African Crop Science Journal, Vol. 12. No. 3, pp. 311-319, 2004
Printed in Uganda. All rights reserved
ISSN 1021-9730/2004 $ 4.00


- FORUM -

# CONTRIBUTION OF SARRNET TO FOOD SECURITY IN THE SADC REGION

N. M. MAHUNGU, V. S. SANDIFOLO, A.G.O. DIXON[1] AND J. A. WHYTE[2], A. MHONE, J.M.TERI, M.N. ALVAREZ, M.I. ANDRADE[3], S. KOLIJN[4], S. JUMBO and C.C. MOYO
IITA/SARRNET P.O. Box 30258, Lilongwe 3, Malawi
[1] IITA, PMB 5320, Ibadan, Nigeria
[2] IITA/ESARC, P.O. Box 7878, Kampala, Uganda
[3]IITA/SARRNET, CP 2100, Maputo, Mozambique
[4]IITA/SARRNET, P.O. Box 6226, Dar-Es-Salaam, Tanzania

## ABSTRACT

The Southern Africa Root Crops Research Netwrok (SARRNET), in collaboration with national research programmes in Southern Africa Development Community (SADC ) have made considerable impact in the SADC region in terms of promoting cassava *(Manihot esculenta)* and sweetpotato *(Ipomea batatus)* production and commercialization. Area under cassava and sweetpotato production has increased tremendously in some SADC countries since mid 1990s. This is attributable to research work on germplasm development where about 51 improved cassava and sweetpotato varieties have been released and made available to farmers through the accelerated plant material multiplication and distribution programmes that took place in at least 10 of the 14 SADC countries. SARRNET has also made great impacts in skill development and knowledge in root crops research for development in the SADC region through funding post graduate/graduate studies, short-term training courses, workshops and symposia. In its second phase which started in 1999, SARRNET shifted its strategy with more emphasis on market oriented research for development by promoting cassava and sweetpotato commercialization in the region. This has made these crops to play a significant role in the economic growth of the SADC countries. This paper presents the contribution of SARRNET on cassava and sweetpotato germplasm development, seed multiplication and distribution, cassava commercialisation, post harvest technologies, training, information and technology exchange.

*Key Words*: Cassava, germplasm, *Ipomea batatus, Manihot esculenta,* sweetpotato

## RÉSUMÉ

Le réseau de recherche du sud de l'Afrique en racines des plantes (SARRNET), en collaboration avec les programmes de recherche national des communautés de développement du sud de l'Afrique (SADC) ont rapporté des impacts considérables dans la région du SADC en termes de promotion de production de manioc *(Manihot esculenta)* et de patate douce *(Ipomea batatus)* et de commercialisation. Les aires sous production de manioc et patate douce ont énormément augmenté dans certains pays de SADC depuis mi 1990. Ceci est attribué au travail de recherche sur le développement du germplasme ou environ 51 variétés de manioc et patate douce améliorées ont été larguées et disponibilisées aux fermiers a travers les programmes accélérées de l'usine de distribution et de multiplication des matériels qui se sont tenu dans au moins 10 de 14 pays de SADC. SARRNET a aussi fait des grands impacts dans le développement d'habileté et de connaissance dans la recherche en racines des plantes pour le développement dans la région de SADC a travers des fonds d'études post graduat et de graduat, des cours de formation à court terme, séminaires et symposiums. Dans sa seconde phase qui a commencé en 1999,

SARRNET a orienté sa stratégie avec plus d'insistance sur la recherche orientée au marché pour le développement par la promotion de la commercialisation du manioc et de la patate douce dans la région. Ceci a amené ces cultures à jouer un rôle significatif dans la croissance économique des pays de SADC. Cet article présente la contribution de SARRNET sur le développement de germplasme du manioc et de la patate douce, la multiplication et distribution des semences, la commercialisation du manioc, les technologies de post culture, la formation, l'échange de l'information et de la technologie.

*Mots Clés*: Manioc, germplasme, *Ipomea batatus, Manihot esculenta*, patate douce

## INTRODUCTION

The Southern Africa Root Crops Research Network (SARRNET) is a network for the Southern Africa Development Community (SADC). The Network is funded by USAID and executed by the International Institute of Tropical Agriculture (IITA) with technical backstopping from the International Potato Center (CIP) on sweetpotato activities. SARRNET Phase I was launched in 1994, with the major goal of increasing income and improving household food security for resource poor farmers in Southern Africa. The main objective was to increase cassava and sweetpotato production and utilisation by smallholder households in the resource-poor areas of Southern Africa through adoption of improved varieties and practices, and strengthening the capacity of national root crops research programmes. The major thrusts of SARRNET Phase 1 were research, training, information and technology exchange and institutional capacity building.

