



Centre for Coordination of Agricultural Research & Development for Southern Africa
Centre De Coordination De La Recherche Et Du Développement Agricole De L'Afrique Australe
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Agricultural Productivity Programme for Southern Africa (APPSA)

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List of Acronyms

APPSA	Agricultural Productivity Programme for Southern Africa
CA	Conservation Agriculture
CARS	Chitedze Agricultural Research Station
CCARDESA	Centre for Coordination of Agricultural Research & Development for Southern Africa
CG Centres	Research Centres CGIAR
CIAT	International Centre for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Centre
COMACO	Community Markets for Conservation
Co-PI	Co- Principal Investigator
CSF	Critical Success Factors
DACO	District Agricultural Coordinator
DADO	District Agricultural Development Officer
DAES	Department of Agriculture Extension Services
DARS	Department of Agriculture Research Services
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IEC	Information, Education and Communication materials
IIAM	Mozambique Agricultural Research Institute
M&E	Monitoring and Evaluation
MASA	Ministry of Agriculture and Food Security
MoAI & WD	Ministry of Agriculture, Irrigation and Water Development
PI	Principal Investigator
PVA	Pro Vitamin A
R&D	Research and Development
RCoL	Regional Centre of Leadership
SADC	Southern Africa Development Community
TIMPs	Technologies, innovations, and management practices
USAID	United States Agency for International Development
WB	World Bank
ZARI	Zambia Agriculture Research Institute

EXECUTIVE SUMMARY

In 2016, the Agricultural Productivity Programme for Southern Africa (APPSA) was in its third year of implementation in the three countries (Malawi, Mozambique and Zambia). CCARDESA provided the regional coordination role. The aim of APPSA is to strengthen and scale up regional cooperation in generation of technologies, capacity building, and knowledge sharing in food legumes, rice and maize. The project has three key components: (1) Technology Generation and Dissemination; (2) Strengthening Regional centres of Leadership; and (3) Coordination and Facilitation.

Component 1: Technology Generation and Dissemination

During the reporting period, Malawi supported 59 R&D projects [leading in 21]; Mozambique supported 65 R&D projects [leading in 21] while Zambia implemented 69 R&D projects [leading in 31]. The projects generated and promoted 140 improved technologies, innovations and management practices (TIMPs) as follows: Malawi promoted 70 TIMPs (55 seed varieties and 12 agronomic practices; 1 post-harvest and 2 pests and diseases management practices). Mozambique promoted 22 TIMPs, (13 seed varieties and 9 agronomic practices). Zambia promoted 48 TIMPs (23 seed varieties, 4 processing technologies, 14 agronomic practices, 4 integrated pest management and 3 post-harvest technologies. A launch of the third call for research proposals to be funded under the project resulted in 25 projects being recommended for support with effect from the 2016/17 cropping season, bringing the total number of R&D projects under APPSA to 74. The 25 new projects are on cassava (5); climate smart agriculture [3]; legumes [10]; maize [5]; rice [1]; sorghum [1]. Although Angola participated in the 3rd cycle funding proposal development, the recommended projects were not implemented by the start of the 2016/2017 cropping season because funds were not yet available.

Component 2: Strengthening Regional Centres of Leadership

Malawi undertook procurement of consultancy services for infrastructure development of Chitedze research Station and for five satellite research stations. The process was yet to be finalised. Consultancy services to develop APPSA Management Information System were also procured. Mozambique commenced rehabilitation of 6 research centres and works are near completion. These include offices, laboratories, staff houses, storage facilities, green houses, processing floors and irrigation system. Zambia purchased 10 more vehicles, 3 buses and office equipment to be delivered in early 2017. In 2016 there was a significant increase in the number of staff sent for long-term training by Malawi and Mozambique. A total of 47 scholarships were issued by the three countries to 16 females and 31 males as follows: PhD=12 (1F:11M); MSc= 27 (10F:17M); BSc=8 (5F:3M). This brings to 144 (50F:94M) the total number of staff sent for long-term training to date (Malawi = 36; Mozambique = 24 and Zambia = 84). By 31 December 2016, eighteen staff from Zambia had successfully completed training at the different levels as follows: Diploma = 9; BSc = 7; MSc=2. During the reporting period, 1,487 Extension Workers (304F:1183M) and 3,454 farmers (1288F:2166M) were trained on various topics to improve the implementation of project activities in the three RCoLs. CCARDESA facilitated the participation of 14 RCoL staff from the three countries in a benchmarking study tour to the East African Agricultural Productivity Programme (EAAPP) in Kenya. The lessons learned will be incorporated into ongoing APPSA efforts in the three countries. Institutional assessment studies were undertaken by all countries, and draft assessment reports and science plans for Mozambique and Zambia were shared during the Implementation Support Mission in April. Malawi shared the final Institutional Assessment report during the November Implementation Support Mission. The project Regional Steering Committee gave a deadline of 31 March 2017 for finalising and submitting these documents.

Component 3: Coordination and Facilitation

Key M&E activities that were undertaken at regional level during the reporting period include convening M&E working group meetings, facilitating R&D project performance assessments and participating in implementation support missions. CCARDESA convened two regional

M&E working group meetings in February and May 2016 to review key indicators and the results framework. A review of R&D projects being implemented under APPSA was undertaken in March to establish the status of implementation and assess the overall performance of the R&D projects. The Governments of Malawi, Mozambique and Zambia, CCARDESA and the World Bank, carried out two joint missions for the implementation support of the project in April and in November 2016. A writeshop for the regional Communication and Knowledge Management Strategy was convened and a draft strategy was shared with the RCoLs. In October CCARDESA convened the Regional Peer Review of 3rd cycle R&D Proposals which saw 25 additional projects being recommended for funding. The first Regional Steering Committee meeting was convened in Malawi on 2 December and was attended by the Principal Secretaries or their representatives, other nominated members (representing key stakeholders), Directors of Research, APPSA Coordinators, World Bank and CCARDESA. CCARDESA initiated discussions with other countries within the SADC region on possibilities to join APPSA. Angola, Lesotho, Madagascar and Swaziland indicated interest in participating in the project. During the course of the year CCARDESA visited Lesotho and Angola after they requested for further guidance on joining APPSA. Significant progress was made with Angola, which is expected to take up the leadership in the additional R&D collaboration which has already commenced around cassava farming systems.

Overall, there has been progress in implementation of project activities across all components. The level of collaboration is also improving, but more effort is required. Because the Special Drawing Rights (SDR) continues to devalue against the US\$, the countries have lost part of the real monetary value of their grant facility on the undisbursed amounts. This requires tight monitoring to avoid over-commitment of funds.

1.0 BACKGROUND

The Agricultural Productivity Programme for Southern Africa (APPSA) has an implementation period of six years, and was approved by the World Bank Board on March 14, 2013 with US\$ 90 million in IDA financing. The project was launched with the participation of three countries (Malawi, Mozambique and Zambia) in October 2013. The development objective of APPSA is to increase the availability of improved agricultural technologies in participating countries in the Southern Africa Development Community (SADC) region. APPSA will pursue this objective by: (i) establishing Regional Centres of Leadership on commodities of regional importance, thereby allowing regional specialization around priority farming systems and more strategic investment in agricultural research capacity; (ii) supporting regional collaboration in agricultural research, technology dissemination, and training; and (iii) facilitating increased sharing of agricultural information, knowledge, and technology among participating countries. The current participating countries are focusing on maize-based farming systems [Malawi], rice-based farming systems [Mozambique] and food legumes-based farming systems [Zambia]. In 2016, Angola expressed interest to join APPSA, focusing on cassava-based farming systems, and discussions are in progress. The Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA) is coordinating the project, which has the following key components:

Component 1 - Technology Generation and Dissemination

The technology generation and dissemination component supports activities associated with the commodity or commodity group being targeted by the Regional Centres of Leadership. Activities under this component are guided by a regional R&D agenda developed through a participatory process coordinated by CCARDESA and the RCoL. The activities are undertaken through collaborative R&D projects involving the participation of at least two countries. R&D projects will support collaborative research, technology dissemination, training, and other activities (e.g. knowledge exchange). The technology generation activities cover a number of key thematic research priorities at both national and regional level. The technology dissemination activities (extension, strengthening of innovation systems) include promotion of technologies developed before the Project got underway.

Component 2 - Strengthening Regional Centers of Leadership (RCoL)

This component supports the strengthening of capacity of RCoLs to participate in regional research activities and to develop research and technology generation systems that are demand led and market oriented. The choice of the specific activities that are undertaken is determined by the specific needs of each RCoL. In general, APPSA supports: (i) upgrading of research infrastructure including physical infrastructure; farm, laboratory, and office equipment; and information technology and knowledge management systems; (ii) improving administration and performance management systems; (iii) developing human capital including by providing scientific training at the post graduate level and by upgrading skills through short courses or targeted training; and (iv) strengthening seed production capacity, seed regulatory functions, and related services

Component 3: Coordination and Facilitation

CCARDESA carries out regional facilitation activities which include: (i) planning, monitoring and evaluation activities related to regional collaboration; (ii) regional exchange of information, knowledge and technologies; and (iii) technical assistance and capacity building. APPSA activities at country level are managed through country-specific institutional arrangements based on the national institutional contexts and capacities. Project coordination activities being financed by APPSA at national level include planning and budgeting, management and administration, monitoring and evaluation, safeguards compliance, and regional engagement.

2.0 PROGRESS OF IMPLEMENTATION

2.1. COMPONENT 1: TECHNOLOGY GENERATION AND DISSEMINATION

The prolonged delays in the start of the agricultural season, coupled with severe and widespread rainfall deficits (in many places the driest since at least 1981) which continued until mid-February resulted in extremely unfavourable conditions for crop development. Rainfall between October 2015 and February 2016 was less than 75 percent of average across most of Mozambique, as well as across significant portions of Malawi and Zambia. Given that the major agricultural season runs from

October/November through April, this abnormal dryness limited crop production as it occurred in many important cropping areas. The above average rainfall from late February came too late to be of significant benefit in most affected areas; the early season drought had already led to irreversible losses in planted area.

Because of the weather challenges, implementation of the R&D projects generally proceeded with some delays across the three countries. Twenty four of the projects implemented focus on technology generation; 16 focus on technology dissemination, while 9 have a mix of both technology generation and dissemination. The third cycle of funding identified 25 new R&D projects, of which 17 focus on technology generation; 5 focus on technology dissemination, while 3 have a mix of both technology generation and dissemination. The new cycle also includes cassava and sorghum.

