in this area will have important pay-offs.

### **Proposal Solicitation and Evaluation**

Project proposals for network approval and funding can be solicited in several ways. They may be developed within thematic groups or multi-disciplinary meetings, if these meetings are held at regular intervals, such as was the case with RESAPAC (the Great Lakes Bean Network). In both EARRNET and PRAPACE, proposals are sometimes solicited through members of the SC, each of whom transmits information regarding research priorities to researchers in their country. The network coordinator plays an important role in keeping everyone informed on research requirements to meet priority objectives. Proposals received by the date of the meeting are reviewed by the SC, with the network coordinator and CIP regional scientists playing an important role in the process. Outside expertise is sought in some cases, for example, the post-harvest group in Uganda assists with evaluation of post-harvest proposals; in the case of PRAPACE, outside evaluators are sought for proposals received after the SC meeting.

As the networks grow and develop in terms of scientific capacity and diversity, a more formalized evaluation system would be desirable. Few people are currently involved, both in the research in most theme areas and in the evaluation process. Further, funding of some proposals is made as contributory to capacity building. Because of the scarce funding situation in all networks, at this point, research sub-projects or activities can only be proposed for a maximum

of two years, with a budget usually between \$US 1500 and \$US 2500 per year. Greater leeway in both time and money could improve the quality and scope of research undertaken (see section III.10).

In reference to overall proposal allocations by discipline or theme area, for example to breeding vs. socio-economics, the ECABREN is the only network to have established guidelines. These initially emerged to counteract a strong bias towards breeding research and have been useful partially for encouraging work in the under-represented disciplines. Note that within the SC of ECABREN, there has been a shift in funded proposals, from those dealing with variety development to those focusing on crop management and socio-economic issues. In the last budget year, this was the result of the quality of research proposals in these latter areas rather than a complete shift in policy at the SC level. Targeted and final allocations for the ECABREN 1996/97 period are shown in Table 3 and represent a reasonable balance of funding distribution given the needs of the network. The country specific example of Ethiopia provides an even more dramatic shift towards crop management and adoption aspects (Table 4).

Table 3

Distribution of ECABREN Sub-Project Budgets: Targets and 1996/7

Strategy	Budget as Percent of All Sub-Projects	
	SC target	Allocation 1996/97
Variety Development and Resistance to Biotic Constraints	30	17
Integrated Pest Management	15	15
Tolerance to Soil Constraints	15	19
Integrated Crop and Soil Management	20	21
Socio-Economic Issues	20	28
Total	100	100

Source: Joint Meeting of Steering Committees (EABRN and RESAPAC), Kampala, Uganda, 19-23 February, 1996.

Table 4

Distribution (%) of ECABREN Funds among Sub-Projects in Ethiopia 1992-96

Projects/Themes	Budget as Percent of All Sub-Projects				
	92	93	94	95	96
Socio-Economics	0	0	0	13	18
Technology Transfer	13	20	30	24	27
Integrated Pest/Disease Management	33	59	25	46	12
Integrated Crop/Soil Management	30	13	27	17	43
Genotype Improvement	23	7	18	0	0

Source: Ethiopian National Bean Program, Nazreth

**Recommendations:**

1. **As the networks grow and develop in terms of scientific capacity and diversity, a more formalized project evaluation system should be established.**
2. **Steering Committees should consider whether general guidelines for overall disciplinary allocation of research activity budgets (as in the ECABREN model) would be useful, particularly for encouraging non-varietal work.**

**II.1b. RECEPTION, SCREENING, AND AVAILABILITY OF TECHNOLOGY****Reception of Technology**

To date, the major technological impacts achieved by the networks have related to germplasm improvements. New growth types of beans were introduced into Rwanda and have diffused rapidly throughout the region. New varieties of potatoes, sweetpotatoes, beans and cassava have been released to counteract both biotic and abiotic stresses (see II.1d). Realization of the potential of genetic resources depends on the existence of mechanisms for the entry of these resources into the region in those cases where they are not found in existing germplasm collections and their movement among member network countries if they prove of value.

Quarantine systems are in place to ensure that imported genetics materials are free of diseases. As an example, potato and sweetpotato germplasm enter the region through the Plant Quarantine Station at Muguga, Kenya, where they are tested for the presence of plant pathogens under controlled conditions. If found to be free of diseases, they can be multiplied, released and distributed to any country in the region. PRAPACE has contributed to enhancement of facilities

at the Center by funding a screenhouse which increased capacity by from 30 to 45%. Once grown in a country, transfer to another requires re-certification. However, if the germplasm is present in the collection at the Plant Quarantine Center, the more rapid procedure is to source that collection. EARRNET also has contributed laboratory equipment/glassware and chemicals to Muguga; one growth room is under refurbishment and two people were trained at IITA to support the activity.

For sweetpotatoes, a tissue culture laboratory in Uganda provides an alternative source for disease-free materials. Thus, genetic materials of sweetpotatoes and potatoes can be transferred by well-conceived, reliable methods into and throughout the region. As bean, cassava and tree germplasm must also meet quarantine requirements of the various countries, advanced planning and coordination is required to organize testing programs involving introduced germplasm. With time, the process of introduction has been shortened.

The need for regional, as well as national nurseries is recognized by all of the networks. In the case of ECABREN, a national program takes the lead responsibility for managing the regional nursery: this had been done on a rotating basis. Generally, the PRAPACE varietal screening is also managed by national programs, with several programs repeating the same trials to generate information of regional use. The cassava regional nursery is managed by ESARC in Serere, Uganda. Regional Coordinators seem to feel that the current system is functioning, albeit not as rapidly as some would like, and that investment of scarce resources in more nurseries may not be wise.

Technologies based on the transfer of information rather than materials do not, of course, require passage through official import systems. However, knowledge-intensive technologies still often require field testing and adaptation. Capacity building (training) is usually an important component to the introduction of technologies in this category and has been an important component of all the networks (see II.2d). When the requirement of capacity building is included, more time may be required to test and implement knowledge-intensive technologies than genetic-based ones.

### **Technology Development and Screening**

A major contribution of the networks has been in the area of technology development and screening. PRAPACE, ECABREN and AFRENA have effectively divided research priorities among member countries and thereby reduced duplication of efforts (see Table 5 for PRAPACE example). Once proven in one program, the technology is transferred to others for adaptive testing as appropriate (see section II.2b for range of technologies transferred among network countries). This division of labor leads to major efficiencies in terms of use of resources, both manpower and time. Less across country division is apparent at this time in the two-year old EARRNET, but more is expected as the research groups in this network are strengthened. Similarly, the central premise of AFRENA's "Flagship" themes has been to divide research labor effectively and pass results from one site to another.

Table 5

## Dividing Research Mandates among PRAPACE Members

COUNTRY	Potato	Sweetpotato
Burundi	Bacterial wilt control	Plant material (seed production)
Eritrea	Development of lowland varieties	--
Ethiopia	Screening for late blight and temperature; tuber potato; seed; on-farm seed production	Development of varieties for earliness
Kenya	Germplasm distribution; postharvest (potato storage and processing); integrated pest management	Integrated pest management; screening for tolerance to virus; postharvest (product development and utilization)
Rwanda	Late blight control; seed production	Rapid multiplication
Uganda	Seed production; breeding for lowland adaptation; virus control	Integrated pest management; screening for virus tolerance; postharvest (product development and storage); screening for earliness and different ecologies
Zaire	Seed production; development of varieties for different agroecologies	Screening for earliness and different agroecologies

The recent organization of across country uniform variety tests for potatoes exemplifies the effort to speed identification of productive, well adapted varieties, through network mechanisms. Initiated in 1996, this testing protocol unites the two most promising varieties from each country for evaluation in a uniform test. The procedure does not prevent each national program from continuing its varietal screening activities but should accelerate the evaluation and dissemination of the best materials across the region. A similar program is planned for sweetpotatoes, beginning in 1997. A precaution to this approach, however, is that regional adoption of very few genotypes would result in a narrow germplasm base and potential problems in the event of widespread pest problems.

#### Broadening the breadth of types of technology developed and screened

As noted above (II.1a), research activities in the networks are becoming broader with greater emphasis being given to pest management issues, soil fertility strategies, socio-economic concerns and technology transfer options. As some of these issues require extensive site repetition and are often input (other than seeds) intensive, they can be expected to tax the resources (for example, manpower and vehicles) available in most of the network partners. Yet, to fully realize the potential of new varieties, limitations imposed by management and natural resource constraints must be assessed and dealt with in an economical and socially acceptable manner. Efforts to identify potential interventions for progress in this area are being pursued more vigorously in some networks than others (AFRENA and ECABREN giving these factors more weight) and, overall,

efforts in management and socio-economic research have been timid to date. An emphasis on-farm trials is providing a rapid assessment of the performance of new varieties (PRAPACE, ECABREN and EARRNET) and resource management techniques (AFRENA and to a lesser extent ECABREN). However, opportunities to explore multi-components, which together have a synergistic effect, are being all too little explored. One exception which stands out is the bean root rot work which combines tolerant varieties, organic amendments, and procedures for sowing on raised beds.

### **Availability of Technology**

As noted above and as will be illustrated in Section II. 1d, major contributions have been made in the area of germplasm enhancement and availability. All the networks evaluated can point to major successes in this area. Yet, there are clear bottlenecks with regards to the distribution of this technology to the farm level. Public institutions do not have the resources to multiply and distribute improved germplasm to the farm level and the public sector seed industries in the member countries are poorly developed. The reasons for the almost non-existence of a private sector seed industry were not clear to the review team, but since the sector could be an important partner in the development process, there is a need to gain a better understanding of reasons (profitability, market size, credit availability to producers, ease of access to recognizably superior germplasm, regulations) for its current status.

The networks are working on innovative, cost-effective systems of seed multiplication and distribution that rely on efforts of small farmers or farmer groups to grow and commercialize seeds or transplants of selected materials. While in their early stages of development, good farmer acceptance of the concept was observed and, in the case of ECABREN, an attempt to extend successful experiences with several small farmer groups in Uganda to approximately 100 NGOs was being planned.

### **Recommendations:**

- 1. Greater attention should be given to multi-component management research designed to determine the agronomic limitations to increased crop productivity. Only after these are fully understood can economic determinations be made.**
- 2. Development of a viable seed industry should receive increased attention. Working through small farmers/farmer groups offers an exciting opportunity, but, presumably, the long-term survival of these entities as seed producers will eventually be governed by the same set of factors which is governing the status of the more formal seed industry. The sector needs to be better understood.**

## **II.1c. MONITORING**

Mechanisms for monitoring exist in each network at several levels, but implementation varies markedly. The levels at which monitoring occurs include the Steering Committees (Executive Committee in PRAPACE), NARS, thematic groups, monitoring/study tours, regional coordinators and national/regional visits by resource persons. As an expression of the level of seriousness given to monitoring, representatives from each network have participated in a workshop on monitoring and evaluation, which was organized and supported by the four networks jointly.

**AFRENA:** Most of the monitoring in this network is achieved through its Annual Meeting at which participating scientists present results and plan new/continuing activities. On an interim basis, monitoring is performed by the ICRAF scientist stationed in each country and by the Regional Coordinator. A monitoring and synthesizing role was envisioned for leaders of flagship themes, but this, while highly desirable, has not developed to include routine on-site visits to all locations involved in the research theme. At present, this network does not have a technical SC comparable to those in the other networks. It has also not organized study/monitoring tours and has yet to encourage the use of National Resource People. Additional information on ICRAF/AFRENA's technical exchange - which may be viewed as a type of monitoring - is presented in Appendix 8.

**ECABREN:** While responsibility for decisions on priorities and allocation of funds for regional research sub-projects lies with the Steering Committee, technical advice is provided by Thematic Working Groups in the areas of research priorities, planning and implementation. These specialized working groups meet once every three years and also participate in multi-disciplinary regional workshops on a three-year schedule. When combined with annual national meetings, there appears to be relatively good opportunity for exchange of information, assessment of progress, and fine-tuning of research methods and directions, although the review team questions the three year interval between meeting of the thematic working groups. Certainly during the formative years for these groups, a shorter interval between meetings would be desirable. In addition to the above monitoring mechanisms, study/monitoring tours, 'expert' visits and linkages provided by the Regional Coordinator all contribute to the monitoring process. Recent examples of monitoring/study tours include: 1.) consultation in Ethiopia regarding quarantine methods for Bean Common Mosaic virus, involving T. Sengooba (Uganda) and H. Gridley (CIAT) and 2.) orientation in Madagascar on farmer participatory research provided by M. Gaudreau (IRRI). A regionally located CIAT team participates by providing technical backstopping, a function increasingly filled by regional scientists (known in this capacity as National Resource People). The ability of network national scientists to fill this regional role is a good indicator of progress made in the direction of capacity building and self-management.

**EARRNET:** Monitoring within EARRNET is accomplished through meetings of the Steering Committee (4 since the formation of the network in 1994) and numerous visits by IITA scientists. While serving as an important linkage between programs in member countries, the Regional Coordinator also monitors progress towards objectives defined by the Steering Committee. To

date, no study/monitoring tours have been organized nor have scientists from the region been engaged in across-region backstopping activities. (Note that capable National Resource People have already been identified). Both of these activities are encouraged by the evaluation team.

**PRAPACE:** As was the case with ECABREN, PRAPACE employs a wide range of mechanisms to monitor progress in the network. Its Executive Committee provides a close review of all projects in twice-annual meetings. Study/monitoring tours are frequent and utilize national personnel well as regional resource people. Annually, a thematic meeting is held with a different theme each year; however, this process is not institutionalized. PRAPACE is the only one of the four networks being reviewed that supports a formal project on monitoring and evaluation. A product of this project, which began in late 1993, is a series of Working Documents which reviews the results with potatoes/sweetpotatoes in each country in the network (part of the series was available in draft form at the time of this review).

### **Recommendations:**

- 1. Regionwide monitoring tours are an important component of networking and are encouraged. They broaden the views of the participants and contribute to their professional confidence and skill.**
- 2. The networks have contributed significantly to scientific capacity in the region. This capacity of National Resource People should be utilized to the fullest extent possible in the monitoring process, of which technical backstopping and mentoring are important components.**

### **II.1d. IMPACTS OF REGIONAL COLLABORATION**

The considerable positive impacts of regional research collaboration are a testament both to the strength of the network links and to the growing commitment of the national programs themselves to achieving scientific excellence as well as to developing technologies which small farmers can actually use. Below are sketched examples of broad types of impacts which can be directly tied to the theme of "technology development dissemination and exchange". Both networks and national programs normally lack socio-economists who can conceptualize and implement impact studies as well as the significant funds (possibly \$15,000-20,000 per study) which may be required to carry out rigorous, nationwide formal impact analyses. Regional and national partners are now being encouraged to give priority to impact analyses: in 1996, 2 special training courses were effected by the PRAPACE/ECABREN/EARRNET/AFRENA networks on "impact assessment" and USAID has recently made available special funds for impact assessment within the East and Central African region.

### **Production Impacts**

The following examples illustrate that three of the networks have already recouped their

research operating costs through successful technology development and at the same time have contributed to enhancing food security among some of the poorest farmers in the world. As one evaluation team member commented: "There has been a very big bang for a very small buck."

A. Improved climbing beans were unknown to Rwandan farmers 10 years ago and were first introduced to the national program through the RESAPAC network. Formal surveys conducted by RESAPAC and the Ministry of Agriculture's Department of Agricultural Statistics showed 43% of Rwandan farmers, or about 500,000 households, growing improved climbers in 1993, just before the civil war erupted. Improved climbing beans yield 2 to 4 times the traditional bush beans and are generally more tolerant to root rots, the most menacing bean disease in the region. The 1993 study showed that, on an annual basis, improved climbing bean use gave 48 thousand additional tons of beans, equivalent to an extra \$11.5 million in income for Rwandan farmers (Sperling and Munyanza, 1995). Surveys conducted post-war in 1995, show 47% of Rwandan farmers growing climbing beans and suggest that the technology itself is in demand and sustainable-- even in times of severe economic stress (SOH Assessment Document 8). Use of the technology cross-cuts wealth, farm size and gender categories and is most prevalent among the more disadvantaged (Sperling and Munyanza, 1995). Improved climbing bean technology is now spreading from Rwanda to Burundi, Zaire, Uganda and Kenya through the ECABREN network. Initial adoption studies in all these countries suggest high farmer demand for this technology (T. Musungayi, 1992; David and Hoggenblik, in press; R. Otsula, pers. comm.)

B. African Common Mosaic Virus-tolerant varieties provide one key for stabilizing cassava production among the poorest of Eastern and Central Africa's farmers. In north-east and eastern Uganda alone, an estimated 50% of the cassava crop is lost to ACMV annually. The disease, which is spread by white flies and diseased planting materials, is said to be moving at a rate of about 20 km a year and western Kenya is now quickly testing and multiplying ACMV tolerant varieties to prepare for the onslaught. The rapid identification and multiplication of ACMV tolerant varieties, resulting from combined efforts of IITA, national programs and the EARRNET, has help to stave off some of the massive losses in Zaire, Rwanda, Kenya and Uganda. It is primarily due to the network that tolerant varieties were quickly developed. As indicated by the Ugandan national Cassava Coordinator, the ACMV problem was only identified in 1988, with the first release already delivered by 1994. (The normal breeding process takes at least 8-10 years). Because IITA has some tolerant germplasm varieties (which themselves built on former East African research), the national program was able to jump most of the early germplasm development and screening stages (G.W. Otim-Nape, pers communication). As of 1996, Uganda has released 3 ACMV tolerant varieties and has 4 more at the end of the pipeline; Kenya is screening the same ACMV-tolerant varieties in advanced yield trials. The network also facilitates the movement of tolerant planting material across national boundaries at a speed not before possible. Here, the networks show their utility for both production increase and disaster prevention.

C. Late-Blight resistant potato varieties have been diffused throughout Burundi, Rwanda, Zaire and Uganda, as a result of national program efforts which were enhanced by very strong network PRAPACE ties. (For instance, Zaire has little funding for potato research but has received and released varieties from Burundi and Rwanda). Impact studies in the early 1990's showed the yield increase to be 2.8t from a baseline of 7.0t/ha (Rueda et al., 1996). While the process of diffusion started in the 1980's, diffusion has accelerated in recent years. Comprehensive economic analyses conducted in 1995 show that the investment in potato research, seed production and extension in the highlands of east Africa has been hugely profitable. When considered as an investment project spanning 15 years, from 1978 to 1993, the internal rate of return is estimated at 84% (Ibid.). The net benefit stream reached \$10 million annually in the late 1980s and early 1990s (Ibid). The analyses suggest that "Past success does not imply that the sources of growth in potato production in the highlands of East Africa have been exhausted. Yields are still low and input intensification is only now starting to take place, suggesting [possibilities for future] high return to crop management research" (Rueda et al. 1996). Among others, impressive cases can also be developed for showing the impact of: the control of bean root rots, the cassava mealy bug and the cassava green mite.

Although many of the AFRENA network's agroforestry technologies are still in the early stages of development, adoption studies are showing some farmer adoption of Calliandra in Kenya as a fodder tree in Embu (Cooper and Atta Krah, 1996), and adoption of Calliandra in Kambale, Uganda for use as climbing bean stakes as well as fodder. The evaluators realize that in looking at impact potential, the AFRENA is somewhat unique given: 1.) the newness of the technologies; 2.) the extended growth cycle of trees and 3.) the kinds of gains envisioned. As an example of the latter, the relationships between having a tree or bush crop in the rotation, their soil enhancing capabilities, and the effect on the following crop may not be well understood, not the benefits and costs always clear. (In Appendix 8 AFRENA cites the beginning of pilot projects which have impact potential but which are still short of major impacts.)

### **Efficiencies in Research Costs**

The networks have also resulted in considerable research efficiencies: saving research time and money and speeding up farmer access to improved technologies.

#### **Examples:**

A. It has taken but 4 seasons to move improved climbing bean technology through the Kenyan NARS. Following a network-sponsored study tour in Rwanda in 1993, the bean breeder R. Otsyula, stationed at Kakomega quickly screened the most promising Rwandan lines in the Kenyan NARS in on-station advanced yield trials and on-farm trials. The varieties Umubano, Flora and Ngwinurare are scheduled for release early 1997. Normal screening procedures might take up to 8 years (or 16 seasons).

B. For cassava, varieties developed in Rwanda, Creolina and Gitaminsa, have been

released in Burundi---at virtually no screening cost.

C. Recognizing the tremendous cost gains to be achieved by moving officially released material from one region to another, PRAPACE has made direct improvements in the plant quarantine stations themselves---to still further speed up the process (see section II.1b). Having the network in the region itself already cuts off at least a year in the variety development process of almost every single potato entry. Otherwise NARS would have to go to Lima for the needed supply of clean germplasm.

The economic value of such efficiencies should not be underestimated. While the "economics of breeding" and particularly of "accelerated screening", still need to be fully developed, two cases suggest the magnitude of savings. Analyses in the Netherlands show that a single year delay in release of one wheat variety may cost the research system some \$600,000. A former CIAT economist has also calculated that it costs about \$900,000 to develop a single bean varietal winner (W. Janssen, per. communication). Exchanges across networks would presumably cut the costs at least by half as it is the latter stages involving multi-site and multi-year testing which are the most expensive.

While the research efficiencies in germplasm are the easiest to document, it should be emphasized that the basic premise of the network is for research efficiencies across technologies. National partners accept the mandate for developing a technology which will be useful for the region. Section II.2b elaborates technologies that were shared across PRAPACE, ECABREN and EARRNET countries from 1992-6.

### **Research Focus on Moving Technologies**

It should be noted that the networks have been able to have substantial impact quickly not only because "the technologies are very good" but also they have given research attention to effective ways of moving them. For instance, ECABREN, in the last five years has done substantial work on bean seed system analysis, seed dissemination approaches, and even cost-effective small farmer production possibilities. Such an emphasis is vital in areas where neither the formal seed system nor the extensionist give priority to moving low value, self-pollinated crops. As an example, they have recently developed and tested seed machinery proto-types which they are now handing over to some 100 NGOs to extend. To spread the ACMV-tolerant material swiftly, cassava researchers and government officials similarly intervened in extension efforts (although, here, not necessarily with a research component.) The "National Network for Cassava Workers" has united prison farms, schools, NGOs, small women's groups and others to multiply tolerant ACMV material. The EARRNET network might consider whether it is useful to evaluate the varying cost-effectiveness of using these groups for multiplication. While ACMV created a "crisis" situation, moving the vegetatively-propagated cassava material is a problem even in stable times. Similarly, AFRENA in southern Uganda is working on a range of technologies and seeking creative ways to link with NGOs to transfer what can be both a labor-intensive and knowledge-intensive technology. While such efforts are sometimes narrowly viewed as falling within "extension", they often would benefit from a more critical research eye: for example, which links

reach the greatest range of users, which links most dramatically shorten formal research time?

Note: a critical research question is answering just how labor and knowledge intensive is any given technology. Certainly establishing tree or bush crops and taking them up within a year or so involves a lot of labor but the results may indeed be worth the effort. The farmers perception about the issue is clearly critical to the ultimate impacts - which is what this section of the report is dealing with.

### **Acute Emergency Interventions**

The escalation of the Rwandan civil war in April 1994 resulted in the death of up to one million persons and the displacement of another two million. Agriculture, the main occupation of upwards of 90% of the population, was acutely affected as civil disruptions peaked in the midst of the normal February-June growing season (the '1994B' season). Harvest losses overall during this period were officially estimated as high as 60%.

The aid community, particularly non-governmental organizations (NGOs) and United Nations agencies, responded swiftly and on a wide scale to the agricultural crisis. Massive amounts of seed aid poured in during the first post-war agricultural season (September 1994-January 1995): 6970 MT of bean, 1707 MT of maize, and 7230 kg of vegetable seed, along with widespread distribution of hoes, fertilizer, and pitchforks.

"Seeds of Hope" (SOH), an unconventional aid intervener, similarly responded along its own areas of expertise. This coalition of national and international agricultural research centers promoted intensive varietal and genetic assessments, and rapid multiplication of landraces and key improved varieties for possible reintroduction into stressed agricultural systems. SOH felt its skills were complementary to NGO strengths--and much needed in a country so genetically-remarkable as Rwanda: both beans (*Phaseolus vulgaris, L.*) and sorghum (*Sorghum bicolor*) were notable for their wide pre-war genetic variability. While, in one sense, the genetic heritage of Rwanda was of concern to the world community (pre-civil war, for example, farmers grew the greatest range of bean varieties found in active use anywhere), genetic diversity was also deemed integral for rebuilding and sustaining productive agricultural systems for Rwanda's farmers.

Within the networks being reviewed, PRAPACE, ECABREN, and EARRNET were formally in SOH and AFRENA initiated its own complementary and vigorous activities. Major efforts went into restocking national program germplasm banks (which in several locations were completely wiped out); multiplying clean planting materials of desired improved varieties, effecting extensive varietal and genetic diagnoses in the first post-war countryside surveys, training a whole new cadre of national program personnel, and helping to re-catalyse the research system itself. The Director of the national program, ISAR, publicly thanked SOH for its swift, extensive, and effective aid and reconstruction efforts during the March 1996 ASARECA meeting.

## **Opening up New Frontiers**

Beyond development of specific technologies *per se*, national scientists stress how important the networks have been for the process of thinking about approaches to technology development. For example, beans researchers suggest that the network has been an important catalyst for encouraging them to experiment with methods to disseminate varieties (possibly through local seed channels) and exploring more farmer participatory approaches; for both cassava and potato researchers, the network has brought into sharp focus previously unaddressed issues of product utilization and enhanced collaboration with universities and non-governmental organizations; potato researchers also cite the important of the network for stimulating them to more systematically pursue issues of monitoring and evaluation. For many working on agro-forestry, the network has provided the only means for them to address research on tree integration into crop management. In most of the NARS visited, agro-forestry research would not exist if the AFRENA network did not exist. This insight is pursued below.

## **Spurring the Development of National Commodity Programs**

It should be highlighted that two of the networks, EARRNET and AFRENA, have been prime catalysts for the coherent development of the national commodity programs themselves.

Until the mid-1980's, cassava research within East and Central Africa had a low profile: cassava was a poor man's crop, a low value crop, and hence not worthy of a major research effort. EARRNET helped to give greater legitimacy to cassava research efforts and to unite and expand the initial small core of resources devoted to cassava. Prior to the establishment of EARRNET in 1994, Madagascar had but 1 cassava scientist; 2 years later, it has about 12. Further, the EARRNET national priority setting workshops on cassava have been the first for Kenya and Madagascar.

The history of agro-forestry (as separate from forestry) is even more woven into the history of AFRENA. Prior to the establishment of the network in 1988, Burundi was the only country in the region with any history of agro-forestry research and it was not a national program. The regional coordinator suggests that there is currently no national research program on agro-forestry research outside the AFRENA network in any of the member countries.

As such, at least two of the networks can take credit for stimulating the process of technology development in a broad sense on each of their themes (that is, catalyzing work on cassava and agro-forestry) as well as technology development in a narrow sense, that is, efforts to develop specific, farmer-acceptable technologies.

## **II.2a RELEVANCE OF REGIONAL AGENDA TO NARS DEVELOPMENTAL PRIORITIES**

Networks will remain useful only if they address crop priorities and subject priorities of network member countries.

Table 6 suggests the overall national priority of crops for countries visited in the course of the project evaluation. In all cases, networks are focusing their attention on crops which are of prime national importance. (Note also that all crops represented by networks also fall within Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)-defined priorities, see section III.6). As emphasized by the Deputy Director of Crops, KARI, overall crop priorities vary by ecozone and target group. For instance, he personally put the cassava crop as the first or second Kenyan national priority as it particularly addresses the concerns of the very poorest on some of the lowest fertility soils.