SARRNET Phase II, which started in 1999, shifted its focus to demand-led research and development in cassava and sweetpotato crops with strong bias on income generation, private sector participation, and food security. SARRNET Phase II goal has been to promote sustainable competitive and market oriented production, processing, utilization and commercialisation of cassava and sweetpotato in the SADC region, and contribute to improved food security and socio-economic development. SARRNET has been conducting market-led research and development activities through collaboration with the National Agricultural Resource Systems (NARS) and stakeholders including farmers, non-Governmental Organisation (NGOs), universities and the public/private sectors. Thus, SARRNET strategy has been redefined to include:

i Food security, in supplying planting materials of superior lines associated with adequate crop husbandry in drought prone areas and other natural calamities;

ii Income generation and equity by adding value to cassava and sweetpotatoprocessed products in rural and peri-urbans areas for small scale farmers to benefit from the premium due to improved products standards/grades and linking them to markets/industries; and

iii Import substitution by increasing cassava and sweetpotato industrial applications and substituting them with imported flour, starch, food and feed in order to save foreign currencies used to import such commodities.

SARRNET has made considerable impact in the SADC region and this paper highlights some of them.

**Cassava and sweetpotato production in the SADC countries.** Cassava and sweetpotato have long been regarded as low value, low status, and highly perishable commodities, with only minor roles in the agricultural process. Relative to cash crops and grains, they had received little research attention. However, since 1986, IITA through ESARRN (East and Southern Africa Root crops Research Network) and SARRNET has enhanced demand-led research on the two crops in the region and has encouraged the member national agricultural research institutes and other partners to test and adapt new varieties and other technical innovations and also identify socio-economic opportunities for increased production and marketing. SARRNET has played a key role in the exchange of germplasm in SADC countries, in developing and distributing improved resistant varieties of cassava and sweetpotato, in pest and

disease control and more importantly, in strengthening capacities of national root crops research programmes. SARRNET activities have helped change the image of cassava and sweetpotato in the region from low status crop to valuable crops which have greater roles to play in the economy.

Cassava and sweetpotato are important crops in SADC countries in terms of area planted and contribution to food security. The potential contribution of cassava to food security became more apparent from the early to mid- 1990s due to persistent droughts and the effects of structural adjustments. These necessitated most African governments to promote agricultural diversification and drought tolerant, and low input crops such as cassava and sweetpotato. With reference to Food and Agriculture Organisation (FAO) data, there has been tremendous increases in area and production of cassava and sweetpotato in SADC region since 1994. The area under cassava has increased by 41%, in Angola and Malawi and by 37% in Zambia, while production has increased by 51.6% in Malawi, 61% in Mozambique and 56% in Angola during 1994 to 2002 (Tables 1 and 2). This implies that cassava and sweetpotato have become important food crops for a large population in southern African.

Cassava and sweetpotato are, respectively, the 6$^{th}$ and 7$^{th}$, most consumed crops in the world. Per *capita* consumption is 28 kg per *capita* for cassava and 26 kg per *capita* for sweetpotato. The per *capita* consumption figures for cassava and sweetpotato appear even more dramatic when considered for Africa. Cassava is estimated to contribute 30-60% of the energy requirements in these countries ((Minde *et al.,* 1998)

Cassava production in the SADC region has expanded even in non-traditional growing areas. The major driving force in this case has been the increasing demand for cassava on the fresh market. Such is the case in Malawi where cassava has become an important cash crop for many farmers. The percentage shares of cassava and sweetpotato, of the total GDP, have also been increasing in Malawi since 1994. These crops are now contributing about 17% shares to the total gross domestic products (Fig. 1).

Countries with appreciable production of cassava and sweetpotato in the SADC are Angola, Mozambique, Tanzania, Democratic Republic of Congo, Zambia and Malawi (Tables 1 and 2).

