REGIONAL COLLABORATION IN AGRICULTURAL RESEARCH AND DEVELOPMENT FACILITATES DIFFUSION OF TECHNOLOGIES IN THE SADC REGION

Government of Malawi

Government of Mozambique

Government of Zambia

CCARDESA
Centre for Coordination of Agricultural Research and Development for Southern Africa

SADC

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Challenges

Duplication of efforts in research and development (R&D) work in the region costs millions of dollars every year. This is attributed to lack of coordination, limited research communication among R&D institutions and the beneficiaries. Knowledge exchange on developments in technologies, innovations, and management practices in agriculture need to be effectively disseminated if gains in research investments are to be realised.

The Agricultural Productivity Program for Southern Africa (APPSA) was aregional collaboration network in agricultural research and development which allowed sharing of technologies in Malawi, Mozambique, Zambia, and other SADC countries. The project, established in 2013, initially involved the three countries - where each participating country was given a loan facility of approximately USD30 million over the period of six years. Other SADC countries are expected to join in future as the project evolves and expands. Background APPSA was a regional project funded by the World Bank, which was developed with the core agenda of improving the availability of agricultural technologies within and across the Southern African Development Community (SADC) countries. The main objective of this initiative was to invest in agricultural technology generation and dissemination by supporting and strengthening Regional Centers of Leadership (RCoLs) that worked on commodities and commodity systems of regional importance. Even though the performance of agriculture in southern Africa improved recently, the sub-region as a whole continued to suffer from periodic food deficits and recurring food price crises, as well as some of the worst nutrition indicators in the world. These were attributed to problems such as lack indicators in the world. These were attributed to problems such as lack of enabling conditions forincreasing agricultural productivity. Low productivity was mainly linked to limited access to new and relevant agricultural technologies among farmers in the SADC region. Technology generation and dissemination wa note to be a slow and time-consuming process which also demanded a high levels of investments. APPSA contributed to resolving these challenges by promoting regional collaboration and by putting in place mechanisms that encouraged technology generation and dissemionation across Malawi, Mozambique and Zambia.

Benefits of collaborative research Regional integration proved to be an effective strategy that allowed groups of countries facing common research challenges to increase the efficiency of their investments in agricultural research and development. Through this regional collaboration, 68 technologies on maize, rice and legumes were shared across the countries. Adoption of a regional approach to research was based on the concentration of resources within a reduced number of large, specialized research institutes serving an expansive shared technology space to deliver a number of national and regional benefits such as:

1. Reducing duplication by allowing a single regional research institute to undertake work that otherwise would be done in parallel within multiple national research institutes.
2. Capturing economies of scale by concentrating resources within a single institute, where they can achieve a critical mass.
3. Increasing the payoffs to research by facilitating dissemination of improved technologies across national borders, thereby vastly increasing the number of beneficiaries.
4. Mitigating the isolation that frequently occurs in small, fragmented research institutes by creating effective mechanisms for facilitating knowledge exchange and technology transfer.

When the project was conceived, the emphasis was mainly on how the aforementioned countries could collaborate through research and development projects. To date, APPSA has benefited a variety of stakeholders including other potential end users of the improved technologies and knowledge generated and/or disseminated by the project.

Agriculture research and development projects

Technology and dissemination activities took place under research and development projects guided by the Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA) and implemented through the Regional Centres of Leadership (RCoL). During the course of the project, research and development priorities were agreed upon by the three participating countries. If any of the three countries showed interest in a specific sub project activity, all other countries were expected to actively participate in the activity for this to be an effective and successful collaboration. If any of the three countries showed interest in a specific sub project activity, all other countries were expected to actively participate as collaborators.

Three centers of excellence were created under the APPSA project. Malawi, led by Chitedze Research

Station, was designated the RCoL for maize and maize-based farming systems; Instituto de Investigação Agrária de Moçambique (IIAM), Mozambique was the RCoL for rice; while Kabwe Research Station of the Zambia Agricultural Research Institute (ZARI) Zambia was the RCoL for food legumes.

The APPSA project supported 74 R&D sub-projects. These resulted in the generation of 160technologies in the three countries and more than 50% of the generated technologies were on improved seed varieties.