As agroforestry normally might not fall within a crop-oriented priority list, research directors were asked directly to assess the importance of this theme to their overall research agenda. KARI indicated that it had been involved since the beginning of AFRENA and suggested that Multi-Purpose Trees (MPTs) were among the most important of network accomplishments. In Uganda, agroforestry has been given a particularly high profile due to direct interest of the President in the subject: in exchange for agroforestry trees, President Museveni gave the AFRENA network a cow). While Ethiopia has a high interest in agroforestry and several ongoing and innovative programs within the Forestry Research Center, internal organizational issues have been one reason for its delay in joining AFRENA as a full network member.

Network mechanisms per se should offer a failsafe procedure in assuring that specific themes researched within any single crop commodity are of national relevance. Network subprojects or mandates always first need the official blessing of the national programs--before they can be submitted for network consideration. As such, national research strategies meld with regional research strategies.

**Table 6**  
National crop priorities in network member countries

Country	National Crop Priorities*	Network(s) Represented
KENYA	Maize Dry Beans Irish Potatoes Wheat Sorghum Rice Millets Cowpeas Pidgeon Peas Barley/Oats Cassava	ECABREN PRAPACE          EARRNET
UGANDA	Bananas Cassava Beans Sweet Potatoes Maize	EARRNET ECABREN PRAPACE
ETHIOPIA	26 priority crops officially identified, including:  Sweet Potatoes Irish Potatoes Lowland Pulses	PRAPACE PRAPACE ECABREN
MADAGASCAR	Rice Cassava Maize Beans	EARRNET   ECABREN

\* Crops listed in order of priority (1st, 2nd...) as given by national research directors.

## **II.2b. TECHNOLOGIES TRANSFERRED ACROSS THE NETWORKS**

While AFRENA is having some interesting results with Calliandra adoption for fodder (in Embu, Kenya) and as staking material and fodder (in Kabale, Uganda) it is probably too soon to speak of systematic transfer from one site to another. Similarly, EARRNET has been off the

ground a mere two years (and cassava itself has a cycle of 18 months). Therefore, Table 7 summarizes the extensive technology transfer that has taken place among members countries of the two older, and more matured networks. The gains (and research savings) have been considerable.

Table 7

Technologies shared across networks

Network	Technology	Countries
PRAPACE	Flush-out potato seed production scheme	Uganda, Rwanda, Burundi
	Production of virus-free sweet potatoes planting materials	Burundi, Kenya
	TPS potential for seed tuber production and on-farm seed production	Uganda, Ethiopia
	Improved germplasm distribution	Kenya, Rwanda
	Processing potential and product development	Kenya, Burundi, Zaire, Uganda
	Use of compost and green manure to sustain yield	Zaire, Rwanda
	Integrated pest management of sweet potato weevils	Uganda, Kenya
ECABREN	Improved climbing beans (Intensification of land and labor)	Rwanda, Zaire, Uganda, Kenya
	Disease-resistant bush bean varieties with roots management	Burundi, Ethiopia, Kenya, Rwanda, Tanzania, Uganda, Zaire
	Quick-cooking varieties (to save firewood)	Éthiopia, Tanzania, Uganda
	Rapid non-formal seed systems	Burundi, Ethiopia, Kenya, Rwanda, Tanzania, Uganda, Zaire
	New bean consumer products	Kenya, Uganda

## II.2c. DEPENDENCE OF NARS ON NETWORK TECHNOLOGIES

The scope of work calls for answering the following question: To what extent are member countries relying upon technologies developed by the IARCs and their collaborating entities?

Because member countries rely upon (a) their own NARS; (b) IARCs; (c) networks; and (d) other national and international programs for their advances in technology, it is not possible to answer with any degree of precision the extent of reliance upon any particular entity.

Since the evaluation is focused upon the importance and effectiveness of the networks, the team feels the thrust of the question should be upon the networks as one of the collaborating entities. Clearly, the IARCs are an important source of materials and technology; no doubt they will remain so.

Increasingly, technologies brought into the region go through the screening and adaptive testing by the networks. Hence they are becoming an effective and economical conduit for new technologies. To the extent the networks can fulfill this role (and we find considerable evidence that they can) the process has major implications for the IARC's and their regional offices.

While far from perfect, the two research and development systems (IARCS, the networks and the NARS) are complementary and, in a good sense of the word, are dependent upon each other.

It is unfortunate that most of the national programs in the East and Central Region are going through a difficult period in terms of financial support from their own national governments. The startling exception is Ethiopia, where the government is giving high priority to developing agricultural research, partially in response to significant food stresses experienced by rural populations in both the 1970's and 1980's. Uganda, also, receives slightly more than average financial support from its national government. We note that, at this unique point in its history, the Kenyan NARS is having particular difficulties financing its research. This has not always been the case.

Table 8, below, estimates sources of funds available for conducting research on network commodities within the specific countries visited in the course of this evaluation. The figures focus only on operating funds: they do not include the substantial and key investments which national programs have made in infrastructure building and maintenance and in the recurrent costs of paying researchers' salaries and benefits. In terms of overall costs, national programs are bearing the lion's share of expenditures in their research programs.

Table 8 shows researcher directors' (and, in some cases, network coordinators') honest assessments of where their research operating funds are coming from for the current financial year. It shows all too starkly that the clarity and severity of the problem is real (even if the figures may lack desired precision--and the team thanks researcher directors' willingness to make estimates on the spur of the moment). **Without network funding, many of these national**

**programs could not presently conduct commodity or agroforestry research at all. They rely on the network for funds and they themselves provide much of the technical expertise to develop productive and farmer-acceptable technologies.**

Table 8

Directors' and Coordinators' Estimates of Sources of Funding (% per source) for their research programs during the current financial year

Research Focus	Country	National Contribution	Network Contribution	Other
POTATOES	Ethiopia	96	<1	3+
	Uganda	15	85	
	Kenya	25	40	35
	Burundi	0	50	50
	Rwanda	0	40	60 (SOH/WV)*
	Zaire	0	80	20
SWEET POTATOES	Uganda	15	25	60 (USAID bilateral)
BEANS	Ethiopia	96	<1	3+
	Uganda	40**	60***	
	Kenya	0	100	
	Rwanda	0	60	40 SOH/WV
	Burundi	0 no activity		
	Madagascar	20	80	
CASSAVA	Uganda	98****	1-2	
	Kenya	0	100	
	Burundi	0 no activity		
	Rwanda	0	100	
	Zaire	likely 0	just started	
	Madagascar	40	60	
AGROFOR-ESTRY	Rwanda	0	100	
	Uganda/FORI	10	90*****	
	Kenya/KARI	10	90	
	Kenya/KEFRI	20	80	

\* Seeds of Hope and World Vision

\*\* Includes counterpart funds from USAID

\*\*\* Includes funds directly from CIAT and some "transfer of technology" funds from USAID.

\*\*\*\* These funds largely come from the Gatsby Charitable Foundation, UK. IORC also made significant contributions to the program. IORC also made significant contributions to the cassava program.

\*\*\*\*\* Includes PL480 funds for Uganda, SIDA funds for Kenya, Australian funds for Rwanda. Included in the Bean Network contributions is the greatly appreciated Candian and Swiss assistance.

## **II.2d. TESTING OF TECHNOLOGIES UNDER FARMER CONDITIONS**

A clear emphasis currently exists for 'Farmer Participatory Research' which involves producers in both the identification of research needs and evaluation of the research output. During the evaluation, many more trials were visited on farms than on research stations reflecting the change in testing philosophy. When the process is finished, an advantage is that the potential acceptability of the technology by the producer is known. Another rather exciting potential was observed in Madagascar where bean variety tests were placed on farmer fields with two levels of management--that of the farmer and that of the researcher. Thus, the conduct of the tests was used as a teaching tool to demonstrate the potential of improved agronomic practices. Since experience in many countries has shown that new varieties often require improved management to exhibit their full yield advantage, utilization of an opportunity to introduce a 'package of practices' approach could greatly increase the value of the on-farm setting. See section III.4 for additional information.

## **II.2e NETWORK CONTRIBUTIONS TO NATIONAL TRAINING AND TECHNICAL NEEDS**

### **Training**

Each network addresses the issue of capacity building to enable national programs to better contribute to challenges of food production or resource management. Training is an important component of this process and essential to the sustainability of any research system. Networks have contributed to this process largely through short-term study courses and work shops covering the range of subject matters required to address priority issues. Long-term training has been limited both because of the overall budget size and, in recent years, because of the short budget time frame. The numbers of these activities developed by each network and the numbers of participants trained are provided in Table 9 below. Appendix 4 is offered to illustrate the typical range of topics addressed by a network in response to identified training priority needs.

Table 9

Network participants receiving short-courses, workshops, study tours or other training

Network Year	Training Activities (#)	Participants (#)
<b>AFRENA</b>		
1992	-	-
1993	3	3
1994	8	10
1995	2	95
<b>EARNET</b>		
1992	2	93
1993	1	18
1994	4	24
1995	4	25
<b>ECABREN</b>		
1992	4	19
1993	6	60
1994	17	177
1995	11	119
<b>PRAPACE</b>		
1992	-	-
1993	5	51
1994	9	108
1995	7	87

The level of training provided meets the needs of network participants only to the extent that network scientists possess an adequate knowledge base. Self-sustaining networks require a cadre of well trained, experienced scientists who can design and manage their own programs. This cadre is emerging in the networks, but slowly, and with little financial help from the project in the critical area of longterm training. The scarcity of trained manpower resources is illustrated by the profile of researchers contributing to PRAPACE, one of the most mature of the four networks reviewed (Table 10). In the six member countries of 1994, only 9 scientists working on the two crops covered by PRAPACE's mandate had Ph.D. degrees; more than 50% of the FTEs available were represented by persons having less than a B.Sc. degree. A greater emphasis must be placed on in-depth capacity building if these programs are to become truly technologically self-sufficient and capable of conducting their own 'strategic' research. Until this challenge is met, the need for external technical resources such as those provided by the IARCs will continue. It should also be noted that there tends to be rapid advancement among some of the more capable researchers, often removing them from the networks themselves. (For example, the head of the Uganda NARO in Namulonge was, until a few years ago, one of the most skilled pathologists in the bean network). It is clear that a relatively constant stream of advanced training is needed to develop and maintain professionalism within the NARS. The constraint that the current level and cycle of funding imposes on networks with regards to capacity building is addressed elsewhere (see section III.10).

Table 10

Profile of personnel working with national potato and sweetpotato research programs in PRAPACE countries (1994)

Qualification	Country	Potato			Sweetpotato		
		number	% time	man/year	number	% time	man/year
Ph.D.	Burundi	-	-	-	-	-	-
	Ethiopia	2	100	2.0	-	-	-
	Kenya	1	100	1.0	2	30	0.6
	Rwanda	2	100	2.0	-	-	-
	Uganda	1	100	1.0	1	100	1.0
	Zaire	-	-	-	-	-	-
	TOTAL	6		6.0	3		1.6
M.Sc.	Burundi	-	-	-	-	-	-
	Ethiopia	3	30	0.9	2	50	1.0

Qualification	Country	Potato			Sweetpotato		
		number	% time	man/year	number	% time	man/year
M.Sc.	Kenya	3	100	3.0	8	40	3.2
	Rwanda	-	-	-	1	100	1.0
	Uganda	3	100	3.0	3	100	3.0
	Zaire	-	-	-	-	-	-
	TOTAL	9		6.9	13		8.2
Eng. Agr.	Burundi	1	100	1.0	-	-	-
	Ethiopia	-	-	-	-	-	-
	Kenya	-	-	-	-	-	-
	Rwanda	2	100	2.0	1	100	1.0
	Uganda	-	-	-	-	-	-
	Zaire	5	75	3.8	5	25	1.3
	TOTAL	8		6.8	6		2.3
B.Sc	Burundi	-	-	-	1	100	1.0
License or	Ethiopia	3	20	0.6	5	70	3.5
Tech. Agr. A1	Kenya	4	100	4.0	7	40	2.8
	Rwanda	1	100	1.0	2	100	2.0
	Uganda	4	100	4.0	2	100	2.0
	Zaire	2	75	1.5	2	50	1.0
	TOTAL	14		11.1	19		12.3
	Diploma Tech Agr. A2 or A3	Burundi	8	100	8.0	3	100
Ethiopia		3	60	1.8	4	75	3.0
Kenya		13	100	13.0	16	50	8.0
Rwanda		4	100	4.0	3	100	3.0
Uganda		3	100	3.0	5	100	5.0
Zaire		5	100	5.0	5	50	2.5
TOTAL		36		34.8	36		24.5
GRAND TOTAL		73		65.6	77		48.9

Source: Progress reports on monitoring and evaluation project (1994-95)

## Germplasm Exchange

Each of the three commodity networks (EARRNET, ECABREN and PRAPACE) identified constraints to production which could be at least partly alleviated through genetic manipulation of the crops involved. Susceptibility to diseases was among the most obvious of these, but significant effort has also been directed towards reducing sensitivity to abiotic constraints, for example, research towards improving adaptability of beans to poor soils.

Large introductions (see Appendices 5 and 6 for details relative to cassava and potatoes) of germplasm have been made with the assistance of the IARCs (see II.1b for quarantine procedures). These have been a source of valuable genetic traits and variety releases. However, many well adapted, consumer accepted varieties of regional origin are still widely grown, as illustrated in Table 11 which shows the origin and characteristics of bean varieties released in Uganda.

Table 11

### Bean (*Phaseolus vulgaris*) cultivars released in Uganda

Uganda Cultivars	Origin	Released
K20	Uganda bred line	1968
K132	CIAT Line CAL 96	1994
K131	CIAT Line MCM 5001	1994
White Haricot	Uganda - local selection	1989
OBA 1	CIAT	1995
MCM 1015	CIAT	1995
MCM 2001	CIAT	1995
Umbano	Mexico: CIAT bank G2333; via Rwanda	Pre-released

It should be emphasized that the networks help move germplasm of local origin as well as 'exotic' material. Notable is the rate at which the variety G2333 (known in Rwanda as 'Umubano' and in Zaire as 'Aliya') has spread across the region, once its value was demonstrated in Rwanda (II.1d). This trend of across country exchange will likely accelerate even more as testing protocols exemplified by the Uniform Potato Variety Test (PRAPACE) begin to have an impact. While regional programs have clearly capitalized upon the potential of direct introductions and have effectively used the collaborative potential of networking to rapidly evaluate and transfer materials, long-term there will likely be a need for greater emphasis on regional crossing programs

to combine the most desirable traits of regional and introduced germplasm. This function is currently being done largely by IARC scientists (although select national scientists have gained these skills in recent years); more in depth training, program stability, and operating resources would enhance the capacity of regional scientists to assume this role.

As in the other networks, AFRENA explores the potential of both indigenous and introduced species. The approach of providing long-term training opportunities (with funds other than those provided by the project) at institutions both within and outside the region may have the very useful side effect of exposing those who will lead agroforestry research to the range in possibilities in the discipline area.

### **Technical Backstopping**

Technical backstopping by the IARCs to network programs has been extensive in a range of disciplines: for example, breeding, pathology, agronomy, socio-economics, post-harvest utilization. As capacity of regional scientists increases, reliance on IARC scientists should decrease. Currently, some national resource personnel have been used in a regional backstopping capacity, but ways to increase this should be sought (see Sections II.2c and II.4.).

## **II.3 TECHNOLOGY, BASELINE DATA, RELEASES, AND THE PIPELINE**

This section calls for information on availability, access and use of technologies in which the networks are significantly involved. The section on impacts, II d above, presents some of the evidence that these critical objectives of the project are being met. Appendix 5 list planting materials and germ plasm exchange as well as the types of items shown below. Over time these materials will also contribute to sustainable agriculture in the region.

- (a) additional information on seed processing, handling and marketing technologies for potatoes, sweet potatoes and beans.
- (b) advanced small scale technology for processing cassava and its use in food products and feed.
- (c) for agroforestry, examples of advanced information in the pipeline consist of the use of *Mimosa scabellia*, a promising fodder species for Rwanda; use of various trees and shrubs in conjunction with fodder crops in Burundi to increase total feed and/or digestible protein; successful planting of *Calliandra calliandra* and *Leucaena diversifolia* in arresting soil movement on the upper parts of scoured terraces, while also providing interim products of fodder, fuelwood and poles. (Kachwekano, Uganda)

Additional information on advanced information in the pipeline is also included in Appendix 8, The Networks Responses to the Draft Report.

This section of the Scope of Work for the evaluation also calls for “an analysis of where the

networks were, technologically, at their inception versus today.” Since baseline data is extremely scarce either for the original inception of the networks (sometime in the 1980's) or for the period under evaluation (1992-1996) and since dozens of technologies exist across networks and within networks, it is simply not possible to address this question in an analytical fashion. The relevance of the issue is critical if it means “are the networks broadening and deepening their ability to address, and do they address, a more meaningful array of problems than they did five years ago?”

As indicated, we do not have time series information for the past five years, but some interesting examples (as well as overall performance) indicate the networks are indeed broadening their “technological” capability, perhaps in “soft” technology as well as hard technology. Examples happening within the past five years are:

1. A productive bean variety ready for release was rejected because the home economist, new on the interdisciplinary team, found the cooking time to be too long--hence using too much fuel and labor.
2. Reverse technology: Some farm households have, for a long time, planted mixed bean varieties as a disease risk management tactic against being wiped out by having only a susceptible single variety. The Ethiopian bean team is now packaging a mix of seeds and working to have the mix accepted as a formal part of “production technology.”
3. While some farm families are growing trees or bush crops for feed, poles, firewood, or for their soil-building properties--or a combination of reasons, the adoption rate has been less than hoped for. The Uganda agroforestry network is recruiting a socio-economist in lieu of another physical scientist. Whether this is a good move remains to be seen--but it indicates a willingness to broaden the “technological” base and address the reason for slower adoption rates than appear practical on the face of the “hard” technology, i.e. marked production increases of corn following nitrogen-fixing trees.
4. The cassava network has been particularly aggressive in broadening the technology beyond the production phase and collaborating in producing small scale processing equipment and use of cassava in cakes, bread and feed.
5. The project is not primarily charged with developing brand new technologies. It is charged with using existing research methodologies and making various technological information available to the extension and farming communities. A prime example of this facet is that in the semi-arid region in eastern Kenya--served by the Katumani Dryland Farming Center--where cassava was not grown, the cassava applied research technology package has now been introduced. This includes testing for cyanide, post-harvest processing and alternate uses of the raw material, distribution of cuttings, as well as conventional varietal screening. The crop is now being grown on the poorer soil types and by the poorest of farm families. The production technology is very low input and sustainable, provided the crop is not produced on highly erodible slopes.

In conclusion, there does not appear to be any doubt that the networks are further ahead, technologically, today than they were five years ago--nor is there a tendency to be wedded to any set technology. If financing is a serious constraint, as it is in FY96/97, then there is a tendency to favor plant breeding, as it is seen--perhaps logically--as the most promising area for impact. Since plant breeding technology is fairly well known the state of technology is not particularly enhanced, but the project could not be expected to abandon that technology in favor of the unknown. To continue the trend toward broadening the technological base will require additional financing.

#### II.4. NETWORK PUBLICATIONS

Network publications, if organized well, should meet a variety of purposes.

- 1) They should serve as a venue for sharing scientific results within and beyond a network. For this to happen, there must be distribution to all network members and mailings to key scientists beyond..
- 2) They should stimulate researchers to "professionalize" and synthesize their results. Here, there must be a mechanism for networks to encourage writing for formal publication.
- 3) They give public recognition to the individual and group accomplishments of gifted scientists. To attain this goal, the contribution of scientists has to be made public both by citing authors and listing references from which information is drawn.
- 4) They might make available articles from scientific journals not otherwise available to national researcher--if the publications series basically serves to circulate reprints.

It is with these four goals in mind that the publication strategy of each network was examined.

**PRAPACE.** The potato/sweetpotato network lists some 79 publications for the 1992-96 period, encompassing both national and network publications *per se*. Four Workshop Proceedings have been synthesized since 1992 alone (Goal 1). Working Papers, started in 1995, serve to circulate work in progress particularly of the NARS scientists. The 8 different papers produced in 1996 specifically focused on monitoring and evaluation. Network scientists are encouraged to publish in *The African Crop Scientist Journal* (Goal 2) and get considerable help from CIP scientists toward this end. In all PRAPACE publications reviewed, individuals and groups were given due recognition of their efforts (Goal 3), and PRAPACE does have an informal policy of photocopying and circulating formal journal articles (Goal 4). Publication of a variety of brochures, and leaflets helps to pass information in a more popular manner and the evaluation team is impressed with PRAPACE's efforts to give Steering Committee Meeting Minutes a more formal and transparent form. PRAPACE should consider whether it would be useful to distribute some of its proceedings and working papers beyond the network and whether a formal reprint series might be in order. From even a brief review of its extensive output, it is

clear that the network takes its job of disseminating information very seriously.

**ECABREN.** The bean network lists 40 publications for the period from 1992-96. Workshop Proceedings (meeting goal 1) are distributed to all in the network and to key scientists in Africa, but might profitably also be distributed more widely to international scientists interested in key subject matter. Since 1986, 32 different workshop series have been edited and distributed, indicating that substantial network weight is put on sharing workshop information based on discussions and field-level results. An Occasional Paper Series (Meeting Goal 2) encourages researchers to formalize their results. To-date, most of the entries have been from IARC scientists; national colleagues should also be encouraged to submit papers there. As papers in both series (Workshop and Occasional) are printed in full, with author attribution and references, the network seems to have fulfilled the goal of acknowledging individual scientist efforts (Goal 3). A Reprint Series, novel to the bean network, provides a useful service for making the refereed articles of both national and IARC scientists more readily available (Goal 4).

The bean network seems to give serious weight and considerable effort to helping scientists publish their results. They just sponsored a writing workshop to help NARS scientists produce "publishable papers". At the end, each participant was to have a draft paper for eventual submission to a formal, refereed journal. In addition, the ECABREN Steering Committee is trying to develop a strategy for diffusing newspaper articles on bean research--both to share information and help NARS justify their resource allocations and generate more research resources. Overall, the publication strategy of the ECABREN network should be commended.

**EARRNET.** Despite its being a relatively new network, EARRNET should consider giving more weight to publications. At this point, the only network publication *per se* seems to be the *Roots Newsletter*, which has been issued three times to-date. To aid information exchange, the proceedings on several non-network workshops (of ISTRC) have also been distributed.

In total the cassava publication of ITTA, ESARC and EARRNET are extensive - see Appendix 8.

**AFRENA.** An *AFRENA Report Series* lists 22 publications from 1992-96; given the relative smallness of the network and the newness of the technology, the extent and diversity of subject matter is impressive (Goal 1 and partially Goal 2). The papers of at least one Annual Review Workshop Proceedings (1993) have been synthesized and it is clear that scientists are being encouraged to publish in refereed journals as evidenced by several entries in *Agroforestry Today* and *Agroforestry Systems*. These articles are distributed widely to network members (Goal 4). For the February 1996 Annual Review, it is unfortunate that full papers were not published, but, at the minimum, individual scientists' contributions should have been recognized. (The document has no bibliography and gives no references for the abundant data presented in the text.) In a similar vein, it is unfortunate that a synthesis of highlights of this network made in 1996 gives no formal recognition to the many scientists who are contributing novel research results. It is not clear that Goal 3, a tenet for good collaboration, is being respected throughout AFRENA publications.

## II.5. COMPLEMENTARITY OF IARC ACTIVITIES AND NARS PROGRAMS

**Overview:** The planning and the programming system has been set forth in section II.1 above and is elaborated below.

Up to now, the divisions of research labor between IARCS and NARS scientists has been determined informally through extensive discussions--and for the most part successfully. Overall, the technical support of the IARCs for the networks has been greatly appreciated, particularly in the area of germplasm development and transfer. Additionally, the IARCs have contributed a significant amount of logistical support which has proved critical for network functioning and on many occasions the IARC's have supplied staff support and financial resources of their own. NARS firmly suggest continued IARC technical inputs to all networks. As a nice tribute to what have generally been successful IARC/NARS relationships, the national bean programme of Rwanda baptized it most spectacular climbing bean release "Umubanomwiza" or "good collaboration" as a testament to the NARS/IARC venture. However, through time, as national programs grow stronger, there is some concern that:

- IARCS activities are sometimes (not always) substituting for what NARS scientists themselves are capable of doing; and
- IARC activity are not structured in a way as to maximize capacity building.

These issues are pursued below.

### **Increasing IARC's Accountability to Networks**

In theory, the activities of IARC scientists working within and giving support to the networks should be highly complementary. Research priorities are set together and sub-projects and regional mandates are discussed in detail. When sketching the overall divisions of labor between the NARS and IARC scientists within the network, the CIAT team working with the ECABREN network suggested that their own roles were quite distinct from their NARS partners. For example, the IARC's scientists focus on methodology development, select "strategic research" which is either too risky for NARS or beyond current capacity; and synthetic research which unites national program work and draws out more generalizable trends. The strongest and clearest divisions tend to be in breeding, where the IARCs may focus on the early generation material, often segregating, and the NARS the stabilized populations. Even here, divisions are not firm, as some national program have top rate breeding capacity and can handle crosses themselves.

In practice, the evaluation team was given clear examples of activities where NARS felt there was overlap and inefficiencies in the IARC/NARS relationship.

While not wanting to stifle IARC creativity, many NARS suggested greater structure in the IARC/NARS relationship might result in more effective capacity building and less duplication of

efforts. To assure that the IARC contribution to the network is as relevant to regional needs and as cost-effective as possible, NARS programs and the evaluation team suggest that:

**Recommendations:**

- 1. IARC scientist work plans' be reviewed by the appropriate SC; (This applies to those scientists collaborating with the networks).**
- 2. IARC scientists always try to work with national counterpart (particularly when involved in "strategic research");**
- 3. IARC scientists firmly be discouraged from leading a sub-project.**

**Greater Use of National Resource Personnel for Network Technical Expertise**

The flip side of greater IARC transparency and coordination with NARS is that NARS suggest that there are areas where their own contribution should be expanded. In particular, greater use should be made of National Resource Personnel within the networks. The EARRNET coordinator suggested that sufficient national excellence existed in selected sub-fields within entomology, pathology and post-harvest (equipment and products) , although the network has not yet supported these individual's skills on a regional level. The ECABREN network is already moving nationals around the region to help monitor such themes as rust and common bacterial blight. Similarly, the PRAPACE, as a policy, tries to use outside consultants as little as possible, and, for instance, recently used national resource people to lead workshops on late-blight and seed production. This tendency to use National Resource Personnel should be encouraged (maybe through budget allocations), and perhaps institutionalized through ASARECA (see section III.8)

**Recommendation:**

- 1. A list of National Resource People in each network should be collated and made available nationally, regionally, and internationally. Networks and donors should consider whether the existence of a separate budget line would help to promote greater use of these significant regional human resources across as well as within networks. (ECABREN already has a budget item for national resource staff.)**

**Strengthening of Cross-Network Links**

There was also some discussion with national programs about possible overlap in network by network activities and whether coordination might lead to greater cost-effectiveness. The

evaluation team was given a series of examples where networks have already made moves to collaborate more effectively: the recent training course on impact assessment involved all four networks (see section II.1d), PRAPACE and EARRNET have done joint training on post-harvest concerns, and the Seeds of Hope rescue mission in Rwanda, in which all four networks participated, had significant positive impact (see section II.1d). There are also examples of cross-network collaboration in research. AFRENA and ECABREN are collaborating on identifying staking material for improved climbing beans; the same two networks are also experimenting with green manure enhancements (particularly Tithonia) to help control root rots. All these activities are laudable. However, most are on-off affairs, and both national programs and the evaluation team suggested areas where continued and institutionalized cross-network collaboration should be encouraged. In particular, issues in soil fertility enhancement, impact and adoption analyses, and more general socio-economic characterization, are not commodity-specific. The development of cross-network thematic groups on these issues could be useful for 1) developing a more united and hence stronger regional research cohort; and 2) sharpening methodologies; and 3) avoiding duplication (see also section II.1a for recommendation).