**Cassava and sweetpotato germplasm development.** The major challenges in the 1980s and early 1990s were to identify cassava varieties that were high yielding, with consumer acceptance qualities, tolerant to major diseases and pests especially cassava mosaic disease (CMD), and cassava bacterial blight (CBB). ESARRN and SARRNET facilitated IITA efforts in the region on biological control of cassava mealybug (*Phenacoccus manihot* Mat-Ferr) and cassava green mite (*Mononychellus tanajoa* Bondar). A comprehensive programme of cassava and sweetpotato improvement was, thus initiated with collaboration from the national research systems. The aims of the programme were to (i) evaluate the local germplasm, and (ii) introduce and exchange cassava and sweetpotato elite germplasm from IITA, CIP and leading NARS through tissue culture and open pollinated seeds. As a result of these activities, 24 varieties of sweetpotato and 27 of cassava, have been released in the SADC countries to answer specific objectives since the inception of the project (Table 3 a and b). More than 30 million people in SADC countries are benefiting from these materials. The major impact of these activities has been increases in productivity of cassava and sweetpotato in the SADC countries. For instance, cassava yield per hectare in Malawi increased from 3.4 kg ha$^{-1}$ in 1994 to 15 kg ha$^{-1}$ in 2002; while for Mozambique, yield increased from about 3 kg ha$^{-1}$ in 1994 to 6 kg ha$^{-1}$ in 2002 (Tables 1 and 2).

**Seed multiplication and distribution programme.** Lack of adequate, high quality planting materials of improved and local recommended varieties was identified as a bottlenecks to the expansion of cassava and sweetpotato in Southern Africa. This is compounded by the bulkiness and high distribution costs, low multiplication rates, and poor keeping quality of planting material. Multiplication and distribution of planting material is, thus, essential for successful adoption of improved cultivars at farm level.

During the droughts of early 1990s, a massive

TABLE 1. Trends in cassava production in some SADC countries

| Year | Angola | | Zambia | | D.R. Congo | | Malawi | | Mauritius | | Mozambique | | Tanzania | | Seychelles | | Zimbabwe | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Area | Production | Area | Production | Area | Production | Area | Production | Area | Production | Area | Production | Area | Production | Area | Production | Area | Production |
| 1990 | 400 | 1600 | 103 | 640 | 2320 | 18715 | 61 | 144 | 14 | 190 | 944 | 4590 | 590 | 7792 | 30 | 150 | 23 | 95 |
| 1991 | 407 | 1640 | 110 | 682 | 2420 | 19366 | 71 | 167 | 14 | 190 | 972 | 3690 | 604 | 7460 | 30 | 150 | 25 | 100 |
| 1992 | 440 | 1861 | 110 | 682 | 2471 | 19779 | 63 | 128 | 15 | 210 | 973 | 3238 | 683 | 7112 | 30 | 150 | 30 | 120 |
| 1993 | 440 | 1861 | 120 | 744 | 2420 | 18890 | 75 | 216 | 13 | 224 | 842 | 3511 | 657 | 6832 | 30 | 150 | 33 | 130 |
| 1994 | 406 | 2379 | 120 | 744 | 2473 | 19101 | 72 | 250 | 9 | 150 | 908 | 3351 | 693 | 7209 | 30 | 150 | 33 | 130 |
| 1995 | 500 | 2550 | 120 | 744 | 2072 | 16870 | 94 | 328 | 10 | 140 | 985 | 4178 | 584 | 5968 | 30 | 150 | 38 | 150 |
| 1996 | 520 | 2500 | 120 | 744 | 2081 | 16886 | 116 | 534 | 10 | 140 | 993 | 4734 | 588 | 5993 | 30 | 150 | 38 | 150 |
| 1997 | 526 | 2326 | 113 | 702 | 2021 | 16402 | 125 | 713 | 13 | 200 | 991 | 5336 | 633 | 5704 | 30 | 150 | 39 | 160 |
| 1998 | 576 | 3210 | 131 | 816 | 2102 | 17060 | 151 | 829 | 11 | 165 | 1015 | 5639 | 745 | 7033 | 30 | 150 | 39 | 165 |
| 1999 | 523 | 3129 | 170 | 970 | 2033 | 16500 | 166 | 895 | 7 | 111 | 958 | 5352 | 655 | 7181 | 30 | 150 | 39 | 170 |
| 2000 | 534 | 4433 | 165 | 815 | 1966 | 15959 | 180 | 2757 | 10 | 151 | 925 | 5361 | 809 | 7120 | 30 | 150 | 40 | 175 |
| 2001 | 573 | 5394 | 165 | 950 | 1902 | 15435 | 198 | 3313 | 13 | 186 | 930 | 5400 | 660 | 6884 | 30 | 150 | 40 | 175 |
| 2002 | 575 | 5400 | 165 | 950 | 1839 | 14929 | 102 | 1540 | 11 | 124 | 930 | 5400 | 660 | 6888 | 30 | 150 | 40 | 175 |