Malawi implemented 44 projects, leading in 14 ((7 from the first round and 7 from the second round). Out of the 25 cycle 3 projects which were recommended for funding in October, Malawi leads in 7 (3 Maize and 4 Food Legumes) and collaborates in 7. The third cycle projects had not commenced by the end of the reporting period.

In Mozambique, a total of 42 R&D projects were active in 2016. Mozambique leads 15 R&D projects (8 from the first round and 7 from the second round). Out of the 25 new projects in cycle 3, Mozambique is implementing 17 projects; leading in 5 (3 Food Legume, 1 Rice and 1 Conservation Agriculture) and collaborating in 12 projects.

In Zambia, 46 R&D projects were implemented during the period under review. Zambia leads in 21: 11 in cycle 1 (2 Maize, 1 Rice, 7 Food Legumes, 1 Sorghum) and 10 in cycle 2 (4 Food Legumes, 3 Multiple Crops, 3 Conservation Agriculture). Out of the 25 new projects in cycle 3 Zambia is implementing 23; leading in 10 (2 Maize, 3 Food Legumes, 2 Cassava, 2 Climate Smart Agriculture and 1 Sorghum).

2.1.1 Technology generation

The technology generation activities that were undertaken focused on germplasm collection and characterization, crop improvement, crop management and post-harvest activities including processing and storage.

Some of the achievements under each commodity are as follows:

2.1.1.1. Achievements under Maize R&D efforts

The maize R&D projects focus on collecting and characterising maize germplasm; improving nutritional quality (developing provitamin A and quality protein maize); developing varieties resistant to major diseases i.e. down mildew, ear rots, maize streak virus (MSV), grey leaf spot, Blights, maize lethal necrosis disease (MLND); developing varieties tolerant to major storage pests (weevils and larger grain borer); identifying and promoting *striga*-tolerant varieties, integrating maize-dairy production systems; promoting CA; improving water use efficiency and disseminating improved agronomic practices and maize varieties.

Some of the reported achievements under the maize programme are as follows:

Crop improvement

- The project on improving the nutritional quality in maize released two quality protein maize hybrids [GV682P and GV687P] in Zambia which were licenced to SANGONDOLA Seed Company for production and Marketing. Breeder and foundation seed will be bulked by ZARI under the seed unit.



Some promising Pro Vitamin A hybrids IYT16



Some promising QPM PYT Entries

- Some pro vitamin A hybrids [G20, G9 and G21] which showed stable agronomic performance both in Zambia and Malawi will be analysed for carotenoid content and if found desirable, their release will be proposed.
- Studies to screen genotypes for tolerance to *Striga* identified six hybrids in Malawi, three in Mozambique and five in Zambia as promising. Artificial inoculation under controlled environments will be undertaken to confirm *striga* tolerance by these hybrids, which will also be further tested for tolerance to foliar diseases.
- Preliminary results from the project on developing varieties with tolerance to major diseases showed that 30 out of the 60 hybrids generated and evaluated are resistant, and therefore potential hybrids for release.



Participatory selection of maize varieties tolerant to striga in Malawi

Disease Management

- In order to create awareness on the MLND disease, a brochure on MLND was jointly developed and printed for distribution during trainings. Lead farmers and Extension officers were trained on trial management and disease identification in the three countries.

- Findings from Maize Lethal Necrosis (MLND) survey conducted indicated that the disease is not yet present in the three countries. Radio programmes, TV programmes, Print media and CIMMYT MLN Portal are among the methods being used to create awareness.



MLN disease vector survey in Malawi

Germplasm collection

325 samples were collected from the three countries and Malawi duplicated 84 samples with the SADC gene bank. A total of 320 accessions were characterized at phenotypic level and Malawi shipped 400 extra samples to CYMMIT for whole genome sequencing. The observed genetic variation among maize accessions shows existence of sources of unique genes for introgression in improved varieties. Malawi hosted a fair to showcase maize genetic diversity and distributed leaflets on the importance of maize diversity. Extension staff in Mozambique was trained on germplasm survey and collection techniques.

Management practices

- Silicon fertilizer application was shown to enhance resilience to water stress in maize. Locally available materials which were identified to be potential sources of silicon include rock phosphate (35.2% Si); rice husks/bran (16.5% Si); silica sand, and soils from certain locales (22.1% Si).
- Maize-velvet bean intercropping is recommended among smallholder dairy farmers as it improves dry biomass yield and nutrient content of stover.
- Creating anaerobic conditions by burning candles inside grain storage structures can effectively minimise grain losses caused by storage pests. Research results showed that super grain bags, metal silos and poly-ethylene silo tanks effectively controlled storage pests by 65 to 88%. The challenge which needs to be addressed is the availability of the storage structures as well as working on the sizes required to store more produce by the farmers. Mozambique trained artisans in construction of maize silos, and silos were produced.



Artisan Training in Chokwe, Mozambique



Trial on use of different storage containers in Mozambique

Conservation agriculture

- While the use of a combination of herbicides (Glyphosphate, Integrity and Stellar) was the most effective in weed control, the high cost of the technology could limit adoption, even though the rate of return to labour is more attractive for herbicides compared to conventional weeding. There is need to demonstrate different combinations of weed management to give wider choice of weed management options with optimum costs.
- “Partial CA - Boxing” – a technique which entails seeding in planting holes with residue cover +ridging following topdressing fertilisation showed promise of increasing crop productivity in smallholder agriculture. Acquisition of specialised field equipment is required in order to better validate the systems.
- CA practices (no tillage + residue retention) tested on farmers’ fields gave higher maize yields compared to conventional method. It is imperative to find long-term solutions involving communities on the role of crop residues in reversing soil degradation.
- For smallholder farmers with limited land and prioritising food security (maize production), associating maize with grain legumes seems a viable option compared to crop rotation.

2.1.1.2. Achievements under Rice R&D efforts

The R&D projects are focusing on germplasm collection, developing improved varieties, improving crop production practices and promoting sustainable production practices.

Germplasm collection

Two hundred and forty nine accessions were collected and kept at the national gene banks [Malawi = 77; Mozambique = 69; Zambia = 103]. Four hundred and twenty two accessions were phenotypically characterized [Malawi = 50; Mozambique = 322; Zambia = 50]. Molecular characterisation is yet to be undertaken. Each country conducted a survey for *in-situ* conservation site, and one hotspot site for on-farm conservation of germplasm was identified in Zambia. Scientists from the three countries attended a short course in molecular characterization. One diversity fair was conducted in Malawi and was attended by 106 participants (38F and 68M).

Crop improvement

- Malawi is preparing to release two varieties under the project on participatory evaluation improved rice varieties to increase productivity.
- Six commercial varieties and landraces are under purification in Mozambique.
- In Zambia 5 rice varieties have been submitted for national variety testing. Ndelema, Sakozi and Nsenga were submitted for purification in preparation for release, while Singa and Pusa were submitted to test for adaptation before release.

Rice productivity

Use of improved varieties under integrated crop management system was tested. The System of Rice intensification (SRI) with 6 integrated practices was demonstrated to farmers at 2 irrigation schemes in Malawi.



Use of compost made from various materials gave similar yields to inorganic fertilizer. This gives farmers alternative options for improving rice productivity.

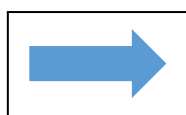
Rice production under different compost treatments at Bwanje in Malawi

Post-harvest management

Post-harvest technologies that are not labour intensive e.g. simple rice shellers were developed and promoted.



Manual processing of rice



Processing rice using a sheller

Seed production

Seed growers were trained, and engaged in seed multiplication of improved varieties that were selected by farmers through participatory variety selection. In Zambia, 420MT of certified seed were produced, while Malawi produced 0.35 MT and Mozambique produced 257MT. In addition, 187 MT of basic seed (Supa and Kilombero varieties) was also produced in Zambia, while Malawi and Mozambique produced 3 MT and 207 MT, respectively. A total of 12 MT of breeders seed was produced by Malawi (1 MT) and Mozambique (11 MT). In Mozambique, the project worked with FAO



Seed multiplication of improved varieties in Mozambique germplasm

and IRRI to reach out to more seed growers. Targeted agro dealers were identified, and trained as a way of facilitating market linkages in all three countries.

2.1.1.3. Achievements under Food Legumes R&D efforts

The target crops are bambara nut (*Vigna subterranean*), beans (*Phaseolus vulgaris*), cowpea (*Vigna unguiculata*), groundnut (*Arachis hypogea*), pigeon pea (*Cajanus cajan*) and soybean (*Glycine maxima*). The crop improvement projects being implemented aim at developing high-yielding, drought tolerant varieties that perform well under poor soil fertility. Other areas of focus include managing aflatoxin and mycotoxin problems faced by farmers; improving access to seed of new varieties; reducing post-harvest losses; developing and disseminating agronomic practices for legume production; addressing loss of legumes diversity; limited availability of machinery for planting legumes; poor quality of legumes.

Some of the reported achievements under the legume programme are as follows:

Beans

- Seed of five improved varieties developed under the project, and common in Malawi and Zambia (CAL 143, VTTT923/10-3, NUA45, VTT924/4-4 and SUG131) was multiplied and is now available for farmers.
- The project which aimed at identifying bruchid species from different regions of target countries identified *Acanthocelides* sp and *Zabrotes* sp in Mozambique, and *Acanthoscelides obtectus* sp in Zambia.
- Four promising bean genotypes which are high yielding, high in Fe and Zn,



and also resistant to common bean diseases (Angular Leaf Spot [ALS] and Common Bacterial Blight [CBB]) have been identified. These are NUA 56, NUA 35, PambelaX NUA 59/5 and Pambela x AND 1602/2. A few more on-farm verification trials will be conducted before they are recommended for release.

Bean variety trial for high Fe & Zn with resistance to ALS & CBB

Cowpeas

- Two promising bruchid-resistant cowpea mutant genotypes (BB8-1-5-2 and LT11-3-3-13) were pre-released in Zambia and submitted for national variety testing before being released by Seed Control and Certification Institute (SCCI). The mutant lines identified in Zambia also showed high genetic yield potential in Malawi. Increased cowpea productivity through use of these genotypes is expected in both countries.



Cowpea seed multiplication at Msekera

- Seed multiplication of selected released varieties (Bubebe, Msandile, CP2, Lutembwe and Namuseba) was undertaken in Zambia in an effort to increase availability of improved seed.