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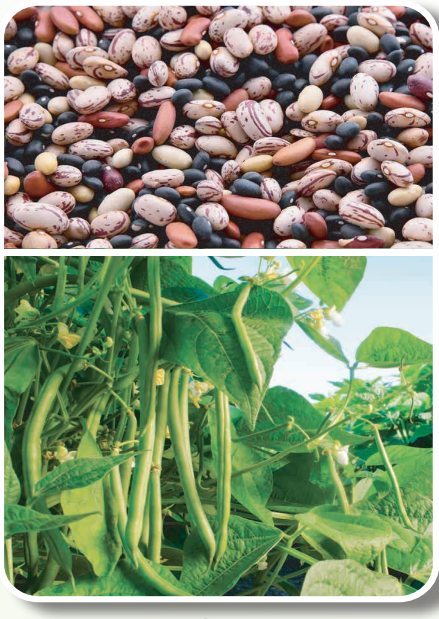
Maize



Legumes

Table 1 summarizes the number of sub-projects led and collaborated with the respective RCoLs:

Regional Center of Leadership	Commodity of leadership	Total number of sub-projects	Sub-projects led by the RCol	Sub-projects collaborated with other RCoLs
Malaw	Maize based systems	65	22	43
Mozambique	Rice based systems	67	21	46
Zambia	Legume based systems	74	31	38

The Legumes RCoL in Zambia supported 74 regional collaborative R&D projects, of which Zambia led in 31. Zambia collaborated in 38 sub-Sharing of agricultural technologies in the SADC regions

- **Malawi**
- Three striga resistant maize hybrid varieties: MH50STR, MH51STR & MH52STR shared with Mozambique and Zambia;
- Five carotene or orange maize hybrids: MH45A, MH46A, MH47A, MH48A and MH49A shared with Mozambique and Zambia;
- Use of Compost Manure in System of Rice Intensification (SRI) shared with Mozambique and Zambia.

- **Mozambique**
- Metal silo and Super grain bag has been used in Malawi under Improvement of Post-harvest Management Practices in Maize;
- 150 newly collected accessions shared with SADC Plant Genetic Resources Centre under Rice germplasm collection and characterization;
- 10 rice lines shared with Co-PI during the meeting held in Salima (Malawi), December 2015 under Development of Improved Rice Varieties in Mozambique. Under the same project from Zambia, Mozambique has received 4 released and commercial varieties (NERICA4, Kilombero, Supa and Faya);