Area in '000ha; Production in '000 t; Source: FAOSTAT Internet Database

TABLE 2. Trends in sweetpotato production in some SADC countries

| Year | Angola | | Zambia | | D.R. Congo | | Swaziland | | Mauritius | | Mozambique | | Tanzania | | Zimbabwe | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Area | Production | Area | Production | Area | Production | Area | Production | Area | Production | Area | Production | Area | Production | Area | Production |
| 1990 | 19 | 165 | 36 | 54 | 79 | 377 | 2 | 1 | 0.043 | 0.3 | 8 | 55 | 290 | 996 | 0.6 | 1.4 |
| 1991 | 19 | 170 | 38 | 56 | 79 | 398 | 2 | 1 | 0.045 | 0.3 | 8 | 55 | 287 | 290 | 0.7 | 1.5 |
| 1992 | 20 | 180 | 35 | 50 | 80 | 402 | 1 | 2 | 0.030 | 0.3 | 8 | 52 | 371 | 256 | 0.6 | 1.2 |
| 1993 | 21 | 185 | 37 | 55 | 81 | 401 | 1 | 2 | 0.028 | 0.3 | 8 | 55 | 284 | 258 | 0.7 | 1.5 |
| 1994 | 21 | 180 | 36 | 53 | 82 | 407 | 1 | 2 | 0.020 | 0.2 | 8 | 60 | 416 | 283 | 0.7 | 1.6 |
| 1995 | 21 | 185 | 35 | 51 | 107 | 412 | 1 | 2 | 0.030 | 0.2 | 8 | 55 | 522 | 448 | 0.7 | 1.4 |
| 1996 | 22 | 188 | 36 | 54 | 90 | 408 | 1 | 2 | 0.050 | 0.7 | 8 | 58 | 522 | 418 | 0.7 | 1.4 |
| 1997 | 22 | 189 | 35 | 51 | 80 | 404 | 1 | 2 | 0.042 | 0.6 | 8 | 59 | 306 | 477 | 0.7 | 1.4 |
| 1998 | 22 | 190 | 34 | 50 | 51 | 255 | 1 | 2 | 0.040 | 0.4 | 8 | 60 | 232 | 637 | 0.7 | 1.5 |
| 1999 | 22 | 182 | 35 | 52 | 49 | 246 | 1 | 2 | 0.035 | 0.4 | 8 | 61 | 197 | 596 | 0.7 | 1.2 |
| 2000 | 64 | 224 | 35 | 52 | 47 | 237 | 1 | 2 | 0.048 | 0.6 | 9 | 65 | 215 | 798 | 0.7 | 1.5 |
| 2001 | 79 | 353 | 36 | 53 | 45 | 228 | 1 | 2 | 0.050 | 0.6 | 9 | 66 | 220 | 950 | 0.7 | 1.6 |
| 2002 | 80 | 355 | 36 | 53 | 43 | 219 | 1 | 2 | 0.039 | 0.3 | 9 | 66 | 293 | 950 | 0.7 | 1.4 |

Area in '000ha; Production in '000 t; Source: FAOSTAT Internet Database

programme of accelerated multiplication and distribution of improved/clean planting materials was undertaken with funding from USAID/OFDA as a drought recovery measure in Malawi, Zimbabwe, Swaziland, Lesotho and Botswana. The programme involved a broad base of stakeholders, including government institutions, International Agricultural Research Centers; Non-Governmental Organisations, religious organisations and community based organisations. Each of the partners played critical roles in the multiplication and distribution of cassava and sweetpotato planting materials. Table 4 presents the extent to which all countries have been successful in establishing a sustainable multiplication and distribution system. About 1000 hectares of nurseries were established in the region with a multiplier effect of about 7,000 ha per year. The results of this activity have been, increases in area put to improved varieties of cassava and sweetpotato from about 5 and 6% in 1998 to more than 13 and 29% in 2002, respectively (Table 5).

**Cassava commercialisation.** SARRNET Phase II shifted its focus to include the needs of the markets/consumers by promoting cassava and sweetpotato not only as food crops but also as commercial commodities. SARRNET has initiated a strong and vibrant private sector participation in the region, by linking root crops farmers to private industries. As a result, the region has registered increasing demand and use of cassava as a raw industrial material. Industrial demand and use of cassava products have risen to more than 12,000 MT in 2003 from about 7000MT in 1999 in the three lead countries: Malawi, Zambia and Tanzania. Number of industries utilising cassava products has more than doubled in these countries (Fig. 2). This has been a result of four functional models that SARRNET initiated to promote cassava commercialisation, which focused on production, marketing and processing.

