



Agricultural Productivity Programme for Southern Africa (APPSA)

ANNUAL REPORT

January – December 2015

APPSA R&D Sub Projects By Themes

Discipline	PI	CO-PI	Total
Soil Conservation and Fertilizer Management	0	2	2
Quality Control and Certification	2	0	2
Extension	7	7	14
Plant Health Control	2	5	7
Water Management	2	6	8
Other	2	2	4
	4	3	7
	2	0	2
Total	21	25	46



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LIST OF ABBREVIATIONS AND ACRONYMS

AATF	African Agriculture Technology Foundation
AGRA	Alliance for a Green Revolution in Africa
AWP&B	Annual Work Plan and Budget
APPSA	Agricultural Productivity Program for Southern Africa
CA	Conservation Agriculture
CAADP	Comprehensive African Agricultural Development Programme
CARS	Chitedze Agricultural Research Station
CCARDESA	Centre for Coordination of Agricultural Research and Development in Southern Africa
CGIAR	Consultative Group for International Agricultural Research
CIAT	International Centre for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Centre
Co-PI	Co-Principal Investigator
DAES	Department of Agriculture Extension Services
DARS	Department of Agriculture Research Services
EAAPP	East African Agricultural Productivity Programme
EIA	Environmental Impact Assessment
ESMPs	Environmental and Social Management Plans
FISP	Farm Inputs Subsidy Program
GART	Golden Valley Agricultural Research Trust
IARC	International Agricultural Research Centre
ICRISAT	International Crops Research Institute for the Semi
IDA	International Development Association
IIAM	Instituto de Investigação Agrária de Moçambique (Agricultural Research Institute of Mozambique)
IITA	International Institute of Tropical Agriculture
IPDM	Integrated Pest and Disease Management
ILRI	International Livestock Research Institute
IRRI	International Rice Research Institute
ISM	Implementation Support Mission
ISTA	International Seed Testing Association
MAL	Ministry of Agriculture and Livestock (Zambia)
M&E	Monitoring and Evaluation
MGDS	Malawi Growth and Development Strategy
MoAI & WD	Ministry of Agriculture Irrigation and Water Development
MoF	Ministry of Finance
MoU	Memorandum of Understanding
MTR	Mid Term Review
MU	Mulungushi University
MVAC	Malawi Vulnerability Assessment Committee
NAIS	National Agricultural Information Services
NARS	National Agriculture Research Institutions
NERICA	New Rice for Africa
NGO	Non-Governmental Organisation
OPV	Open pollinated varieties

PAD	Project Appraisal Document
PDO	Project Development Objective
PI	Principal Investigator
PIM	Project Implementation Manual
QPM	Quality Protein Maize
RCoL	Regional Centre of Leadership
R&D	Research and Development
SADC	Southern Africa Development Community
SCCI	Seed Control and Certification Institute
ToT	Training of Trainers
UEM	Universidade Eduardo Mondlane – Maputo (Eduardo Mondlane University)
UNOPS	United Nations Office for Project Support
UNZA	University of Zambia
USAID	United States Agency for International Development
WAAPP	West African Agricultural Productivity Programme
WB	World Bank
WIKWIO	Weed Identification and Knowledge in Western Indian Ocean
ZARI	Zambia Agriculture Research Institute

EXECUTIVE SUMMARY

This technical progress report covers the period from 1 January to 31 December 2015, and is intended to provide an update on key achievements during the reporting period.

Implementation of the project activities at national and at regional level followed the three components, namely, (a) Technology Generation and Dissemination, (b) Strengthening of Regional Centres of Leadership and (c) Coordination and Facilitation. Regional coordination and facilitation activities were elaborated in the annual work plan that was developed by CCARDESA and endorsed by the implementing countries. The key activities in the work plan included Regional Review and Strategic Meetings, Technical backstopping and Networking, Monitoring and Evaluation, Facilitation of Information-sharing Platforms, Trainings and Workshops, Policy Harmonization and Advocacy. The country work plans were approved by the respective national steering committees.