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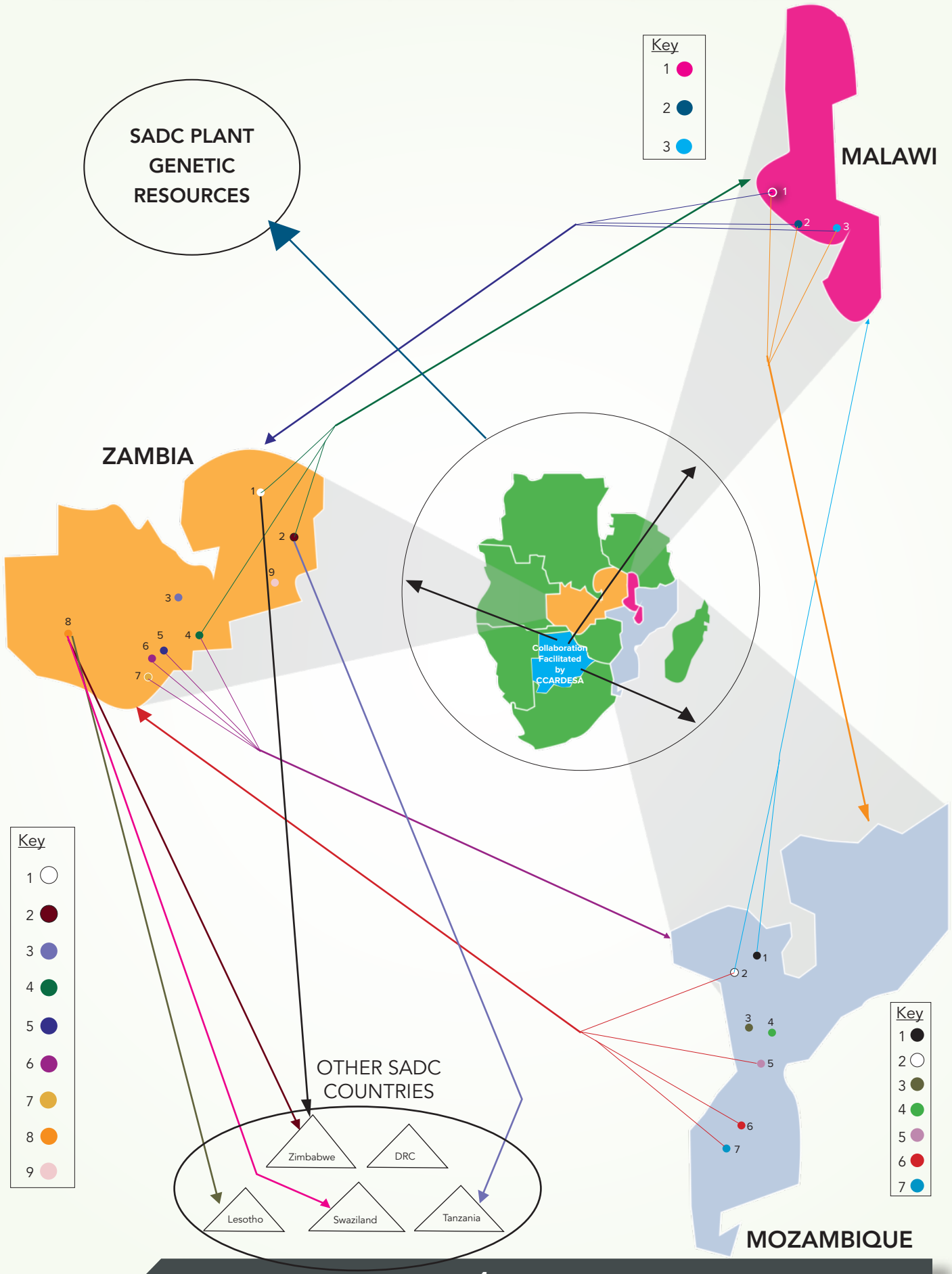

KEY:

MALAWI

1 5 Carotene or orange maize hybrid: MH45A, MH46A, MH47A, MH48A & MH49A

2 3 striga resistant maize hybrid varieties: MH5OSTR, MH51STR & MH52STR

3 Use of Compost Manure in System of Rice Intensification (SRI)

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1 6 rice improved varieties

2 metal silos

3 32 Hybrids

4 150 newly collected accessions

MOZAMBIQUE

5 Metal silo & Super grain bag

6 15 genotypes of cowpea

7 10 rice lines

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1 metal silos

2 2 cowpea varieties

3 3 rice improved varieties

4 2 Agronomic and cultural practices

5 4 rice varieties

6 4 Bean varieties

ZAMBIA

7 2 pigeon pea varieties

8 5 ground nuts varieties: GV671A, GV664, GV6672, MGV-6, MGV-7

9 3 maize varieties

- Under Promotion and Dissemination of Improved Rice technologies for sustainable production in Mozambique, Malawi, and Zambia, from Mozambique 6 Rice improved varieties were shared with Malawi and Zambia (Makassane,
- Mocuba, Nene, Limpopo, ITA 312 and Chupa) and from Zambia 3 Rice improved varieties were shared with Mozambique (NERICA 3, NERICA 4 and Supa MG);
- Under Improving Grain Storage Structures for smallholder farmers in Mozambique and Zambia, METAL SILOS (MS) are being disseminated in Zambia – northern (Kasama), southern (Choma), and western (Sesheke) provinces;
- Under evaluation and dissemination of improved cowpea varieties and cropping systems in Mozambique and Zambia for enhanced food security, family nutrition and income, 15 genotypes of cowpea were shared with Zambia;
- 32 experimental hybrids shared with Malawi partners which are likely to release it because they had good performance under their condition.
- **Zambia**