Besides industrial cassava use, the region has also seen the growth of fresh cassava market in urban and peri-urban centres. Specifically for Malawi, the fresh cassava market is dynamic and lucrative and is playing an important role in empowering farmers economically. The contribution of cassava and sweetpotato as alternatives to bread is now very pronounced in both rural and urban households. Cassava and sweetpotato are mainly eaten as snacks during breakfast.

**Post-harvest technologies.** The other area where SARRNET has made considerable impact is on the development and dissemination of processing technologies targeting increased income generation among resource poor farmers. Cassava processing among smallholder farmers in the SADC region was almost negligible and mostly rudimentary. Emphasis during SARRNET Phase I was assessment of cassava food products quality and processing technologies, improvements of processing technologies and product quality, development of new products and markets. During

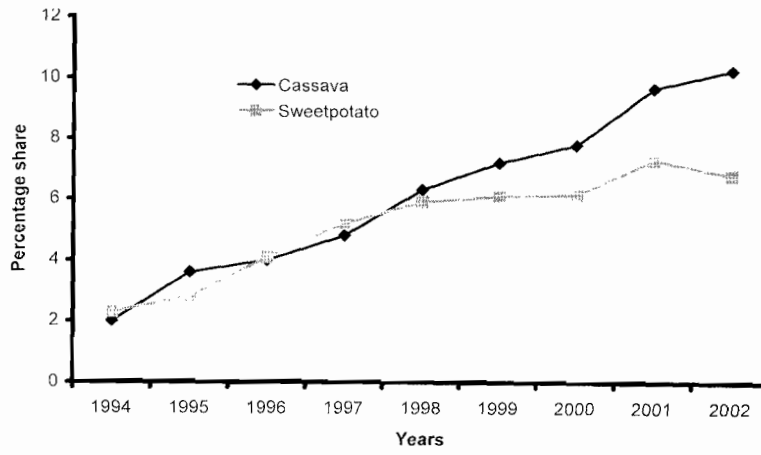


Figure 1. Percentage shares of cassava and sweetpotato to total GDP in Malawi (1994-2002). Source: Malawi National Statistical Office, 2002.