### **Concerns with ESARC/EARRNET Divisions**

The rationale for the development of two overlapping programs on cassava in the East, Central, and Southern African region escapes the research team. (Note that both are largely supported by USAID funding). The East and Southern Africa Regional Centre (ESARC), based in Namulonge, Uganda, was inaugurated in 1994 as an IITA regional center serving the mid-altitude agro-ecology of East and Southern Africa. (Its mandate includes banana and plantains, as well as cassava.) It has a Steering Committee (which has no real budget oversight) and has described its major activities in the realm of: strategies to combat African Common Mosaic Virus (ACMV); post-harvest; and germplasm development. Although considerable cassava research had been done prior to 1994 under the EARRNET, *per se* also inaugurated about 1994, as a network of NARS in the East and Central African Region (that is, a subset of the ESARC countries) also has a Steering Committee (different from ESARC, although with two members overlapping) and includes among its principal thrusts: strategies to combat African Common Mosaic Virus (ACMV); post-harvest; and germplasm development. When asked about possible duplication, the coordinator of ESARC indicated that their mandate was regional, while the EARRNET mandate was basically national. EARRNET may currently have a national focus, but that it primarily because the network is not being giving the sufficient mechanisms or resources to develop into a regional body.

The fundamental differences between ESARC and EARRNET are clear to the evaluation team. One is an IARC sub-station with abundant money and laboratories (and a station over which IITA has a 49-year lease). The other is a poorly financed network among national programs, which is trying to gain some of the technical capacity already evident in ESARC. Note that even in its own region, EARRNET has no say over how ESARC spends cassava research funding.

In addition to the normal, honest, professional differences of opinion on what should be done when there are two departments addressing the same commodity when located on the same research station, conflicts between networks appear to also stem from:

- (a) the level of effort and scope of ESARC relative to ERRNET and the national programs
- (b) differences in salary scales
- (c) differences in per diem rates
- (d) the operational flexibility of ESARC can be, if like the IARCs, much more responsive, in the short run, than can be that of the NARS
- (e) the seeming availability of relatively more operational funds for ESARC (and IARCs) compared to NARS operations usually results in much better appearance of plot boundaries, sign boards, etc. This invites invidious comparisons.

All of this is not to say ESARC should lower its standards, but rather to say there are problems, which may appear trivial to some, but are not so to others.

The evaluation team does not have sufficient information nor the mandate to consider how ESARC and EARRNET might be more effectively linked. USAID, The Committee of Directors and IITA might well turn their attention to this issue sooner rather than later.

Considering the situation at this time, it appears that:

- 1. The existence of a parallel IITA structure based in Uganda (ESARC) questions the whole purpose of the EARRNET network and any ultimate intention of the IARC to help NARS reach their full organizational and technical capacity.**
- 2. The IITA program, ESARC, serves as a direct contender to EARRNET for funds and mandates. With the huge discrepancies in funding levels and no national control over ESARC budget, ESARC serves to undermine capacity building and sense of ownership of the EARRNET by national programs. ESARC is where the power structure lies.**

### **Concerns with Lack of ICRAF/AFRENA/NARS Divisions**

In terms of the AFRENA network, the difficulties in distinguishing what is IARC and what is NARS has been pointed out in several sections of this report. Lack of clear mechanisms for NARS input into decision-making (no real network Steering Committee exists) is coupled with lack of clear technical divisions of labor (the IARC seems to be organizing the technical agenda at each site), and a lack of transparency in budget allocations (see section IV below).

In its own terms, AFRENA is an ICRAF collaboration with the NARS and not a network among NARS.

The current AFRENA model places no emphasis on devolution of research management to the NARS or on developing a sense of regional ownership of the network. AFRENA is an IARC-driven and IARC-managed network. **To achieve meaningful complementarity in the IARC and NARS, a rethinking of the basic premise of AFRENA is a must.**

## **II.6 RECOMMENDATIONS**

Many successes which could be attributed to network activities were evident during the review. Recommendations are offered in the hope that they contribute to further success of a productive project. The following recommendations are a compilation of those made throughout section II of the report; the text can be referenced for greater detail and/or clarification.

### **II.1a. Priority Setting and Research Planning**

1. The actual procedures for priority setting should be revisited to assure that the research program is not simply technology driven or driven by the subjects already being explored. The priority setting process should be scientific; the 'Planning by Objectives' approach is endorsed as a comprehensive tool.
2. All networks should have a functional Steering Committee which can provide technical oversight.
3. Technical oversight should be directly linked to financial allocations. This suggests that Steering Committees should also make the research budget allocations, perhaps with veto power remaining with the Committee of Directors.
4. Steering Committees might consider how to develop mechanisms to assure that a good disciplinary breadth is available when screening specific proposals. In particular, the lack of socio-economic representation should be addressed.
5. The development of thematic groups should be encouraged in each network, with meetings to be held every two years.
6. The development of cross-network thematic groups should be explored for themes which are not necessarily technology specific, for example socio-economics and soil fertility management.
7. Multi-disciplinary meetings should be encouraged within every network and should probably be held every two years.
8. As the networks grow and develop in terms of scientific capacity and diversity, a more formalized project evaluation system should be established.

9. Steering Committees should consider whether general guidelines for overall disciplinary allocation of research activity budgets would be useful, particularly for encouraging non-varietal work.

### **II.1b. Reception, Screening, and Availability of Technology**

10. Greater attention should be given to multi-component research designed to determine the agronomic limitations to increased crop productivity. Only after these limitations are fully understood can economic determinations be made.

11. Development of a viable seed industry should receive increased attention. Working through small farmer/farmer groups offers an exciting opportunity, but presumably, the long-term survival of these entities as seed producers will be governed by the same set of factors which is governing the status of the more formal (and very weak) seed industry. The sector needs to be better understood.

### **II.1c Monitoring**

12. Regionwide monitoring tours are an important component of networking and are encouraged. They broaden the views of the participants and contribute to their professional confidence and skill.

13. The networks have contributed significantly to scientific capacity in the region. This capacity of National Resource People should be utilized to the fullest extent possible in the monitoring process, of which technical backstopping and mentoring are important components.

### **II.2a Relevance of Regional Agenda to NARS Developmental Priorities**

14. Network mechanisms *per se* should offer a failsafe procedure for assuring that specific themes researched within any single crop commodity are of national relevance.

15. On-farm variety tests should be closely monitored and associated with the study of other potentially yield-enhancing agronomic practices. The conduct of variety tests with two levels of management (as observed in Madagascar), the farmer's and the researcher's, could serve as an important teaching tool and permit a fuller understanding of the variables affecting performance of new varieties.

16. Networks should continue to seek support for postgraduate training programs to ensure a supply of researchers with the most up-to-date technical skills and to provide for replacement of researchers lost from the networks.

### **II.3 Network Publications**

17. Publication should be encouraged to share scientific results, stimulate professionalization of researchers and gain public recognition for individual and group accomplishments. Publication in formal peer-reviewed journals is encouraged since these are likely to be available internationally and become part of the 'permanent record'.

### **II.4 Complementarity of IARC Activities and NARS Programs**

18. IARC scientist work plans should be reviewed by the appropriate Steering Committee.

19. IRAC scientists should always try to work with national counterparts.

20. IARC scientists should be firmly discouraged from leading a subproject.

21. A list of National Resource People in each network should be collated and made available nationally, regionally and internationally. Networks and donors should consider whether the existence of a separate budget line would help to promote greater use of these significant regional human resources.

## **III. NETWORK ADMINISTRATION AND MANAGEMENT**

### **III.1 RESEARCH ADMINISTRATION AND COORDINATION**

#### **Administrative Cost Effectiveness**

Assessment of cost-effectiveness is quantitatively difficult, if not impossible, without standards for comparisons and there really aren't any for the type of endeavor being evaluated. Even though the project research has been underway for several years, there are still start-up costs associated with any development project such as office relocations, disruptions due to civil strife and the regional projects, on a routine basis, entail substantial international travel and per diem costs. Additionally, the organization and supervision of research and training are charged against the line item for personnel and management, rather than costed against research--which would reflect a markedly different and more accurate break down of the ratio between "administration" and "research" costs *per se*.

Viewed from the perspective of judging management effectiveness, it is necessary to consider the labor, time and travel involved in the organization, screening, approval and monitoring of research on a regional basis. This involves efforts by the Steering Committee, NARS Directors and the work of the Regional Coordinators. All of these fixed costs are charged against the substantive research. Since the fixed costs category (about \$166,000) of each network (except

AFRENA) now supports a research item of around \$90,000, the evaluation team feels cost-effectiveness can be improved by increasing the research line by a significant amount and also allowing a research topic to be carried out over several years. This approach, while cost-effective to a degree, will soon reach a point of diminishing returns if management becomes stretched too thin. As a practical matter, knowing when the ratio is appropriate stems from actual experience. The evaluation team feels that staffing the Research Coordinator's office with a second professional along with the recommended increase in the research item would result in a more cost-effective management system.

### **Diversity of Research**

The need for a greater diversity of research is taken into account in the program planning process and ultimately will be carried out in the field. This is particularly so 1.) as the reliance on germplasm becomes an exploited tactic, 2.) as one needs to more fully exploit the productive potential of any given variety, and 3.) as the need for multidisciplinary and systems research become more apparent and identified as a priority. The need for a broader spectrum of research is addressed in section II.1b. The mechanisms for priority setting and selection of topics are already in place. Supervision and coordination costs of a new type of research and a new level of effort will be added to the existing management burden.

### **Cost Structure of Key Network Services**

The general budget and cost estimates by major types of services are presented in section III.7 and section IV. While these estimates mask, to a large degree, the complexity of operations, the overall size and emerging relationships are evident. Less money and a smaller percentage of available funds are now being allocated to regional research than was budgeted at the outset of this phase of the project. This situation, which derives from the sticky nature of fixed costs in the face of declining budgets, can and should be, reversed by larger budgets, particularly with larger amounts ear-marked for research.

The differences in personnel costs shown in section IV reflect the differences in pay scales of key personnel and do not indicate that the cost structure is out of line with respect to services being financed. Our limited assessment of the cost structure did not reveal any evidence of resource allocations being out of line with needed services, but rather an appropriately agile ability to adjust services to the realities of the resources available.

### **Spread of Key Network Services**

As implied in the above sections, network research supervision resources are already spread thinly--even acknowledging that the use of NARS staff and facilities are the main mode of operation for the specific research activities. The three commodity networks presently have activities in up to ten countries. Obviously, this involves a huge geographic area and an area where transportation networks are thin and are well known for their deferred maintenance. In order to utilize network resources and not spread them too thinly, it becomes increasingly

apparent (as it no doubt was in the beginning of the project) that only through effective collaboration with project partners can the project expect to have effective supervision and coordination. The NARS staff welcomes deeper involvement in the project at all levels of operation but they need operational funds in order to do field work-and supervision is part of field work.

**Summary and Recommendations:** The project is cost effective but is becoming spread widely and needs to diversify its research.

**Recommendation:**

1. If the objective of more research and more research diversification is accepted, as recommended by the evaluation team , then a recommendation also follows that the two positions be filled in the Research Coordinators office and a substantially larger research budget be provided.

### **III.2. IARC CONTRIBUTIONS TO ADMINISTRATION AND MANAGEMENT**

#### **Regional Coordinators**

At present, IARC personnel have been seconded to work as Regional Coordinators (RC) in two of the networks, EARRNET and AFRENA, and in the case of EARRNET, the RC has a full-time assistant (Ph.D. level), also employed by IITA. All these IARC personnel have been energetic and generous in giving technical and administrative backstopping. However, the Committee of Directors of ASARECA feels that RCs should be selected and answerable to the networks themselves--if the networks are to represent the NARS in the most meaningful way in the region. This process to give the networks more sense of ownership should be encouraged.

ECABREN is in a process of transition away from IARC-hired coordinators. The Great Lakes Region RESAPAC network was shifted over to a national scientist in 1994. This national scientist was screened and selected by the Committee of Directors (CD) of ASARECA and is answerable first to the CD and the Steering Committee of his own bean network. As of December 1, 1996 the former EABRN will also be headed by an RC hired by the network and ASARECA. While the efforts of the part-time CIAT Regional Coordinator was lauded by all interviewed, this transition towards regional management of the network is very welcome. For legal reasons (see section III.8) CIAT has presently agreed to continue administering the payroll of both these individuals. The CIAT Regional Office in Uganda is on contract to ECABREN to provide accounting services (fee of \$7,000/year).

PRAPACE moved from an IARC-hired to a network hired coordinator in 1993. As the tragedy in Rwanda led to the death of the first coordinator, his assistant was nominated and confirmed in this post in 1995 and is doing an excellent job by all accounts. CIP is administering the payroll, with the eventual hope that ASARECA itself will soon gain the legal and financial

status to take over this function. While the CIP regional representative based in Nairobi does not fulfill a management position in PRAPACE, he provides administrative backstopping to the network and organizes technical backstopping from CIP. CIP is also responsible for accounting services for PRAPACE. The evaluation team feels that the positive support he gives to the network should be emulated.

A sketch offered by PRAPACE suggests some of the dimensions of the Regional Coordinator's current role (Table 12).

Table 12

Dimensions of the Regional Coordinator of PRAPACE

Network Coordinator	
Attributes	Administrative and technical coordination
Organization	PRAPACE
Contract length	3 years renewable
Staff under orders	Assistant Coordinator, 2 administrative personnel, 2 guards, 1 driver
Number of trips per year	10 to 14, including the annual meeting of CIP in Lima
Contact within the member NARIs	
- NARI DG	Yes
- NARI Head of finance	No
- NARI Director of program	Yes
- IARC outposted staff	Yes
- Donor agencies	Yes

**IARC Administrative Support for the Coordinators**

During the extensive discussions with the Regional Coordinators, there was no evidence of ineffectiveness of support from the IARCs.

**IARC Technical BackStopping**

The nature of the technical backstopping is cited throughout the report and in section III.2a below. Generally, the support has been well received from a technical perspective. There have been some instances where national scientists have felt the IARC scientists may have been overly aggressive in their program approach, but this is a "style of operations" problem and not strictly a technical issue.

**Technical Coordination**

The IARCs do not technically coordinate the research activities. This is a function of the NARS Steering Committees and the Research Coordinators, now seen increasingly as employees of NARS/ASARECA (except in the case of AFRENA).

**Training**

Most project sponsored training is short-term and is designed to enhance existing skills of

network personnel. This type of training is adequate as long as a pool of trained personnel already exists in the NARS. However, as shown in Table 10, section II.2e, the number of highly trained persons, as measured by degree level, for research in PRAPACE (1994) was adequate only for a program in its early stages of development. The depth and breadth of personnel certainly did not suggest a capacity level which would permit continued high quality and innovative research in the absence of outside inputs. The situation appears to have been even more critical in AFRENA.

In AFRENA, funds from outside the network have been used to provide advanced training to scientists. In September, 1994, 13 persons here studying for MSc. or Ph.D. degrees with fellowships funded from outside the network. Similarly, ECABREN has found funding, largely from outside the network, to sponsor advanced training: during the 1992-1995 period, 7 persons completed MSc degrees and 7 completed Ph.D. degrees. To reduce the cost of degree programs, there is an increasing use of regional universities as educational sites. Efforts of the networks to find funding for this much needed component of institutional development are laudable.

### **IARC's Support as Aligned with Network Priorities**

IARC's support is aligned with network priorities as they basically only render support for those network activities selected through an involved priority setting system. See section II.1a for a discussion of the activity prioritization.

### **IARC Core Funding to Backstop Network Activities**

With the exception of ICRAF/AFRENA wherein network and core funding are jointly managed, the other IARCs do not use core funding to specifically pay for network activities. However, core funded activities have definitely been used in the past and are currently used in support and backstopping of various network programs. Specifically, this is occurring through:

1. Provision of genetic materials, including tissue cultures in the case of vegetatively propagated crops (cassava, potatoes, and sweet potatoes).
2. Provision of trainers, training resource personnel, and technical consultants from headquarters or regional offices.
3. Logistical support.
4. Technological research findings other than genetics and germplasm material.
5. Use of the IARC's communications and database systems.

In the case of ICRAF/AFRENA, there is no particular differentiation between core and network funds. During the past year and, to a lesser extent, in prior years, the network financing did not cover the AFRENA costs. Therefore, core funding finances the shortfall (or conversely

network funding covers only a portion of the regional network program). ICRAF's calculation for the AFRENA operations is about \$200,000-\$250,000 per country, or about \$500,000 for Kenya and Uganda. Thus, network funding covers only about 50% of costs with the other 50% coming from core budget. Additionally ICRAF/AFRENA has been particularly active in securing bilateral funds for Rwanda and Kenya, and these funds are managed by the national institutions.

In conclusion, given that the IARC budgets are under pressure, it is unlikely that any additional support can be expected for the networks from this source. Support is likely to be less. The obvious recommendation is that efficiencies be sought by further capitalizing on the comparative advantages of the various collaboration institutions engaged in the project. That is, drawing upon the less costly, but considerable, national staff and facilities where at all possible for the services currently provided by the IARCs. The IARCs would still be expected to supply critical research information and materials, but perhaps relatively less hands-on developmental efforts, to the extent that national and network resource personnel can fulfill that role.

### **III.3. EXTENT OF ADEQUATE NATIONAL/BILATERAL SUPPORT**

As suggested when discussing the allocation of operating budgets in section II.c, most of the NARS in the four networks rely on network funds for operational costs for a very significant proportion of their research. Ethiopia in general is an exception: government allocations to agricultural research have been generous. Select programs, such as the cassava national program in Uganda, have also received substantial bilateral grants. However, overall the situation looks fairly grim for national funding (other than salaries and infrastructure maintenance) to agricultural research. The question is not "are there key activities or tasks which do NOT receive adequate support" but rather "which tasks/activities DO receive adequate support."

The networks and AFRENA in particular have been active in responding to shortfalls in national funding and in sourcing bilateral funds for the network. They are to be commended for this effort.

Indeed, without the initiative of ICRAF it is doubtful if agroforestry would exist in any substantial form.

### **III.4. NARS PARTICIPATION IN THE NETWORKS**

#### **Personnel**

Personnel numbers and qualifications appeared to be adequate to carry-out funded activities. As pointed out elsewhere in this report, as the networks progress towards self-sustainability, training requirements will need to be reevaluated.

At several places during the review, ways to increase research efficiency were discussed with

research management personnel. One possibility is to support strong researchers in roles as project leaders and/or mentors for less experienced scientists. Obstacles appear to be the 'thinness' of the staff in terms of trained scientists (most institutions appear to be 'bottom-heavy', see Table 10 for an example) and the lack of resources for adequate logistical support of project leaders. A further obstacle appears to be the current dependence of many projects on donor funding for operational support. Uncertainties with regards to amount and duration of funding often results in project discontinuity.

### **Integration of National and Network Research Programs**

The process of research planning (section II.2a) engaged in by each of the networks and the activity approval process involving both research leaders (Steering Committee members) and institute directors (Committee of Director members) provides for a high degree of integration of national and network research programs. The teams viewed the research programs at both level to be compatible.

### **Effectiveness of Trial Supervision and Quality of Results**

Trials viewed on experiment stations appeared to be well managed and capable of producing reliable results. There has, however, been a movement towards on-farm research (see section II.2d) which relies heavily on farmer inputs for its execution. While there seemed to be good acceptance of the concept, it may be too early to properly assess its contribution to agricultural development. Clearly, it will be possible to judge farmer acceptance at the end of the process. However, a reservation is that without close monitoring, the researcher may not know why the technology was or was not successful. The research setting provides an opportunity to meet dual objectives, but the availability of resources to adequately monitor the process (per diems, transportation, etc.) appears to be limiting. While on-farm research is being viewed as low-cost, what we are witnessing may be a case of getting what's being paid for.

### **Effectiveness of the Steering Committee in Providing Technical Guidance**

The review team viewed the Steering Committee concept as effective. The early dominance of these committees by scientists of only one or two disciplines appears to be in the process of rectification. We encourage active efforts to achieve disciplinary balance as the networks engage in a broader range of research.

## **III.5. INVOLVEMENT OF NARS DIRECTORS IN REGIONAL NETWORK PRIORITY SETTING AND MANAGEMENT**

The directors of the NARS form the Committee of Directors of ASARECA. This is the head body of the association and, as suggested by one director, "should inspire, decide, orient and supervise all the activities of ASARECA on the technical, administrative as well as financial levels" (Prof. Masimango, per. comm.).

ASARECA has already constituted its own working group to determine what its feel should be the priority agricultural research issues in the region. (These are elaborated in section III.6). All network commodities fall within ASARECA priorities.

The Committee of Directors, and hence ASARECA, also has a strong role in priority setting within the current structure of three of the regional networks: PRAPACE, ECABREN and EARRNET. As described in the section of this report focusing on priority setting (II.1a) each of these three networks used different mechanisms to set priorities and screen individual activity priorities at one point of time. However, in all these three networks, the Steering Committee works to assure that projects are being developed and implemented along the lines of established priorities. Checks exist both 'above' and 'below' the Steering Committee to assure that network activities are indeed meeting national ends. All projects submitted to the SC have to have first passed national commodity program leader's approval. At the top end, all activities approved by the Steering Committee can only be implemented if they have the seal of approval of the Committee of Directors (hence ASRAECA).

The Committee of Directors used to meet individually with each network once a year, at different locales and on different dates. Now the work plans of all networks (including discussion of general priorities and specific work plans) are considered at a single yearly meeting, located at ASARECA headquarters in Entebbe. This modification has resulted in a much more efficient use of NARS Directors' time. However, it has also stretched the capacity of the CD to give an in-depth review, hence informed criticism to any one network (each of which is allotted about an hour's presentation). To help alleviate this problem, one NARS director suggested that each Steering Committee should deliver (mail) a written report to each concerned NARS Director detailing how activities are being programmed, progress toward their implementation, and any key research results. This would best be done at least one month in advance of the CD annual meeting within ASARECA.

As AFRENA does not presently have a Steering Committee which is responsible to a Committee of Directors, the extent of NARS Director input into that network's priority setting is unclear. However, AFRENA does present its program at the Annual Meeting of the CD at ASARECA and presumably receives some feedback in that forum. Note: By early 1997 - after the evaluation field work - a sub-committee - the AFRENA Directors Committee - has been approved to work with ASARECA.

### **III.6. NETWORK PRIORITIES IN REGARD TO REGIONAL PRIORITIES**

One of ASARECA's initial challenges was to prioritize research areas to receive attention in East and Central Africa. A Working Group on Regional Research Priority Setting met in April 1995 and ranked 19 commodities and factors of production as being priorities-- out of potential 101 themes for collaborative research (ASARECA, n.d.). Table 13 lists these priorities as ranked by ASARECA.

Table 13

ASAREC research priorities: commodities and factors of production

Program	Rank	Score
Maize	1	3.79
Beans	2	3.67
Sorghum	3	3.42
Banana	4	3.37
Soil & Water	5	3.34
Soil Fertility	6	3.33
Dairy	7	3.32
Wheat	8	3.32
Beef	9	3.25
Potatoes	19	3.16
Coffee	11	3.15
Sheep & Goats	12	3.12
Cotton	13	3.10
Rice	14	3.03
Forestry	15	2.98
Cassava	16	2.94
Socio-Economics	17	2.94
Groundnuts	18	2.80
Citrus	19	2.46

The information in table 13 suggests that ALL the networks are working on themes that are of prime regional importance—as defined by the region itself. It is important to note that regional priorities do not necessarily translate into national priorities. An example given by one NARS director (Prof. Masimango/INERA, Zaire) suggests that sorghum might only interest one or two countries in 10, but nevertheless be a priority for a particular agro-ecological zone in any given country.

It is expected that the priorities listed above will remain fluid: specific countries may experience natural disasters, or the economic situation or political priorities may significantly fluctuate.

### III.7. COST EFFECTIVE MANAGEMENT APPROACHES

The basic design of the project is inherently cost effective. With a very limited budget for research *per se* the project supports the use of considerable additional resources from the NARS which are applied to the research activities. The project is structured to trade upon prior investment in national and international facilities, intellectual properties and agricultural material. The underlying assumption is that there are underutilized resources, particularly among the NARS facilities. Has the project been able to capitalize on such resources?

The section on impacts and the lists of research activities section clearly indicates that the leveraging tactic has worked. The maintenance of the research in the face of declining budgets also indicates that the project management is concerned about maintaining the research line item at a rate which is, while low, relatively constant. Table 13 below presents a picture of the cost structure for the recent phase of the Project.

Table 14

The Emerging Budget Picture: 1993 to 1996/7 Comparisons

Item	Approximate Network Budgets (\$000)			
	1993		1996/7	
	\$	%	\$	%
Personnel, Management, Administration	265	59	148	44
Network Research	88	20	57	17
Training	56	12	54	16
Other (Audit, Evaluation, Planning Meetings, etc)	41	9	77	23
TOTAL	450*	100	336	100

\*These estimated costs are based upon several different budgets presentations in a variety of formats. The 1993 Grant agreement shows AFRENA getting \$750,000. A historical record shows them receiving \$450,000, similar to the other networks. The 1996/97 estimates are based upon current average budgets of PRAPACE, ECABREN and EARNET. AFRENA current budget is less and would be unrepresentative of the picture provided. The actual expenditures

from year to year vary greatly among networks depending on whether vehicles were purchased, or whether the staffing was in full or covered only partially, or whether other significant cost items were incurred.

It is apparent that the research item has been somewhat maintained, on a percentage basis, at the expense of percentage of total budget allocated to personnel - the major item within Item 1. This reduction in personnel costs has been achieved by not filling some slots for periods of time and by hiring personnel at intermediate salary levels rather than at international senior rates. Further "savings" have been achieved by not always filling a second authorized position. It is not clear that this is really cost effective - it places a very heavy burden on the Research Coordinator, which may yield diminishing returns.

It should be emphasized that the imputed costs borne by the NARS for research, and the technical and management support by the IARC's are not included in the direct costs shown above; these are very substantial. If the NARS support of scientists and support staff, sites and facilities were assessed at their true international (border) prices, then the research inputs become very significant. These contributions in kind are precisely why the project - broadly defined, not just in budgets items - has been able to have the impacts which it has shown with a very small investment.

The present governing system for the networks appears appropriate for the next several years. A useful addition to the system is emerging. As the Committee of Directors (NARS Directors General or Managers) cannot be expected to serve as their own secretariat, they have been instrumental in establishing ASARECA to provide that function as well as to provide professional advice and guidance. The broader role of ASARECA (beyond the network) is now being developed in collaboration with the CD. For the present, and for the near term, the evaluation team believes--and it is our understanding that ASARECA also believes--that the technical oversight and approval mechanisms of the program remain as they presently exist, with the networks themselves.

### **III.8. ROLES AND RELATIONSHIPS FOR THE NEAR TERM**

#### **General**

The changing relationships between key institutions (with some exceptions as noted throughout this report) is basically along the lines implicitly--although not explicitly-- stated in the original "project design". That is, the IARCs will assume a decreasing role in administrative and management aspects of the project, thus freeing them to concentrate on research and technology development at their Centers and in the Region, where essential.

#### **ASARECA and the Future**

ASARECA was set up to serve as an executive committee to help encourage efficiencies in

research through regional coordination. As a "secretariat", it can achieve a great deal through such activities as:

- synthesizing reports and recommendations
- fulfilling an archival function
- serving as an information clearing house.

However, ASARECA's own statement of its current "frame of action" is much broader and goes well beyond the notion of the function of a "secretariat":

In terms of ASARECA and the networks, the evaluation team suggests that:

1. All the Regional Coordinators be approved by the Committee of Directors (ASARECA); and that
2. Until ASARECA has the legal capacity and is commissioned to act as an employer, the IARCs are asked to continue to render administrative services which facilitate Regional Coordinator (RC) employment. This includes managing RC payroll, as per the CIP and PRAPACE models.