Groundnuts

- One drought-tolerant variety was submitted for national variety testing in Zambia for release by SCCI.
- Work on improving groundnut productivity through the use of low soil fertility, drought tolerant varieties, and Integrated crop management (ICM) technologies identified the following superior-performing genotypes in terms of yield: ICGV-SM series -08565, -08535, - 08528, 08556, -03530, and ICG 14788 and ICGV 00331. The next step is to subject these genotypes to on farm evaluations and obtain information on traits preferred by farmers. Drought tolerance levels of the promising genotypes will also be established through controlled drought trials before release.



ICM technologies: Planting in rows and mulching in Groundnuts

Soybean

- A new technology [combined application of inoculant (Nitrofix) + inorganic fertilizer (Soymix or TSP) + new soybean variety] increased soybean yields by over 50% in Malawi and Zambia. The new varieties used, three of which were grown in both countries were Nasoko, Makwacha, Tikolore and Serenade in Malawi, and Lukanga, Kafue (Tikolore), Nakobo, Serenade and Makwacha in Zambia.
- 797 farmers and 18 extension agents (6 F; 12M) were sensitised (through trainings and food fairs) on soybean processing and utilisation. Following trainings, farmers produced some of the following products: milk, meat balls, snack, flour, relish, fritters, cake, coffee, porridge, sausage, soy-cassava



Farmers showcasing soybean products in Malawi

doughnuts, soy-banana weaning food, soy-cassava balls and hot soy drink.

- Market linkages are needed if the farmers are to realise the benefits from soybean production; in Zambia 200 farmers were linked to Mount Meru Millers for soybean contract growing.

Pigeon pea

In an effort to promote production of pigeon pea, a less widely grown legume in the three countries, awareness of the crop was created through production and distribution of a guide on Pigeon pea production in English and in Portuguese. Demonstrations were established on farmers' fields and field days conducted. Short- and medium-duration genotypes with fusarium wilt resistance were evaluated for yield potential and adaptability, and the good performing genotypes were selected for further evaluation in advanced variety trials both on-station and on-farm.



Pigeon pea field day in Mchinji, Malawi



Pigeon pea production guide in Portuguese

Legume seed production

Under the strengthening legume seed delivery project, the three countries produced 21.2Mt of basic seed, 1.2Mt of breeders' seed and 362Mt of certified seed. About 420 seed growers and 50 extension officers were trained on seed production and crop inspection respectively. In addition, the project has advanced a business model for certified seed conveyance comprising of 348 farmers in partnership with upcoming seed companies and seed associations.



On-farm seed production plot in Zambia

Mycotoxin management

Traditional drying and curing methods were reviewed and adapted in an effort to reduce aflatoxin contamination, thereby enhancing utilization and marketability of groundnuts and bambara nuts. Fifty nine farmers were trained, and took part in the preparation of improved drying technologies which are (i) side raised windrow, (ii) dwarf raised windrow and



Farmer training on dwarf raised windrow drying technology in Zambia

(iii) raised ventilated platform. Analysis of the samples from the different drying techniques using the high pressure liquid chromatography (HPLC) validated effectiveness of the techniques in reducing Aflatoxin levels. The project also explored processing of Bambara flour using home utensils. The study on natural occurrence of aflatoxin and bio deterioration of dried cowpeas and pigeon in Malawi showed that floating and washing reduces aflatoxin contamination in grain legumes. The findings highlighted the need to investigate the presence of mycotoxins in all the grain legumes, and also regularly monitor the aflatoxin levels.



Side raised windrow



Raised ventilated platform

Some of the promising technologies for release/popularization

Beans

- High yielding, Fe & Zn content varieties => NUA 56, NUA 35, Pambela x NUA 59/5 and Pambela x AND 1602/2

Cowpeas

- High yielding/ bruchid-resistant LT 11-5-2-2, LT 4-2-4-1, NAMUSEBA, BB 7-9-7-5, BB PTR

Groundnuts

- High yielding, drought tolerant varieties => ICGV-SM series -08565, -08535, -08528, -08556, -03530; ICG 14788 and ICGV 00331
- Aflatoxin management practice => Floating & washing

Soya bean

- Early maturing, high yielding genotypes => TGx1485-1D, TGx1990-46F, TGx1990-52F, TGx1990-57F, TGx1995-5FN, TGx 183510E and TGx1990-55F
- Medium maturing, high yielding genotypes => TGx 1989-53FN, TGx 1987-62F, TGx 1990-111FN, TGx 1993-4FN, TGx 1990-80F, TGx1989-45F and TGx1990-106FN
- Agronomic practice => Inorganic fertilizer + inoculant + improved variety

Pigeon Peas

- Short-term, high yielding genotypes => ICEAP 00659, ICEAP 00660/3, ICEAP 01125, ICEAP 00612 and ICEAP 01101/2
- Medium-term, high yielding genotypes => ICEAP 01155, ICEAP 01146/1 and ICEAP 01172/1
- Genotypes resistant to *Fusarium* wilt => ICEAP 01155, ICEAP 01170 and ICEAP 01160

2.1.2. Technology dissemination

To date, the projects have disseminated 156 technologies, innovations and management practices (TIMPs). Malawi has so far disseminated 37 technologies (27 varieties and 10 agronomic practices). There are 12 projects that are integrated in innovation platforms to improve dissemination of technologies. In Mozambique, 63 improved technologies were made available to farmers: 11 varieties, 28 agronomic practices, 11 pest management practices, 5 disease management practices, 3 water management and 5 post-harvest technologies. To date, the project in Zambia has disseminated 46 TIMPs [31 improved varieties, 4 post-harvest technologies, 10 agronomic practices, and 1 improved integrated pest management practice]. The major technology dissemination pathways included use of the lead farmer approach, on-station trials, on-farm demonstrations, field days, print and electronic media and training manuals. In the 2015/16 cropping season 2,673 lead farmers participated in the technology dissemination activities. 5,877 demonstrations were established to showcase technologies that are being generated and disseminated by the project, and 1,558 field days were conducted, attended by 126,509 farmers (54,545 F).



Promising variety under dissemination of improved maize variety project in Malawi.



Soya bean under the dissemination of food legume based technologies project in Zambia.

2.1.3 Commodity Review and Planning Meetings

Regional commodity review and planning meetings were simultaneously conducted for the three commodities from 12 to 16 December 2016. The meeting venues were (a) Nampula, Mozambique (food legumes); (b) Lusaka, Zambia (maize and multiple crop projects) and (c) Lilongwe, (rice and cassava). The CG centres were invited to participate in the commodity meetings relevant to their mandate. CYMMIT was invited to the maize meeting; ICRISAT and CIAT were invited to the food legumes meeting and IRRI was invited to the rice meeting. Staff from the USAID Food Security Bureau in Washington participated in the food legumes meeting.

The meetings reviewed project implementation progress in the three countries and updated/finalised the R&D project documents (proposal, research protocol, technology dissemination action plan, workplan, budget, logframe and result framework, safeguards checklists) in preparation for 2016/17 cropping season. In addition, there were discussions around emerging research issues for the particular commodity; ideas for improving quality of science; plans for ensuring availability of quality seed; plans for strengthening partnerships; ensuring sustainability; capacity building needs; monitoring plans and schedules for exchange visits.



Maize and Multiple crops group in Lusaka, Zambia



Food Legumes group in Nampula, Mozambique

While some progress was made in meeting the expected outputs of the meetings; the final sets of R&D documents were still not submitted by 31 December 2016. For the

new projects starting in 2016/17 cropping season, this makes monitoring for compliance with peer review comments and recommendations difficult.

2.2 COMPONENT 2: STRENGTHENING REGIONAL CENTRES OF LEADERSHIP

Activities under this component aim at strengthening the institutional capacity that is required to establish the regional centres of leadership. Capacity strengthening focuses on the upgrading of physical infrastructure; improving administration and performance management systems; development of human resources needed to sustain program objectives and outcomes; upgrading ICT and knowledge management systems; strengthening seed production capacity, seed regulatory functions, and related services.

2.2.1 Upgrading of research infrastructure

During the reporting period, RCoLs procured farming and laboratory equipment and also renovated some research infrastructure.

In Malawi, a contract for infrastructure development of five satellite research stations was issued in November 2016 and the works are being tendered. A consultant to prepare detailed designs for the rehabilitation and construction of research infrastructure at Chitedze research station was also identified, and the detailed proposal is expected in January 2017.

In Mozambique, the rehabilitation of infrastructure [threshing floor; machinery sheds; office buildings; residences; warehouses; hydroponic greenhouse; laboratories; at the zonal centres (Chokwe, Lichinga, Nametil, Nampula, Sussundenga and Umbeluzi) is ongoing. The design work for the new research station (Namacurra) is complete, and the tender is expected to be launched in early 2017. Designs for the rehabilitation of small irrigation systems at three zonal centres [Umbelúzi (25 ha), Chókwè (36 ha), and Ribáue(50 ha)] are yet to be finalised.

In Zambia, APPSA in collaboration with E-Government designed ToRs to facilitate design, installation and maintenance of internet network system for 11 research stations [Copperbelt, GART, Kabwe, Mansa, Misamfu, Mochipapa, Mongu, Mt Makulu, Mutanda and Nanga]. Ten land cruisers and three buses were procured, and are awaiting delivery. Preparatory work for the design and supervision of roadworks for three stations [Kabwe, Msekera, Misamfu], and for rehabilitation of Mochipapa and Mt Makulu dams is in progress.



Rehabilitated Chokwe offices in Mozambique.



Wall fence construction at Mt Makulu Research Station in Zambia.

2.2.2 Improving administration and performance management systems

In Malawi, the APPSA Management Information System (MIS) was developed, and presented to stakeholders in August 2016. The system is yet to be fully operationalised because of electricity challenges which have resulted in the server being offline for lengthy periods. Plans are in place to outsource server hosting. APPSA facilitated the development of the DARS website, which will have a webmail facility. The DARS institutional assessment study was completed and the final report presented in December during the implementation support mission. However, the action plan was missing from the report. An inception report of the RCoL Science Plan was submitted in October 2016, followed by a diagnostic meeting in December: the final report is expected in February 2017.

In Mozambique, the institutional assessment was completed, and the report compiled, but also without the requisite action plan. The RCoL Science Plan is yet to be finalised. Preparations to develop a project MIS are in progress.

In Zambia, the RCoL Science Plan and Institutional assessment report were discussed during a validation workshop for ZARI, and the documents are yet to be finalised. Attempts were made to utilise the aWHERE platform as the project MIS, but unfortunately the service was discontinued; efforts are underway to develop a project MIS utilising alternative service providers.