TABLE 3(a). Sweetpotato varieties released in the SADC region

| Variety | Source or place of origin | Place of release, Year and Local Name (Italics) | SADC population reached |
|---|---|---|---|
| Ribbok | South Africa | Botswana, Namibia and South Africa | 10,000,000 |
| Eland | South Africa | Botswana, South Africa | 5,000,000 |
| SPN/O | Tanzania selection | Malawi 1986 (*Kenya*), Mozambique (*Malawi*), Zambia and DRC (*Chingovwa*) and Zimbabwe (*Chingovya*), Botwana (*Kenya*), Swaziland *Kenya*) | 80,000,000 |
| Cemsa 74-228 | (CIP) | Malawi 1999 (*Semusa*), Angola (*Cemsa*) | 10,000,000 |
| Mugamba | (CIP) | 1999 Malawi | 2,000,000 |
| Tainoni | Asia (CIP) | 1999 Malawi | 2,000,000 |
| Kakoma | Malawi | 1999 Malawi | 2,000,000 |
| Salera (1941/121) | | 2002 Malawi (*Salera*) | 2,000,000 |
| Kapiri, | Zambia selection | Zambia (*Kapiri*) | 3,000,000 |
| Katondo | Zambia selection | Zambia (*Katondo*) | 3,000,000 |
| Mbete | Zambia selection | Zambia (*Mbete*) | 3,000,000 |
| TIS 25 32 | IITA (Nigeria) | Mozambique 2002 | 1,000,000 |
| TIS 2534 | IITA (Nigeria) | Mozambique 2002 | 1,000,000 |
| INIA 15 | Mozambique | Mozambique 2002 | 1,000,000 |
| INIA 9 | Mozambique | Mozambique 2002 | 1,000,000 |
| INIA 3 | Mozambique | Mozambique 2002 | 1,000,000 |
| NC1560, | Nigeria | Angola | 3,000,000 |
| Lanceolada, | | Angola | 3,000,000 |
| Lo323, | | Angola | 3,000,000 |
| W119, | | Angola | 3,000,000 |
| Cubana | Angola selection | Angola | 3,000,000 |
| Bosbok | South Africa | Zimbabwe, South Africa, Botswana | 15,000,000 |
| Brondal | South Africa | Zimbabwe, South Africa, Botswana | 15,000,000 |
| Blesbok | South Africa | Botswana, Lesotho, South Africa, Namibia | 15,000,000 |
| **(b) Cassava varieties released in the SADC region** | | | |
| Manyokola | Malawi | Malawi 1999 (*Manyokola*) Zambia (*Manyokola & Maniopola*) and Mozambique | 20,000,000 |
| TMS 91934 | IITA (Nigeria) | Malawi 1999 *(Silira)* | 1,000,000 |
| TMS 60142 | IITA (Nigeria) | Malawi 1999 *(Maunjili)*, Angola | 1,000,000 |
| MK 95/478 | Local selection from IITA OP | Malawi 1999 *(Mkondezi)* | 1,000,000 |
| CH92/112 | Malawi (IITA OP) | Malawi 2002 (*Yizaso)* | 1,000,000 |
| CH92/077 | As above | Malawi 2002 (*Sauti*) | 2,000,000 |
| Bangweulu | Zambia | Zambia 2001 | 2,000,000 |
| Nalumino | Zambia | Zambia 2001 | 2,000,000 |
| Kapumba | Zambia | Zambia 2001 | 2,000,000 |
| Mbuyu/ Msufi/Mnazi | Tanzania | Tanzania | 5,000,000 |
| Kibangameno | Amani selecton | Tanzania, Kenya | 3,000,000 |
| Kigoma mweusi | Tanzania | Tanzania (*Kigoma Red) mweusi*, Mozambique *(Kigoma Red)* | 30,000,000 |
| Ngwananhanga | Tanzania | Tanzania | 3,000,000 |
| Mfaransa | Tanzania | Tanzania | 3,000,000 |
| Lumala mpunu | Tanzania | Tanzania | 3,000,000 |
| Kibaha | Amani selection | Tanzania | 3,000,000 |
| Hombolo 95/05 | Selection from IITA OP | 1998, Tanzania, drought resistant | 200,000 |
| Muzungu | Amani selection | Tanzania, Kenya | 3,000,000 |
| NDL 90/34 | Tanzania | Tanzania | 3,000,000 |
| TMS42025 | IITA | 2002 Mozambique | 2,000,000 |
| TMS30001 | IITA | 2002 Mozambique and Tanzania | 5,000,000 |
| TMS30395 | IITA | 2002 Mozambique | 2,000,000 |
| MF 1 | Australia | 1994 Zimbabwe | 3,000,000 |
| MF 2 | Australia | 1994 Zimbabwe | 3,000,000 |
| MF 3 | Australia | 1994 Zimbabwe | 3,000,000 |
| MF 4 | Australia | 1994 Zimbabwe | 3,000,000 |
| Nachinyaya | Tanzania | Tanzania and Mozambique | 15,000,000 |
| TMS 60142 | IITA (Nigeria) | 1994 Angola | 4,000,000 |
| M 96000910 | IITA parent I8200058HS (Nigeria) | 1994 Angola | 4,000,000 |
| Precoce d'Angola | Local recommended variety | 1994 Angola | 4,000,000 |
| TMS 40142 | IITA Introduction | 1994 Angola | 4,000,000 |
| Nganarico | Local variety | 2000 | 4,000,000 |

Phase II, a total of 79 processing machines comprising of modern chippers, slicers, and graters have been introduced in Zambia, Tanzania and Malawi. These have promoted cassava processing at farm level and have helped create small enterprises where farmers have been grouped into associations . These associations are selling high quality processed commodities to industries hence improving their incomes. Successful examples of associations benefiting from this activity are Bungu community in Rufiji district, eastern Tanzania, where four farmers associations have been formed for cassava processing and marketing. In Malawi, two associations Milonde in Mulanje and Migoyi in Phalombe district have been formed. These associations are able to produce high quality flour and chips and they have been linked to the markets in Dar es Salaam in Tanzania and Blantyre in Malawi (Fig. 2). Number of Industries utilising cassava products in the SADC countries since 1999.

## TRAINING AND CAPACITY BUILDING

**Post-graduate training.** One of the major goals of SARRNET was to develop manpower through higher degree/non-degree training, and in service training to develop their capacity for research on root crop research and development. Two PhD and six M.Sc fellows have been trained through SARRNET sponsorship. In addition to postgraduate training, 5-degree students have been trained.