Component 1 activities focused on *Technology Generation and Dissemination*. A total of 48 out of the 49 approved R&D projects (16 on maize; 19 on legumes, 9 on rice and 5 on conservation agriculture) were implemented during the 2014/15 cropping season. Malawi implemented 42 R&D projects (led in 14), while Mozambique implemented 41 R&D projects (led in 15). Zambia implemented 46 R&D projects, leading in 21. The sub projects on germplasm collection gathered 219 maize and 215 rice accessions, and most of the accessions were characterised at phenotypic level. In a bid to increase availability of quality seed 320 MT of certified seed of five rice varieties (Macassane, M'dziva, Limpopo, ITA312 and Mocuba) were produced. Foundation seed of various legumes (beans, groundnut, pigeon pea, and soybean) was also provided to seed producers for multiplication, and more than 350 T of seed produced. In partnership with ICRISAT-Malawi, the project on breeding groundnuts for multiple disease resistance successfully fast-tracked the release of 3 varieties (MGV-6; MGV-7 and Wazitatu) that are multi-tolerant to rosette and leaf spot diseases and yield 30% higher than current varieties. The project also produced 1000 T of pre-basic seed of 5 varieties to facilitate dissemination of the varieties. Zambia released the following varieties: beans –Lunga and Lugwebungu; maize (quality protein) – GV682p and GV687p; rice - SUPA MG and soybeans - Lukanga.

There are approximately 113 off-the-shelf technologies (a combination of improved varieties [86], agronomic practices, pest and disease management practices, post-harvest management practices, agro-processing etc.) that have been disseminated to date.

Under the Component on '*Strengthening of Regional Centres of Leadership*', the RCoLs were requested to conduct Institutional Assessments and develop Science Plans to ensure that their approaches to science are systematically and coherently reoriented and strengthened and delivery performance is improved and measurable. Draft institutional assessment reports and science plans for Mozambique and Zambia were shared during the mid-term review of the project. In an effort to encourage good performance and delivery by the research and development scientists, CCARDESA introduced awards to 2 high performing scientists from each implementing country. The two award categories were "Research for Development" and "Regional Collaboration". To assist APPSA learning of how EAAPP implemented their programme, challenges experienced and successes achieved, CCARDESA facilitated the participation of Directors of Research and APPSA National Coordinators in the EAAPP end of Phase I Conference which took place in August 2015 in Nairobi. At the RCoLs, construction and rehabilitation of roads and buildings continued at the targeted research stations, and so did procurement of a variety of field equipment, laboratory equipment, office equipment and vehicles to boost the project fleet. The cumulative total number of scholarships awarded by the three RCoLs by December 2015 was 106, distributed as follows: 18 PhD (16M, 2F); 37 M.Sc. (27M, 10F); 33 B.Sc. (15M, 18F). Zambia also awarded 9 Diploma scholarships (5M, 4F). The three RCoLs trained 12,420 (6,051M; 6,369F) lead farmers and follower farmers on the different technologies that are being generated and/or disseminated.

Under the component on '*Coordination and Facilitation*' achievements include convening two Regional M&E Working Group meetings to finalise M&E documents and plan for the project's mid-term review (MTR) mission that was to take place in October/November 2015. Governments of the APPSA implementing countries, the World Bank CCARDESA and the RCoLs participated in the implementation support mission in April/May 2015 and the MTR in October/November 2015. A wide group of APPSA stakeholders [CIMMYT, CIAT, ICRISAT, ILRI, IRRI, SADC Seed Centre, African Agriculture Technology Foundation (AATF), Alliance for a Green Revolution in Africa (AGRA), Universities, Private Sector representatives as well as countries interested in joining APPSA] were invited to participate in the regional wrap up meeting of the midterm review. At the same meeting, the Permanent Secretaries of Agriculture for Malawi, Mozambique and Zambia signed a Communique committing to support the attainment of APPSA project objectives. A Regional Steering Committee to steer the project activities was proposed and Terms of Reference accepted during the MTR. Disbursements of funds to CCARDESA by the countries were done by Zambia and Mozambique, while Malawi still faced some administrative challenges in disbursing the funds. In an effort to strengthen seed regulatory and related services Malawi and Zambia commenced revision of the seed policy and seed act, respectively, taking cognizance of SADC regulations.