2.2.3 Progress in Human Capital Development

Capacity building is addressing the capacity gaps identified in the 3 RCoLs, and is expected to contribute towards improved delivery of the research agenda of the respective RCoLs. In 2016, the total number of staff sent for long-term training, disaggregated by country, and by level of training was as follows:

Country	BSc		MSc		PhD		Total
	M	F	M	F	M	F	
Malawi	0	5	9	4	5	0	23
Mozambique	2	0	8	4	5	1	20
Zambia	1	0	0	2	1	0	4
Total	3	5	17	10	11	1	47

Since project inception, a total of 9 Diploma, 41BSc, 64 MSc and 30 PhD scholarships were awarded to RCoL and implementing partner staff. By 31 December 2016, eighteen staff from Zambia had successfully completed training at the different levels as follows: Diploma = 9; BSc = 7; MSc=2. Five hundred and sixteen (350M; 166F) extension personnel was trained in the various thematic areas listed in the table above, bringing to 1004 (634M; 370F) the total number of extension agents trained since project inception (Table 3). In 2016, 3454 farmers ((2166M; 1288F) were trained in various thematic areas listed in the Table 1 below, bringing to 15 783 (8701M; 7082 F) the total number of farmers trained to date.

Table 1: Training of RCoL staff, partner staff and farmers in 2016

	Thematic area	December 2016		
		Male	Female	Total
No. of BSc		3	5	8
No. of MSc		17	10	27
No. of PhD		11	1	12
Total		31	16	47
No. of days of technical training delivered to RCoL staff	<ul style="list-style-type: none"> ▪ Refresher training on Results framework ▪ Farm Management ▪ Procurement ▪ Monitoring and Evaluation tools, ▪ Seed multiplication, ▪ Development Evaluation - IPDET, ▪ PRIMAVERA Accounting System for financial management ▪ Maize Lethal Necrosis Disease (MLND) diagnosis, management and field evaluation ▪ Experimental layout, trial management and data collection ▪ Molecular characterisation and data analysis ▪ Germplasm survey and collection techniques 	1,897	459	2,356
No. of extension personnel trained disaggregated by gender & thematic area	<ul style="list-style-type: none"> ▪ Establishment and management of demonstrations ▪ Soybean production, utilization and processing ▪ Safe handling and use of agro chemicals ▪ Environmental Safeguards ▪ Benefits of Certified Seed ▪ CA practices ▪ Integrated Pest and Disease Management ▪ Pest surveillance methodology ▪ Improved rice cultivation techniques (lowland and upland rice) ▪ Integrated Crop Management technologies ▪ Sampling for genotyping of inbred lines ▪ Best agronomic practices and data recording 	1,183	304	1,487
No. of farmers trained, disaggregated by gender & thematic area	<ul style="list-style-type: none"> ▪ Farmer mobilization and sensitization ▪ Biochar Technology ▪ Soybean production ▪ Benefits of seed production ▪ Safe use of agro chemicals ▪ Construction of grain storage facilities ▪ Agro-processing (soybean, bambara nuts) ▪ Seed production (legume and rice) ▪ Rice conservation techniques ▪ Improved post-harvest curing structure for groundnuts ▪ Good agricultural practices 	2,166	1,288	3,454

2.2.4 Technical Backstopping and Networking

In an endeavour to facilitate exchange of information and lesson learning, CCARDESA facilitated a 6-day study tour for a 14-member team (APPSA National Coordinators, Directors of Research and key project staff in the APPSA implementing countries) to travel to Kenya on 14 February. The focus areas for the study were on programme implementation, infrastructure development, reforming the National Agricultural Research Systems, the science and technology dissemination agenda for KARLO. The team visited strategic programmes and institutions such as East Africa Agricultural Productivity Program (EAAPP), Kenya Agricultural and Livestock Research Organization (KALRO), Kenya Plant Health Inspectorate Services (KEPHIS),



APPSA and EAAPP team members with senior Department of Livestock officials

By the end of the study tour, the participants learnt about the strategies used to achieve excellence in the face of a challenging R&D environment, and learnt lessons to be incorporated into ongoing APPSA efforts, chief among which were:

- Close involvement of the of Steering Committee members with the project coordination unit (PCU) and other key stakeholders was among the success factors of the project;
- Existence of M&E position at Regional level (ASARECA) was key to the development and operationalization of a robust M & E system for the project
- Regional M&E quarterly meetings- trainings on e.g. data analysis, reporting, tools development also improved the implementation of the project
- Identification of flagship projects for showcasing successful regional projects improved political buy-in
- Team building, staff dedication and general hard work was key to success

The study tour report documented the following recommendations;

Capacity building

- Team building of interdisciplinary teams to improve team work
- Facilitate internal and external exchange programmes to strengthen project management and collaboration at all levels

Monitoring and Evaluation

- Recruitment of a regional APPSA M&E and Communication Officers
- Increase frequency of regional M&E working group meetings
- Improve reporting
- RCoLs need to conduct in country commodity meetings prior to the regional meetings
- The Regional Steering Committee should be more involved in the project - appraisals, field visits to enhance funds disbursement and project implementation as a whole

Coordination and Communication

- Identify flagship projects to improve political buy in at both national and regional levels
- Explore the Shamba Shape up model in communicating the various project activities

2.2.5 Strengthening seed production capacity/seed regulatory functions

Alignment with the Regional seed policy harmonization is proceeding slowly. In Malawi, APPSA engaged consultancy services for drafting of the seed policy and the seed bill. The policy is still awaiting cabinet approval. In Mozambique, the national legislation has passed, but regulations are still pending. In Zambia harmonization of the legislation in line with regional SADC policy is pending Cabinet approval. In all three countries, while APPSA financing has enabled an increase in basic/foundation seed, the levels produced are still far from sufficient. In order to address some of the challenges around breeder and foundation seed production, IIAM reorganized its basic seed unit (USEBA), which has a mandate to coordinate seed issues across the value chain and produce pre-basic and basic seed. In Malawi, Government proposed the establishment of a semi-autonomous National Seed Commission which will be responsible for seed certification & quality control. Zambia intends to follow the Mozambique example where a basic seed unit supports production. Meanwhile, Zambia allocated resources to the Seed Control and Certification Institution (SCCI) to strengthen its systems and structures for variety release, seed inspection, testing, quality assurance and certification.

2.3 COMPONENT 3: COORDINATION AND FACILITATION

At national level APPSA continues to be implemented within DARS, IIAM and ZARI with a team coordinating and managing the program on a day to day basis. The team is comprised of contracted consultants as well as Government staff.

CCARDESA takes the lead in coordinating regional activities and providing technical assistance to regional implementation in the areas of convening strategic meetings, establishing a platform for knowledge exchange, information sharing and networking; technical backstopping, monitoring and evaluation, policy harmonization and advocacy, training and dissemination. The funding constraints which CCARDESA experienced affected facilitation of APPSA activities, resulting in most of the planned activities not being implemented.

Implementation progress under this component was as follows:

2.3.1. Convening Regional Review and Strategic Meetings

2.3.1.1. Regional Peer Review of 3rd cycle R&D Proposals

CCARDESA developed and shared with RCoLs a call for the 3rd round of R&D project proposals for funding under APPSA. Based on the gaps in the first and second cycle portfolio of APPSA R&D projects, the third cycle focused on the following priority areas:

- Multi-crop Legume germplasm collection

- Seed Security
- Use of biotechnology to enhance and accelerate varietal development / dissemination
- Reducing pre- and post-harvest losses
- Food Safety/Value Addition and Marketing
- Agricultural mechanisation
- Climate Smart Agriculture
- Socio-economic studies
- Technology Dissemination

With expectations to join APPSA as soon as is feasible, Angola requested to participate in the third call for R&D proposals which was launched in March. The RCoLs received a total of 131 Concept Notes [64 Malawi; 33 Mozambique; 30 Zambia and 4 Angola], out of which a total of forty three were recommended for development into full project proposals. The 43 research proposals developed by the countries (Angola=4; Malawi=10; Mozambique=14 and Zambia=15) were submitted to CCARDESA for quality assessment. In accordance with the APPSA research project cycle guidelines, CCARDESA convened a meeting of regional peer reviewers (a multi-disciplinary team of six experts) from the 10th to 14th October 2016 in Johannesburg who reviewed the proposals in detail. The APPSA national coordinators were also invited to participate in the peer review. At the end of the exercise, a total of 25 projects [cassava=5; climate smart agriculture=3; legumes=10; maize = 5; rice=1; sorghum=1], were recommended for funding with effect from the 2016/17 cropping season. The proposals were rated as follows: highly satisfactory (3); satisfactory (11); moderately satisfactory (11). A report detailing the evaluation process, outcomes and recommendations on the proposals was compiled and forwarded to the RCoLs. The recommendations for improvement of proposals highlighted by the independent reviewers were to be effectively carried out before release of funds to the scientists. With 25 projects recommended for support after the regional peer review process, the total number of R&D projects funded under APPSA to date is seventy four. The full list of cycle 3 projects is given in (Annex 4). The cycle 3 projects were expected to commence in the 2016/17 cropping season.

2.3.1.2. Regional Steering Committee Meeting

The mandate of the APPSA Regional Steering Committee (RSC) is to guide, monitor and control APPSA activities and ensure that the programme implementation is in line with the objectives and the targets of the programme as stated in the APPSA Project Appraisal Document (PAD). Its membership comprises of Permanent Secretaries for Agriculture; two other nominated members per country (representing key stakeholders); CCARDESA and the World Bank (as observers). In attendance are the Directors for Research and APPSA Coordinators

It was agreed during the Midterm Review of the project in 2015 that the RSC will be a high level committee which will ensure closer and more regular supervision and coordination of APPSA during implementation. CCARDESA convened the 1st Steering Committee meeting in Lilongwe, Malawi on Friday, 2 December 2016, which was chaired by the Permanent Secretary for Malawi (Mrs. Erica Maganga).



Some of the key actions agreed upon were as follows:

(i) Project integration into host institutions

- RCoLs should commit to more regular reporting; participation in national steering committees
- Senior Ministry staff to participate in APPSA field monitoring visits

(ii) Harnessing and maximising CGIAR inputs into APPSA.