The team wholeheartedly supports the idea of a body like ASARECA which can help give unity and coherence to agricultural research on a regional basis. However, it should be emphasized that the body is very young and should be given the space to develop its own strategy rather than assume a donor-driven or donor-encouraged form. ASARECA is in the process of thinking through its goals, strategy and tactics.

Both ASARECA and the evaluation team highlight that at this time:

- ASARECA does not have the capacity for technical oversight of the networks.
- ASARECA does not have the capacity for financial oversight of the networks.

ASARECA has to be sustainable in itself, through support by member countries, to have a legitimate voice in the region.

### **Relationships Between NARS, ASARECA and IARCS**

Changing relationships at the management level and at the operational level are occurring. The evolution calls for flexibility so that work on the ground doesn't suffer. Shifting the ownership labels on an organogram is not sufficient to ensure continuity of the program. Many NARS staff have very real claims to ownership of the project, based upon their training, experiences and underutilized facilities. It would appear to the evaluation team that it is indeed timely for them to accept more responsibility, thus legitimizing ownership. As cited elsewhere in this report, such

moves could entail a larger budget for research, local technical assistance, research monitoring and related activities. Thus the team's recommendations for enhanced financing. It is recommended that the USAID grant remain with the IARCs.

The essential point is that for efficiency reasons the project must use national facilities, maintain professionalism of local staff (who have invested heavily in their own training) and generally assume greater responsibility for a large portion of the regional research.

### **III.9 POTENTIAL SUSTAINABILITY OF NETWORKS WITHOUT USAID FUNDING**

Since the networks do not presently have any revenue generating capacity and are unlikely to have any in the foreseeable future, it is clear that external financial resources will continue to be required. The networks do not even have access to the tax base which is, to some degree, available to the NARS. However, because of intense pressure on national resources, there is not much likelihood of substantial resources from the NARS, even though the NARS and their staff recognize the value of networking. The networks might very well be sustainable by external investors other than USAID, as are the IARCs, United Nations regional operations or regional African organizations. Co-financing from various bilateral donors and/or NGOs is also possible and some already exists in the networks. These options are open to the networks but considerable lead time would be necessary to put financing mechanisms into place.

Given USAID's various sources of potential support to an efficient and useful project, the evaluation team would recommend that USAID continue to provide financial assistance to the networks, at least for the next several years, and with substantially more funds for research.

This recommendation is still consistent with the development objectives of USAID. Institutional development of the networks is still needed and the contribution to food security may be sufficient justification for increased support.

As the networks become fully mature, the institutional developmental objectives become less apparent. However, that stage has not yet been achieved.

### **III.10. USAID MANAGEMENT BACKGROUND**

USAID has a variety of support systems for field activities as well as grants and contracts as implementing mechanism. Bilateral missions have country specific projects although sometimes they support regional projects and may buy into them financially. Bilateral projects have been the most common method of operation. Regional projects cover several countries. Regional officers exist to: 1.) monitor regional projects; and 2.) assist in provision of technical and support services to the bilateral missions and to serve global projects which have operations in the region. The relative emphasis between the two functions of Regional Offices have shifted from time to time.

The network project was originally a Regional Project with primary responsibility for administrative and financial support resting with the Regional Office (REDSO/East Africa). In 1992 the network project became part of a more global program in support of policy analysis and research in Africa. AID/W became the primary support office. The larger program contains a wide variety of activities including activities in both East and West Africa. The shift in location of oversight responsibilities has been the major change in USAID's management structure with respect to the network project. The substantive issues of inputs and decisions remain with the end users.

## **Assessment of Performance**

### **1. Release of Funds**

There have been instances where some project activities have not started on time and others have been inappropriately delayed but this project--like any project dealing with sporadic start of U.S. Government fiscal years--has developed coping tactics and the delays, while indeed troublesome, have not proven fatal.

### **2. Inputs**

The inputs have been primarily financial grants and monitoring. Grants normally require less monitoring than contracts, and this situation appears to be the case for this grant.

### **3. Timeliness of Decision**

The evaluation team did not hear of any specific project decision in which the lack of timeliness of decisions was a critical issue.

### **4. Feedback**

Project managers were disappointed in having little feedback despite submission of numerous reports.

In summary, the various project managers are very appreciative of the support provided by individuals at USAID. The managers have not expressed any particular preference for the location of the USAID Project Officers or Project Support Officers nor have those project staff noted any major differences in project support prior to or since the move of the USAID Project Officer to USAID/W. The critical issue does not appear to be which office supports the project but perhaps they were unaware of the changes in the system which affected the availability of an USAID officer to helpfully work with the project managers.

In narrowly defined terms, USAID management support passes well but there exists at least four other problems.

1. The project managers and the evaluation team are both seriously concerned about the extant policy of funding research activities for only a one-year time span. The restriction seems artificial and bureaucratic. Such a restriction affects research, capability building and maintenance of professionalism in the following ways.
  - a. Much needed interdisciplinary research which takes longer to design and carry out tends to be precluded.
  - b. The number of replication sites and their extent over time and area are sharply curtailed. Extensive field work tends to be ruled out.
  - c. Adequate time for design, execution, analysis and write-up of findings is collapsed into a truncated period of time which could lead to questionable findings and conclusions.
  - d. Even the purchase and use of relatively minor equipment tends to be precluded given the lead time necessary for purchase, installation, testing and ultimate use.
2. The evaluation team was unable to determine why the language in the agreement between USAID and the Consultative Group is so restrictive regarding the period of expenditures. The team is not familiar enough with USAID's regulations to make a specific recommendation on how to solve the problem. Illustratively, language might be developed specifically for research sub-project activities allowing a period of four or five years for expenditures to occur. This would be consistent with the project purpose. Alternatively, a more complicated procedure might be to desegregate the networks from its "parent" project and design a self-standing network project. There are no doubt other alternatives to the resolution of the problem.
3. The evaluation team has noted in Section III.8 above the idealized model of moving the ownership, management and operations of the research to the NARS. Yet, some of USAID's overall management appears to have been unaware or indifferent to two of the basic networking building efforts within the project. As noted in section II.6, the substantial USAID financing of ESARC has diminished the role of the smaller yet better integrated network financed by the project at hand-EARRNET.

With respect to AFRENA, USAID has been no doubt aware of the concerns that ICRAF assumes a larger management role vis the collaborating institution than is currently deemed advisable--at least as seems advisable by the evaluation team. The evaluation team is well aware that the position of both AFRENA and ESARC is that considerable IARC involvement will result in greater short-run progress than without such involvement. But this begs the question of the level of performance in the medium term if the NARS should assume greater authority and responsibility for the programs. The management models of AFRENA and ESARC appear reminiscent of the 1960 and 1970's. The markedly enhanced, and well demonstrated, national/regional capabilities clearly suggest alternatives for today.

4. From the perspective of the current evaluation, USAID management would be called into question if it reduces funding to this small, effective project at the very time it is reaching a critical stage in its evolution. The project's own management structure is well on its way to becoming institutionalized. A few more years are needed for it to become mature. Even if that process were completed, USAID may very well want to increase support to the project because of the niche it occupies with respect to food security concerns in the region. To fail to support, or effectively find support, could only be deemed poor management or lack of foresight.

## **IV FINANCIAL MANAGEMENT**

### **1. Sources and Flow of Funds**

In general, the main sources of NETWORK funds may broadly be categorized as multilateral sources, bilateral sources and national sources.

Multilateral funds typically include funds from various donor agencies (including USAID) and are channelled through the CG Secretariat, which administers and transfers the funds to various International Agricultural Research Centers IARCs - ICRAF, ITA, CIP and CIAT. The IARCs have the responsibility of channelling the funds to the Networks, who in turn allocate them to various national projects and sub-projects.

In cases where network projects benefit from bilateral funds, these are mostly channelled through the relevant National Agricultural Research (NARS) headquarters and, in some instances, transferred directly to recipient research stations.

At a national level, various forms of contributions, including provision of physical facilities, land, and funds are variously made available to sub-projects by NARs network partners.

On network basis the flow of funds is as follows:

#### **a) AFRENA**

AFRENA operations are supported by both bilateral and multilateral funds.

- Multilateral funds from the CG Secretariat are transferred to ICRAF, and ICRAF, on the basis of approved proposals and budgets, allocates the funds directly to the sub-project stations.
- Bilateral funds (not AID/W funds, which are considered multilateral) are transferred directly to the National Research Headquarters, or stations, and do not generally pass through ICRAF books. Rather these go directly to the national AFRENA sub-projects.

Examples: **Kenya**

EMBU: Funding for program activities in this station mainly from a bilateral SIDA grant and



The main bilateral donors contributing towards the Beans network are the Canadian International Development Agency (CIDA), the Swiss Development Corporation (SDC) and ODA. These bilateral donors transfer money directly to the regional CIAT account from where it is distributed towards various network activities. However, a regional coordinator has recently been appointed, and there is a need to de-link the administration of regional network funds from the CIAT in keeping with the institutional development objectives of the project. (Note: By March 1997, the new ASARECA appointed regional coordinator was on board and the de-linking proceeds.)

d) **PRAPACE**

The Potato network flow of funds is probably the most transparent and may (along with others) be considered as a model for the other Networks (see all diagrams below) The Potato network derives funds for its activities almost entirely from multilateral sources through the CG Secretariat.

These funds are transferred to the CIP headquarters from where they are allocated to network activities by the PRAPACE Network regional coordinator as follows:

- In the case of Kenya and Zaire, the funds are transferred directly to the recipient research stations, and information is copied to the respective NARs headquarters as well as the CIP Regional Director.
- In the rest of the countries (Uganda, Ethiopia, Rwanda, Eritrea and Burundi) funds are transferred to the respective NARS headquarters and the information is copied to the program leader in the national research stations. This procedure was found to be successful, particularly in Ethiopia, and satisfactory in the other countries.

Table 16, below, shows the 1995/96 use of funds by functional activity.

## **2. Procedures and Reporting Requirements**

### **Budgetary Process**

In three of the networks (EARRNET, ECABREN and PRAPACE), the Steering Committee, comprising mainly national network partner representatives, reviews, recommends and approves budget proposals and work-plans submitted for various network activities. Fund allocations and disbursements are made according to approved budgets and in tranches to the recipient entities as noted above. These disbursements are cleared by financial reports and required supporting documentation.

The respective Regional Network coordinators are responsible for the day-to-day management of operating funds by means of an imprest account.

For AFRENA the budgeting and management process differs from the other three networks and also whether ICRAF (and the donors) perceive the funds as bilateral or

multilateral. Budgeting for the use of multilateral funds is done by ICRAF at the level of the Regional Coordinator and with the approval of his supervisors. There was no broad-based Steering Committee, nor is there any significant participation by national network partners.

Taking into consideration the existence of other funds (e.g. bilateral), multilateral funds are allocated to various AFRENA sub-projects to cover costs such as:

- Personnel expenses for ICRAF Senior Scientists.
- Regional networking expenses including training, workshops, planning meetings, etc.
- Research operating expenses
- Capital items (computers, research facilities, etc.) where such expenses are not covered under bilateral sources.

At each ICRAF project, multilateral funds are managed by the ICRAF station scientist. By their own statements the NARs network partners have little information about the funds nor control over the amount of funds flowing into this account.

Budgeting and management for bilateral funds is done jointly between national agroforestry project leaders and the counterpart ICRAF Senior Scientist based at the station.

#### **Budgetary Controls:**

Across all the networks and national programs, the accounting units generally maintain sound budget expenditure controls and keep good track of the financial positions through the use of books of accounts. Request for expenditure at sub-project level are reviewed by the program leaders to confirm consistency with workplans and sent to project accounting unit for certification of funds availability.

#### **Accounting systems:**

All the four networks employ an imprest system of financial management in the utilization of multilateral funds. Network partners clear their advances by vouchers and expenditure reports as a basis for further replenishment.

Across the network's centers an examination of sample documents and discussions held with center officials revealed that financial management and internal control systems provide for:

- accounting records that are supported by sufficient documentation to identify, segregate, accumulate and record all costs incurred, and
- records that adequately identify the source and use of funds.

However, in cases where funds are transferred to NARs headquarters, there is a tendency to borrow from specific network project funds for purposes other than intended. Though

reimbursements are made, this practice occasionally causes delays and interferes with the implementation of target research activity.

### **Reporting Systems:**

At the sub-project level the program leader, in collaboration with the project finance officer, is required to prepare monthly, quarterly and annual financial statement

In three of the networks financial reports originating from sub-projects are normally sent to NARs headquarters (the control and monitoring agent) which forwards the same to the regional network coordination office. From this level, the reports are sent to the IARC headquarters which prepares a consolidated annual financial report for the donors.

Due to AFRENA's different organizational structure, financial reports are sent directly from the network centers to ICRAF headquarters.

### **Auditing mechanisms:**

- Two of the networks (AFRENA and ECABREN) were found to have sound internal control systems. Both undertake comprehensive internal audits and periodic project audits of select centers at the field.
- PRAPACE and EARRNET have weak internal audits at a regional level which are limited to reviewing payment vouchers that are forwarded to the CIP and IITA headquarters respectively. No project audits have been conducted for the last two years.
- In general, the evaluation team found that where network funds are channelled through NARs headquarters, relatively strong internal control and monitoring systems existed and the sub-projects activities are subject to the NARs headquarters internal audit requirements. Member NARs therefore seem to be adequately accounting for network funds received, though there is still room for improvement. Specifically for improving internal auditing, as mentioned in the prior paragraph, and there should not be any delays in having funds in the hands of researchers when authorized.

## **4. RECOMMENDATIONS**

### **Flow of Funds**

The delays in physical transfers of funds from NARs headquarters to network sub-project centers do occur from time to time. This situation is further complicated by lack of adequate national funds for local program activities, which was identified as a significant cause of occasional diversion of network funds (plausibly for "emergency expenditure" items and reimbursed thereafter) at the NARs headquarters level.

The evaluation team suggests that funds be consequently transferred as close to the national network research station as possible to allow for maximum efficiency. In these circumstances

the upper NARs echelons could, and should be, adequately informed of such transfers to facilitate their responsibilities for monitoring and auditing.

- Where it has not already been done, accounting officers in network stations would be trained on donor regulations and donor reporting requirements to facilitate direct transfer of funds to the research stations or sub-stations.

While the above procedure may be the generally preferred process, various NARS have strong preferences for alternative processes, and these must be honored. Various systems seem to work satisfactorily. Deficiencies do not seem to be systemic, but rather in not always following established procedures.

### **Reporting Systems:**

Some network projects have been constrained by inadequate reporting and accounting for funds received. Some EARRNET sub-projects, for instance, have an arrears of between 1 - 2 years for financial reports. Though good progress is being made towards having outstanding reports submitted, it has delayed the overall monitoring and control of expenditures, hence reducing the quality of the project.

- Corrective action must be taken. We recommend that respective steering committees play a leading role in exerting pressure on the concerned NARs network partners to follow up out-standing financial reports and ensure that timely reporting is done. Adequate procedures and information gathering systems need to be instituted by NARs partners to ensure that transactions can be readily accounted for in a timely manner.

To the furthest extent possible, financial disbursement at the research stations should be closely tied to technical progress reports and work plans. This would reduce cases of funds being depleted before the completion of the research project. It is worth noting that Madagascar has already started doing this.

### **Procedures:**

For all multilateral funds, the committee recommending approval for the operating budgets should be broad and include both project staff and the NARs network partners.

In particular, it was unclear to the evaluation team exactly how, who, where and when the budget allocations are determined in AFRENA. It was apparent, nevertheless, that hardly any participation by NARs representatives exists in this case.

Most of NARs network counterparts in most AFRENA centers raised concern that the existing structure of procedures and controls that governs the administration of multilateral funds and other resources excludes NARs network partners.

Funds and research facilities and equipment at the stations are solely controlled by the AFRENA senior scientist located at the particular station who, in turn, reports directly to the Regional Network Coordinator based at ICRAF.

An assessment for possible structural re-organization of the AFRENA network procedures and controls governing the administration of multilateral resources is recommended in order to be consistent with a partnership concept.

This assessment might be undertaken by an independent team of management consultants with the objective to increase participation by the network partners in the decision making process governing the use of multilateral resources--whether they be funds for research facilities, vehicles or personnel financed by the grant. ICRAF and its partners may very well resolve difficulties among themselves without outside involvement.

For example, while the USAID grant is multinational in its first iteration for all IARCs, all except ICRAF then segregate the grant into a separate "regional network" account. ICRAF seems to treat the network grant as "core" funding, whereas it seemingly could treat the grant as bilateral in the second iteration and then jointly program the funds as is done for all bilateral funds--for substantive purposes and with financial management objectives mutually agreed upon by the grantee and grantor. It is the belief of the evaluation team that taking on increasing amounts of financial management responsibilities by network partners is a developmental objective of the project as well as research *per se*.

**Audits:**

The PRAPACE and EARRNET steering committee should consider whether periodic audits of select sub-projects might be useful in strengthening internal control and monitoring systems within the network.

**CONCLUSIONS:**

In general, the existing structure of financial management processes and procedures seem to be functioning well and to be supporting network activity. Though no cases of gross mismanagement of network funds were identified, there is some room for improvement, as cited in the section on audits above.

As the networks evolve and move further away from the IARCs, there generally is a continuing need to strengthen financial management procedures through training and capacity building, especially at the level of the network partner stations.

Table 15

## Distribution of EARRNET Funds by Research Activity (FY 1995/96)

Countries	Uganda	Kenya	Burundi	Rwanda	Madagascar
Development of improved post harvest technologies	4,300	4,000	4,290		
Germplasm development, evaluation and distribution	3,000	4,865		3,200	3,500
Ecologically sustainable plant protection					
Technology transfer and impact assessment		3,000	4,000	4,000	
Rapid multiplication and distribution of improved planting material	6,300	4,865	6,300	6,365	225
IPM of cassava greenmite and mealybug	6,300				
Production utilization survey					2,500
Totals	19,900	16,730	14,590	13,565	7,750

Table 16

## FY 1995/96 Funds Distribution by IARC, by Functional Activity

IARC	CIAT	ICRAF	CIP	IITA
Functional Activity	Beans	Agroforestry	Potatoes	Cassava
Coordination	44%	44%*	24%	30%
Planning/Evaluation	9%	7%	7%	8%
Research Collaboration	19%	22%	15%	17%
Training/Institution Strengthening	7%	4%	22%	22%
Administrative Support	5%	8%	17%	8%
Overhead Costs	16%	15%	15%	15%

\* An updated report by ICRAF states coordination per se to be 25-30%. The 44 % figure may include items more appropriately attributed to administrative support or overhead.

## V. CAPACITY BUILDING

### V.1. SUMMARY

Throughout this report, capacity building has been implicitly addressed at two different but clearly related levels: 1.) the traditional concept of developing the national research facilities, their land and their staff; and 2.) the building of a capacity to organize, finance, and manage regional research. That is, the creation of a regional network of activities and a network management structure which crosses national borders and results in more efficient use of scarce resources than would be the case without such a network, is addressed. The measurement of success in these endeavors will be the positive impacts among agricultural researchers and farmers, as discussed in Section II.1.d of this report.

With respect to the national capacities to carry out research, the general conclusion is that considerable capacity already exists and the major concern is utilization of these capacities. Having made this generalization, there are, however, many caveats and exceptions to be cited. For example, Ethiopia's system is reasonably well financed with local currency, but needs foreign exchange for critical hardware items; Kenya's generally well trained staff, with reasonably good facilities, will soon go down hill as they lack both foreign exchange and local financing; agroforestry is a relatively infant science, at least as far as organizational homes and facilities are concerned. The point is to recognize the strengths and capitalize on them and to address needs where possible. As will be shown below, the networks have made significant contributions to national capabilities, but the network's project design and its resources are not well suited to the traditional bricks and mortar issues, long-term training, nor long-term research and research system management which are the core of national systems development.

Regarding the institutionalization of the network's capacity to carry out, on a sustained basis, the numerous network activities envisioned and outlined in Section I of this report, much has been accomplished, but considerable work still remains to be done. This is not surprising. While the efficiencies to be gained through regional collaboration are easy enough to foresee, the establishment of management mechanisms, finding or development of an organizational home, and the selection of sub-projects and the allocation of limited resources is anything but easy.

During the past four years, the network project has made major strides in institutionalizing the networking process for the beans and potato networks and somewhat less so for cassava; progress towards regional institutionalization of the agroforestry network is less obvious, even though meaningful research is being done. Specifically, the Committee of Directors has been instrumental in establishing ASARECA which, among other functions still to be defined, serves as a Secretariat for the networks. This is a major step forward as it provides a platform for policy and program coordination (but stops short of technically supervising the research) as a base for searching for and recommending the hiring of key personnel, and generally taking care of the documentation of decisions taken by the Committee of Directors and carrying out necessary follow-up actions on their behalf. Additionally, the Steering Committees are generally functioning, as is the process for screening sub-projects and their management. Features which

need further institutionalization (and which are dependent upon additional resources) are:

1. Identification of and commitment to longer term research and greater diversity of research;
2. Use of national scientists on a routine basis as consultants on research problems, their design, and the analysis of findings; and
3. Closer monitoring of research designs and their supervision.

## **V.2 EFFECTIVENESS OF TRAINING**

Regarding the specific questions posed in the Scope of Work, the following views are submitted. A summary of training activities is presented in Table 9. The team is unaware of any well-defined follow-up studies on the precise effectiveness of the training, but it appears reasonably safe to assume it has been effective as evidenced by impact measures and by successful completion of the vast majority of subproject activities.

An aspect of postgraduate training which has been encouraged at several points in this document is that well trained scientist often have opportunities to assume leadership roles and are advanced. A recent survey by ECABREN of 16 bean researchers who had completed postgraduate degrees (9 MScs and 7 Ph.Ds) revealed that 10 were still engaged in bean research, 2 were studying for more advanced degrees, 2 had left bean research but moved to related activities, and 2 had left the field altogether. Thus, there is a need to graduate new scientists on a continuous basis.

## **V.3 ASSESSMENT OF NETWORK'S IMPACTS ON NARS' CONTRIBUTION TO VARIOUS NATIONAL DEVELOPMENT OBJECTIVES**

The objectives of regional research and national research are similar in that, for a participating nation, the results are assumed to first help the citizens of the nation and secondly the other countries. In this regard, the subprojects of the networks fit within the research objectives and priorities of the various nations. The section on impacts (III.d) illustrates the achievement of the dual objectives, and section III.a describes the process (capacity) for setting priorities and selecting sub-project activities.

Among the national development objectives, there are usually statements extolling the need for regional collaboration as a general proposition. To this end, the network makes a significant and nonpolitical contribution beyond just agricultural development.

Table 9, Section II.2c shows the extent to which network funding is used in various countries for various commodities. Since the commodities are all within the priority lists, it is clear that in many instances the contribution of the network is significant.

#### **V.4 DO THE NETWORKS INCREASE NARS RESOURCES OR SUBSTITUTE FOR THEM?**

Network resources are additive to the NARS resources, and indeed the resources of both sources compliment each other. If such an arrangement of collaborative (joint venture) subprojects didn't exist, the networks would have to "contract" for research to be done, and the NARS staff would quite often be idle. Viewed myopically, any resource flowing into the NARS could be said to be a substitution for what they should be doing for themselves. But, even if significant funding was being supplied to the NARS-- as is the case for local currency in Ethiopia--it is extremely difficult to see regional research management funds, or even research funds, flowing from the NARS. Domestic claims are simply very strong for scarce resources.

The evaluation team feels it is important that the network maintains its image as a source of assistance for a particular type of activity (that is, regional and fully collaborative research) and not as a substitute for needed national endeavors. The small network project should not be viewed as a major player in national systems development or for maintenance of the national systems. It is for these reasons that the team views with some concern the AFRENA model and the large IITA regional operations for cassava. Because of their size and their operating style, without full partnership of the NARS, they might be looked upon as a substitute for national endeavors. The appearance of or actual substitution of major resources for the NARS should be avoided. At the moment, ICRAF/AFRENA contribution is about 90% of operating costs for national and regional efforts. This is a sustaining level of contribution which may be necessary at this time. Over time, it would appear that neither the IARCs' or small regional network projects should shoulder this level of support.

#### **V.5 ARE NARS ASSUMING GREATER RESPONSIBILITIES FOR THE NETWORKS?**

Save for Ethiopia, the responsibility for funding national research, let alone well respected regional research, is a major problem in the region. This presents a major frustration and an embarrassment to the NARS staff. A great number of the staff are fully qualified to assume greater responsibility for management and monitoring of the network, and indeed many of the staff are increasingly active as program directors for the commodities within their countries and also serve as active committee members for the regional networks. The evolution of the potato and beans networks attest to these observations. Even though the network financing is controllable by the grantee, the management is for the most part within the hands of the networks, as it should be. In addition to the potato and bean network, the cassava network is increasingly in the hands of network staff. The Steering Committee is also active in management and has already identified a need for closer monitoring of activities.

There does not seem to be any question as to whether the NARS are willing and able to assume greater responsibility for the networks. It is simply inevitable that some of the authority for reporting, accountability, impact assessment, and project evaluations, and hence some

management, will remain with the donor. This fact, coupled with a lack of their own financing, limits the NARS ability to accept full responsibility for all aspects of the networks. Given these realities, the team feels good progress is being made towards the NARS assuming 'ownership' of the networks.

## **V.6 WHAT ARE THE PROSPECTS OF MAINTAINING THE NETWORKS WITHOUT IARC BACKSTOPPING?**

The IARCs currently provide: 1.) a channel for the financing of the project and the attendant administrative and logistic support which goes with the grant and the obligations of the USAID grant; 2.) technical consultative services; and 3.) research information and materials (genetic materials, diagnostic services, and plant protection and soil management materials).

Presumably, all of these "backstopping" services could be provided by a government entity in collaboration with international agricultural institutes, such as USDA plus collaborators or a large state government research establishment, such as the University of California's agricultural college or a consortium of private agricultural and public institutions. The question may be posed, why should this be contemplated when a functioning system is in place. The issue would appear to be one of developing, over time, a continuing relationship which draws on the strengths of both the IARCs and the NARS. The IARCs might, over time, devote an increasing share of their efforts to research and the NARS a larger share and a larger amount of time to the combination of research and development activities.

## **V.7 CONCLUSIONS AND RECOMMENDATIONS**

From the above presentation it is quite clear that the NARS are not able to accept responsibility for network funding, but are quite competent to assume coordination of technical programs. Scientific leadership appears to be a shared responsibility and the various key actors welcome the opportunities to chart scientific direction collaboratively.

With respect to critical relationships and responsibilities, as well as for proto-type organizational charts and management structures, the evaluation team does not feel comfortable making detailed recommendations given the relatively short time to assess the various options.

A weakness of the basic project design is its lack of elaboration regarding the end of project status relative to such items as:

- Organizational home(s) and ownership of the networks--singly or in combinations, locations, etc.
- Sources of sustainable financing; for example whether to seek national contributions and, if so, by what formulas, or whether to seek multiple external investors, and, if so, whom?

- Time frames for devolving management responsibilities among IRACs, NARS and project staff
- Staffing patterns and authority and responsibilities of staff for review of research design, monitoring and review of findings
- Mechanisms for adding or deleting countries, commodities or research themes
- Network or the networks "Secretariat" responsibilities for publication, information dissemination and archival responsibilities.

While it was no doubt difficult to meaningfully address the unforeseen future at the outset of the project, the task of setting institutional goals should be done soon. This would not seem to be the task of an evaluation team, but rather should be a participatory design effort by project managers and the financing entities. This should be a serious effort--financed by the project--and carried out over the next year. As well as identification of the objectives and institutional goals to be met in the next several years, such an exercise should also address the interim issues of the ICRAF/AFRENA and the ESARC/EARRNET models as they relate to the longer term objectives of the commodity networks.