The levels of attainment of the project development objectives are as follows:

- (i) A cumulative target of 39 technologies were to be made available to farmers by the end of 2015; the actual number was 113, representing 290% of the target. It is however important to note that 76% of these technologies are "improved seed varieties" of the various commodities.
- (ii) 65% of the Lead Farmers (LFs) in targeted areas were expected to be aware of an improved technology promoted by the Project. Only Malawi which conducted a baseline survey reported that 85% of the LFs in targeted areas were aware of an improved technology promoted by the Project
- (iii) No (zero) technologies generated or promoted by the Project in one country were expected to be released in another country by 2015. Nevertheless, seed of 10 recently released improved varieties of beans (2), groundnuts (3), maize (2) and rice (3) were shared among countries for dissemination.
- (iv) A cumulative target of 1.805 million project beneficiaries was set for 2015; the cumulative figure reported was 115,765, representing only 6.4% of the target. Of these beneficiaries, lead farmers constituted 4.2%. The proportion of female farmers was 33% in Malawi, 34% in Mozambique and 48% in Zambia. **NB:** It is important to note that information for this indicator was poorly captured at R&D project level, particular; there was a lot of under reporting.

1. BACKGROUND

The Agricultural Productivity Programme for Southern African (APPSA) is a six-year project (2013 – 2019) financed by the World Bank using a Specific Investment Loan (SIL) to the tune of US\$ 90 Million. APPSA supports the objectives of the World Bank's Africa Action Plan, which identifies regional integration as an important element to achieving higher economic growth and poverty reduction. The project's objective is to increase the availability of improved agricultural technologies in participating countries in the SADC region through: (i) establishing Regional Centres of Leadership (RCoLs) on commodities of regional importance; (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. Implementation of APPSA is based on partnerships and collaborations among three participating countries (Malawi, Mozambique and Zambia). Malawi is focusing on maize-based farming systems, Mozambique on rice-based farming systems, and Zambia on food legumes-based farming systems (involving beans, cowpeas, groundnuts, pigeon peas, and soybeans). Additional countries within the SADC region are expected to join as APPSA evolves and expands.

Component 1 - Technology Generation and Dissemination

Generation and dissemination of appropriate technology is one of the essential enabling conditions to ensuring increased agricultural productivity. The technology generation and dissemination component supports activities associated with the commodity or commodity group being targeted by the Regional Centres of Leadership. Among the APPSA implementing countries, there is scope for greater cooperation and coordination to address shared research priorities by implementing R&D activities that emanate from research priorities developed and agreed upon by stakeholders. The technology generation activities cover a number of key thematic research priorities at both national and regional level. These research priorities are periodically reviewed and updated during project implementation. The component is also supporting technology dissemination activities (extension, strengthening of innovation systems) that include promotion of off-the-shelf technologies. APPSA thus contributes to the generation and dissemination of technologies with trans-boundary benefits.

Component 2 - Strengthening Regional Centers of Leadership

Under this component, APPSA is strengthening the capacity of RCoLs to participate in regional research activities and to develop research and technology generation systems that are demand led and market oriented. Institutional capacity building under this component centres on supporting two main thrusts: (i) human capital development and (ii) improving the physical and infrastructure facilities including the information management and communication services. The choice of the specific activities that are undertaken is determined by the specific needs of each RCoL. Human capital development includes providing scientific training at the post graduate level and upgrading skills through short courses or targeted training. Improvement of infrastructure includes upgrading of research infrastructure (farm, laboratory, office equipment); information technology and knowledge management systems; improving

administration and performance management systems; strengthening seed production capacity, seed regulatory functions, and related services.

Component 3: Coordination and Facilitation

APPSA activities at country level are managed through country-specific institutional arrangements based on the national institutional contexts and capacities. There are project implementation units established at each RCoL and are staffed by dedicated full-time staff. 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. At the regional level, the role of CCARDESA is to work with the RCoLs in coordinating regional activities: providing assistance for networking, capacity building and technical backstopping, monitoring and evaluation, regional coordination and supervision, regional exchange of information, knowledge and technologies and policy analysis. With respect to R&D policy analysis and dialogue, APPSA is supporting analytical work, needs assessments, and policy dialogue or policy harmonization activities in key areas that affect R&D at national and regional level. The thrust of the activities is focusing on clarification of intellectual property rights; operationalization of the SADC harmonized seed regulatory system, implementation of biosafety regulations, and similar topics.

2. PROGRESS OF IMPLEMENTATION

The major achievements under each component during the reporting period are detailed below.