- There is need to strengthen partnerships, as APPSA is expected to complement R&D investments made by the CGIAR centres

(iii) Knowledge Management & Communication

- In order for the RCoLs to benefit the region, there is need to facilitate the transfer of agricultural technology, information and knowledge across national boundaries and beyond. Each RCoL to establish a knowledge repository and virtual library.
- Each RCoL to put in place measures to enable these knowledge repositories to work, which includes strengthening the human resource base

(iv) Long- and short-term Training of RCoL staff

- Countries to fast track scholarship awards process and increase the number staff to be trained in order to successfully address the existing capacity gaps.

(v) Seed Issues

- The project can pilot joint submission of varieties to the regional variety release system in 2017, i.e. do a test run for each commodity
- CCARDESA to obtain information on harmonized agro-ecological zones from SADC Secretariat and share with the countries to ease utilization of regionally released varieties.
- CCARDESA to share a pest and disease vulnerability map that indicates hot spots for potential outbreaks.

(vi) Maize Lethal Necrosis Disease

- There is need for concerted efforts to collaborate with East Africa region in fighting expansion of MLND into the region:
 - ✓ Information on MLND surveillance should be continuously shared
 - ✓ Collaboration on breeding activities in partnership with CYMMIT should continue

(vii) APPSA sustainability

- The national institutional assessments have dragged for too long and must be concluded: the information generated is expected to identify areas where APPSA support can facilitate specific actions to improve institutional functioning and other areas where policy or institutional reform are required. Both the Institutional Assessment Report (including Action Plan), and the RCoL Science Plan should be finalised by March 2017.
- CCARDESA to conduct a study on the options for autonomy and possibility of establishing revolving funds for RCoLs by Dec 2017.

2.3.2 Financial Management

During the year under review the total work plan budget for CCARDESA was \$ US\$964,331. The 2016 contributions received were as follows: Malawi = US\$261,975 (February) and Zambia = US\$ 90,000 (October). The absorption rate by 31 December 2016 was 28.7%. Disbursement of funds to CCARDESA was not done as expected due to some destabilizing challenges experienced at the Secretariat during the course of the year.

In Malawi, the financial absorption was at 27%, after spending US\$2,122,836 out of the planned US\$7,824,656 for the financial year. Component 2 had the lowest absorption rate of 16%, which was due to the nature of the activities to be implemented: designing of infrastructure was at initial stages. Mozambique had planned a budget of US\$8,080,000, and the utilisation rate was just over 30%. Some delays in contracting resulted in low disbursement rates under component 2. Zambia had planned a budget of USD10, 356,392 and the project utilised US\$5,452,103, translating to 52.6% absorption rate. The low expenditure rate (30%) under component 2 was due to non-completion of most of the major goods and civil works in the procurement plan.

Overall, there has been no significant improvement in the utilization of funds across the countries, particularly under component 2. This has been mainly due to some delays in procurement processes, particularly for infrastructure components in all the three countries. There is need to fast track these processes.

Because the Special Drawing Rights (SDR) continues to devaluate against the US\$, the countries have lost part of the real monetary value of their grant facility on the undisbursed amounts. This requires tight monitoring to avoid commitment of non-existent funds.

2.3.3 Environmental and Social Safeguards

Compliance to National Environmental Policies to prevent and mitigate undue harm to people and their environment in the development process is promoted and monitored under APPSA. Some of the key environmental and social safeguards activities that were undertaken by RCoLs include (i) training of extension workers and project staff in safe use of agrochemicals (ii) training in fire-fighting, first aid and general occupational safety (iii) inventory of obsolete pesticides (iv) revision of laboratory safety guidelines (v) principles of integrated pest management. Following the approval of 3rd call R&D projects, the RCoLs with assistance from the World Bank environmental and social safeguard expert conducted screening of the new projects to identify potential activities that may bring about negative social and environmental impacts. Compliance of R&D projects to environmental and social safeguards was closely monitored. Inventories of obsolete stockpiles in laboratories at research stations around the countries were completed in Zambia, but were yet to be finalized in Malawi and Mozambique. Once the inventories are completed, discussions will be undertaken in all three countries to facilitate decisions on the disposal of obsolete stockpiles.

2.3.4 Monitoring and Evaluation (M&E)

The key M&E activities that were undertaken during the reporting period are described below:

2.3.4.1 M&E working group (WG) meetings

CCARDESA organized two meetings (February and May) for the APPSA M&E working group (Coordinators and M&E officers) to review regional indicators and incorporate proposed additional indicators as per the recommendation by the first APPSA Midterm review. This activity was undertaken in consultation with the World Bank M&E expert who provided guidance on the definitions of the indicators and development of a revised regional Result Framework. By the end of the second meeting, the revised set of regional indicators was drafted and proposed additional APPSA PAD Results Indicators reviewed.

In an effort to improve the quality of reporting by R&D scientists, the M&E working group reviewed the template for reporting on R&D projects to ensure that all the relevant data required for updating the national results frameworks and that technical information being generated by the projects would be properly captured. Following this exercise, the M&E teams conducted workshops for scientists to create awareness on the revised indicators, regional result framework, reporting template and other M&E related topics.



M&E WG members & Communication focal persons at meeting in Johannesburg

2.3.4.2 R&D Project Performance Assessment

In March, 3 independent reviewers (one from each APPSA country) were invited to undertake a review of R&D projects being implemented under APPSA in order to establish the status of implementation and assess the overall performance of the R&D projects. Country teams also undertook the same exercise in their respective countries. The reviews were based on a monitoring checklist that was developed by CCARDESA and shared with the countries. The results of the assessments were used by the RCoLs to decide on whether to request for a no-cost extension or not (Annex 3). This was a crucial exercise since the majority of projects from the first round of funding missed the first cropping season, or experienced serious delays in implementation. Based on the performance assessments, 90% of the projects from cycle one were deemed to be performing reasonably well and recommended for a no-cost extension in Malawi. In Mozambique and in Zambia, the proportion of projects which required a no-cost extension was 100% and 81%, respectively. In total, five projects from cycle 1 of funding (Malawi=1 and Zambia=4) were concluded, although not in entirety as some activities continued in the collaborating countries.

2.3.4.3 Implementation Support Mission

Annually, two joint Government/CCARDESA/World Bank Implementation support Missions are undertaken to assess progress in implementation of project activities. The missions were undertaken to review the project implementation status and assess whether activities are proceeding as planned. The first Implementation Support Mission for 2016 was undertaken in April and started in Zambia through Malawi and concluded in Mozambique with a regional wrap up meeting in Nampula. The second mission was undertaken in November and commenced in Mozambique through Zambia and ended in Malawi with a regional wrap meeting in Lilongwe. During this process, the missions held detailed discussions with a range of stakeholders within each of the three implementing agencies, as well as staff of the respective Ministries of Agriculture and other project stakeholders, who were also invited to attend the wrap-up meetings.



ISM team field visit in Nampula



ISM team visit to Sunseed oil producing company in Malawi

Key observations/recommendations of the Missions were:

Technology generation and dissemination

The interventions APPSA could consider include:

- Linkages to extension have expanded and this is expected to result in improved sharing of information and skills on the different technologies that are being promoted. More work is needed on cost benefit analysis within R&D projects so as to assess impact of technologies and educate farmers on the benefits of using such technologies
- APPSA should consider accelerating the generation of technologies; identifying complementary partnerships to increase impact and intensifying training of farmers on dissemination
- Project could consider a 4th round of short-duration projects (1 to 2 years) focusing on socio-economics work and machinery testing
- There is need to improve interaction between M&E and scientists in order to meet set targets. Training on data analysis should take place in all countries
- Strengthen value addition of all commodities
- While reporting has somewhat improved, it still requires attention from management, and should be a factor in deciding on any no cost extension.

Seed issues

- The project could consider (i) developing the capacity of seed actors, including seed inspectors, seed growers and seed traders and strengthening coordination among actors involved in the seed chain, (ii) Maintenance of varieties and increasing awareness of the new improved varieties, (iii) facilitating the process of joint submission of varieties to the regional variety release system on a pilot basis and (iv) collaborating with USAID Feed the Future Southern Africa Seed Trade Project in some of the activities it is planning to implement to support Harmonised Seed Regulations (HSR).

Mentorship

- Mentorship could be developed to promote a culture of learning and improve the quality of science undertaken in the R&D projects. CCARDESA in collaboration with the RCoLs can identify potential mentors and facilitate a structured leadership and mentoring training the mentorship process.

Safeguards

- Systematic capture and reporting on safeguards is required in order to demonstrate that the project is in compliance with the Bank's safeguard policies as well as relevant Government laws.
- Countries need to appreciate the importance of safeguards in rehabilitation/construction works and in R&D projects. Safeguards issues need urgent attention in some cases. Farmer safety training on herbicide and pesticide use should be scaled up. Obsolete pesticide require attention for storage and disposal

Monitoring & Evaluation

- There is need to expedite establishment of the Management information system (MIS); countries can explore options with Malawi MIS service provider
- RCoLs should convene report writing sessions for PI/co-PIs so that complete reports can be produced before the reporting deadlines.
- Management information systems (MIS) complete reports
- Holistic monitoring, including on fiduciary and safeguards issues should be undertaken at all times

Institutional strengthening

- The institutional assessments which commenced more than a year ago need to be completed, and concrete action plans developed and shared with relevant authorities
- There is continued progress in rehabilitation/construction works, albeit still slow in some cases. Fast tracking designs and signing of contracts for infrastructure development is required.

Strengthening partnerships with CG Centres

- Because the scaling up of R&D activities under APPSA may also require commitment by CG centres to scale up their support activities, there is need for discussions on the specific support which is required

Project execution

- RCoL Coordination offices need to pro-actively work with scientists in order to improve project performance
- Coordination activities during peak periods need to be improved. One option is to consider use interns to manage the workload.
- Visibility of APPSA should be enhanced

Project Performance Ratings

The ratings for implementation of APPSA in the 3 countries were as follows:

Category	Malawi	Mozambique	Zambia
Overall implementation progress	Moderately satisfactory	Moderately satisfactory	Moderately satisfactory
M&E	Moderately satisfactory	Moderately Unsatisfactory	Satisfactory
Safeguards	Moderately Unsatisfactory	Moderately Unsatisfactory	Satisfactory
Financial Management	Unsatisfactory	Moderately Satisfactory	Moderately Satisfactory
Procurement	Moderately Satisfactory	Satisfactory	Moderately Satisfactory

Countries are encouraged to closely monitor performance across all categories against which the project is rated in order to improve on the poor ratings

2.3.5 Communication and Knowledge Management

In order to elicit ownership of the project communication strategy, CCARDESA convened a writeshop from 1 to 5 February with communication focal points from the APPSA implementing countries to draft a regional Communication Strategy. The strategy that was produced is designed to provide a structured framework for both internal and external communications for the project. It also highlights a number of key interlocutors who are important target audiences or stakeholders for APPSA while also defining the tools which the project will employ to engage them. The draft was circulated to the countries for further review, following which a communication implementation plan will be finalised and implemented. A summary of what the Communication Strategy entails was presented during the Implementation Support Mission in November 2016.