**Short-term training courses.** Since inception, SARRNET has organised thirty short-term training courses where 511 participants, most of them being from SADC countries, were trained in various themes, including breeding, management of research for development, statistical data analysis, post harvests, integrated pest management, and rapid multiplication techniques (Table 6). Individual attachments to IITA and CIP were also organised. In addition, exchange visits and annual monitoring tours were also organised where NARS scientists were backstopped by IITA and CIP scientists.

The direct impact of these training programmes has, therefore, been attainment of skills to better execute research activities, which ultimately leads to increase in the production and productivity of the agricultural and natural resource sector.

**Facility improvement.** SARRNET has also contributed to developing and expanding the infrastructure in certain countries. Equipment and facility improvements sponsored by SARRNET include walk-in drying-oven in Tanzania, Mozambique and Angola; processing equipment

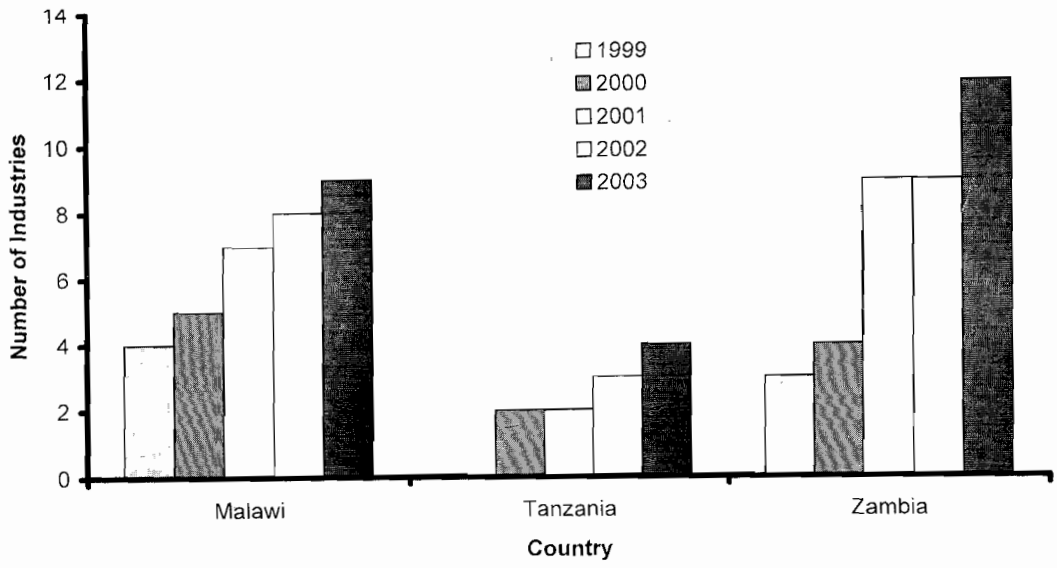


Figure 2. Number of industries utilising cassava products in SARRNET countries since 1999.

and renovation of post harvest laboratory in Botswana, Malawi and Zambia; renovation of tissue culture laboratory; facility for CNP analysis in Malawi; and rehabilitation of a screen-house in Tanzania.

**Information and technology exchange.** SARRNET sponsored workshops and symposia, where participants from SADC countries shared information. More than 450 participants were sponsored by SARRNET to attend technical