2.1 Component 1: Technology Generation and Dissemination

A combination of a delayed onset of the season and a poor mid-season rainfall pattern at critical stages of crop development resulted in generally poor crop performance across countries. In Malawi, the late onset of rains delayed the production season by 30 to 40 days. The country received heavy and continuous rains between late December and early January 2015, resulting in widespread floods which were followed by dry-spells between February and March 2015, destroying crops before they could reach maturity. In Mozambique, excessive rainfall and flooding in the north and central part of the country, and drought and dry spells in the southern parts of the country severely hampered the agricultural production season. In Zambia, the prolonged dry spells and poor rainfall distribution shortened the growing season. The general crop performance was therefore negatively affected by these negative events.

2.1.1 Technology generation

Despite the poor season, there was notable progress in the implementation of the R&D projects, with a total of 42, 41 and 46 projects being implemented in Malawi, Mozambique and Zambia, respectively (Table 1). Fourteen of these projects have a significant technology dissemination component.

Table 1 Summary of R&D projects implemented in 2014/2015 cropping season

Country	Legumes	Maize	Rice	CA	Total
Malawi	15	12	9	3	42
Mozambique	16	14	6	5	41
Zambia	19	16	6	5	46

Malawi implemented 42 projects, 14 of which it is leading. Thirteen of the 14 R&D projects which Malawi is leading were implemented as planned, while less than 15% of the projects where it is co-participant experienced delayed implementation. Mozambique implemented 41 R&D projects, 14 of which it is leading. The majority (86%) of the projects were implemented with minor delays. The project on *“Improving rice productivity through introduction of rice duck-based farming system”* which Mozambique is leading was not implemented because pre-implementation preparatory work and authorization to implement was not concluded in time. Zambia implemented all the 21 R&D projects that it is leading and 25 out of the 28 projects where it is co-participant. Out of all the projects that it is leading; 5 were implemented as planned, 11 with minor delays, 5 with substantive delays.

Across the countries, the major reason for delays in implementation was the late start of the agricultural season which resulted in general delays by scientists in commencing the project activities. Also common across the countries were the delays in disbursements of funds to sub-projects which resulted in some planned activities not being implemented in time. Differences in the level of implementation of the R&D projects across countries were not as significant as in the first cropping season, and this could be attributed to better interaction and communication among project teams, particularly those that have been working together for long, i.e. since the 2013/14 season. The significant improvement in the face to face meetings between project teams had a positive influence on the quality of implementation.

The focus of the R&D projects is guided by common research priorities shared by the participating countries. As shown in Table 1 below, the R&D projects are covering a wide range of thematic areas that are key to the region. For projects that address more than one thematic area, they are categorised under the thematic area in which most of their activities are focused.

Table 2 Coverage of thematic areas by R&D projects

Thematic area	Commodity			Total
	Maize	Rice	Legume	
Agronomy; Soil fertility management; farming systems management.	5	4	7	14
Breeding for yield, quality, resistance to pests and diseases; abiotic and biotic stresses	3	5	8	12
Conservation Agriculture	5			5
Germplasm Maintenance	1	1		2
Grain quality			2	2
Integrated pest and disease management	1	1		2
Nutrition and health	1		1	2
Post-harvest, processing, marketing and value addition	2	2	2	6
Socio-economic studies, market search and impact evaluation.	1			1
Water harvesting, water management	1	2		3
Total				49

The current spectrum of R&D projects shows emphasis in thematic areas such as agronomy/farming systems management and crop variety improvement. Key thematic areas of regional importance that are not adequately covered or not covered at all include biotechnology; agricultural mechanization including development of farm implements; agro-processing, food safety and value addition; promotion of agricultural marketing/trade; promotion of labour saving technologies; technologies for adaptation to climate change. These will be covered in the next call for proposals, given their importance, and potential for impact and spill over effects.

Some of the achievements under each commodity are as follows:

2.1.1.1. Some achievements under Food Legumes R&D efforts

Legume variety improvement work focused on drought, pest and disease tolerance, high Fe and Zn content, early maturity, biological nitrogen fixation etc. Work on developing bean varieties with high Fe and Zn content, and with resistance to angular leaf spot and common bacterial blight achieved fast progression of populations from F2 to F5 generations (within 2 years). The well performing lines that were common among the three countries (more than 15 lines) will



be included in on-farm preliminary variety selection trials in all three countries.

Work on improving bean productivity in low soil fertility and drought prone areas continued with the multi-location testing of 25 genotypes for drought tolerance. Farmers were also invited to participate in the evaluations of the genotypes on farm. One hundred and thirty common bean entries were evaluated to assess potential for enhanced biological nitrogen fixation. Pigeon pea lines resistant to fusarium wilt were evaluated in the three countries, and seed of released varieties was multiplied on 2 ha in Malawi, 2ha in Mozambique and 1ha in Zambia.