Joint Communication and M&E WG Communication Strategy writeshop in February 2016

2.3.6 APPSA Expansion

In January 2016 CCARDESA held discussions with key Government officials in Lesotho following the country's expression of interest to join APPSA. The country was advised to prepare a concept note for sharing with their Ministry of Finance and the World Bank. CCARDESA visited Angola in June, together with the two legume lead scientists from Mozambique and Zambia for further discussions on joining APPSA, and finalizing current legume projects which Angola can participate in. Discussions with Angola and World Bank on Angola implementing R&D activities under APPSA continued during the course of the year. In preparation for funding under APPSA, Angola submitted three proposals under 3rd cycle of funding and they were recommended for implementation, with collaborators in Mozambique and Zambia. Angola will also be collaborating in 6 ongoing legume projects, and 5 new projects from the 3rd cycle, giving a total project portfolio of 14. Angola wishes to be the Regional Centre of Leadership in Cassava, but also with a significant amount of work in legumes. Swaziland requested CCARDESA to facilitate a benchmarking visit for them to Mozambique to learn more about the project before they can finalise their decision to join APPSA. The trip could not be financed by CCARDESA.

3.0 LESSONS LEARNED

- The results oriented reporting appears to be done at the expense of process monitoring, which leads to under reporting. It should be noted that at the start of R&D projects with slow delivery rate, there are usually no results to report on but processes and steps towards getting the results. Therefore, process monitoring remains critical, and should be managed so that the project doesn't under report on key processes and deliverables.
- Technical backstopping and mentoring is required to assist the young R&D scientists with the necessary skills and knowledge they need to improve the quality of research outputs.
- Regular monitoring visits to project sites by M&E teams which include multi-disciplinary seasoned scientists help provide the required technical backstopping to field staff.
- If the project is going to succeed in increasing availability of improved technologies to farmers, there is need for functional involvement of key stakeholders in the value chain, particularly extension/advisory service providers and private sector in the dissemination activities.
- The programme will greatly benefit from wider collaboration and partnerships with key stakeholders. Partnerships with CGIAR centres facilitate germplasm availability and improve help improve the quality of science.
- Strong leadership support and basic understanding of the value of M&E by management are critical for successful M&E. There should be demand for accountability.

4.0 KEY CONSTRAINTS

- Delayed commencement of the rainy season affected commencement of rainfed R&D activities in the three countries.
- Implementation of the planned regional activities was affected by unavailability of adequate project funds at CCARDESA; a significant proportion of the planned activities were not implemented.
- Scientists' exchange visits were not facilitated in a manner to be effective. These visits to exchange experiences are essential to embrace the regional nature of the expected project outcomes.
- Lack of required research equipment continued to be a challenge for some projects. Delayed rehabilitation of laboratories hampered some of the crucial research work that should have been undertaken. Mitigation of dry season effects is still a challenge due to non-availability of irrigation facilities. Some of the breeding work which is expected to continue during the dry season under irrigation is not undertaken because of this challenge. All this impacts negatively on projects' expected outputs.
- Delayed reporting is still a major issue across RCoLs. There is also under reporting on the achieved outputs. There is need for commitment to adhere to the reporting schedule, and to produce acceptable reports (timely, complete, consistent and accurate). Limited team commitment to quality and timely reporting remains a big challenge.

- The delays in accessing funds by Angola delayed implementation of their proposed activities.
- Failure to meet the agreed deadlines is still an issue that needs to be addressed as a matter of principle.

5.0 RECOMMENDATIONS

- There is need to fast track rehabilitation of irrigation infrastructure and green houses to fast track breeding programmes across all the commodities in the three implementing countries. Other outstanding research equipment such as , key laboratory equipment and software for data collection and analysis needs to be procured as a matter of urgency, otherwise the investments that have gone into R&D efforts will go to waste. Quality of scientific outputs will be greatly compromised.
- Timely, balanced, accurate and objective reporting is critical and should be encouraged by management. Progress reflection and reporting should be properly planned for to avoid last minute rush and poor quality inputs to progress reporting.
- Scientists' exchange visits should be properly planned for and facilitated.
- More formalized critical progress reflection platforms are key for timely and quality progress input provision – these need to be strengthened at RCoL level and should be mandatory, otherwise the whole essence of progress reflection is lost.
- M&E is a management function; therefore management should take an active and objective interest to help shape how M&E can contribute to effective decision making. Delayed progress reporting compromises the value of M&E outputs, and stale information is not useful for decision making.
- Prioritisation of dissemination interventions is a must if the project is to be able to easily demonstrate impact of R&D interventions.
- Mentorship and technical backstopping should continue in conjunction with scheduled monitoring visits by multi-disciplinary teams. RCoLs are requested to develop schedules for monitoring visits during the cropping season and ensure that all projects are monitored by the multi-disciplinary teams.
- RCLs should ensure that the R&D projects document success stories. There is a lot of success in the R&D work being implemented, but the success is not being shared.

6.0 CONCLUSION

While progress in implementation has been noted, overall progress performance of the project has remained moderately satisfactory. There is need to adequately monitor performance of the aspects of project implementation that are deemed not satisfactory. These include funds disbursements, safeguards compliance and reporting, slow project implementation, poor, late and inaccurate reporting. There is need for concerted efforts to improve on dissemination activities if spill-over of technologies across national boundaries is to be achieved.

Annex 1: Status of PDO Results Indicators as at 31 December 2016

PDO Level Results Indicators	Unit of Measurement	Y3 target Total	Progress report as at December 2016						TOTAL	Comments
			Target Values Y3 (2016)			Actual Values Y3 (2016)				
			MWI	MOZ	ZAM	MWI	MOZ	ZAM		
1. # of technologies being made available to farmers & other end users ¹	No.	65	25	19	21	47	63	46	156	The following technologies are being disseminated across the commodities: Malawi 47: 37 seed varieties; 10 agronomic practices. Mozambique 63: 11 seed varieties; 28 agronomic practices, 16 pest and diseases management practices, 3 water management practices, 5 post-harvest technologies. Zambia 46: 31 seed varieties; 15 agronomic practices.
2. % of Lead Farmers in targeted areas who are aware of an improved technology promoted by the Project ²	%	80	80	80	80	97	-	-		Zambia completed their Baseline survey but the percentage of Lead Farmers was not reported on. Mozambique is yet to undertake the study.
3.# of technologies generated or promoted by the Project in one country that are released in another country	No.	70	12	3	9	70	22	48	140	Malawi promoted 70 technologies, (55 seed varieties and 12 agronomic practise, 1 post-harvest and 2 pests and diseases management). Mozambique promoted 22 technologies, (13 seed varieties and 9 agronomic practices).

¹ From the agriculture perspective, the term ‘technology’ refers to the tools, methods or machinery that are used primarily or entirely in order to support agricultural enterprise. There are many categories of agricultural technologies within the production to marketing value chain, and these include mechanical (tractors, combines, power tiller, thresher, milling machine, pliers, hoe, spade), biological (new seed varieties), chemical (fertilizers, pesticides, herbicides), agronomic innovations (new management practices) etc. In all cases the application of agricultural technologies aims to increase production and productivity in a cost effective or efficient way, and the level of agricultural production or productivity is guided by the technology that is being used in farming.

The indicator refers to the technologies developed and/or promoted by the Project. “Availability” will be measured by whether farmers have access to the improved technologies (e.g., improve seed varieties, inputs, knowledge about improved management practices etc.) developed by any of the regional APPSA R&D Project. Data will be collected by surveys of local input markets and local extension / advisory programs. If a technology is found to be available in at least 40% of the targeted administrative district and markets, then it is considered “available to farmers and other end-users”.

² “Lead farmers” represent the group of innovative and successful farmers within the local community who are committed to training their fellow farmers on agriculture methods and technologies. Typically, they are selected by the community and registered as “lead” (sometimes also called “contact” farmers) with the field extension office in a given administrative unit (e.g. district, block). They are in direct contact with researcher or extension agents to help champion the demonstration of a technology in their areas. Awareness will be measured through periodic surveys of farmers that will measure their awareness of specific technologies promoted by the Project. This indicator will be disaggregated by gender.

PDO Level Results Indicators	Unit of Measurement	Y3 target Total	Progress report as at December 2016						TOTAL	Comments
			Target Values Y3 (2016)			Actual Values Y3 (2016)				
			MWI	MOZ	ZAM	MWI	MOZ	ZAM		
										Zambia promoted 48 (23 seed varieties, 4 processing technologies, 14 agronomic practices, 4 integrated pest management and 3 post-harvest technologies. NB: Data on this indicator was not correctly captured. Countries reported technologies being promoted within their systems but did not indicate how many of these were released in another country.
Beneficiaries										
4. Direct Program beneficiaries ³	No.	3,606,000	1,202,000	1,202,000	1,202,000	110,432	155,010	322,115	587,557	This number of beneficiaries includes those individuals who were the direct recipients of technical cooperation aimed at strengthening their capacity to undertake development tasks that are directed at them. The numbers of beneficiaries reached by the projects through awareness creation activities were not quantified.
of which LFs	No.	6,000	2,000	2,000	2,000	3,014	3,547	1,714	8,275	
of which other farmers	No.	3,600,000	1,200,000	1,200,000	1,200,000	107,418	151,463	320,401	579,282	These are follower farmers who learn from the Lead Farmers. However, these figures do not cover farmers reached through electronic media and road shows.