  Maize Varieties released (In collaboration with Harvest Plus) :
- GV671A - Malawi, Zimbabwe & Zambia
- GV664 – Malawi, Zimbabwe, DRC & Zambia
- GV6672 – Malawi, Zimbabwe, DRC & Zambia Groundnut varieties released:
- MGV-6 – Malawi, Mozambique & Zambia
- MGV-7 – Malawi, Mozambique & Zambia
- Lupande – Malawi, Mozambique & Zambia
- Wazitatu – Malawi, Mozambique & Zambia
- Wamusanga – Malawi, Mozambique & Zambia Pigeon Pea varieties released:
- MPP-2 – Tanzania & Zambia
- Mwaiwathu alimi– Malawi & Zambia Beans varieties released:
- Lyambai (CAL 143) – DRC, Lesotho, Malawi, Mozambique, Swaziland, Zimbabwe and Zambia.
- Chambeshi (A197) – Malawi and Zambia.
- Kalambo (VTTT923/10-3) – Mozambique and Zambia.
- Mbereshi (NVA 45) – Lesotho, Malawi, Mozambique, Swaziland, Zambia and Zimbabwe Agronomic & Cultural Practices:
- Double row planting for groundnuts – Malawi, Mozambique & Zambia.
- Tied ridge water harvesting technology – Malawi & Zambia.

Patronella Hamadi Chulu, an Agricultural Extension Officer for Kapita Agricultural Camp in Mambwe District, Zambia appreciating some of the cobs from Pro - Vitamin A varieties grown by some of her farmers

Farmers appreciating maize varieties rich in Vitamin A at a field day in Chitedze Agricultural Research Station in Malawi

Farmers that grow Pro- Vitamin A maize varieties in Mambwe District, Zambia

Feedback from Researchers

Vitamin A deficiency is the leading cause of preventable blindness in children, and approximately one third of children under the age of five are at risk in Southern Africa.

Dr. Kesbell Kaonga, a maize breeder from Malawi managed to release ten Pro-Vitamin A varieties under the APPSA project. These varieties are currently being multiplied by seed companies. Farmers are receptive and happy with the introduction of these nutritious orange maize varieties. He emphasized on the importance of collaboration, networking, and sharing of germplasm at regional level through APPSA and believes that the framework should be expanded across the region.

Mr. Hermínio Abade, a Rice Breeder who led a technology generation project in Mozambique found that having other countries on board strengthened his germplasm bank given that he used to struggle with the lack of high-quality germplasm for rice breeding. He expressed that APPSA presented an opportunity for farmers and researchers from the collaborating countries to exchange materials and share technologies. He also indicated that Zambia and Malawi no longer had problems related to reduced number of germplasms for research. Hermínio Abade has been involved in rice breeding for the past seven years. During this period, he released one variety and was currently working to release three more varieties under APPSA.

According to **Mr. Kennedy Muimui**, a Bean Breeder from Zambia Agriculture Research Institute (ZARI) under the Ministry of Agriculture, working with other countries enabled the team to fast track some results that the farmers were eager to receive from research and extension. Collaboration increased the payoffs to research by facilitating dissemination of improved technologies across national borders, thereby vastly increasing the number of beneficiaries. He also expressed that the three participating countries were able to generate and release a number of improved agriculture technologies and these technologies were made available to small holder farmers and other end users.

Lessons Learnt

The experience and lessons gained through the APPSA collaboration initiative, were invaluable to the three participating countries and the entire SADC region.

- Exchang visits and collaboration contributed to building a regional research agenda;
- Collaboration helped in reducing some needed investments in research by allowing one country taking the lead of a specific commodity in which the results benefits all;
- Collaboration increased the likelihood of germplasm exchange between countries and different research programs in the region.

The APPSA project phase involving Malawi, Mozambique established in 2013 ended in January 2020. Recently, two countries, Angola and Lesotho joined the programme focusing on cassava and horticulture respectively. Other SADC countries are expected to join in the future as the project evolves and expands.

Participants appreciating rice products in an agricultural exhibition in Namacurra, Mozambique

Agricultural Scientists from Malawi, Mozambique and Zambia sharing research findings through conference presentations

Participants of Rice Processing Training in Mozambique

Improved Maize Demonstration PCOT