In partnership with ICRISAT-Malawi, the project on breeding groundnuts for multiple disease resistance successfully fast-tracked the release of 3 varieties (MGV-6; MGV-7 and Wazitatu) that are multi-tolerant to rosette and leaf spot diseases and yield 30% higher than current varieties. The project also produced 1000t of pre-basic seed of 5 varieties to facilitate dissemination of the varieties.

In order to strengthen legume seed delivery systems, 840 famers were trained in legume seed production (Zambia: 795, Mozambique: 45). The project procured 8.1 MT of basic seed (2.5T beans; 2.8T groundnut; 100 kg pigeon pea; 2.7 T soybean) and distributed to seed growers (on cost-recovery basis) for seed multiplication.

Some of the dissemination projects focused on the following dissemination packages; use of improved seed varieties, fertilizer application and use of inoculum in soya beans. The project on processing and utilisation of groundnuts and bambara nuts conducted studies to examine post-harvest handling practices of groundnuts. The studies concluded that there are hazardous conditions that are likely to predispose the nuts to aflatoxin contamination in the current handling process. Based on the findings, the project will propose improved post-harvest practices that are to be disseminated to farmers. Improved post-harvest curing structures are undergoing laboratory validation. Mozambique taught farmers how to process bambara nut flour into various nutritional products and developed simple recipes for adoption by smallholder farmers.



A groundnut demonstration field at Lupembe EPA in Karonga, Malawi

2.1.1.2. Some achievements under Maize R&D efforts

Under germplasm collection, 219 accessions were collected, and 100 accessions were screened for drought tolerance during the dry period (June to November). Characterisation of 260 accessions at phenotypic level was also done. Eighty four (84) accessions from Malawi were duplicated with SADC Gene bank. Under crop improvement, work on generation of bio-fortified maize germplasm (pro-vitamin A, Fe and Zn enhanced) progressed well, with breeding nurseries established and



three way cross hybrids created to establish preliminary yield evaluation trials. Similar progress was noted for generation of quality protein maize germplasm. In Zambia, laboratory screening of lines and hybrids for PVA content was done at Mount Makulu laboratories. Work on screening and promotion of striga-tolerant varieties focused on conducting a baseline to assess striga occurrence in maize cropping areas. Several trials were established on-station and on-farm with introduced inbred lines, OPVs and hybrids to screen for tolerance/resistance to striga, and promising materials were harvested and shared across the participating countries for further evaluations. Development of experimental hybrids progressed, with 188 lines developed as follows: Pro-vitamin A – 100; Quality Protein Maize – 30; tolerance to downy mildew – 8; tolerance to Maize Lethal necrosis disease – 50.

Trials on Water Use efficiency were established in Malawi and Zambia to assess performance of up to 30 different maize varieties. Farmers at different irrigation schemes were exposed to the different irrigation regimes and were involved in the evaluation of performance of the maize varieties.



Improving Water Use Efficiency trial in Malawi

Preliminary results of work on improving grain storage using either polythene silo tanks (PST), metal silos or super grain bags (SGB) showed that all three storage methods were effective in reducing pest infestation by as much as 90% in the first four months. Assessments on the best performing storage structure are continuing.



On-station testing of improved storage structures (PST, SGB, Metal silos) vs Traditional grain bags) in Zambia

There are two projects that are addressing maize lethal necrosis disease (MLND) issues under APPSA. One is looking at development of maize varieties resistant to major diseases, including MLN while the other is looking at investigating the occurrence of MLND in the three countries. The latter project is conducting a survey on MLND in project areas that are prone to the disease, in addition to creating awareness of MLND through workshops, electronic and print media. Work on development and improvement of inbred lines tolerant to major pests is progressing well. The project is looking at host plant resistance (HPR) as an attractive solution to reduce the field and storage insect pest losses among small scale farmers and developing disease resistant maize varieties.

In disseminating improved maize varieties and agronomic practices, Zambia promoted 11 improved varieties and Malawi promoted 12 varieties. A total of 523 demonstrations were established to promote these varieties (150 in Malawi and 373 in Zambia) in conjunction with good agronomic practices (spacing, fertilizer rates, weed and disease management).