## **VI. LESSONS LEARNED**

1. The "project" to develop networks for carrying out regional research lacks the usual USAID, and other development agencies, description of what is done as set forth in a project paper. While the project documentation is reasonably clear with respect to what action (research) is to take place, the end of project status as to what institutional framework is to be established was not set forth and this lack of definition still plagues the project to some degree. That is, the networks are operating as quite different models and, more understandably, evolving at different rates of growth.

With hindsight, it appears the project would be further along had the institutional development objective been clearly set forth. To a large extent, this task still remains to be done

2. The project issues alluded to above--the inconsistency of the agroforestry model--and the competing cassava models--have seemingly been known to USAID for some time. To the extent these are defects in the project and, if they have been known for several years, it appears USAID is unduly slow to call for corrective action. It is understandable for an external investor not to be heavy-handed when dealing with competent grantees, or not to "break anyone's rice bowl," but the flip side of that coin is to use scarce resources (tax money) in an inefficient manner.

3. The efficiency lessons which have been learned through the project are considerable.

That is to use the comparative strengths of the IARC (scientific expertise) in collaboration with the much less expensive and well-trained national personnel who, in many cases, operate out of reasonably adequate facilities. In the context of the project at hand, this means "regional research", but the concept of efficient division of labor would apply equally to "national research."

4. A further lesson appears to be that for the efficient long-term divisions of labor between IARC's Regional Offices and the NARS there will soon be a requirement for a significantly larger investment in the NARS than is presently happening (Ethiopia excepted). Without more investment, the professionalism of the staff and the facilities of the NARS will soon deteriorate and hence yield poor returns to the total system regardless of how the work is divided. Investment in the NARS is of critical importance for the overall system.

## Appendix I: Terms of Reference (Scope of Work)

### Evaluation of the USAID-funded Collaborative Agricultural Research Networks in East and West Africa

#### Scope of Work

#### OBJECTIVE

The objective of this evaluation is to assess whether the anticipated results and targets of the seven collaborative agricultural research networks funded by USAID in East and West Africa have been achieved with regard to: capacity building; success in influencing the availability, access and use of technology; and related people-level impacts. Two evaluation teams will be organized to conduct separate evaluations, one for the networks in East Africa, one for those in West Africa, using the same scope of work. Network achievements will be assessed in four areas: (1) technology development, exchange and dissemination; (2) capacity building; (3) network administration and management; and (4) financial management.

The purpose of these networks is to: (a) develop, test, and put into place mechanisms which will enable participating NARS in Africa to progressively assume greater responsibility for management, funding and monitoring of regional agricultural research; and (b) increase the development, adaptation and utilization of sustainable agricultural technology. The goal is for NARS to access expertise, services, commodities, and supplies from the IARCs and other sources to support regional and national development objectives.

The evaluation will provide input into donor decisions regarding future network support. It will also provide guidance for the networks, NARS, regional research associations and affiliated IARCs on steps that might be taken to strengthen networking activities including their future orientation.

The networks to be evaluated are as follows:

#### East Africa

- AFRENA (Agroforestry Research Network for Africa, with ICRAF)
- ECABREN (Eastern and Central Africa Bean Research Network--formerly EABRN, with CIAT)
- EARRNET (East African Root Crops Research Network--formerly ESARRN, with IITA)
- PRAPACE (Regional Potato and Sweet Potato Improvement Program for Central and Eastern Africa--formerly PRAPAC, with CIP)

#### West Africa

- WCASRN (West and Central Africa Sorghum Research Network, with ICRISAT)
- WECAMAN (West and Central Africa Collaborative Maize Research Network, with IITA)
- RENACO (West and Central Africa Cowpea Network, with IITA)

Nine Rice Task Forces<sup>5</sup>, with WARDA

(Mangrove Swamp Rice, Upland Rice Breeding, Lowland Rice Breeding, Sahel Rice Improvement, Integrated Pest Management, Problem Rice Soils, Economics of Rice Systems, Cropping Systems, and Irrigated Rice Breeding)

## BACKGROUND

For more than ten years, USAID has been supporting the IARCs to initiate and implement agricultural research networking projects in Africa, in collaboration with the NARS. At their inception, these efforts were funded out of the Africa Bureau's Support to African Agricultural Research and Faculties of Agriculture (SAARFA) Project, the Southern Africa Regional Program (SARP), and the Semi-arid Food Grains Research and Development (SAFGRAD) Project. In 1991-92, a series of evaluations were completed for regional research networks supported under the SAARFA and SAFGRAD Projects. In 1992 the Africa Bureau consolidated its support for collaborative regional research networks in East and West Africa and incorporated them into the Policy Analysis, Research and Technical Support (PARTS) Project. The eight networks listed above were chosen for a second funding phase under the PARTS project. At that time, USAID project management was transferred to G/EG/AFS for the networks in East and West Africa.

In the past several years an increased level of effort has gone into developing and working through regional organizations/associations that facilitate cross network coordination and integration of network efforts with national programs, e.g., ASARECA, CORAF, and INSAH. It will be important for the Evaluation Team to engage these associations in the reviews.

## STATEMENT OF WORK

Each evaluation team will spend approximately three weeks during November 1996 in their respective African regions to carry out the review. In East Africa, the team should focus on network operations carried out from October 1, 1992 through September 30, 1996. In West Africa, the evaluation time period is October 1, 1993 through September 30, 1996. Each team will visit selected network member countries as chosen by USAID and the networks. The evaluation will be based on field visits to meet with NARS directors and scientists, staff of IARCs and affiliated institutions, network coordinators, USAID field missions and REDSOs, and select NGOs. Each team will review all appropriate records and documents including financial records. Most of this documentation is located in the network field coordination offices, and appropriate time will need to be scheduled in the field locations to review it.

Each evaluation team should address the following items for each network:

### *Technology Development, Exchange and Dissemination*

1. Assess the effectiveness of methods and procedures in place for:
  - a. regional research strategic planning and priority setting;
  - b. reception and screening of technologies in the networks;
  - c. monitoring the implementation of network research programs; and
  - d. evaluation of impacts from regional research efforts.

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<sup>5</sup>These nine task forces will be referred to throughout the scope of work as a single network.

2. Assess the effectiveness of network research and technology exchange in terms of:
  - a. relevance of research agenda pursued to the development objectives in the participating countries;
  - b. extent of technology transfer from IARCs to NARS and among the NARS themselves, facilitated by the networks;
  - c. the extent to which network member countries are relying on technologies/varieties developed by the IARCs and their collaborating entities;
  - d. extent to which the networks are supporting member country testing of technologies under farm conditions; and
  - e. extent to which network provided training, germplasm exchange, sharing of disciplinary expertise, and developed technology are meeting national needs.
3. Is the network increasing the availability, access and use of sustainable agricultural technologies in the region? Provide appropriate documentation of this to include: an analysis of where the networks were, technologically, at their inception versus today; a listing of technologies released in the last 2-3 years; and a listing of technologies in the pipeline for future release.
4. Has the publication and dissemination of network-generated technology been adequate?
5. To what degree is the planning and programming of network activities independent of IARC programs? Document the network planning/programming process.
6. To what degree do network activities and IARC programs compliment each other?

Based on the above, recommend steps to strengthen technology development, exchange and dissemination by the networks.

#### *Capacity Building*

1. How effective has the network, in collaboration with the IARCs, been in training of national scientists'?
2. Is the network having an impact on the NARS contribution to national development objectives of participating member countries?
3. Does the network increase NARS resources or substitute for them?
4. Are the national programs progressively assuming greater responsibility for management, monitoring and funding of the network?
5. What are the prospects of maintaining the networks without current IARC backstopping?
6. Assess the extent to which NARS are ready to take over network funding, coordination of technical programs and scientific leadership. Based on the above, recommend steps to strengthen the capacity of NARS to assume these responsibilities.

#### *Network Administration and Management*

1. Assess the current size and complexity of each network's operation in terms of: effectiveness of research supervision and coordination; cost effectiveness; diversity of research, cost structure of key network services; and spread of network resources.

2. Assess IARC contribution to the network in terms of:
  - a. providing qualified network coordinators;
  - b. effectiveness of logistical and administrative support to the coordinators;
  - c. technical backstopping of network research programs;
  - d. technical coordination of research activities;
  - e. training;
  - f. alignment of IARC support in the region with network priorities; and
  - g. use of IARC core funding to support and backstop network activities.

Based on the above, recommended ways the IARCs' contribution can be strengthened.

3. Identify the tasks/activities that require but do not receive adequate national and/or bilateral support?
4. Assess the effectiveness of NARS participation in the networks in terms of:
  - a. allocation of personnel on a full-time basis to network activities (number and level of training) and other resources;
  - b. integration of network-sponsored research into the national research program;
  - c. effectiveness of trial supervision and quality of results; and
  - d. effectiveness of the Steering Committee in providing technical guidance.

Based on the above, recommend ways to strengthen the NARS participation.

5. How involved are the NARS directors in priority setting and management of networks?
6. Assess the extent to which the present mix of networks are in line with regional priorities and recommend steps, if required, to realign priorities and programs with a view to increasing their effectiveness.
7. Identify best practices in providing cost-effective approaches for organization, management, coordination and/or governance of regional collaborative research networks.
8. Develop a prototype technical and administrative organizational chart indicating linkages and relationships of stakeholders (i.e., ASARECA, NARS, IARCs, etc.).
9. What are the prospects for the networks continuing without USAID funding? How could the networks become more sustainable and less dependent on external funding?
10. Assess the performance of USAID management in terms of: timeliness of release of funds; provision of inputs; timeliness of management decisions; and feed-back on project implementation progress, issues and problems.

#### *Financial Management*

1. Are the member NARS adequately accounting for the network funds received?
2. Are the IARCs adequately consolidating financial reports to USAID on NARS' network expenditures.
3. Trace the steps of how network funds are transferred from USAID to the IARCs, from the IARCs to the NARS, and from the NARS to their individual scientists. Is there a timely flow of funds? Make recommendations for improvement.

4. What are the IARCs' network auditing mechanisms and are they adequate?

#### TEAM COMPOSITION

Each regional team should include: one representative from the IARCs (selected by the IARCs involved in the evaluation--this individual need not represent one of the IARCs to be evaluated); one representative from the NARS (to be jointly chosen by the networks to be evaluated); a USAID representative; a senior agricultural economist; a senior agronomist familiar with the commodity and program areas addressed by the networks; and a financial officer familiar with financial record keeping for donor-funded projects. In addition, in West Africa CORAF and INSAH will be invited to jointly nominate an individual to serve on the team in an independent capacity.

In addition to each team, the IARCs, networks and NARSs will be invited, at their own expense, to have key reference people accompany the team during their site visits, as appropriate.

#### REPORT

Each team leader will submit ten copies of the draft report to USAID no later than January 1, 1997. The report should include the following:

- a. Executive summary;
- b. Introduction including a brief project context, description and purpose;
- c. Methodology used in carrying out the evaluation including the scope of work and other details attached as appendices;
- d. Progress since the last USAID network evaluation in 1991/92 to include incorporation of recommendations made at that time;
- e. Evaluation findings;
- f. Conclusions, recommendations and lessons learned; and
- g. Appendices which include any technical and management issues raised during the evaluation requiring greater elaboration, a copy of the evaluation Scope of Work, a brief annotated bibliography of the documents and reports consulted, and a list of the persons and agencies contacted.

Following the submission of the draft report for each region, USAID will review the reports and, if needed, direct the Team Leaders to incorporate in their final reports the subsequent consideration of any questions or issues raised during this review. The Team Leader for each region will then resubmit ten copies of their final report by March 1, 1997. In addition, the two Team Leaders will develop a single synthesis summary report, incorporating the evaluation findings for the two regions, also to be submitted by March 1, 1997.

APPENDIX 2. ITINERARY OF THE AGRICULTURAL RESEARCH EVALUATION TEAM  
November 7-30, 1996

DATE	PLACE	VISITS/TASKS
November 7,8	Nairobi, Kenya	Team members already in Nairobi reviewing literature; Interview USAID Staff
9	Nairobi, Kenya	Full team assembles in Nairobi
10	Nairobi, Kenya	Team building meetings and literature review
11	Nairobi, Kenya	Meet with Regional Coordinators/ KARI Directors
12 (A)	Embu, Kenya	Meeting with KARI Director, AFRENA/PRAPACE/EARRNET/CABREN Researchers; Station and Field Visits: Agroforestry
12 (B)	Machakos, Kenya	Visits at KARI/Katumani; Review of Station trials (EARRNET); Meeting with KIRDI (cassava processing) Researchers
13 (A)	Kakamega, Kenya	Flight to Kisumu; Visit to KARI Regional Research Station at Kakamega; Station and Field Visits: Bean, Cassava and Sweet Potato trials
13 (B)		Visit to FOR/ICRAF Maseno Meeting with AFRENA Researchers. Station and Field Visits: Agroforestry
14	Soroti, Uganda Mbale, Uganda	Visit with MOA Representative Visit to ESARC Station at Serere Field Visit to Seed Producers' group
15	Kampala, Uganda	Visit to NARO/Namulonge Meetings with research Director and National Bean Program; Meeting with CIAT Regional Staff
16	Kampala/Kifu	Meeting at FORI; Station Visit to Kifu; Field Visits: Agroforestry
17	Kampala, Uganda	Team Meeting; Literature review; Team B to Kabale
18 (A)	Namulonge, Uganda	Meetings with National Cassava Programm; Review of Station Trials on Bean, Cassava and Sweet Potato; Visit to Biological Control Laboratory
18 (B)	Kabale, Uganda	Meeting at FORI Station; Visit to farmer sites: Agroforestry; Visit to AFRENA Flagship site
19 (A)	Namulonge, Uganda	Meeting with Station Director of NAARI, Scientists from National Sweet Potato Program; Meeting with ESARC Coordinator; Visits to Post-Harvest Laboratory

19 (B)	Kabale, Uganda	Visit to NARO/PRAPACE Potato Research; Visit seed production field; Return to Kampala
20 (A)	Addis Ababa, Ethiopia	Flight to Ethiopia; Team Meeting
20 (B)	Kampala, Uganda	Team meeting; Travel to Nairobi
21 (A)	Addis Ababa	Meetings with IAR Director Meeting at Forestry Research Center
	Holetta, Ethiopia	Meeting National Potato Program. Station Visits
21 (B)	Antananarivo, Mad.	Meetings with Director of FOFIFA and MIN. AG.; Review ECABREN/EARRNET networks; Field visits
22 (A)	Nazret, Ethiopia	Meeting with National Bean Program
22 (B)	Antananarivo, Mad.	Continue review; meet NGOs; visit farmer fields
23 (A)	Awassa, Ethiopia	Meeting with Regional Sweetpotato Program
23 (B)	Madagascar	Visit on-farm and experiment station research: beans and cassava
24 (A)	Nairobi, Kenya	Flight to Nairobi; beginning of team write-up
24 (B)	Antananarivo, Mad.	Began report; Returned to Nairobi
25-30	Nairobi, Kenya	Team write-up and briefings

### APPENDIX 3. Persons Consulted

#### KENYA

##### *KARI Headquarters, Nairobi*

Dr. A. M. Mailu	Deputy Director, Crops
Dr. J.A.W. Ochieng	
Dr. R.L. Ole Odupoy	Deputy Director, Finance, Planning and Administration
Dr. James Matata	
Dr. Ekidor	Assistant Director
Mr. Wesonga	

##### *KARI: Regional Research Station, Embu*

S.P. Gachanja	Station Director
Fred Kanampiu	Research Scientist (soils) AFRENA
Macharia Gethi	Research Scientist (entomology) EARRNET (PRAPACE)
Festus Murithi	
Mick O'Neill	Senior Agronomist (ICRAF/AFRENA)
Jayne Mwangi	Research Officer (Agroforestry) NAFRP/KEFRI
I.W. Kariuki	Research Officer (Animal Scientist) AFRENA
J.N. Gitari	Research Agronomist (ECABREN)

##### *KARI: National Dryland Farming Centre (NDFRC)*

Dr. Wilson A. Songa	Plant Pathologist and Team Leader, KARI/ODA Crop Protection Project
J. W. Kamau	Root crops breeder
Betty Bugusu	Post Harvest Scientist
Lazarus K. Menin	Agronomist - Grain, Legumes
Musyoki Robert	Tissue culture
S. M. Wambugu	Food Scientist - KIRDI
J. M. Souga	Entomologist

##### *KARI: Regional Research Station, Kakamega*

Dr. A. Orodho	Director
Mr. R. Otsula	Bean breeder
Mr. S. Anjanga	Plant Protection Scientist/Beans
Mr. J. Nderitu	Entomologist/Beans
Ms. Malinga	Food and Nutrition Specialist
Mr. P. Ndolo	Researcher on Root and Tuber Crops

##### *Kenya Forestry Research Institute (KEFRI)*

Dr. P.K.A. Konuche	Director, KEFRI
Benjamin Amadalo	Entomologist/Agronomist (KARI)
Stanley M. Gathumbi	Forester (KEFRI)
Eva Gacheru	Weed Scientist (ICRAF)
Stephen Ruigu	Tree Breeder (ICRAF)
Daniel Nyamai	National Agroforestry Coordinator
Emily Obonyo	Sociologist (KEFRI)
Collins Obonyo	Agricultural Economist (KEFRI)
James Kanuri	Maseno, Centre Director

*ICRAF/AFRENA: East and Central Africa, Kabale (NARO)*

Wilson Bamwerinde	Project Leader, Research Scientist
Adison Kakuru	Research Scientist
Alex Nshimiye	Accounts Assistant
James Turyakira	Senior Technician
Posiyano Nteziryayo	Senior Technician
Florence Mugsuha	Technician
Denis Tugume	Technician
Jeniffer Turyatemba	Technician
Joy Rukampera	Junior Technician

*M'Bale: District Headquarters (MOA)*

Charles Aben	District Agricultural Officer
Ongom 'B' Silver	Deputy District Agricultural Officer
Amuriat, M.	FEW Soroti S/County
John Justine Orone	Root Crops Coordinator

**ETHIOPIA**

*Institute of Agricultural Research: Headquarters (Addis Ababa)*

Dr. Tadesse Gebre Medhin	General Manager
Dr. Gejet Gebeyehu	Deputy General Manager

*Institute of Agricultural Research: Holetta Research Center*

Bereke T. Tuku	Head, Potato Program/Agronomist
Bekele Kassa	Pathologist (Potato)
Gebremedhin Woldegiorgis	Breeder/Agronomist (Potato)
Endale	(Agronomy)
Mr. Rezene Fessehaie	Director/Agronomist Weed Scientist
Solomon Bekele Bunc	Head, Administration and Finance

*Institute of Agricultural Research:*

*Nazareth Research Center*

Habtu Assafa	Pathologist, Bean Coordinator
Teshome Regassa	Research Officer, Agronomy/Physiology
Senayit Yctneberk	Division Head, Food Science
Melesse Termesgen	Research Officer, Farm Implements
Dereje Migatu	Division Head, Bean Breeding
Tilahun Mulato	Researcher Officer I, Agricultural Economist
Tsdeke Abate	Entomologist, National IPM Coordinator
Tenkes Fujie	Finances Administration

*Forestry Research Center*

Dr. Mebrate Mihreth	Director, FRC
Mr. Jnru Dechasa	Agroforester

*Kenya Industrial Research & Development Institute (K.I.R.D.I.)*  
Samuel M. Wambugu  
Research Officer, Food Technology

*KARI: Potato Research Center, Tigoni*

Jackson N. Kabira  
Alice Walingo  
Mary Anyango Oyunga  
Edwins C. Ikitoo

Food Scientist, Center Director  
Assistant Food Scientist  
Senior Lab Technician  
Principal Research Officer

## UGANDA

*ASARECA, Kampala*  
Prof. G.C. Jeff Mrema

Executive Secretary

*National Agricultural Research Organization (NARO), Kampala*  
Prof. Joseph K Mukiibi  
Director General

*Serere Agricultural and Animal Production Research Institute*  
Dr. J. Peter Esele  
Director

*NAARI, Namulonge*  
Dr. Theresa Sengooba  
Alpine Karinarimo  
Fumwesigye Komutunga  
Edmond Kikoba  
Beatrice Male-Kayiwa  
Mary Mugisa-Mutetikua  
M. Silim Nandy  
P. Tukamuhabwa  
Dr. G.W. Otim-Nape  
Mr. Anton Bwa  
Mr. Gard Turyamureeba  
Mr. James Ogwang  
Mr. Solomon Ogwal

Director  
RELO/Agronomist  
Agrometeorologist  
Agronomist/Weed Scientist  
Plant Breeder (Beans)  
Agro-Economist (Beans)  
Post-Harvest  
Plant Breeder  
Head/Plant Virologist - Cassava Program  
Socio-Economist  
Breeder  
BioControl Entomologist  
Entmologist/Cassava

*Forestry Research Institute (FORI), Kifu*

John R.W. Aluma  
John Onorio  
Nelson Wajia-Musukwe  
J.F. Osoto Esegu  
Moses Mbablule

Director  
Head, Agroforestry Program  
National counterpart Kifu Station and AFRENA Scientist  
Programme Leader Forest Management and Scientist Tree Improvement  
Scientist, AFRENA project/FORI

*NARO: Kalengere Research Station, near Kabale*

J.J. Hakiza  
Benon Matecka  
Julius Mukalasi  
Rugero Kakuhenzire  
Deo Tibanyendera  
Margaret Ruhara

Breeder, Officer in Charge  
Senior Lab Technician  
Agronomist  
Entomologist  
Farm Manager  
Administrative Assistant

## MADAGASCAR

### *Ministere de la Recherche Applique au Developpement Rural (M.R.A.D)*

Felix Rajaomazava General Manager

Ministere de L'Agriculture General Manager

### *Centre National de Recherche Applique au Development Rural (Fo.Fi.Fa)*

Francois Rasolo Director General

Yvonne Rabenatsandro Scientific Director

#### Programme Haricot

Lea Randraimbolanoro Program Leader

A. Rabakoarihanta Breeder

B. Rabary Agronomist

G. Rakotomalala Phytopathologist

#### Programme Manioc

Sahondra Ranomenjanahary Program Leader, Phytopathologist

J.H. Rajaonarison Entomologist

C. Racliarisoa Entomologist

I. Ralimanana Breeder

M. Randrianarisoa Responsable du Programme a Tulcar

J. Randrianavelo Breeder

N. Rabemanantsoa Socio-Economist

#### *Other*

#### CARE International

#### Universite de Madagascar Antanarivo

Razafimahefa

V. Andrianaivalona

#### Programme National de Vulgarisation Agricole

R. Rakotarinosy

#### Service Penitencier

## IARC PERSONNEL

#### AFRENA/ICRAF

Dr. Kwesi Atta-Krah ICRAF/AFRENA-ECA Coordinator

Mr. Ralph Roothaert Research Officer (Embu)

Mr. Flemming Nielsen Associate Researcher, ICRAF (based at FORI)

Dr. Ekow Akyeamong ICRAF Scientist (Uganda)

Mr. Geoffrey Ebong Research Administration ICRAF/AFRENA

Dr. Amadou Niang ICRAF Senior Scientists (Maseno)

Mr. Bruce Scott ICRAF: Deputy Director General

*ECABREN/CIAT*

Dr. Pierre Nyabyenda  
Dr. Roger Kirkby  
Dr. Robin Buruchara  
Dr. Soniia David  
Dr. Charles Wortmann  
Mr. Julius Kamukindwa

RESAPAC Coordinator/Breeder  
EABRN Coordinator/Agronomist  
Plant Pathologist  
Sociologist  
Agronomist  
Accountant

*PRAPACE/CIP*

Dr. Peter Ewell  
Dr. Ne Bambi Lutaladio

Regional Coordinator, CIP  
PRAPACE Network Coordinator

*IITA/EARRNET/ESARC*

Dr. James Benjamin A. Whyte  
Dr. Bill Williams Khizzah  
Mr. Dirk R. Vuysteke  
Dr. Shaun Ferris

EARRNET Coordinator IITA/ESARC  
Regional Aronomist EARRNET  
Team Leader ESARC  
Postharvest Technologist, ESARC

*USAID consultant team on ASARECA Management*

Mr. Timothy J. Mooney  
Mr. Gilbert Fitzhugh (sp)

ABT Associates, Inc

**WASHINGTON**

*USDA/Washington*

Sussy Brennan

Program Assistant/USDA/ICD/DRD/AAE

*Other*

Dr. Michael W. Bassegy

IITA/Director, International Cooperation Division

**TELEPHONE INTERVIEWS IN THE U.S.**

Marc Winter

Agricultural Development Officer/USAID and formerly Africa Bureau and Zimbabwe

Cal Martin

Agricultural Development Officer and REDSO/E

Charles Simkins

Agronomist, Ohio State University, formerly at NAARI, Namulonge, Uganda

Jim Sentz

Agronomist, University of Minnesota, Former evaluator of networks

**USAID/Washington**

Dr. Carole Levin

Dr. Jeff Hill

Global Bureau, Grant Officer  
Tech Transfer Advisor, Productive Sector Growth and Environmental Div.

Dr. Menwuyellet Moussie

Dr. John Steele

Dr. Rudy Vigil

" " "  
" " "  
Project Officer, Productive Sector Growth and Environmental Div.

APPENDIX 4: An Example of Training Diversity

PRAPACE Training Schedule for 1995					
Subject Matter	Location	Type	Sponsor	Number of Trainees	Participating Countries
Sweetpotato processing	China, Philippines, Vietnam	Study tour	CIP/PRAPACE	7	Uganda, Kenya, Zaire, Tanzania, Malawi
ISTRC conference	Malawi	Regional	CIP/PRAPACE	9	Ethiopia, Kenya, Uganda, Zaire
Potato seed production	Rwanda	In-country	CIP/PRAPACE	26	Rwanda
Potato germplasm resistance to late blight	Uganda	Regional	PRAPACE	18	Burundi, Eritrea, Ethiopia, Kenya, Rwanda, Uganda, Zaire
Impact assessment	Kenya	Regional	PRAPACE	4	Uganda, Kenya, Zaire, Ethiopia
Certified potato seed	Uganda	In-country	CIP/PRAPACE	15	Uganda
Workshop on late blight management	Egypt	Regional	CIP	8	Ethiopia, Uganda, Kenya, Zaire

Appendix 5: Materials and Technologies Introduced and Distributed by the Networks

		(Cassava)			
		Seeds		In-vitro plantlets	
Year		No. of families	Quantity	No. of genotypes	No. of plantlets
1992	Kenya	-	-	16	80
	Uganda	205	90,516	22	110
1993	Burundi	38	50,000	-	-
	Kenya	-	-	19	95
	Madagascar	-	-	84	420
	Rwanda	38	50,000	16	80
	Uganda	88	27,340	20	100
1994	Burundi	192	33,516	-	-
	Kenya	147	33,833	29	126
	Madagascar	164	34,173	29	76
	Rwanda	119	23,193	-	-
	Uganda	527	97,316	31	81
1995	Kenya	345	65,072	81	405
	Madagascar	94	281,585	-	-
	Uganda	1,560	239,218	134	671
1996	Kenya	159	26,421	100	300
	Madagascar	145	23,888	-	-
	Uganda	1,346	284,120	102	474

Additional information on cassava is presented in appendix 8.