TABLE 4. Cassava and sweetpotato multiplied in the SARRNET countries

| Country | Crop | No. of sites | No. of varieties | Area planted (ha) | Collaborating partners |
|---|---|---|---|---|---|
| Angola | Cassava | 3 | 3 | 3 | OIKOS, World Vision,IITA/SARRNET, ADRA, PRODECA, SOP, Federacao, Lutherana |
| | Sweetpotato | 3 | 3 | 4 | |
| Botswana | Sweetpotato | 1 | 3 | 0.1 | Government, SARRNET |
| Lesotho | Sweetpotato | 5 | 4 | 9.7 | World Vision, CARE, Berea Agric. Group, Lesotho Mine Workers, Mafeteng Dept. Project. |
| Malawi | Cassava | 7 | 4 | 181.80 | Action Aid, Chinese Mission, Save the Children, Lutheran Church, Concern Universal, World Vision, Self Help International, Christian Service Committee, Salvation Army, Extension and Research Department of the Min. of Agriculture, SARRNET |
| | Sweetpotato | 3 | 3 | 63.60 | |
| Mozambique | Cassava | 3 | 6 | 6 | INIA, World Vision, Food for Hungry, GTZ, DANIDA, Save the Children, Swiss Co-operation, Lutheran Federation, SARRNET |
| | Sweetpotato | 4 | 5 | 80.8 | |
| South Africa | Sweetpotato | 13 | 22 | 2 | INR, Provincial Dept. Agriculture, Univ. of Fort Hare |
| Swaziland | Cassava | 8 | 2 | 3.8 | Lutheran Dvt Foundation, Farmer Foundation, Women Resource Center, Univ.Swaziland |
| | Sweetpotato | 8 | 3 | 7 | |
| Tanzania | Cassava | 5 | 10 | 21.8 | KAEMP, CCT, CARE, MRFIP, Plan International, IFAD, BDRDP, CRS, GOT-COR |
| | Sweetpotato | 4 | 6 | 2.1 | |
| Zambia | Cassava | 7 | 3 | 25 | KAEMP, CCT, CARE, MRFIP, Plan International, IFAD, BDRDP |
| | Sweetpotato | 5 | 5 | 10 | |
| Zimbabwe | Cassava | 8 | 14 | 13 | AGRITEX, Africare, Zimbabwe Farmers Union, Univ. of Zimbabwe, Women Stewards of Zimbabwe, Counterpart International, Seed-co, SARRNET, Private sector |
| | Sweetpotato | 11 | 9 | 13 | |
| Total cassava | | | | 254.4 | |
| Total sweetpotato | | | | 192.3 | |

TABLE 5. Percentage area planted with Improved/cleaned cassava and sweet potato varieties inSARRNET participating countries

| Country | Crop | % estimates of area put to improved varieties in target countries | | | | |
|---|---|---|---|---|---|---|
| | | 1998 | 1999 | 2000 | 2001 | 2002 |
| Malawi | Cassava | | 21.81 | 20.89 | 22.87 | 24.0 |
| | Sweetpotato | | 5.22 | 5.84 | 6.70 | 30.0 |
| Mozambique | Cassava | | 0.04 | 0.044 | 0.063 | 6.10 |
| Tanzania | Cassava | | 0.66 | 0.69 | 0.858 | 5.0 |
| | Sweetpotato | | 7.2 | 7.5 | 8.208 | 8.3 |
| Zambia | Cassava | | 7.0 | 13.5 | 15.31 | 19.0 |
| | Sweetpotato | | 25.3 | 25.4 | 47.75 | 50.0 |
| % Regional average | Cassava | 5.00 | 7.38 | 8.81 | 9.77525 | 13.5 |
| | Sweetpotato | 6.00 | 12.57 | 12.77 | 15.6645 | 29.4 |

TABLE 6. Participants in short-term courses sponsored by SARRNET for 1994 to 2002

| Country | Total participants |
|---|---|
| Malawi | 146 |
| Swaziland | 39 |
| Tanzania | 76 |
| Mozambique | 103 |
| Zimbabwe | 50 |
| Lesotho | 25 |
| South Africa | 3 |
| Botswana | 11 |
| Zambia | 13 |
| Namibia | 7 |
| Angola | 38 |
| Total | 511 |

meetings and workshops including two scientific workshops organised and sponsored by SARRNET in Lusaka in 1998 and 2002. In addition to workshops, SARRNET sponsored the publishing of bi-annual newsletter "ROOTS" and a web page, which was updated regularly to facilitate information sharing.

## ACKNOWLEDGEMENT

The authors thank all governments of the SADC region for incorporating root crops activities into their national and regional research systems. Support from all stakeholders including NGOs, religious organisations and private sector is highly acknowledged. This project (SARRNET) supported by USAID, executed and administered by IITA with CIP backstopping. All players are being acknowledged for contributing to the livelihoods of resource poor households who are the majority of the SADC region.

## REFERNCES

Akoroda, M. O. 1999. Study of the contribution of cassava and sweetpotato to total food availability in Malawi. Consultancy Report to USAID/Malawi.

IITA/SARRNET. 1999. Summary of Phase I Achievements: 1994-1999.

IITA/SARRNET, 2001: 2001 Annual Technical Report.

Minde, I. J., Ewell, P.T. and Teri, J. M. 1999. Contributions of cassava and sweetpotato to food security and poverty alleviation in the SADC countries. In: *Food security and crop diversification in SADC countries: the role of cassava and sweetpotato.* Akoroda, M.O. and Teri, J.M. (Eds.), pp. 27-39. Proceedings of SARRNET Workshop held at Pamodzi Hotel, Lusaka, Zambia, 17-19 August 1998.