³ “Direct beneficiaries” refers to the persons (e.g. Lead Farmers, contact farmers, other farmers and their dependent family members living in the same household) in the project target region who in the first instance utilize project outputs (i.e., knowledge, improved materials and technologies) AND their immediate household members that are benefiting from the research outcome (i.e., the utilization of the research output). Household members are included in the beneficiary count of dissemination projects as the project is intended to bring changes in their livelihood too. Meditation

PDO Level Results Indicators	Unit of Measurement	Y3 target Total	Progress report as at December 2016						TOTAL	Comments
			Target Values Y3 (2016)			Actual Values Y3 (2016)				
			MWI	MOZ	ZAM	MWI	MOZ	ZAM		
of which female (%)	%	>30	>30	>30	>30	41	30	42		
Intermediate Result 1: Collaborative technology generation & dissemination around priority farming systems										
5. # of collaborative research or extension projects under implementation	No.	35	30	35	7	21 [58]	20 [57]	31+2 [69]	74	An additional 25 R&D projects were approved under cycle 3 funding, bringing the total to 74. Malawi is leading in 21 and collaborating in 37; Mozambique is leading in 20 and collaborating in 37; Zambia is leading in 31 and collaborating in 38. Angola was expected to implement 16 (leading in 3) but none of the projects commenced during the period under review.
6. % of collaborative research or extension projects completed	%	75	75	75	75	4	0	10		Malawi terminated 2 R&D projects out of 46 and Zambia 4 projects out of 46. NB: although six projects were terminated activities still continued in the collaborating countries. Therefore, no projects were recorded as completed.
7. # of technologies generated	No.	70	23	23	24	2	9	9	20	Malawi generated 2 rice seed varieties. Mozambique generated 9 technologies: 2 seed varieties, 1 agronomic practice, 2 pest and disease management practices and 4 post-harvest technologies. Zambia generated 9 seed varieties, (6 legume; 1 rice and 2 maize). These technologies are being promoted in the three countries.
Intermediate Result 2: Improved technical capacity to lead national and regional research and dissemination agenda										

PDO Level Results Indicators	Unit of Measurement	Y3 target Total	Progress report as at December 2016						TOTAL	Comments
			Target Values Y3 (2016)			Actual Values Y3 (2016)				
			MWI	MOZ	ZAM	MWI	MOZ	ZAM		
8. # of clients (RCoL staff) days of training (disaggregated by gender & type of training)	No.	6000	700	700	1,780	928 (243F)	806 (39F)	622 (177F)	2,356	The RCoLs spent 1,048 days on short term training in 2016. The short term training covered, Results Based Farm Management, M&E, Development Evaluation-IPDET, refresher training on Results framework, safeguards compliance, benefits of certified seed, CA practices, Integrated Pest and Disease Management, soybean production, utilization and processing
9. # of research centers rehabilitated or equipped	No.	9	3	3	3	0	6	1	7	Seven research centres have been rehabilitated. Mozambique: 6 (these include rehabilitation of offices, staff houses, rice and seed warehouses, threshing floor, greenhouses, laboratory, and storerooms). Zambia: 1 (wall fence, tractors, laboratory equipment, street lights).
Intermediate Result 3: Effective structures and systems for regional collaboration and R&D management										
10. Common M&E system being used by APPSA participating institutions	Yes/No	Y	Y	Y	Y	Y	Y	Y	Y	A regional M&E framework, monitoring tools and reporting templates are in place to guide M&E work at national and regional levels. Malawi has developed an online MIS while Mozambique and Zambia are yet to develop the system. CCARDESA is in the process of developing a regional MIS.
11. # of APPSA AWP drafted discussed & agreed on time	No.	12	3	3	3	3	3	3	12*	The annual work plans for the RCoLs were drafted and approved by the respective National Steering Committees / Technical Committee. CCARDESA developed a regional work plan that was shared and endorsed by the countries in December. *this includes 3 regional work plans

PDO Level Results Indicators	Unit of Measurement	Y3 target Total	Progress report as at December 2016						TOTAL	Comments
			Target Values Y3 (2016)			Actual Values Y3 (2016)				
			MWI	MOZ	ZAM	MWI	MOZ	ZAM		
12. # of countries with redrafted revised seed policy in compliance with SADC harmonization framework	No.	3	1	1	1	0	1	0	1	Malawi and Zambia Seed Policies have been drafted but awaiting approval. Mozambique framework was finalised and ready for implementation.

Annex 2: 2016 APPSA Regional Work Plan and Progress Achieved

The funding constraints which CCARDESA experienced between May and October affected implementation of most planned activities.

Main Activities	Sub activities	Progress
1.1. Regional Review and Strategic Meetings	1.1.1 Regional Workshop on Endorsement of Project Concept Notes	<ul style="list-style-type: none"> CCARDESA drafted the concept note for 3rd call for proposals, and RCoLs were requested issue the call for proposals in March. They received 131 concept notes: Angola 4; Malawi 64; Mozambique 33 and Zambia 30 Concept Notes which were reviewed by a national team of experts. No regional concept note endorsement workshop was conducted due to lack of funds at CCARDESA. A total of 42 shortlisted proposals were submitted to CCARDESA for a regional peer review. These were distributed as follows: Angola 3; Malawi 10, Mozambique 14 and Zambia 15.
	1.1.2 Regional peer Review of R&D Proposals	<ul style="list-style-type: none"> CCARDESA invited a multi-disciplinary team of six reviewers to review the 42 proposals developed by Regional Centres of Leadership (RCoLs). APPSA national coordinators were also invited to participate in the review exercise. Twenty five projects (Maize: 5; Food legumes: 10; Cassava: 5; Climate Smart Agriculture: 3; Rice: 1; Sorghum: 1), were recommended for funding with effect from the 2016/17 cropping season. The project proposals were rated as follows: highly satisfactory (3); satisfactory (11); moderately satisfactory (11).
	1.1.3 Regional Planning and Review Workshop with broader groups of APPSA stakeholders and partners	<ul style="list-style-type: none"> CCARDESA was part of the organizing committee for the Joint Pan African Grain Legume and World Cowpea Conference which took place in Livingstone, Zambia from 28 February to 4 March 2016. This workshop was attended by some of the scientists in the APPSA programme who had an opportunity to share preliminary results of their R&D interventions through exhibitions, presentations and posters.
2.1 Technical Backstopping and Networking	2.1.1 Facilitate the convening of Commodity Technical Group Meetings for RCoLs	<ul style="list-style-type: none"> CCARDESA conducted three regional commodity review and planning meetings from 12 to 16 December 2016. The food legumes team met in Nampula, Mozambique while the maize team, which included the projects on multiple crops met in Lusaka, Zambia. The rice and cassava teams, together with the conservation projects met in Lilongwe, Malawi. The objectives of the meetings were to review project implementation progress in the three countries, update R&D

Main Activities	Sub activities	Progress
		<p>project documents, develop work plans, budgets, log frames and result frameworks for 2016/17 cropping season.</p> <ul style="list-style-type: none"> ▪ GCIAR staff was invited to the meetings to provide technical support. CYMMIT was invited to the maize meeting; ICRISAT and CIAT were invited to the food legumes meeting and IRRI was invited to the rice meeting. ▪ The USAID Food Security Bureau in Washington and System of Rice Intensification (SRI) project in West Africa Agricultural Productivity Program staff were also invited to participate in the food legumes meeting and rice meeting respectively. However, the SRI staff did not attend due to logistical challenges. ▪ CCARDESA developed and shared a report template with the National Coordinators and Lead Scientists to assist in compiling the meeting reports. Only the maize group submitted a report.
	2.1.2 Facilitate exchange visits for Scientists	<ul style="list-style-type: none"> ▪ RCoLs were requested to monitor and supervise exchanges of agricultural scientist teams as a means of advancing agricultural science and technology and ensuring clarity and mutual understanding of goals and objectives of the R&D projects. ▪ Some scientists undertook field visits to their counterparts' projects and jointly participated in activities like monitoring visits and field days.
2.2 Monitoring and Evaluation	2.2.1. Recruit Consultant to develop a dynamic M&E online system	<ul style="list-style-type: none"> ▪ ToRs for the consultancy were developed and shared with the World Bank and were approved. Request for Expression of Interest was circulated through the CCARDESA website and CCARDESA received six submissions from the region which were evaluated. ▪ The top 3 proposals (technical) were requested to submit financial proposals. Finalisation of the recruitment process was deferred to 2017 due to insufficient funds.
	2.2.2. Prepare APPSA semi-annual and annual reports	The first semi-annual report for 2016, covering January to December 2016 was shared with the countries and the World Bank.

Main Activities	Sub activities	Progress
	2.2.3. Carry out routine Technical backstopping/monitoring visits.	<ul style="list-style-type: none"> Technical backstopping was provided for the regional review of R&D projects which was undertaken by three independent reviewers, one from each of the implementing countries. The reviews followed the monitoring checklist which was developed by CCARDESA and shared with the countries as well as the World Bank. A total of 37 R&D projects were assessed. Overall, at least 80% of the projects were found to be on target towards meeting the project objectives. However they would require a no-cost extension due to the delayed start during the first year of implementation. The review report was shared with the RCoLs and presented during the Implementation Support Mission in April.
	2.2.4. Regional M&E working group meetings	<ul style="list-style-type: none"> The first Midterm review of APPSA recommended a revision of some of the indicators in the Regional Results Framework. CCARDESA organized two meetings (in February and May 2016) for the APPSA M&E working group to review the regional indicators and reference guidelines. The revised documents were shared with the World Bank. The meetings also revised the reporting templates for R&D projects so that all the relevant and technical data generated by the projects for updating the national results frameworks would be properly captured.
	2.2.5. CCARDESA/WB Implementation Support Missions	<ul style="list-style-type: none"> Two implementation support missions per year were proposed in the design of the project. The missions are undertaken to assess progress in implementation of project activities. CCARDESA participated in the two joint Implementation Support Missions (ISM) which were conducted in April and November 2016. Other participants in both missions were representatives from Governments, World Bank and CGIAR. Overall implementation progress was rated moderately satisfactory in both missions.
2.3 Developing the APPSA	2.3.1 Recruit a Consultant to develop a Regional	<ul style="list-style-type: none"> A consultant was engaged to facilitate the drafting of the Communication Strategy during the <i>writeshop</i> in February with Communication focal points from the APPSA

Main Activities	Sub activities	Progress
communication Strategy	Communication & Knowledge Management Strategy	implementing countries. The draft strategy was circulated to the countries for further review and development of action plans.
	2.3.2 Regional Communication Working group meetings	Communication focal points were part of the Communication Strategy <i>write shop</i> conducted in February 2016.
	2.4.2 Maintain APPSA Webpage	<ul style="list-style-type: none"> ▪ CCARDESA initiated a review of its website and APPSA webpage, following comments made during the April ISM. ▪ The following documents were uploaded on the APPSA webpage: first regional technical report covering 2013-2014, 2015 annual report, 2016 first semi-annual report, 3 success stories, APPSA brochure in the three SADC languages, project summaries and project fact sheet.
	2.4.3 Create awareness about APPSA Programme in other SADC countries	<ul style="list-style-type: none"> ▪ A visit was undertaken to Lesotho in January to hold discussions with the team following the country's expression of interest to join APPSA. The country was advised to prepare a concept note for sharing with their Ministry of Finance and the World Bank. ▪ CCARDESA visited Angola in June, together with the two legume lead scientists from Mozambique and Zambia for further discussions on joining APPSA, and finalizing current legume projects which Angola can participate in. Further discussions with Angola and World Bank on Angola implementing R&D activities under APPSA continued. ▪ Swaziland requested CCARDESA to facilitate a benchmarking visit for them to Mozambique to learn more about the project before they can finalise their decision to join as the Regional Centre of Leadership in sweet potatoes. The trip was deferred due to unavailability of funds.
2.4 Out scaling of technology	2.5.1 Facilitate capacity building of the scientist on technology dissemination and scaling up	The workshop was re-scheduled to take place in 2017 due to insufficient funds at CCARDESA.