Germplasm Exchange and Varieties Released to Farmers in PRAPACE  
Member Countries: (Potatoes)

Country	No. of CIP germplasm introduced in Phase I / Phase II	No. of varieties released in Phase I and II	% of adoption in selected areas in 1992	CIP number and name of some released varieties
Burundi	871 / 270	3	80	CIP-382195.25 BU86022 Ndinamagara
Ethiopia	- / 321	4	-	Krolisa, CIP-378501.3 CIP-374080.5 UK-80.3
Kenya	- / 221	1	-	Kenya Dhamana
Rwanda	1,509 / 242	16	60	Cruza, Sangema, Mabondo, Kinigi, Marita, Gahinga, etc
Uganda	492 / 125	3	-	Kabale, Kisoro, Victoria
Zaire	201 / 54	3	60-89	Nseko CIP-380606.6 CIP-380583.8

Beans

The bean program (ECABREN) has increasingly shifted its research program to a more comprehensive bean production and utilization approach rather than an emphasis on breeding programs. Nevertheless, the network has been instrumental in a) the widespread introduction and adoption of climbing beans—a new technology and new type of plant for eastern Africa; b) preservation and use of the productive bean variety Phaseolus vulgaris in Rwanda under an emergency situation; c) present release of varieties Umubano, Flora and Ngwinarare in Kenya; and d) extensive distribution of cultivars in Uganda (see Table II in the text of the report and the following tables).

Bean production and systems improvement technology available in ECABREN member countries in 1996<sup>1</sup>

Country	Widely recommended and used by farmers	Available to farmers on restricted scale <sup>2</sup>	Very promising <sup>3</sup>
Burundi	<p>Intensification through climbing beans.</p> <p>Eight introduced and 9 locally selected varieties (various growth habits/resistances).</p>	<p>Several additional varieties.</p> <p>Agroforestry association and other techniques for stake production for climbers.</p>	<p>Drought-tolerant variety [for Imbo Plain].</p> <p>Stem maggot and bruchid control by botanicals.</p> <p>IPM against snap bean pests.</p>
Ethiopia	<p>Introduced varieties: <i>Awash-1</i>, <i>Roba-1</i>.</p> <p>Broadcast seeding at high rate for weed suppression.</p>	<p>Introduced varieties: A 262 [nationally]; <i>Alemaya-1</i> [GLP X92] from Kenya; <i>Chirro-1</i> [G 2816] [for drought tolerance in Rift &amp; E.Highlands].</p> <p>Intensification by broadcast intercropping in maize [Rift, Western].</p> <p>Seed dressing against bruchid.</p> <p>Alley cropping with <i>Sesbania</i>.</p>	<p>Bruchid control by botanicals, and by resistant varieties.</p> <p>Set of 8 introduced lines for export canning quality.</p> <p>Three crosses tolerant to stem maggot [Southern Zone].</p> <p>Several varieties under verification.</p>
Madagascar	<p>Introduced varieties: <i>Mahavatsy</i> [GLPX92 from Kenya] <i>Marohavana</i> [ZAA 64 from CIAT] also a French variety.</p>		<p>Other introduced lines.</p>
Mauritius		<p>Bred varieties: ASR 127, ASR 159.</p>	<p>Introduced drybean lines: MCD 252, PAN 22, <i>Ex-Rico</i> 23, V 5003.</p> <p>Introduced snapbean line: HAB 440.</p>

Country	Widely recommended and used by farmers	Available to farmers on restricted scale <sup>2</sup>	Very promising <sup>3</sup>
Kenya	<p>Fertilizer recommendations for maize/bean intercropping.</p> <p>Organic and inorganic soil amendments, also local selection GLP X92 and Rwandan variety RWR 211, for root rot management/productivity.</p> <p>Intensified cropping with climbing beans from Rwanda [W. Kenya].</p>	<p>Reduced tillage for beans [Central Kenya].</p> <p>Several bred lines from University of Nairobi.</p> <p>Rootrot resistant bush introductions: MLB-49-89A, MLB-40-89A, RWR 719, RWR 1092, SCAM-80-CM/5.</p> <p>Bean samozas and other foods.</p>	<p>Introduced &amp; locally bred rust-resistant French beans.</p> <p>Varieties resistant to charcoal rot.</p> <p>Integrated pest management for reduced pesticide use in French beans.</p>
Zaire	<p>Intensification through climbing beans.</p> <p>Varieties: <i>M'Mafutala</i> (=RWR362), <i>Kirundo</i>, <i>Nakaja</i>, <i>Aliya</i> (=G2333), <i>Chihembe</i> (=G2331).</p> <p>Introduced variety tolerant to Al-toxic soils: <i>Ubusosera</i>.</p>	<p>Stake production for climbing beans: <i>Calliandra calothyrsus</i> and banana fibre.</p> <p>Control of angular leafspot by varietal mixtures.</p>	<p>Varieties identified in participatory selection with farmers:</p> <p>10 bush bean varieties;</p> <p>12 climbing bean varieties.</p>

- Notes:**
- <sup>1</sup> Information from reports of national programs, EABRN and RESAPAC.
  - <sup>2</sup> Variously defined as restricted release, or in extensive on-farm testing by farmers.
  - <sup>3</sup> Currently used in, or ready for, on-farm testing.

Country	Widely recommended and used by farmers	Available to farmers on restricted scale <sup>2</sup>	Very promising <sup>3</sup>
Tanzania	<p>Introduced varieties:  <i>Lyamungu 85 &amp; 90, Selian 95</i> [for mid-alt];  <i>Uyole 84 &amp; 90</i> [for high-alt].</p> <hr/> <p>Use of K (potash) fertilizer in Usambara.</p>	<p>Introduced varieties:            EP4-4, <i>SUA 90</i> [low-alt];            Selian 94, G14369, G14374 [mid-alt];            Uyole 94, <i>Njano</i> [high-alt].</p> <p>IPM against stem maggot, using soil amendments.</p> <p>Management of bruchids in stored beans by sun-drying/ash (for food) or neem (for seed beans).</p>	<p>Introduced varieties:            G8864, PVA773 [mid-alt].</p> <p>Application of manganese for Problem Y [N. Tanzania].</p>
Uganda	<p>Introduced varieties:            CAL 96, MCM 5001, OBA 1, RWR 136, MCM 1015, MCM 2001.</p> <p>Local selection:  <i>White Haricot</i>.</p> <p>Low-cost green manuring with <i>Crotalaria</i> or <i>Mucuna</i>.</p> <p>Intensified cropping with <i>Umubano</i> and other Rwandan climbers [W. &amp; E. Uganda].</p>	<p>Bruchid control by sieving or tumbling.</p>	<p>Varieties resistant to <i>Zabrotes</i> bruchid in storage.</p> <p>Varieties tolerant to high-manganese and to low-P soils.</p>

Country	Widely recommended and used by farmers	Available to farmers on restricted scale <sup>2</sup>	Very promising <sup>3</sup>
Rwanda	<p>Intensification through climbing beans; <i>Calliandra calothyrsus</i> for stake production</p> <p>Bred varieties: 59/1-2, <i>Urugezi</i>, <i>Urugezi 2</i>, RWR 221.</p> <p>Introduced varieties: <i>Umubano</i>, <i>Vuninkingi</i>, <i>Flora</i>, <i>Puebla</i>, <i>Saxa</i>, <i>Muhondo 6</i>, <i>Peveya 8</i>, <i>Bataaf</i>.</p> <p>Locally selected varieties: <i>Mutiki 2</i>, <i>Urunyuma 3</i>, <i>Ikinimba</i>, <i>Kilyumukwe</i>, <i>Gisenyi 2 bis</i>.</p> <p>Organic and inorganic soil amendments, and resistant variety RWR 211, for root rot management/productivity.</p>	<p>Agroforestry association for stake production for climbing beans.</p> <p>Several additional varieties: <i>Decelaya</i>, L 53, RWV 167, 26/1, 7/4, RWK 5, RWR 603, AND 661, G 11060, <i>Ntekerabasilimu</i>, <i>Kibuga</i>.</p>	<p>On-farm tested varieties: LAS 328, PF 16, RAB 487, RWK 10 and RWR 189.</p> <p>Tolerant variety LSA 191 for low-P soils.</p>
Sudan			<p>Introduced bean lines.</p> <p>Recommendation for reduced irrigation.</p>

## Agroforestry

The agroforestry network (AFRENA) does not, as a general rule breed new varieties of trees or bushes and hence does not "release varieties" or germplasm to be approved by the forestry equivalent of a Seed Board. Rather, they select trees or bushes with various characteristics and use them in combinations with other crops or for combinations of purposes.

<u>Tree/Bush Species</u>	<u>Main Purpose(s)</u>	<u>Site</u>
Calliandra calothyrsus Grevillea robusta	fodder fuel, timber, windbreak	Embu, Kenya
Sesbania sesban	soil management	Maseno, Kenya
Almus acuminata Calliandra colothyrsus	terrace management (2) pole production (3) fuel wood	Kabale, Uganda
Almus, Grevillea, Casuarina cunninghamiana and Cedrela odorata	wood production upper story timber intercropping	Kifu, Uganda

Additional information on AFRENA's work can be found in appendix 8 below.

The evaluation team employed what appears to have become somewhat "standard" approaches for project assessments. The major focus was on achievements of purpose (technology generation) and fundamental project design questions rather than processes and reports on inputs. The objective of the evaluation was to determine ways in which the project may be strengthened as well as to determine the impacts and validity of the investments.

Specifically, the methodology consisted of the following:

1. Review of extensive amounts of project literature (project documentation, technical reports, evaluations and status reports)
2. Team building efforts and discussions with the evaluators and project managers (network staff) to arrive at common understanding regarding the purposes of the evaluations and procedures.
3. Extensive interviews with management and technical staff (see appendix 3)
4. Field visits to verify the work being carried out, conditions of research sites and participation of farmers. (see appendix 2)
5. Team consultations to arrive at consensus on major funding and recommendations.
6. Reviews of the draft report and incorporation of comments if deemed appropriate.

The "methodology" also consisted of bringing together a team experienced in agronomy, the social sciences, financial management and project management. Hence, professional judgments also become significant as a part of the methods for the evaluation.

Unfortunately the vast majority of the materials reviewed in the conduct of the evaluation are not listed below. The materials used were prepared for shipment from Nairobi and delivered for shipment to the United States, but they never arrived. Consequently, the items below are but illustrative of the types of materials used. They represent but a minor fraction of the literature reviewed.

### Types of Materials Reviewed

- Project Documentation: from USAID, the Consultative Group, and IARC consisting of project description materials.
- Grant agreements
- Annual reports and other periodic reports
- Technical reports
- Impact reports
- Evaluations
- Workshop and seminar proceedings
- Steering committee reports

### Actual Examples of Material Reviewed

1. Anonymous; USAID's Project Paper. Policy Analysis, Research and Technical Support (698-0478). AFR/ARTS/FARA Agency for International Development. Washington, D.C. May 1992.

This is the basic project document which describes the project and justifies the funding.

2. USAID, Memo of Understanding between the African Development Support Bureau and Global Bureaus.

This document spells out the roles of various offices and the role of research networks in agricultural development.

3. USAID and the Consultative Group Grant Agreement and Its Amendments. USAID. Washington, D. C. July 1993.

These documents spell out the terms and conditions of the grant and the grant objectives and set forth the responsibilities of USAID and the CG/IARCs.

4. Maseno Agroforestry Research Center Program Description. Maseno, Kenya. 1996.

This document describes the collaborative efforts of ICRAF, KEFRI and KARI.

5. East Africa Root Crops Research Network (EARRNET). Mamulonge, Uganda. 1996.

This report documents the current and recent past research program.

6. Program of ESARC (East and Southern African Regional Center). IITA and NARS. Namulongwe, Uganda, 1996.  
This document describes the ESARC program.
  
7. Overview of ASARECA (Association for Strengthening Agricultural Research in Eastern and Central Africa). ASARECA Secretariat. Entebbe, Uganda. 1996.  
Program description of ASARECA.
  
8. Background Information for Sweet Potato Growing Areas. North and Sidama zones in Ethiopia. Working document number 8, draft, PRAPACE, IAR. Awasa Center, Awasa, Ethiopia. 1996.  
Describes sweet potato production problems in eco-zones.
  
9. AFRENA, Maseno, Kenya. Program description. ICRAF/AFRENA, Nairobi, Kenya, 1996.
  
10. K. Atta-Krah, et al. AFRENA-ECA Research Partnership for Agroforestry Development Progress Report. 1995-96. Submitted to ASARECA and AFRENA-ECA Consortium of Donors. ICRAF. September 1996. Nairobi, Kenya.  
This is a comprehensive technical report of research achievements in the program of ICRAF/AFRENA.
  
11. Litaladio, N. B. Establishment, Operation and Management of the PRAPACE Network Under the Auspices of ASARECA PRAPACE. Kampala, Uganda. 1996.  
This is a document describing the potato and sweet potato research in East Africa.
  
12. Merlet, J. F., et al. Management of Regional Agricultural Research, ISNAR/ASARECA. Entebbe, Uganda. 1996.  
This annex to a larger report spells out management arrangement and their various options.

Appendix 8: IARCs and Networks Responses to the Draft Report  
and Comments on the Responses

To: Dr Robert Morrow  
cc: Dr Harry Minor

From: Pyndji Mukishi (ECABREN Coordinator) and Roger Kirkby

Date: 27 February 1997

RE: USAID NETWORKS EVALUATION:  
RESPONSE OF ECABREN STEERING COMMITTEE MEMBERS TO DRAFT REPORT

1. The ECABREN Steering Committee [which met recently] and the Network's coordination appreciated the thorough review that was carried out, and the helpful comments made.
2. While the SC fully agrees with the recommendation concerning the Network efficiency indicator of coordination: research costs, we would like to draw the attention of the Evaluation Mission to the fact that a further 15% budget cut for the coming year was announced by Dr Moussie to the SC immediately after he described the review as having been "very positive for ECABREN". This announcement somehow damped the discussion of the Report itself.
3. The Review prefers payment by IARCs to research stations, while also indicating that auditing is best when funds go through NARI headquarters. Is there an inconsistency here? Since the practice of EABRN (sending funds through HQs with copy for information to the program and project leaders) was a specific decision of the Network CD, we need clarity on this if ASARECA CD is to review this policy and if all networks are to follow the same procedure. RESAPAC was accustomed to making payments direct to stations (with information to NARS director) in the case of Zaire, due to its particular logistics.
4. In view of the last-minute changes that were made to the Mission's travel and visits schedules after some institutions had gone to considerable trouble to lay on a useful visit program, the Steering Committee would like to request the Mission to include in its final draft a specific thank-you-and-apology note to those institutions that had been on the

schedule but could not be visited. These institutions included: ISAR (and Tree Seed Center ?), Rwanda; and the University of Nairobi.

5. Table, Page II-22: Other ECABREN technology transferred across the network have been:

- rapid non-formal seed dissemination systems (Burundi, Ethiopia, Kenya, Rwanda, Tanzania, Uganda, Zaire);
- new bean consumer products (Kenya, Uganda).

6. Page II-34 [foot]: ECABREN already had a budget line item for national resource persons.

7. Page IV-2: RESAPAC coordinator was regionally hired since 1994; the staffing problem affected only Rwanda as he was able to visit Burundi and Zaire. EABRN also had agreed to hire this way from 1995, but was delayed from implementing this for two years by the simultaneous development of ASARECA, during which time regional priorities among commodities were being reviewed and the DC could not make a decision on the matter. It would not have been appropriate to proceed without their support.

8. There is a reference (p. IV-3) to PRAPACE's as being the most transparent and preferred mode of financial operation. The ECABREN Steering Committee would find it helpful to understand the perceived differences from PRAPACE's approach, so that ours can be improved if necessary. This is particularly so since procedures described as being employed by PRAPACE have generally been used in EABRN and RESAPAC since 1985/86, and elsewhere in the report our own procedure of financial reporting/auditing is commended to the other networks. ECABREN SC expressed the view that its financial procedures are irreproachable.

9. The proportion of USAID funds allocated by ECABREN to coordination last year was 44%, not 48% (p. IV-9). This figure was inflated, for that one year only, by the need for an overlap between the outgoing RESAPAC coordinator and the incoming ECABREN coordinator; otherwise the proportion would have been 40%.

10. Minor editing:

- (p. I-3) EABRN started in 1985
- (p. II-11, para 1, line 16) bean root rot work
- (p. II-16) The researcher Mr Otsyula is at Kakamega, not Embu
- (p. III-3) CIAT regional office in Uganda, and formerly in Rwanda.

Kind regards, and we look forward to receiving and acting upon the final version.

Date: February 23, 1997

To: Bob Morrow <shmorrow@juno.com >

cc: Peter T. Ewell, CIP-Nairobi (P.Ewell@cgnet.com >  
 Louise Sperling <Remote3@ISNAR.MSM.CGNET.COM >  
 Harry Minorh <Minorh@ext.missouri.edu >  
 Crispin Bokea <PDS.PRG@AFRICAONLINE.CO.KE

From: N.B. Lutaladio, PRAPACE-Kampala

Subject: Comments on Evaluation Draft Report: Technological Information in the Pipelines.

Please find herewith as an attachment our comments on the draft report. I take the opportunity to commend the evaluation team for a work well done. Also attached are technological information in the pipelines in PRAPACE member countries.

With best wishes and regards.

#### A. COMMENTS ON THE EVALUATION REPORT

##### Section I

Page 1-3, last paragraph on potato/sweetpotato

include ERITREA among the listed countries  
 sweetpotato were added to it's mandate in 1992 (not 1994) as stated

##### Section II

page II-2, second paragraph on PRAPACE

In PRAPACE, constraints were identified FOR DIFFERENT AGROECOLOGIES IN THE REGION and PRIORITY research agendas related to them were distributed among the network countries as REGIONAL MANDATES on.....

last sentence of paragraph 2  
 Results obtained IN one COUNTRY were expected ....

page II-6, first paragraph under Proposal solicitation and evaluation

line 8. Proposals received ....., with the network coordinator AND CIP REGIONAL SCIENTISTS playing an important role in the process

second paragraph

line 7. 1500 and US\$2,500 PER YEAR

page II-10, last paragraph

line 4. The procedure DOES NOT PREVENT EACH NATIONAL PROGRAMS TO CONTINUE ITS VARIETAL SCREENING ACTIVITIES it should accelerate .....

page II-22, Table 7

under technology . Line 1. Flush out POTATO SEED production scheme  
Line 2. Production of SWEETPOTATO virus-free...

under countries, line 5. include UGANDA (for processing potential and product development)

last PRAPACE technology. Integrated pest management of SWEETPOTATO weevils

page II-39. It is not clear if this page is part of the recommendations under II.5

Section III

- page III-3, paragraph 3 under Regional coordinators

line 1 of paragraph 3. PRAPACE moved an IARC-hired to a network hired coordinator in 1993 (not 1992).

line 2 of paragraph 3. the tragedy in Rwanda led to THE DEATH OF THE FIRST NETWORK HIRED COORDINATOR, his assistant WAS CONFIRMED IN THIS POST IN 1995 - and doing .....

page III-8, paragraph 4

line 4 of paragraph 4... ASARECA headquarters in ENTEBBE (not Kampala)

Section IV

page IV-3, under d) ASARECA include ERITREA in the rest of the countries

- in diagrams 3: PRAPACE headquarters in Kampala since JANUARY 01, 1995 (not May 01, 1995)

- in diagram 4: replace Kigali Banque Commercial du Rwanda by Kampala Standard Chartered Bank

## Section V

- page V-5 is missing in my copy

Appendix 6: missing

A list of bibliographie/reference consulted could be added in the appendix.

## B. TECHNOLOGICAL INFORMATION IN PIPELINES

Crop	Technology or technological information	Country
Potato	- Integrated late blight management (with late blight tolerant/resistant varieties)	Ethiopia, Uganda, Kenya
	- Mid-elevation adopted and virus resistant varieties	Uganda
	- Seed production and storage, and marketing	Uganda, Ethiopia
Sweetpotato	- Product development	Kenya, Uganda
	- Improved early maturing varieties (high dry matter, high Beta carotene content)	Uganda, Kenya, Zaire Rwanda, Ethiopia
	- Integrated crop and pest management of weevils	Uganda, Kenya



# International Centre for Research in Agroforestry

## ICRAF

Dr. Menwuyellet Moussie,  
USAID Africa Bureau,  
1111 N. 19th St#210,  
Arlington, VA 22209, USA.

18 February 1997

Dear Dr. Moussie,

### *ICRAF Response to USAID Review Report*

Attached is our response on the USAID review of networks that was undertaken in November 1996.

The review itself was timely and appropriate. It was also undertaken in a detailed and professional manner, although the duration of the exercise was rather too tight, given the broad scope of work that the team was given. Overall, however, we would like to say that the team did a reasonably good job.

With specific regard to AFRENA however, we have some strong concerns, on the team's assessments and recommendations. Almost everything that was said about AFRENA in the substantive segments of the report seemed to revolved around one thing: the team's dissatisfaction with the model of networking in operation between ICRAF and NARS. This, of course, included issues such as lack of ownership by NARS, lack of involvement and NARS control of funding, and ICRAF dominance, etc.

We have taken note of the major concerns raised, and we intend to re-discuss this issue of partnership and ownership openly with our NARS partners, in order to arrive at a mutually acceptable mode of operation. We are therefore taking the liberty of sharing the review report (and our responses) with our partner NARS and requesting for their independent assessment on the issues raised in the report, and the recommendations made re: AFRENA-ECA. These issues will then be discussed further at the meeting of the Directors of Institutions participating in the AFRENA-ECA network, scheduled for 3-4 March 1997. The output of this meeting will help guide the evolution of our partnership model into the future.

We shall continue the process of discussions with our NARS partners in order to make the necessary modifications in our structure and operation, that will enhance the attainment of the objectives for which this network was established.

May we take this opportunity to thank USAID for its continued support to the AFRENA-ECA programme.

With best regards.

Yours sincerely,

Bruce Scott  
Deputy Director-General

## **ICRAF RESPONSE TO USAID REVIEW OF NETWORKS**

The AFRENA-ECA network was started with a generous grant from the USAID in 1988, and the network has continued to benefit from USAID funding ever since. The recent review of AFRENA and three other networks supported by USAID in the region, has helped to identify areas in the various networks requiring some attention. In the case of AFRENA, the review report did raise a number of concerns on the mode of partnership and financial management responsibility between ICRAF and the NARS. The response given below is intended to address the main concerns raised, and provide clarification on the various issues, for the purpose of setting the records straight. The response therefore is not intended to be defensive, but rather constructive.

Overall, it should be said that the consultants did a good job on a very difficult assignment—especially in the way they synthesized the various issues and activity components across all the networks. The report has been prepared in synthesis fashion, rather than simply as a compilation of views on the different networks. This has enhanced the value of the report.

In trying to do the above however, the review team appears to have accepted a common picture of what "networks" are supposed to be, how they are to be run, and what should be the relative roles of NARS and IARCs in the operation and financial control of networks. The team appears to have assessed each network against this common picture, and highlighted what they saw as deviations from this "accepted mode of operation of networks". This style of analysis however has not been fair to AFRENA and to ICRAF. We do not believe that it is appropriate to make a straight comparison between AFRENA (a natural resource management program) and the three commodity networks, without taking into account the specific objectives and characteristics of the respective networks.

The report also appears to assume that all the four networks are supposed to have some common mode of operation as networks. This view is not shared by ICRAF, nor indeed by the network. We are aware that the AFRENA mode of operation is different from that of the other networks, but this was a deliberate and purpose-oriented decision, rather than by accident or as a deviation. We have always maintained that the AFRENA is a network of partnership between ICRAF and NARS (as opposed to a network of national programs, which may be the case with the other networks). The review report is very critical of this networking mode, and indeed recommended that there should be a clear separation between what is ICRAF and what is the network, especially with regard to fund management and project ownership. (This is clearly expressed on page II - 36 of the report, under title 'Concerns with Lack of ICRAF/AFRENA/NARS Divisions').

This is quite a significant recommendation, and it questions not just the mode of operation of the AFRENA as a network, but also touches on ICRAF's mode of operation within Africa. This recommendation is being taken seriously by ICRAF; we are therefore planning discussions with our various NARS partners in the region, to get their input for the development of mutually shared models of operation for ICRAF activities in the region. One obvious possibility would be for ICRAF to move away from working directly within the AFRENA, and develop specific collaborative partnerships on bilateral basis, with interested NARS partners, for ICRAF's research. We perceive that, even in this model, the mode of partnership could differ across locations and across countries.

On ICRAF's position of seeing AFRENA as a mechanism for building, developing and institutionalizing the national agroforestry research agenda, the team states categorically that "the project should not be viewed as a major player in national systems development or for maintenance of the national systems". The report goes on to say that "it is for these reasons that the team views with some concern the AFRENA" model of networking (page v.3).

It is conceivable that the above position taken by the review team is based on the assumption of existence of national research programs in each of the programs or components being addressed by the networks. This may be so for all three commodity networks - there have been national research institutions/programs in all three commodities - beans, potatoes and cassava, even prior to the initiation of the networks. However this is not the case with agroforestry, where no such programs existed, at the inception of the AFRENA program. The fact that today, one can see the emergence of national agroforestry research programs in countries participating in AFRENA should be seen as a major credit to the network. This view, however does not appear to be shared by the review team.

On the issue of network management structures, the report states, time and again, that AFRENA does not have a Steering Committee. What the team refers to as "Steering Committee" consists of national scientist leaders, who provide technical direction and planning for the network research. In AFRENA jargon, we call this the Technical Committee. This actually exists, and meets once a year in February to review research and plan Programme of Work for the new year. The most recent meeting of the AFRENA-ECA Technical Committee was held at Embu 10-14 February, 1997, and was attended by Dr. Moussie of USAID-Washington. This committee has however, over the years, been expanded to include all our national scientists and ICRAF staff working in the country programs. This has made the group much bigger than originally intended. A decision was taken at this last planning meeting to cut the size of the committee, to make it smaller and more manageable.

In addition to the AFRENA Technical Committee, a Regional Steering (Directors) Committee also exists within AFRENA-ECA. This Committee was suspended on the creation of ASARECA, on the understanding that ASARECA will provide the overall steering Committee functions for all regional networks in the region. AFRENA has however recently received clearance from ASARECA for this Committee to be reconvened, to be able to get detailed input and guidance from our NARS directors into the development of the AFRENA programme. The output of the AFRENA Directors' committee will then be reported to the full ASARECA Committee of Directors. Apparently, there is some mix-up in the review report, on our Technical Committee and the to-be-reconvened Directors Committee.

Another issue for which AFRENA-ECA was seriously criticised in the report, has to do with NARS involvement/control for the management of financial resources. The report is relatively silent on the role ICRAF plays in the seeking of funds for network operations, and the periodic use of ICRAF core funds for sustaining and maintaining network operations. The report is however, very critical of the fact that ICRAF maintains responsibility for the management of the multi-lateral funds of the network. The review team was not happy with the fact that such funds are channelled through ICRAF, and that budgeting and management is done directly by ICRAF staff, rather than through the national partners or through ASARECA.

The report does not say much on the evolution that the AFRENA program has gone through with regard to finance management. From a situation of a single fund source - multi-lateral USAID grant, which was entirely controlled by ICRAF staff, the project has moved more towards bilateral grants, which are managed almost exclusively by the respective NARS. Such bilateral funds, which now constitute the larger percentage of the network funds, do not even pass through ICRAF books, even though in all cases ICRAF took on the lead responsibility for the negotiation of the funds.

ICRAF feels therefore, that the strong implications in the report that ICRAF does not involve the NARS partners in budgeting and financial management, and the recommendation that ICRAF should learn "to operate in an increasingly collaborative fashion as do other networks" is rather misleading and unfair both to ICRAF and AFRENA, and may have been due to an inadequate information on our part.

It is also clear from the concluding section of the report that the review team accepted the USAID view on networking as a required model for all the four networks, and indeed questioned why USAID had not taken "corrective action" all these years, for the "inconsistency of the agroforestry model". This is in direct contradiction to the often declared USAID position of not intending to impose any rigid model on the networks. It also does not take into account the fact that other donors co-funding the networks could indeed have very different views on partnerships and networking. Furthermore, it is significant to note that these four networks are very different projects which were negotiated for independently of one another. Each network (at least the AFRENA network) is distinct, and has its particular characteristics which is adequately described in the original project documents. We believe therefore that applying a common or standardised measure for all the networks may not be appropriate.