2.1.1.3. Some achievements under Rice R&D efforts

Under germplasm collection, Malawi collected 55 accessions and characterized them while Zambia collected 73 accessions, and established 50 trials for seed multiplication and phenotypic characterization. Twelve accessions were successfully characterized.

Mozambique planted 215 accessions for agro-morphological characterization. The eco-geographic survey that was conducted in Mozambique helped to pinpoint the potential diversity hotspots for wild rice species and for upland rice. Two on-farm conservation groups formed in Malawi were given seed of five released varieties and five accessions from the national gene bank for seed multiplication.

Work on enhancing productivity of improved rice varieties through the development of integrated crop management practices successfully promoted the use of hand tractors/ power tillers for land preparation. This technology reduces the drudgery in levelling paddy fields, makes transplanting easy and suppresses weeds. From the exposure through field days conducted in the previous cropping season, farmers exposed to the project on promotion and dissemination of improved rice technologies demanded for seed



Use of power tiller in land preparation in Mozambique

of NERICA 3 and NERICA 4 varieties. Seed was availed to 269 farmers for establishing demonstrations in Mozambique. In Malawi, 100 kg of NERICA seed, 40 kg of two Mozambican rice varieties (Macassane and Tumbeta) were distributed to farmers for establishing demonstrations. To facilitate seed availability for more demonstrations in the 2015/16 season, the project provided 50 kg of basic seed of eight varieties (Macassane, Simão, Tumbeta, Mocuba, Chupa, Limpopo, Ita-312, Nené) for seed multiplication, and a total of 1600kg of basic seed was produced. 100 farmers in Zambia were availed with seed of NERICA4 and SUPA MG for establishing demonstration plots.



Rice variety experiment at Lifuwu, Malawi

Thirty two lines from IRRI, ten improved and local varieties were assessed for tolerance to salinity and drought tolerance in Mozambique and Zambia. Participatory evaluation of improved rice varieties was undertaken in Malawi and Mozambique, where multi-location “mother-baby” trials were established to demonstrate performance of 12 test varieties. Field days were conducted to increase awareness of the availability of improved rice varieties.

Work on development of improved rice varieties continued with pure line selection using landraces. Selected materials were evaluated for disease, biotic and abiotic factors.

Advanced materials will be evaluated in the replicated yield trials. Work on the purification of mixed commercial lines was also undertaken in Mozambique and Zambia.

The project on strengthening rice seed delivery systems hosted a variety release meeting which accepted the release of the rice Supa MG variety. In an effort to improve the production, supply and delivery of seed, the project sourced 5 MT of Supa MG rice variety and 0.5 MT of Kilombero variety which were distributed to 350 farmers in Zambia for multiplication (on cost-recovery basis). Mozambique supported identification and testing of promising rice varieties through national programmes, and 320 MT of certified seed was produced from 130 ha grown by eight farmers. In addition, 73 farmers established 151 ha of basic seed production by December 2015 and more than 500 MT of seed is expected.



Seed Multiplication of promising rice varieties in Mozambique

2.1.1.4. Some achievements under Conservation Agriculture efforts

There are five projects focusing on various facets of conservation agriculture that include maize-legume rotations, use of biochar as soil amendmend, assessing disease and pest challenges in maize production, assessing herbicide weed control and performance among smallholder farmers; evaluating full CA trade-offs under partial CA and traditional farming systems.

Preliminary results of the on-farm work on use of herbicides for weed control showed that farmers have limited knowledge on types of spraying equipment, waiting period between herbicide applications and sowing, fertilizer application (timing, rates, requirement per unit area etc. In Zambia, results of the assessment to determine the uptake of herbicides among stakeholders showed that the probability of using herbicides increases with increase in total land cultivated, education level as well as age of the farmer - younger and educated farmers are more likely to adopt herbicide use than older generation farmers. Awareness of herbicide use was created through meetings, field days, leaflets and posters.