Main Activities	Sub activities	Progress
dissemination	2.5.3 Regional workshops on technology dissemination	The workshop was re-scheduled to take place in 2017 due to insufficient funds at CCARDESA.
2.5 Knowledge management and exchange sharing	2.6.3 Facilitate a study tour to EAAPP	<ul style="list-style-type: none"> ▪ CCARDESA facilitated a 6-day study tour for a 14-member team (APPSA National Coordinators, Directors of Research and key project staff in the APPSA implementing countries) to travel to Kenya in February. The major objective of the study tour was to benchmark with the East Africa Agricultural Productivity Program (EAAPP) and other strategic institutions and programmes on programme implementation, Infrastructure Development, Reforming the National Agricultural Research Systems, the Science and Technology Dissemination Agenda for KARLO.
3.1 Policy Harmonisation and Advocacy	3.2.1 Facilitate a regional workshop on seed	The workshop could not take place due to inadequate funds at CCARDESA.
	3.2.2. Convene Regional Steering Committee meeting	<ul style="list-style-type: none"> ▪ The first Regional Steering Committee meeting was held in Lilongwe, Malawi on Friday, 2 December 2016. The meeting was attended by Permanent Secretaries for Agriculture (or their representatives); other nominated members of the steering committee, Directors for Research, APPSA Coordinators, CCARDESA and the World Bank TTL. The key objective of the 1st Steering Committee meeting was to review progress with the implementation of the components of the project since inception, discuss achievements and challenges in project implementation and guide the activities to ensure that the programme implementation is coherent and consistent with the objectives and the targets of the project as stipulated in the PAD.

Annex 3: Cycle 1 R&D Project recommendations for no-cost extension

PROJECT CODE	PROJECT TITLE	Lead country	Recommendations		
			MALAWI	MOZAMBIQUE	ZAMBIA
MZ-P01-2013	Improving nutritional quality in maize in Mozambique, Zambia and Malawi	Mozambique	○	○	○
MZ-P02-2013	Disseminating improved maize varieties and agronomic practices among smallholder farmers	Zambia	○	n/a	○
MZ-P03-2013	Development and improvement of inbred lines tolerant to major storage pests	Zambia	○	○	○
MZ-P04-2013	Improvement of integrated maize / dairy production systems	Malawi	○	n/a	○
MZ-P05-2013	Improvement of post-harvest management practices in maize	Mozambique	○	○	○
MZ-P06-2013	Development of maize varieties resistant to major diseases in Mozambique, Malawi and Zambia	Mozambique	○	○	○
MZ-P07-2013	Screening and promotion of Striga tolerant maize varieties in Malawi, Mozambique and Zambia	Malawi	○	○	○
MZ-P08-2013	Maize germplasm collection and characterization for climate change adaptation	Malawi	○	○	○
MZ-P09-2013	Improving water use efficiency in maize production	Mozambique	○	○	○
RC-P01-2013	Rice germplasm collection and characterization	Mozambique	○	○	○
RC-P02-2013	Development of improved rice varieties	Mozambique	n/a	○	○
RC-P03-2013	Enhancing productivity of improved rice varieties through the development of integrated crop management practices	Mozambique	○	○	○
RC-P04-2013	Promotion and dissemination of improved rice technologies for sustainable production	Mozambique	○	○	○
RC-P05-2013	Strengthening rice seed delivery system for enhanced production among smallholder farmers	Zambia	n/a	○	○

Key: ○ - Project has ended ○ - 1 year no-cost extension ○ - 2 year no-cost extension
n/a - Country not collaborating ○ - Project suspended

Annex 3: Cycle 1 R&D Project recommendations for no-cost extension

PROJECT CODE	PROJECT TITLE	Lead Country	Recommendations		
			MALAWI	MOZAMBIQUE	ZAMBIA
LG-P01-2013	Improving bean productivity in low soil fertility and drought prone areas	Mozambique	○	○	○
LG-P02-2013	Developing bean varieties for high Fe and Zn with resistance to ALS and CBB	Zambia	○	○	○
LG-P03-2013	Adaptation and promotion of bruchid resistant bean varieties in Malawi, Mozambique, and Zambia	Malawi	○	○	○
LG-P04-2013	Improving groundnut productivity in low soil fertility and drought prone areas of Mozambique, Malawi and Zambia	Mozambique	○	○	○
LG-P05-2013	Breeding groundnut Varieties for multiple disease resistance, for quality and food market access in Mozambique and Zambia	Zambia	n/a	○	○
LG-P06-2013	Strengthening food legume seed delivery systems in Malawi, Mozambique, and Zambia	Zambia	○	○	○
LG-P07-2013	Up-scaling improved soybean production and utilization for enhanced nutrition and income generation	Zambia	○	○	○
LG-P08-2013	Developing high yielding soybean varieties that are resistant to major diseases and with preferred market traits	Zambia	○	○	○
LG-P09-2013	Developing high yielding varieties and sustainable management practices for improved cowpea production	Zambia	○	○	○
LG-P10-2013	Development and promotion of improved pigeon pea varieties for increased and sustainable production	Malawi	○	○	○
LG-P11-2013	Enhancing dissemination of food legume based technologies for increased production	Zambia	○	○	○
SG-P01-2013	Promoting the adoption of improved management practices for increased Sorghum production in Zambia	Zambia	n/a	○	○
TOTAL			19	24	21

Key: ○ - Project has ended ○ - 1 year no-cost extension ○ - 2 years no-cost extension n/a - Country not collaborating ○ - Project suspended

Annex 4: List of Approved 3rd Cycle Projects

Project Code	PROJECT TITLE	Lead Country
CASSAVA		
CV-P01-2016	Pathogens limiting cassava culture in Angola, Mozambique and Zambia: epidemiology and integrated pest management measures	Angola
CV-P02-2016	Molecular characterisation of released cassava varieties and selected clones	Zambia
CV-P03-2016	Cassava germplasm collection, characterisation and conservation	Angola
CV-P04-2016	Evaluation of cassava genotypes tolerant to abiotic stress in Angola and Zambia	Angola
CV-P05-2016	Cassava quality, processing and utilization: The influence of the variety and agro-ecological environment	Zambia
LEGUMES		
LG- P19-2016	Scaling up high yielding pigeon pea varieties in Mozambique and Malawi	Mozambique
	Scaling up of high yielding cowpea varieties and technologies in Mozambique, Malawi and Zambia	
LG- P20-2016	Use of pigeon pea and sorghum crop residues in goat feeding	Mozambique
LG- P21-2016	Improving seed availability of high yielding and resilient groundnut varieties in Mozambique, Malawi and Zambia	Mozambique
LG- P22-2016	Phenotypic and molecular characterization of common bean varieties released in Malawi, Mozambique and Zambia	Malawi
LG- P23-2016	Enhancing the International Competitiveness of Small to Medium Sized Legume and Cereal Processing Enterprises through Facilitating the Adoption of Quality Assurance (QA) programs	Malawi
LG- P24-2016	Development and Dissemination of a Manually Operated on-the-ridge Planter of Food Legumes	Malawi
LG- P25-2016	Promoting Cowpea Productivity and Production through use of high Phosphorous use efficiency Cowpea Cultivars in Zambia, Mozambique and Malawi	Zambia
LG- P26-2016	Development of a cowpea based weaning food	Zambia
LG- P27-2016	Multi-Crop food legume germplasm collection and characterization in Malawi, Mozambique and Zambia	Zambia
	Cowpea germplasm collection and characterization	
LG- P28-2016	Harnessing and unlocking the potential of local cowpea, Bambara nut and pigeon pea diversity for improved livelihoods of farmers	Malawi
CLIMATE SMART AGRICULTURE incl. CONSERVATION AGRICULTURE		
CS-P01-2016	Optimizing maize- cowpea intercropping systems productivity and water use resilience to climate change in Zambia and Mozambique	Zambia
CS-P02-2016	Mainstreaming climate smart agriculture through sustainable solar- powered micro-irrigation for sustainable small scale business development	Zambia
CA-P06-2016	Evaluating sustainable intensification opportunities for improved labour productivity using mechanized conservation agriculture in central Mozambique and Malawi(SIMECMM)	Mozambique

Project Code	PROJECT TITLE	Lead Country
MAIZE		
MZ-P14-2016	Promoting use of modern multipurpose hand-tools both for planting seed and applying fertilizer, and maize sheller as part of smallholder-farm mechanization in Malawi, Mozambique and Zambia	Malawi
MZ-P15-2016	Development and diffusion of an on-spot fertilizer applicator for smallholder farmers in Mozambique and Zambia	Zambia
MZ-P16-2016	Development of maize varieties tolerant to drought and heat by use of double haploid technology as a mitigation to climate change in Malawi, Mozambique and Zambia.	Malawi
MZ-P17-2016	Establishing core collections of example varieties and drought tolerance thresholds for maize to promote SADC seed trade.	Zambia
MZ-P18-2016	Assessment of solar drying for reducing post-harvest losses in maize – a case of rural smallholder farmers in Malawi, Mozambique and Zambia	Malawi
RICE		
RC-P10-2016	Dissemination of rice production technology to women in rural families and supplementation of rice sub-products in orphan children in Mozambique, Malawi and Zambia	Mozambique
SORGHUM		
SG-P02-2016	Strengthening the Sorghum seed delivery for enhanced production among smallholder farmer in Mozambique and Zambia	Zambia