WE do accept the fact that there could be, and indeed are, a number of problem issues within AFRENA that needs to be re-examined and sorted out, between ICRAF and the partner NARS. This however does not necessarily imply separation of ICRAF from the AFRENA network. WE would like to stress the fact that the situation with agroforestry research in NARS is very different from that of research on commodity crops. National capacities for agroforestry and natural resource management research is also generally much weaker than it is for the commodity crops. We therefore strongly disagree with the statement of the review team (III.9 (3) ) that "the model of AFRENA appears to have been more appropriate for the 1960's and 70's than they are today."

ICRAF seeks to continue to work with her partner NARS to improve the partnership model in the AFRENA network., and to support the expansion of agroforestry research activities in member countries. This USAID review report will be a useful basis for our discussions. in this process. ICRAF will support and continue to seek for more graduate training for agroforesters in national programs, and seek to gradually shift more technical and financial management responsibility to the NARS. ICRAF however believes that the agroforestry research task within the region is, at least for now, much better achieved through continued partnership between ICRAF and the partner NARS. We have reason and evidence to show that this view is shared by the NARS with whom we work.

We seek continued support of USAID and other donors to both ICRAF and the partner NARS, in order to strengthen this partnership and give greater support to the enhancement of national capacities for agroforestry research and development in the east and central Africa region.



**ICRAF**

20th February 1997

David Atwood  
Division Head  
AFC/SD/PSGE  
USAID Africa Bureau  
1111 N. 19<sup>th</sup> St. No. 210  
Arlington, VA 22209, USA

Dear Mr. Atwood,

Ref: USAID Support to AFRENA ECA

Recently I had the opportunity to meet with Dr. Menwuyellet Moussie at ICRAF to discuss the activities in the AFRENA Network in East and Central Africa and the recently concluded AID Evaluation.

The agroforestry network in East Africa (AFRENA-ECA) has made tremendous progress since it was established in 1988. A number of technologies have been developed which are being adopted by small scale farmers. Let me summarise some of these:

- In south western Uganda AFRENA has developed tree based technologies that effectively stabilise the terraces on the steep slopes in that area and at the same time provide farmers with useful products such as fuelwood, fodder and poles for construction. These technologies are being adopted and spread by women's groups established by the project to specifically disseminate agroforestry in the region. The AID Administrator, Brian Atwood and Assistant Administrator, Sally Shelton have both visited the project site in the last two years and were highly complementary on the effectiveness of how research is reaching the poorest of the poor in rural Uganda.
- At another site, Embu, on the slopes of Mt. Kenya, ICRAF and our national partners have directly contributed to increasing farmers' income through agroforestry. Fodder species are being used by farmers as a direct supplement for dairy meal in the zero grazing systems. The tree fodder, calliandra, is being rapidly adopted by hundreds of farmers. It is planted along farm boundaries, on contours and intercropped with their napier grass and other forages. On average farmers have been able to increase their profits by US\$ 100 per cow per year using this

agroforestry based-feeding system. Part of this programme has been funded by Sida and was assessed as highly successful during an external review that was conducted in 1996.

- In western Kenya at another site, Maseno, we are on the verge of a breakthrough that could contribute dramatically to providing food self sufficiency in the region, which has the highest population density in rural Africa and where the soils are now completely degraded and N - and P- deficient. With the Tropical Soil Biology and Fertility (TSBF) group, we have discovered that a combination of biological sources of nitrogen and phosphorus gives increases in maize yield of 400%. This is not surprising except that the source of the nitrogen and the phosphorus are natural and come from the area. The surprise has been the application of a weed, *Tithonia*, as the source of nutrients. Furthermore, *tithonia* mulch in combination with rock phosphate gives us better results than the recommended rates of inorganic fertiliser. This is because in some way we do not yet fully understand how *tithonia* makes the phosphorus more available. The cost is minimal compared to the fertiliser, although the labour required is considerable. The World Bank is so interested in these results that they are prepared to provide KARI and ICRAF with funds for a pilot development project at the district level in the region. We are particularly excited about possibilities of extending the use of *tithonia* and rock P to higher value crops, since farmers are telling us they are interested in cash income as well as food self sufficiency.

All of this work has been supported through the AFRENA-ECA network. And there are more positive developments in the pipeline. We shouldn't be surprised by the rate of adoption that we are beginning to see. Many studies have now shown conclusively that the rate of on-farm tree planting by farmers in east Africa is at a higher rate than population growth. There are more trees in the farm landscape today in Kenya, than there was twenty years ago.

ICRAF is in the final stages of planning our new Medium Term Plan for the period 1998-2000. We find these types of results so encouraging that we have decided to establish a Development Division. This new Division will be responsible for disseminating agroforestry technologies on a wider scale. This will be done with our local partners in the NGO community and the government extension services. ICRAF's primary responsibility will be to ensure that proven research results are channelled through these dissemination mechanisms and secondly to monitor and evaluate the

adoption process and to assess the impact that these improvements are making in the lives of farmers.

AFRENA-ECA has also made significant progress on institutionalising agroforestry in the participating countries of the network. Ten years ago there were no institutions in the region conducting agroforestry research. ICRAF has been instrumental in assisting five countries in east Africa to develop Agroforestry Master Plans. All of ICRAF's work is undertaken in direct collaboration with national research institutions. AFRENA-EA has worked directly with about twenty NGO's and helped them to strengthen their capacity to undertake agroforestry with farming communities in the region. None of this existed before AFRENA-EA came into being. AFRENA-EA is the only programme in the region dealing with agroforestry. Issues related to the governance of AFRENA-EA that were raised by the external review team will be addressed at a meeting of the Directors of the NARS scheduled for 3-4 March, which will be chaired by the Director of KEFRL. Let me assure you that ICRAF is committed to having the participating NARS have increasing authority and responsibility for running the network. One of the challenges faced by AFRENA that was pointed out by the external review will be to identify mechanisms to ensure that there is more cross fertilisation of activities between the countries of the region so that the achievements that have been mentioned above can be shared by all participants in the region.

USAID has supported AFRENA-ECA since its inception in 1988. Since, AFRENA has been successful in securing funds from the EU, Sida and IDRC. If we are to realise the full impact of some of the technologies that have been described above and many others, it is vital that we continue to receive adequate financial support. We are aware of the constraints that all funding agencies are currently facing, however it is clear that maintaining support to AFRENA at the current level will ensure that impact occurs and that USAID's investment in the AFRENA enterprise has paid off in terms of improving the welfare of small farmers in the region. If USAID were to totally withdraw, even for one year, we are worried about the signal this would send to our other donors who have supported AFRENA because of USAID's leadership in the programme.

I hope that this brief summary of the AFRENA-ECA activities is clear and

...4/-

if you wish we would be prepared to provide you with additional information as required.

Yours sincerely,

pp: *W. Davis*

R. Bruce Scott  
Deputy Director General

cc: Pedro A. Sanchez  
Kwesi Atta-Krah  
Roger Leakey

RBS/jm

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Date: Fri, 21 Feb 1997 13:28:00 -0800 (PST)  
Subject: RESPONSE II ON USAID REVIEW  
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X-Status: Read

Dear Moussie , Bob and Harry

Attached is the continuation of the ICRAF response to the review report..

Here, we provide specific comments on particular sections of the report.

I hope you find them useful.

=====  
ICRAF RESPONSE ON REPORT OF USAID REVIEW OF NETWORKS : Comments on  
specific sections of the report

1. AFRENA Steering Committee  
Ref.: Page II-3 Paragraph 2; Page II-4 Table 2.

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With reference to above sections of the report, please note our response:  
We

do have a technical committee up of the following core group:

Uganda:

John Okorio - FORI, Forester  
Nelson Wajja-Musukwe - FORI, Forester  
Wilson Bamwerinde - FORI, Economist  
Ekow Akyeampong - ICRAF, Agronomist

Kenya:

Daniel Nyamai - KEFRI, Agroforester  
James Kamiri - KEFRI, Soil Scientist  
Amadou Niang - ICRAF, Agronomist/Agroforester  
George Karanja - KARI, Agronomist

Rwanda:

Athanase Mukuralinda - ISAR, Forester

ICRAF:

AFRENA-ECA Coordinator  
ICRAF Research Programme Coordinators (4)

2.0 Study/Monitoring Tours. Ref.: Page II-12, Section II.1c. -  
Monitoring

AFRENA indeed does organize study tours for its scientists. These tours are known in AFRENA jargon as 'Technical Exchange Study Tours'. They are not meant for monitoring purposes, but rather as a way of technical exchange and learning from one another. Examples:

- A team from Embu visited Maseno in 1995 to help with fodder research activities. The Maseno team also returned this visit.

- A team from Uganda also visited Maseno to understudy soil fertility characterization procedures, etc.

These visits have, however, not been as regular as desired, due to funding and time constraints.

3.0 Impacts of Regional Collaboration. Ref.: Page II-6, Paragraph I --  
"Although the AFRENA....."

This section on potential adoption and impact of the AFRENA network only mentions the impact with our fodder work, and the climbing bean technology (the latter, in fact, is relatively a new development).

I would like to highlight two other principal impacts:

- In southwestern Uganda, AFRENA has developed tree-based technologies that effectively stabilise the terraces on the steep slopes, and at the same time, provide farmers with useful products such as fuelwood, fodder and poles for construction. This work is actually leading to the development of a pilot development project between AFRENA and the Uganda National Farmers Association in Kabale.

- In western Kenya, which is our principal location for soil fertility research, AFRENA is on the verge of a major breakthrough that will contribute towards providing food self-sufficiency and increases in farm income. This work involves the use of tree and shrub species such as tithonia and sesbania, in combination with phosphorus (from either organic or inorganic sources) in dealing with the major problem of soil degradation and low productivity in this region. Presently, the World Bank is discussing with KARI and ICRAF towards the launching of a pilot-scale project to demonstrate the feasibility of these results.

4.0 Research Focus on Moving Technologies. Ref.: Page II-7 last paragraph, beginning: "Similarly, AFRENA in southern Uganda....."  
Reference is made to a statement in the report that AFRENA is seeking to transfer "labour-intensive and knowledge-intensive technologies". I think

this is an over-statement. AFRENA in southwest Uganda is working on a range of technologies:

- upperstorey trees for poles and fuelwood
- contour hedges for erosion control
- fodder banks for calliandra and improved fallows for soil fertility regeneration

We think it is a bit over-generalised to describe all these as labour-intensive and knowledge-intensive.

5.0 Spurring the Development of National Commodity Programmes. Page II-

--Paragraph 3: "The history of agroforestry....."

There was no national agroforestry programme in any of the countries at the inception of AFRENA. In the case of Burundi, what existed was a french government-sponsored project on natural resource management, which had some agroforestry component. This however, was a project and not the national agroforestry programme.

6.0 Sources of Funding and Country Fund Contributions. Ref.: Table 8 - Section on AFRENA

A more correct picture for AFRENA would be:

Country	National Coordination	Network Coordination	Other
Uganda/FORI	10	90(4x)	
Kenya/KARI	10	90(5x)	
Kenya/KEFRI	20	80	
Rwanda/ISAR	0	20	80(6x)

- (4x) includes PL480 funds
- (5x) includes SIDA bilateral funds to Kenya
- 6(x) includes SOH/WV/CSIRO Australia funds

7.0 Concerns with Lack of ICRAF/AFRENA/NARS Divisions. Page II-36

Our major comment on this has already been expressed in the earlier section of this response.

8.0 Extent of Adequate National/Bilateral Support. Ref.: Page III-6

We agree with your conclusion that country allocations for research (except in the case of Ethiopia) are rather low.

With regard to bilateral grants, I think you should highlight as a positive development, the special case of AFRENA in spearheading sourcing of bilateral funds to complement USAID multi-lateral support, for respective countries. We have now bilateral funds for Rwanda, Uganda and Kenya. These funds are fully managed by the national institutions.

9.0 Involvement of NARS Directors. Ref.: Page III-8. Section III.5. Paragraph 3

It is true that presently, ASARECA and the Committee of Directors, does

not  
have a strong role in priority setting, budget approval, staff  
recruitment  
(e.g. coordinators, etc.) within AFRENA, as it does for the other three  
networks.

NARS Directors of institutions involved in AFRENA have been constituted  
into  
an AFRENA Directors Committee, in order to be able to have detailed  
discussions and input of the Directors in both technical and management  
operations of the network. The AFRENA Directors Committee has recently  
been  
approved by ASARECA as a sub-committee of the ASARECA CD. It will  
therefore  
report to the larger ASARECA CD.

This information needs to be reflected in this section of the report.

10.0 Potential Sustainability of Networks. Ref.: Section III-9 Item (3),  
Page III-16

The statement that the AFRENA model of operation appears to be more  
appropriate for the 60s and 70s, in our opinion, does not take into  
account  
the special characteristics of agroforestry research in our various  
national  
institutions, both at time of initiation of AFRENA, and even as at today.

This statement in the report is indeed an over-statement, and we suggest  
that the issue be re-analyzed.

11.0 Budgetary Process. Ref.: Page IV-3 Paragraph 3; Page IV-4 Paragraph  
2;  
Page IV-6 Section on "Procedures"

AFRENA has both multi-lateral and bilateral sources of funding.

Budgeting for the use of multi-lateral funds is done at ICRAF, however,  
there is input of the national programmes through the ICRAF out-posted  
scientists, who submit the budget requests.

It is also not entirely correct to say that NARS network partners "have  
no  
access to information of nor control over the amount of funds flowing  
into  
this account". Multi-lateral funds budgeted for the AFRENA are,  
generally,  
jointly managed by the ICRAF scientist and the national counterpart.. A  
good  
example of this scenario is the case of Maseno (which receives the  
largest  
share of multi-lateral fund support). However, since ICRAF is held  
primarily  
accountable for this money, there is a much stronger hold and control by  
the  
ICRAF staff on this component of the fund. This, of course, is not always  
appreciated by the national partners.

The bilateral funds, on the other hand, are jointly budgeted for between  
the  
NARS and ICRAF, but controlled by the respective NARS.

We do not understand how the allocation of 55% of resources was given as figure for coordination. This may include costs for the out-posted ICRAF scientists. However, we do not consider these scientists as doing coordination. They are there for research and technical backstopping. The

coordination costs in AFRENA relates to the office of the Regional Coordinator and that is estimated at 25-30%.

### 13.0 Conclusions and Recommendations. Ref.: Page V-4 -- VI-1

There is a strong implication in this report that ICRAF and AFRENA have deviated from some standard and agreed mode of operation, which is not so.

The report needs to take into account the fact that the AFRENA is operating exactly in the mode it was set up to operate, and has not therefore deviated from its originally agreed mode. The report however, does make useful recommendations for the future. These will be discussed further between ICRAF and the respective NARS.

## **Collaborative research networking: initiation, evolution, implementation, evaluation**

Networking continues to be an indispensable and efficient mechanism to conduct scientific research, whether regional, national or international, and irrespective of the economic development of the country or countries involved.

**"Agricultural research networks are organizational mechanisms that link scientists and institutions committed to work together, exchange information, forge closer links for collaborative research, share research tasks and use existing scarce resources more efficiently to effectively solve common agricultural research problems"**

**"National Agricultural Research Systems (NARS) encompass all entities in a country conducting agricultural research, whether through specialized research institutes, universities, the private sector, rural and commodity development projects, and non governmental institutions. It includes linkages to major client groups: policy makers, technical assistance and donor organizations, extension services, producers and international research organizations"**

Networks are categorized by SPAAR. Invariably, operations of the USAID-supported networks in Africa could be considered as an amalgamation of all three types which include:

**Information exchange networks** organize and facilitate exchange of ideas, methodologies and results of research currently underway.

**Scientific consultation networks** involve country-by-country or participant-by-participant focus on common priority research areas initiated and implemented independently by the participating institutions and hold regular meetings and provide other means to exchange information on research as in type 1.

**Collaborative research networks** involve joint inter-country planning, implementing and monitoring of research on problems of mutual concern to countries within the region. These could include information exchange, technical collaboration and training. Though the characteristics and benefits have been outlined in the draft report, their effectiveness (1) depend on clear and common objectives which can be achieved efficiently by pooling information (technological) and resources (manpower, financial) to the common pool, (2) determined by the ability of members to contribute and benefit from information that is assembled.

Regional networks provide forums where policy makers and NARS leaders can establish a regional policy for research and collectively allocate responsibility between national and regional research. They need to identify ways to set priorities at the national level that take into account research work that is being done by other countries belonging to the regional network. Networks may evolve into institutions as contacts and exchanges become more regular and formal. However, institutionalization is not always positive. Donors place resources in a common pool so that research organizations join the network to have access to the resources. However, unless there are common objectives between NARS that require an exchange of information, expertise, or other resources, or to plan joint activities, the rationale for the network disappears when the common pool of resources is exhausted.

IARCs sometimes use networking mechanism to carry out their programs as well as to transfer and diffuse the technologies they generate. Participation of NARS depend on the usefulness of the

technology and the resources that are made available to participants. This type of network does not always emphasize capacity building in the national system, continuous external resources will have to be provided to maintain the network and they promote exchanges between each NARS and the center but not necessarily the research organizations themselves.

With that background information, constructive comments can only be made on the areas where EARRNET based information were erroneously reported

## I: GENERAL

The style of reporting in general seems too oriented towards the “networks” as being the supreme institutional entity instead of a facilitating mechanism among NARS. Each network has its own characteristics (commodity-based/agroforestry), manpower, infrastructure, financial resources, historical background etc. Lumping and evaluating them using the same criteria without regards to the above skews the evolutionary process of each network. Right from the beginning, ECABREN was notably singled out as having an ideal model for which all other networks have to emulate.

- The limited definition of NARS to mean “National Agricultural Research Institutes” is still unfortunately evident.
- Not all networks are driven by germplasm development, other issues such as broadening the utilization base and expanding markets as a driving force to increase production is overshadowed. Value addition is a necessary ingredient to improving agricultural productivity.

## II TECHNOLOGY DEVELOPMENT, EXCHANGE AND DISSEMINATION

### II.1a. Priority setting and research planning

#### *Priority setting*

Cassava is mainly grown in the mid altitudes and coastal areas of Kenya and Madagascar with differing growing (soil/climatic) conditions. In EARRNET’s priority setting exercise, three categories each of altitude and rainfall amount were used to demarcate ecological homologues (Appendix 1). Rainfall distribution was not considered due to the crop’s growing cycle. The mid altitude with moderate rainfall were assigned the highest priority at regional level. The lowlands at all rainfall regimes had the second regional priority and lastly, the highlands with moderate to high rainfall.

Each country then prioritized their three major constraints under each theme within the three priority ecologies. From these the most probable interventions were proposed. The outcome of the exercise as contrasted for Kenya and Uganda is presented in Appendix 2. It is worthy to note the great similarity in cassava related problems in each country in spite of the considerable variations in agroecologies. Subsequent discussions at SC and national program meetings continue to confirm these as basis for EARRNET research and development activities.

Contrary to what is reported, constraints identification, planning, implementation, technology transfer, monitoring and impact assessment are all agroecologically biased. This was presented during the initial briefing for the network evaluation at ILRI.

#### *Activity planning*

#### *Steering Committees*

The absence of economists/socio economists as voting members on Steering Committees could only be addressed through special network arrangements. National commodity programs are biased towards biological sciences. Social science is a recent consideration especially in the more advanced research institutes and programs. National commodity program heads in all member countries, irrespective of network affiliation, are all biological scientists. Presently, socio-economist/economist can only be invited to participate and provide the necessary backstopping to networks. For EARRNET, this vacancy is now being provided by the theme leaders in Uganda and Kenya. Both participated in the impact assessment courses organized by the networks.

#### *Thematic group*

The effectiveness of any network is dependent on the ability of collaborating programs to contribute and benefit from information and technologies developed.

At the onset of EARRNET, the Root Crop Programs in member countries were at different stages of development, varied in structure, manpower strength, research infrastructure and capacity to develop linkages with technology transfer agencies. Recognising the effect that the heterogeneity would have on the levels and quality of contribution, strategies were developed to enhance effectiveness by emphasising training and collaboration with other research and development institutions/personnel and linking them to major client groups. This has resulted in the emerging national thematic groupings. The next evolutionary process involves encouraging the formation of national cassava networks as a prelude to an effective full-fledged regional cassava network encompassing all major actors in broader NARS sense.

Agricultural research and technology transfer are interdependent and part of a process to increase food production. Due to differences in organizational structures and functions, the type of work to be accomplished, division of labour, the amount of information or communication needed to perform it properly needs careful orchestration. Research institutes, universities, ministry departments, and NGOs/parastatals are charged with aspects of research and technology transfer in the same country. As part of national set of institutions they are also interdependent in terms of resource allocation. Outputs of one unit are the inputs of another and vice versa. Research results are used as inputs for the task of transferring technologies to farmers: knowledge of farmers problems and their use of technologies are inputs for research to improve existing technologies. Poorly defined tasks can seriously undermine technology transfer. Missing links occur where researchers and technology transfer agents are ignorant of each others activities with its attendant negative influence on the process of technology generation and delivery. Often institutional, human, cultural, traditional barriers and poor management practices hamper its effectiveness leading to duplication of physical resources, support facilities and programs.

With the success in facilitating establishment of in-country networks (Madagascar, Uganda, Kenya) EARRNET is now poised to facilitate regional thematic meetings, exchange visits and multidisciplinary meetings. By tapping on the comparative advantage of collaborating institutions/programs/personnel, the network was poised to attract other interesting parties such as NGOs and the private sectors to strengthen and enhance NARS ability to respond to the growing concerns for increased use of cassava for food security. This is a developmental process which need caution to avoid later inconveniences.

#### *Multidisciplinary meetings*

The suggested two-year cycle could be counter productive as it relates to cassava which has a

growing cycle of 12-18 months depending on the ecology in which evaluations are conducted.

### *Proposal Solicitation and Evaluation*

A critical analysis of the 'ECABREN model' for allocation of network funds to the different themes shows a major shift (in percentage terms) among only two themes; breeding vrs socioeconomics. As stated, this is not an SC policy but due to the quality of research proposals received in the latter thematic area.

Ethiopia receives 96% of its recurrent funds from their Government with <1% coming from the network. As such the percentage shift among the different projects/themes is national in character and not reflective of changes in network emphasis. One would have liked the team to consider the distribution of the national contribution over the same themes or probably use Kenya (100% funding from ECABREN) as an example to reflect the realities of funding network activities.

Uganda under EARRNET, is in the same category as Ethiopia, in terms of shifts in emphasis which arose from the ACMD outbreak. The availability of resistant varieties switched emphasis from plant protection/germplasm development to multiplication/distribution and socioeconomics issues which have dominated their activities for the past few years. Uganda receives 98% of its recurrent funds from Gatsby Charitable Foundation. Presently postharvest and plant protection are major issues in Kenya and Madagascar, respectively, while the regional emphasis is driven by postharvest utilization/commercialization (later discussed).

General guidelines for disciplinary allocation of research activity budgets is a useful suggestion but should be crop-tailored and influenced by country priorities and capacities. The generalized "ECABREN model" should not be used as a yardstick.

## **II.1b RECEPTION, SCREENING AND AVAILABILITY OF TECHNOLOGY**

### *Reception of Technology*

The influence of Plant Quarantine regulations on movement of germplasm is more stringent among vegetatively propagated crops compared to those cultivated by grains/seeds. Potato and sweet potato germplasm are introduced from Latin America into the region (Africa). These need to be virus tested etc., multiplied and distributed for evaluation within the different national ecologies before release. By the mere location of IITA in Africa, most elite germplasm are cleaned, virus indexed, issued with the Nigerian Plant Quarantine certification, before distribution (ref. Appendix 5 of draft evaluation report) to EARRNET member countries for evaluation under their own ecologies. Those found acceptable to end users are recommended for release. Broad based germplasm are also introduced in seed form for the same purpose. The released varieties, Migyera, Nase 1, Nase 2 by the Uganda cassava program emanated from IITA, Ibadan, as TMS 30572, TMS 60142 and TMS 30337, respectively. SS4, currently recommended for release, is a selection from open pollinated seeds of TMS 30001, introduced from IITA.

Though there are similarities in cassava constraints across the region, germplasm movements is hampered by the differences in national plant quarantine regulations. EARRNET has championed the issue of quarantine since inception. EARRNET/ESARC has and continue to contribute to upgrading the facilities at PQS, Muguga, provided equipments/chemicals, facilitated training of personnel in tissue culture, virology, indexing etc and recently pioneered arrangements to obtain an open quarantine permit to facilitate exchange of vegetatively propagated crops between Uganda and

Kenya. This is part of a broader program which would ease germplasm exchange/distribution among all network member countries. Apart from Uganda, which benefits directly due to the site of the cassava regional nursery, Kenya would benefit from the germplasm enhancement program at Serere through this open quarantine arrangement as of 1997 season.

### *Technology development and screening*

The notion that across country division of responsibilities is less apparent in EARRNET is unfortunate. This is clearly presented in the project proposal submitted to the evaluation team. The relevant tables are reproduced for ease of reference as Appendix 3. The recognition of countries, collaborating institutions and theme leaders accountable for the activities under the priority activities in each theme is provided.

### *Broadening the breadth of types of technology developed and screened*

Addressing this section requires some basic information from the COSCA studies conducted in 563 villages across 11 major cassava growing countries, inclusive of Uganda, Zaire, Kenya and Rwanda.

Cassava is particularly important in fragile ecosystems where food supply is constantly threatened by environmental constraints such as drought, pest and disease outbreaks because of its ability to grow under conditions considered as sub-optimal for the majority of other food crops.

Famine rarely occurs in areas where cassava is widely grown since it provides a stable base for food production systems. Its production responds positively to the use of inputs in terms of both field area expansion and high yield.

- Cassava generates cash income for the largest number of households in comparison with other staples. Cassava is therefore a cash crop and not a subsistence crop in Africa.
- As a low cost carbohydrate source for low income urban consumers, especially where available in a form convenient for working urban housewives, it plays a food security role in areas prone to drought, famine, and periods of civil strife.
- Increasing cassava production will largely depend on the expansion of market opportunities for the crop. It is primarily used in the manufacture of traditional food products mostly by the informal sector. Expansion of cassava is therefore demand-limited. Increased reliance of cassava as a low-cost energy food, the entry of cassava in the animal feed industry and in other industrial applications will provide the necessary incentive that will motivate farmers to expand cassava production.
- It is often reasoned that as fallow periods decline, cassava will increasingly replace crops which demand higher soil fertility and production labor. Farmers' ability to respond to declining fallow periods due to demographic, market, pests/disease, and other pressures by replacing more susceptible crops with cassava is constrained by its long cropping cycle. Under continuous cultivation where the fallow period is less than one year, currently available improved varieties can only be grown at a disadvantage because they will have to be harvested before they attain maximum yield. There is also the need to develop agronomic practices for greater soil water and nutrient use efficiency.

Therefore, a concerted approach is needed to combine increased utilization of cassava through linkage to new and existing markets, cultivation of high yielding, pest and disease resistant well adapted genotypes, better soil conservation and crop management practices as well as efficient and environmentally sound plant protection methods.

These findings, among others, have enabled member countries to focus on most important

constraints and apportioned responsibilities in an effort to change the stigma on cassava as a "poor mans" food into a commercial crop by promoting commercial value of cassava as food, livestock feed and an industrial raw material. Expansion of post harvest utilization/commercialization is therefore regarded as the driving force to most EARRNET activities. Bringing into focus previously unaddressed issue of product utilization is an *understatement* and minimizes the importance with which EARRNET attaches to post harvest. **EARRNET activities are market driven.**

Product development research is strongly being promoted and the private sector is encouraged to participate. Issues being addressed include: raw material import substitution, promotion of a positive image for cassava, development of products for existing and new markets, identification of the functional characteristics of cassava genotypes in relation to various end uses; utilization of cassava plant parts (e.g. leaves, peel, etc.) for livestock feeding; suitability of cassava leaves as vegetable; determination of foliage yield and digestibility for human and animal nutrition. The impact of pathogens and saprophytes on the quality of stored cassava products including contamination with mycotoxins would be investigated.