Surveys, on-station and on-farm research aimed at identifying best bet resource allocation strategies that can make cropping systems more attractive to resource-poor farmers involved in Conservation Agriculture were conducted. Cereal and legume cropping combinations were tested across environments, and farmers appreciated the benefits of including a legume crop with sufficient ground cover in a rotation. Some of the emerging learnings as articulated by farmers were that intercropping with legumes is beneficial especially where land pressure is an issue; it can help replenish nutrients and it reduces weed pressure. Farmers also wanted to understand the management of pigeon pea shrubs as they perceived that the shrub would interfere with the maize crop. CA being a new technology in the target areas in Mozambique, institutional collaboration that includes universities, Department of Extension and the farmer's associations was strengthened in order to facilitate sustainable dissemination of CA practices. CA management procedures were explained through leaflets, posters and an extension manual developed by the project. The scientists implementing CA under maize-legume systems participated in the APSIM modelling training that was organised by CIMMYT in Harare, Zimbabwe. This training was aimed at improving the quality of science with regards to designing and expanding on-farm technology testing.

In order to determine disease and pests challenges in maize production under Conservation Agriculture, 65 trials (Malawi 42, Zambia 23) were established. It was observed that some maize varieties showed vulnerability to leaf diseases and pest infestations when subjected to CA cropping systems. Further experiments will be conducted to facilitate enhanced knowledge of maize varieties that are compatible with CA cropping systems; enhanced scaling out of conservation agriculture as a climate change resilient cropping system and refining of the CA recommendations vis-a-vis maize variety adaptation.



To examine impact of using biochar from waste in Zambia, collection of feed-stocks for biochar and compost production and manure was done, after which biochar was produced. Laboratory experiments and Greenhouse trials were conducted to determine the effects of surface and sub-surface applied biochar on, downward migration of carbon and nutrient leaching, and also determine the benefits of biochar and compost/manure from on-farm wastes on soil fertility. Field trials of promising combinations are yet to be conducted.

2.1.2 Technology dissemination

Utilisation of research results will depend to a considerable extent on their proper dissemination to farmers. Taking cognisance of this, APPSA technology generation projects have been designed with a technology dissemination component to facilitate uptake of technologies being generated. Dissemination activities are carried out in collaboration with a range of partners, including farmers, farmers' organizations, researchers, extension agents, seed companies, and NGOs. There are a number of projects that are currently focusing on dissemination of technologies that were generated prior to APPSA, and are ready for dissemination.

The **key technologies** being disseminated generally cover the following areas:

- Agronomic/crop husbandry practices
 - Plant spacing
 - Fertilizer applications (rates, types, timing), including fertilizer application in different legumes
 - Soybean inoculation with rhizobium
 - Minimum tillage
 - Weed management, including use of herbicides
 - Water harvesting; tied-ridging
 - Legume-maize rotations with different legume combinations
 - Legume seed production practices (isolation, spacing, fertilization)
 - Crop residue management
- Crop improvement
 - Improved seed varieties (maize [including Pro vitamin A, Pro-vitamin A, drought and Low “N” tolerant maize varieties], rice, legumes [cowpeas, sugar beans, soybeans, pigeon peas], sorghum)
- Post-harvest
 - Improved storage
 - Super grain bags
 - bulk containers (polyethylene; metal)
 - Packaging machines
- Processing:
 - De-hullers (for all legumes)
 - Driers (cowpea and bean leaves)
 - Legume flour (Bambara nut; soybean)
 - Soybean milk production
 - Soya flour for porridge or baking

There are a number of **technology dissemination pathways/tools** being used in disseminating research findings to farmers, in addition to the normal extension methods. These include:

- Lead farmers

- On-farm demonstrations
- Field Days
- Agriculture shows
- Print media, electronic media,
- Innovation Platforms

Lead farmers

Innovative farmers with the aptitude and commitment to work with their communities towards the ultimate goal of increasing productivity were selected to participate in project activities. The lead farmers received thorough training on the technologies to be demonstrated and they in turn trained the follower farmers. The lead farmers took the lead in demonstrating specific technologies, thereby imparting their knowledge, constraints and solutions to the use of such technology, in the process. Through use of the lead farmer approach, fast-track adoption of new technologies being disseminated among farmers is envisaged. To date, the project has worked with 1436 lead farmers in Malawi, 2011 in Mozambique and 1756 in Zambia to demonstrate various technologies.



Lead farmer - improved legume production in Zambia

On-farm demonstrations

On-farm demonstrations are conducted to illustrate the application of appropriate technology that fits the local set of conditions. They are a valuable tool in the teaching of new management practices or technologies as they allow learning how an alternative management option will perform on actual farms at field scale. In demonstrating the technologies, the

project uses the lead farmer approach, and because the lead farmers are located in all camps/extension planning areas, greater geographic distribution of demonstrations is achieved. The total number of demonstrations established across projects was 384 in Malawi and 1503 in Zambia. The number in Mozambique was not quantified.