Broadening the breadth of types of technology developed and screened is rather in the area of agronomy which invariably was included among our thematic research disciplines during the 1995 SC meeting in Madagascar.

#### *Availability of Technologies*

Multiplication and distribution of planting material is ranked highly by all countries. Seed industry is a service that needs to be sustained at national levels to assist in expansion of cassava production. Its development is viewed as highly national government dependent and as such outside mandate of the network. However, compared to cereal seed industries within the region, many of which have or are on the verge of folding up, development of viable cassava seed industry is dependent on the quality of initial/resultant planting materials. Pest and diseases together with poor cultural practices can contribute to 50% yield loss. Similarly, in dry ecosystems, cassava biomass production is usually low compared to more humid ecologies. Cassava planting materials are bulky as well as highly perishable within a short time after cutting. In absence of well established cassava - based industries, development of an industry for cassava planting material aimed at supplying demands for subsistence cultivation becomes expensive. Besides, once cloned, cassava variety maintains its genetic purity and the need to constantly supply seeds as in cereals becomes less apparent.

Exploiting innovative means of disseminating technologies to stakeholders/end users may be a better cost effective alternative. The effective use of farmer groups, NGOs, extension services, development organizations, etc. in multiplication/distribution of vegetatively propagated crops has been shown in other countries; Cameroon, Nigeria, Sierra Leone, Uganda, Malawi, Ghana. Funding has been recognized by EARRNET SC as a problem and EARRNET is assisting national programs to obtain special funding to enhance this activity. The issue of their sustainability is debatable, especially when project funds dry up. The proposal to evaluate the cost effectiveness in using different multiplier groups is well taken. This would be discussed in our next SC meeting.

#### **II.1c MONITORING**

EARRNET is fully aware of the importance of monitoring tours and the use of national resource persons. Plans are underway to implement that activity. The issue is further discussed under thematic groups.

## **II.2C. DEPENDENCE OF NARS ON NETWORK TECHNOLOGIES**

The draft report recognizes that technologies are brought into the region, screened through adaptive testing of the network, but remained silent on the sources except to single out ESARC as representing separate IARC technology development. Rephrasing the Terms of Reference to address the dependency concerns supposes that IARCs are not active players within the region. Regional research in East Africa should thus be the sole domain of the networks and no other collaborating institution. Considering that these networks are organizational arrangement among NARS, it is more or less asking whether NARS are interdependent in technology development.

Interdependence at that level presupposes that priorities set at the national level take into account research work that is being done by other countries belonging to the regional network. This is absolutely far fetched at the present NARS institutional development stage. It is too early for ASARECA, just but a few years old, to address the issue. Even still, priority setting in all member countries is national in character.

Some technologies brought into the regional have some affiliation to the IARC supporting the concerned network. IITA, just like CIAT and CIP, has provided technologies to the region from its base in Nigeria. Decentralization of IARC activities to better serve the region is now at stake. I do worry about the cereal/livestock networks that ASARECA has approved initiation of. Is the support provided by CIMMYT/ILRI going to be classified under the same category as IITA? I wonder.

## **II.3 NETWORK PUBLICATIONS**

Historically, cassava R&D personnel in Africa have institutionalized fora for information exchange among NARS. These include root crop biased conferences, symposia, workshops, collaborative meetings, to mention but a few. EARRNET has supported participation of scientists to these meetings whose rotation results in assemblies almost on annual basis. These fora have provided avenues/exchanges assessible under the four purposes outlined in this section of the draft evaluation report. Lack of such national, regional and international gathering have spurred networks to fill the vacuum created. This needs commendation. Similarly, using existing avenues established through the collaborative action of root crop researchers in Africa should be deemed useful. There are numerous advantages to both initiatives which need not be elaborated presently.

A partial listing of publications were provided in the EARRNET evaluation report (1992-96) relative to the ISTRC-AB meeting during which about 15 papers were presented and discussed. Kindly find the list of publications (Appendix 5) that have been published by scientists in EARRNET member countries. The list is not exhaustive as they continue to be compiled.

It is but necessary to note that a Root Crop Journal was inaugurated during the 1995 ISTRC-AB meeting as a result of NARS recommendation made during its 5th meeting in Kamlapa, Uganda. EARRNET encourages publication not only in this Journal, but others inclusive of the Crop Science Journal referred to for PRAPACE. Distribution of Proceedings on several "non-EARRNET" workshops is missing the point. EARRNET is a partner to all of them.

## **II.4 COMPLEMENTARITY OF IARC ACTIVITIES AND NARS PROGRAMS**

### **Concerns with ESARC/EARRNET Divisions**

The conclusions reached by the evaluation team that there is competition between EARRNET and

ESARC is of concern. Both EARRNET and ESARC are regional programs, each with well defined mandate as shown for two themes (Appendix 5). The mode of operation of the actors in Uganda was explained on a number of occasions during the visits. Unfortunately, it seems that the explanation did not clarify the situation. It would have been appreciated if the evaluation team had shed more light on the nature of "competition" instead of comparing sources of funding, steering committees and emphasising research thrusts. There is more to these thrusts than mere stating combating ACMV, germplasm development and post harvest.



Appendix 2: Research interventions for priority research and development activities in EARRNET member countries

Kenya

RESEARCH DOMAIN	PRIORITY	AGROECOLOGICAL ZONES		
		LOWLAND LOW TO MEDIUM RAINFALL	MID ALTITUDE MEDIUM RAINFALL	HIGH ALTITUDE, MEDIUM TO HIGH RAINFALL
PLANT HEALTH	CGM	IPM		
	ACMV			
	CBB, LARGER GRAIN BORER	DOCUMENTATION, BASELINE STUDIES		
POST HARVEST	PROCESSING	IDENTIFY, INTRODUCE, DEVELOP METHODS AND EQUIPMENTS, TRAINING		
	PRODUCT DEVELOPMENT	IDENTIFY PRODUCTS FOR CASSAVA SUBSTITUTION, INTRODUCE AND DEVELOP NEW RECIPES, ESTABLISH PILOT PLANTS FOR POST HARVEST TECHNOLOGIES, TRAINING		
	STORAGE	STORAGE STUDIES (LARGER GRAIN BORER), DOCUMENTATION		
GERMPLASM DEVELOPMENT	RESISTANCE TO PESTS, DISEASES AND NEMATODES	BREEDING		
	YIELD, DRY MATTER, QUALITY			
	CYANIDE			
MULTIPLICATION	PLANTING MATERIAL	INSTITUTIONALIZATION, MONITORING, IMPACT ASSESSMENT		
AGRONOMY	INTERCROPPING	VARIETAL AND AGRONOMIC TRIALS		
	SOIL FERTILITY	INTERCROPPING, FERTILITY MANAGEMENT TRIALS		
TRAINING	PERSONNEL	ALL CATEGORIES		

Uganda

RESEARCH DOMAIN	PRIORITY	AGROECOLOGICAL ZONES		
		LOWLAND LOW TO MEDIUM RAINFALL	MID ALTITUDE MEDIUM RAINFALL	HIGH ALTITUDE, MEDIUM TO HIGH RAINFALL
PLANT HEALTH	ACMV	IPM		
	CM			
	CGM			
POST HARVEST	PRODUCT DEVELOPMENT	DRYING METHODS, HEAP FERMENTATION, PRODUCT DIVERSIFICATION		
	STORAGE	STORAGE STUDIES		
	MARKETS	PACKAGING, QUALITY CONTROL		
GERMPLASM DEVELOPMENT	RESISTANCE TO PESTS AND DISEASES	BREEDING		
	YIELD, DRY MATTER, QUALITY			
	CYANIDE			
MULTIPLICATION	PLANTING MATERIAL	INSTITUTIONALIZATION, MONITORING, IMPACT ASSESSMENT		
AGRONOMY	WEEDS	IPM		
	INTERCROPPING	BREEDING, DENSITY STUDIES		
	SOIL FERTILITY	INTERCROPPING WITH LEGUMES, FERTILIZER APPLICATION		
TRAINING	PERSONNEL	IN COUNTRY (EXTENSION PERSONNEL, OPINION LEADERS, FARMERS), SCIENTISTS, TECHNICIANS		

### Appendix 3: Regional research responsibilities

#### a: Ecologically sustainable plant protection (ESPP)

Activity	Country	Collaborating Institution(s)	Theme leader(s)
<b>Diagnostic surveys/studies on diseases and pests</b>			
i. Mosaic virus	Uganda Madagascar	NAARI FOFIFA	Olim-Nape Ranomenjanahary
ii. Green mite (biological control)	Uganda Kenya Burundi	NAARI KARI ISABU	Ogwang Songa/Mambiri Ndayiragije
iii. Mealybug (biological control)	Uganda Kenya	NAARI KARI	Ogwang Songa/Mambiri
<b>Yield loss assessment</b>			
i. Mosaic virus	Uganda Madagascar	NAARI FOFIFA	Olim-Nape/Khizzah Ranomenjanahary/Rafimanana
ii. Green mite	Uganda Kenya	NAARI KARI	Ogwang/Khizzah Mambiri/Kamau
iii. Mealybug	Uganda Kenya	NAARI KARI	Ogwang/Khizzah Mambiri/Kamau
<b>Germplasm evaluation</b>			
	Burundi Kenya Madagascar Uganda	ISABU KARI FOFIFA NAARI	Nimprongeza Kamau Rafimanana Khizzah
<b>Interaction between genotypes with biotic stresses</b>			
	Uganda Kenya	NAARI KARI	Khizzah/Olim-Nape/Ogwang Kamau/Songa/Mambiri
<b>Development of strategies for managing diseases and pests</b>			
	Uganda Kenya	NAARI KARI	Olim-Nape/Ogwang/Khizzah/Baguma Kamau/Songa/Ndolo/Mambiri

b: Development of improved post harvest technologies

Activity	Country	Collaborating Institution(s)	Theme leader(s)
Collection of baseline data on storage, processing, utilization and marketing systems to identify constraints and needs	Burundi Kenya Uganda	CNTA/ISABU KARI/MINAGRI/NGOs NAARI/KAARI/MINAGRI	Irabahayo Bugusu Silim-Nahdy
Identification, introduction, adaptation and promotion of suitable technologies to expand agro- and non-agro based markets	Burundi Kenya Uganda	CNTA/ISABU/University KARI/KIRDI/University (Nairobi)/MINAGRI NAARI/KAARI/University (Makerere)	Irabahayo Bugusu Silim-Nahdy
Physical and chemical quality assessment of cassava genotypes and products	Burundi Kenya Uganda	CNTA/ISABU KARI/University (Nairobi) NAARI/KAARI/University (Makerere)	Irabahayo/Niimprangeza Bugusu/Kamau Van der Grift/Khizzah
Determination of cyanogenic potential in cassava roots/leaves and its food products	Burundi Kenya Uganda	CNTA KARI/University (Nairobi) NAARI/KAARI/University (Makerere)	Irabahayo/Niimpirangeza Bugusu/Kamau Van der Grift/Khizzah
Establishment of pilot plants	Burundi Kenya Uganda	CNTA KARI NAARI	Irabahayo Bugusu Silim-Nahdy/Van der Grift
Development of livestock feed	Uganda	NAARI	Ebong
Training	Burundi Kenya Uganda	CNTA/ISABU KARI NAARI/KAARI/University (Makerere)	Irabahayo/Ngendahayo Bugusu/Kamau Silim-Nahdy/Otim-Nape

c: Germplasm development and distribution

Activity	Country	Collaborating Institution(s)	Theme leader(s)
Local germplasm collection, evaluation, characterisation, utilization, maintenance and documentation	Burundi Kenya Madagascar Uganda	ISABU KARI/National Gene Bank FOFIFA/MINAGRI/NGOs NAARI	Ntimprangeza Kamau Ralinanana Khizzah/Ssemnakula
Introduction and germplasm exchange of improved genetic material as seed and tissue culture	Burundi Kenya Madagascar Uganda	ISABU KARI/Plant Quarantine FOFIFA/Plant Quarantine NAARI/Plant Quarantine	Ntimprangeza Kamau Ralinanana Khizzah/Ssemnakula
Varietal development	Uganda	NAARI	Khizzah/Ssemnakula
Multi-site evaluation of germplasm	Burundi Kenya Madagascar Uganda	ISABU KARI FOFIFA NAARI	Ntimprangeza/Sakubu Kamau Ralinanana Khizzah/Ssemnakula
Basic seed production for on-farm testing	Burundi Kenya Madagascar Uganda	ISABU KARI/MINAGRI FOFIFA/NGOs NAARI/MINAGRI	Ntimprangeza/Sakubu Kamau Ralinanana Khizzah/Ssemnakula

d: Crop management studies

Activity	Country	Collaborating Institution(s)	Theme leader(s)
Develop appropriate cultural practices	Kenya Madagascar Uganda	KARI FOFIFA NAARI	Ndolo Randrianarisoa/Randrianbola/Raciariisoa Daguma/Kikafunda
Studies on genotype x cropping systems interaction	Kenya Uganda	KARI NAARI	Ndolo/Kamau Daguma/Kikafunda/Khizzah
Plant nutrition and soil fertility studies	Kenya Madagascar Uganda	KARI FOFIFA NAARI	Ndolo Randrianarisoa/Randrianbola/Raciariisoa Daguma/Kikafunda
Integrated disease/pest management	Uganda	NAARI	Daguma/Otin-Nape/Ogwang/Khizzah

e: Technology transfer and impact assessment

Activity	Country	Collaborating Institution(s)	Theme leader(s)
Surveys to characterise production, utilization and marketing systems, identify constraints and needs	Burundi Kenya Madagascar Uganda	ISADU/MINAGRI/NGOs KARI/MINAGRI/NGOs FOFIFA/MINAGRI/NGOs NAARI/MINAGRI/NGOs	Ngendahayo Muhammed/Isabera Rabemanantsoa/Ramaroson Dua/Daguma
Validation, dissemination and promotion of improved pre- and post-harvest technologies for domestic, commercial and industrial utilization	Burundi Kenya Madagascar Uganda	ISADU KARI FOFIFA NAARI	Ngendahayo Muhammed/Isabera Rabemanantsoa/Ramaroson Dua/Daguma
Compilation of necessary data base and information management systems to guide priority setting, implementation of research, development and training activities	Burundi Kenya Madagascar Uganda	ISADU KARI FOFIFA NAARI	Ngendahayo Muhammed Rabemanantsoa Dua/Daguma
Monitoring status of cassava production, utilization and marketing through dissemination and adoption of new technologies by stake holders	Burundi Kenya Madagascar Uganda	ISADU/MINAGRI/NGOs KARI/MINAGRI/NGOs FOFIFA/MINAGRI/NGOs NAARI/MINAGRI/NGOs	Ngendahayo Muhammed/Isabera Rabemanantsoa/Gilbert/Ramaroson Dua/Daguma

f: Rapid multiplication and distribution of improved planting material

Activity	Country	Collaborating Institution(s)	Theme leader(s)
Establish primary, secondary and tertiary multiplication and distribution centres	Burundi Kenya Madagascar Uganda	ISABU/MINAGRI/NGOs KARI/MINAGRI/NGOs FOFIFA/MINAGRI/NGOs NAARI/MINAGRI/NGOs	Sakubu Isabera Ramaroson Bua
Train extension personnel and farmers	Burundi Kenya Madagascar Uganda	ISABU/MINAGRI/NGOs KARI/MINAGRI/NGOs FOFIFA/MINAGRI/NGOs NAARI/MINAGRI/NGOs	Sakubu Isabera Gilbert Bua

Appendix 4. List of publications from EARRNET member countries

1. Bill Williams Khizzah and Remco Van Der Grift (1994): Genotype by Environment Interaction for Yield Components in Cassava (*Manihot esculenta* Crantz) Uniform Yield Trial in Uganda. Paper presented at the 10th Symposium of the ISTRC, Salvador Bahia, Brazil Nov. 13 - 19, 1994
2. G.B. Allard (1993): A summary of the achievements of the IIBC integrated pest management of root and tuber crops project pp 3-8. In *Root and Tuber Pest Management in Kenya*. Proceedings of national workshop held in Mombasa, Kenya, 3-7 August, 1992. Edited by G.B. Allard, L.G. Skoglund, D.K. Rangi and R.J. Murphy, December, 1993.
3. W.K. Malinga and S.T. Gichuki (1993): An overview of root and tuber crops research programmes in the coastal region pp 13-16. In *Root and Tuber Pest Management in Kenya*. Proceedings of national workshop held in Mombasa, Kenya, 3-7 August, 1992. Edited by G.B. Allard L.G. Skoglund, D.K. Rangi and R.J. Murphy, December 1993.
4. F.F. Omari (1993): Screening for major pests of cassava and sweet potato at the National Dryland Farming Research Centre, Katumani pp 81-86. In *Root and Tuber Pest Management in Kenya*. Proceedings of national workshop held in Mombasa, Kenya, 3-7 August, 1992. Edited by G.B. Allard, L.G. Skoglund, D.K. Rangi and R.J. Murphy, December, 1993.
5. S.T. Gichuki, T.L. Munga, K. Mwangi and A.S. Abubaker (1993): Preliminary screening for resistance to major cassava and sweet potato pests in the coast region pp 87-92. In *Root and Tuber Pest Management in Kenya*. Proceedings of national workshop held in Mombasa, Kenya 3-7 August, 1992 Edited by G.B. Allard, L.G. Skoglund, D.K. Rangi and R.J. Murphy, December, 1993.
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7. P.O. Kweni, E.W. Mutitu, R. Naria and P.J. Ndolo (1993): Evaluation of available cassava germplasm in Kenya for resistance to cassava bacterial blight pp 101-106. In *Root and Tuber Pest Management in Kenya*. Proceedings of national workshop held in Mombasa, Kenya, 3-7 August, 1992. Edited by G.B. Allard, L.G. Skoglund, D.K. Rangi and R.J. Murphy, December, 1993.
8. C.W. Kariuki, B.M. Ngari, P. Mweki and D. Mutisya (1993): Biological control of cassava green mite, *Mononychellus tanajoa* pp 107-114. In *Root and Tuber Pest Management in Kenya*. Proceedings of national workshop held in Mombasa, Kenya, 3-7 August, 1992. Edited by G.B. Allard, L.G. Skoglund, D.K. Rangi and R.J. Murph, December, 1993.
9. M.F.O. Ndoga (1993): Feeding preferences of five indigenous predators of *Mononychellus tanjao* and *Tetranychus. Cinnabarinus* pp 115-117. In *Root and Tuber Pest Management in Kenya*. Proceedings of national workshop held in Mombasa, Kenya, 3-7 August, 1992. Edited by G.B. Allard L.G. Skoglund, D.K. Rangi and R.J. Murphy, December 1993.
10. Muinga, R.W. and P.N. Mbugua (1991): The feeding value of cocoyams (*Colocasia Escolenta*) meal as a substitute for traditional energy sources in broilers: (Cassava was included as an experimental diet in this evaluations); *Bulletin of Animal Health Production for Africa* (1991).
11. S.T. Gichuki and G.M. Kamau (1993): Effects of different weed control methods on the performance of cassava at the coast: In *Proceedings of the fourteenth Triennial Conference in Arusha Tanzania* (October, 1993).
12. Ali Ramadhan, Njunie, M.N. Muinga, R.W. (1994) Alley cropping of cassava with maize in *Leucaena* or *Gliricidia* hedgerows in the Coastal Kenya; In *ILCA Programme Reports*.
13. W.K. Malinga and S.T. Gichuki (1992): An overview of Root and Tuber Crops Research Programmes in the coastal region of Kenya. Paper presented in a national Workshop for root and tuber crops pest management. 3-7th August.
14. Gichuki S.T., Munga T.L., Kiarie M. (1992): Preliminary screening for resistance to major cassava and sweet potato pests in the coastal region of Kenya. Paper presented in a national workshop for root and tuber crops pest management. 3-7 August. Mombasa, Kenya.
15. Munga T.L., Gichuki S.T. and Abubaker A.S. (1993): Effect of plant population on yield of cassava (*Manihot esculenta* Crantz). Paper presented in the 3rd KARI Annual Scientific Conference Nairobi - Kenya.
16. S.T. Gichuki and Munga T.L. 1995: Performance of cassava varieties in two agro-ecological zones of Coastal Kenya; Paper presented in the sixth Triennial Symposium of the International Society for Tropical Root Crops -Africa Branch (ISTRC - AB). Lilongwe - Malawi; 23-27 October.
17. S.T. Gichuki and J.I. Tipape. (1994): Performance of cassava then intercropped with maize and cowpea. A paper presented in African Crop Science Conference Proceedings. Vol. 1, pp 157 - 159 Uganda (1994); 1994 African Crop Science Society

Journal.

18. J.M. Thresh, L.D.C. Fishpool, G.W. Otim-Nape and D. Fargette African cassava mosaic virus disease: An underestimated and unsolved problem. *Tropical Science* 34 (1) 5-14
19. J.M. Thresh, D. Fargette and G.W. Otim-Nape Effects of African cassava mosaic geminivirus on the yield of cassava. *Tropical Science* 34 (1) 26-42
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21. J.P. Legg, R.W. Gibson and G.W. Otim-Nape Genetic polymorphism amongst Uganda populations of *Bemisia tabaci* (Gennadius) (Homoptera: Aleyrodidae): vector of African cassava mosaic geminivirus. *Tropical Science* (1) 73-82
22. D.Fargette, J.M. Thresh and G.W. Otim-Nape The epidemiology of African cassava mosaic geminivirus: reversion and the concept of equilibrium. *Tropical Science* 34 (1) 123-133
23. J. Abaka-Whyte (1995) Eastern Africa Root Crops Research Network (EARRNET). Paper presented at the Sixth Triennial Symposium of ISTRC-AB, 22-28 October, Lilongwe, Malawi
24. B.W. Khizzah (1995): Relationships between yield components and cyanogenic potential and their influence on selection. Paper presented at the Sixth Triennial Symposium of ISTRC-AB, 22-28 October, Lilongwe, Malawi
25. S. Ranomenjanahary (1995): La recherche sur le manioc à Madagascar et son impact sur le développement intégré des zones rurales. Paper presented at the Sixth Triennial Symposium of ISTRC-AB, 22-28 October, Lilongwe, Malawi
26. H. Ojulung, A.G.O. Dixon, P. Ntawuruhunga & G. Ssemakula (1995): Genotypic stability analysis and its application to cassava regional trials. Paper presented at the Sixth Triennial Symposium of ISTRC-AB, 22-28 October, Lilongwe, Malawi
27. P. Ntawuruhunga, A.G.O. Dixon & H. Ojulung. (1995): Genetic variability among cassava genotypes and growth performance over time. Paper presented at the Sixth Triennial Symposium of ISTRC-AB, 22-28 October, Lilongwe, Malawi
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29. T. Munga (1995): The influence of cassava plant type and density on intercrop yields of cassava and maize. Paper presented at the Sixth Triennial Symposium of ISTRC-AB, 22-28 October, Lilongwe, Malawi
30. C. Githunguri (1995): Association among leaf area index, crop growth rate and dry matter partitioning of six cassava genotypes in three diverse agro-ecological zones of Nigeria. Paper presented at the Sixth Triennial Symposium of ISTRC-AB, 22-28 October, Lilongwe, Malawi
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Appendix 5: Division s of responsibilities among NARS, networks and ESARC.

Plant Health in Cassava - Research needs

ACTIVITY	NARS & NETWORKS	NETWORKS & ESARC
ACMV	Studies to determine importance - Uganda	Technical backstopping as required
CBB	Studies to determine importance	As above
CBSV	Studies to determine distribution and importance -Malawi	As above
CGM	Perform pre and post release surveys to determine performance of phytoseiids in controlling CGM	Identify, introduce and release other phytoseiids
CM	Perform pre- and post release surveys to determine performance of phytoseiids in controlling CM	Identify, introduce and release other predators and parasitoids

Genetic Improvement of Cassava - Research Responsibilities

Priority	NARS	Networks	ESARC
Host Plant Resistance* ACMV CBB CGM CM	Generation of improved populations Lead NARS - Uganda - Rwanda - Malawi	Establishment of regional nurseries - EARRNET - SARRNET	Increase genetic stocks including: Germplasm introduction
High yield & dry matter with appropriate root quality	Local germplasm collection, evaluation & maintenance	Information and germplasm exchange	Virus indexing
Low cyanide potential		GxE interaction studies linked with NARS and ESARC	Seed health
		Technically backstop NARS in selection for specific environments	Convene meeting for quarantine services in the region
			GxE interaction studies linked with networks
			Assist local germplasm maintenance

\* Details of resistances required correspond to priorities identified for plant

## POSTSCRIPT

### The Evaluation Team's Comments of Network Responses to the Draft Report

The team fully appreciates the network's concerns and thanks them for their professional expressions of where we, and they, have different understandings of the situations, as well as for pointing out errors of fact. The responses are provided above.

The comments from ECABREN (beans) and PRAPACE (potatoes and sweet potatoes) provided additional information as to network achievements and corrections of details and some factual points. The response from the International Institute for Tropical Agriculture (cassava) provided considerable additional information on their program, its processes, its achievements, its publication and other viewpoints. IITA's response called for clarification of the draft reports section on the dependency relationships between IARCs, the networks and national programs, and for further illustrations of the sources of conflict between ESARC and NARS partners. These concerns have been addressed. With respect to the latter problem (and perhaps it is smaller than we have painted it) it appears that USAID and IITA may be finding themselves in the unenviable position of sponsoring two networks which address the same commodity but which have some built-in sources of irritation.

The major item of contention in the draft report is the teams oft repeated concern for the formalization of a regional entity for agroforestry and its ownership and management mechanisms.

Assuming the existence of a regional entity, the ownership issues are critical for all networks as are the concerns that a Steering or Technical Committees' designee manage the networks since the NARS Directors hardly have time to devote to such issues and ASARECA does not have the capacity to supervise networks--nor, in the view of the team should it attempt to develop that particular capacity.

The general benefits of regional research networks are set forth in the first section of the report. Ownership of the networks by the NARS should also provide the following benefits:

- more rapid exchange and adoption of new technology than would be the case of external ownership
- at today's cost structure, NARS ownership is markedly less expensive than for extensive use of senior international scientists
- a shift to more NARS ownership and involvement and less IARC involvement should allow IARCs to concentrate, if they choose to on alternative types of effort.

All of the above is not to say IARCs should depart from the scene, but rather that the senior partner-junior partner roles be reversed as is already happening in most instances.

With respect to the ICRAF/AFRENA model, ICRAF correctly identifies the team's (and the NARS) dissatisfaction as revolving around two points: (1) ownership and (2) the type of model.

1. If one accepts the ICRAF/AFRENA model as "a partnership between ICRAF and NARS as opposed to a network of national programs", the ownership question remains. Within this model ICRAF/AFRENA already operates successfully as a significant but "junior" partner with respect to bilateral funds. Within the existing model, this shift in roles would be useful for the network funds--at least in the considered belief of the evaluation team.

2. If read literally the "partnership between ICRAF and various NARS" could be interpreted to mean no "regionalization" of the research work. Clearly this is not the case, and the Flagship working arrangements among countries is a very good example of regional networking. The issue is whether the regional work warrants a formal and institutionalized structure and, if so, who will own it? It is felt that for the networks are to persist, over time, the institutionalization among NARS is important. Additionally, without a NARS owned institution, ICRAF would tend to be the de facto regional entity for organization of regional activities.

Regarding accountability of funds, the network project consists of a series of sub grants wherein accountability is passed along to the next user of the funds according to their approved budgets. The evaluation team does not view the accountability of funds as an impediment to devolution of ownership.

The evaluation team appreciates the Network coordinators sharing of the draft report with their counterparts and it is expected the report will be given a fair hearing among other decision makers.