Demonstration on maize-legume rotation in Zambia

Field days

Field days are one of the most popular technology dissemination pathways employed by the project as they are central to agricultural technology dissemination, given that farmers are availed the opportunity to observe for themselves whatever technologies are

being promoted. Field days were conducted across projects in all three countries to showcase

the various technologies that were being demonstrated. Farmers, key government officials and other key stakeholders in the farming industry attended the field days, and appreciated the technologies that were being demonstrated. In Malawi 31 field days were conducted, and were attended by 5 342 farmers (F2460; M2873). In Zambia, 37 field days were conducted, and were attended by 6 758 farmers (data not gender disaggregated). The number in Mozambique was not quantified.



Field day: cereal-legume rotation in Zambia

Field Day: Rice Harvesting in Chókwè Mozambique

Print and electronic media

Electronic and print media is used to communicate information about research and dissemination activities being supported by APPSA. The project is producing posters, brochures, pamphlets and other technical publications. Other knowledge transfer tools include training manuals, booklets, policy briefs and scientific publications.

Malawi developed and printed the Pigeon pea manual and distributed 500 copies. Leaflets on MLND were printed and distributed in all three countries (250 in Malawi; 330 in Mozambique; 330 in Zambia). In Zambia, National Radio and TV programmes, workshops and fliers with key messages on use of herbicides, application rates, application timings, and storage were produced. Fliers on MLND were distributed, and a TV and radio programme on MLND was also aired.

Innovation Platforms

Innovation platforms (IPs) are widely used in agricultural research to connect different stakeholders to achieve common goals. They are considered to be a crucial vehicle for scaling up and dissemination of agricultural technologies. There are a few projects under APPSA that have proposed use of innovation platforms to disseminate technologies. The researchers have approached different stakeholders to participate in building IPs in order to disseminate the selected technologies and to contribute to finding solutions. The IPs are yet to be strongly visible as a pathway for dissemination of technologies in APPSA.



Meeting with members of Innovation Platform - Nthambiza ASP, Malawi

2.2 Component 2: Strengthening Regional Centres of Leadership

Component two focuses on (a) upgrading of research infrastructure including physical infrastructure, farm, laboratory, and office equipment; and information technology and knowledge management systems; (b) improving administration and performance management systems; (c) developing human capital including by providing scientific training at the post graduate level and by upgrading skills through short courses or targeted training; and (d) strengthening seed production capacity, seed regulatory functions, and related services.

2.2.1 Upgrading of research infrastructure

In the three RCoLs, civil works activities were at various stages of implementation. In Malawi, preparatory activities for the construction/rehabilitation of offices, laboratories and warehouses at Chitedze and the 5 satellite stations were undertaken. The infrastructure consultant to conduct an assessment of the infrastructure rehabilitation needs was hired, and the assessment commenced. Offices housing the APPSA secretariat were



Farming equipment at Chitedze Research Station

refurbished. Procurement of office equipment and farm inputs was carried out as required. Four tractors and accessories (four ridgers, four ploughs, four harrows, four mowers, four sprayers and four trailers) were procured. Nine project vehicles and 1 minibus were also purchased. On the other hand, procurement of some crucial research equipment (e.g. laboratory equipment, irrigation equipment, statistical analysis packages etc) is yet to be undertaken.

In Mozambique, the upgrading of research infrastructure activities focused on activities to establish Namacurra Research Centre, namely, acquisition of title deeds for 52 ha for the establishment of the research centre; concluding the consultations, trainings and compensations of the project affected people (PAPs); disclosure of relevant project information to PAPs and key stakeholders. Rehabilitation of infrastructure was also undertaken at the Zonal Centers (Umbeluzi, Chokwe, Sussundenga, Nampula, Nametil, Lichinga). One minibus (15 seater) and four sedan vehicles were procured for the PMU, while twenty three (23) 4x4 vehicles procured were distributed to IIAM Headquarters, 4 zonal centres and to R&D projects. Agricultural equipment was also procured in the following quantities: 24 tractors, 12 ploughs, 11 disk harrows, 16 tine furrow openers, 8 weed cutters, 5 graders, 12 mechanical sprayers, 6 rippers, 8 tipper trailers, 5 disc ridgers, 9 planters, 5 rototillers, 2 plant diggers, 7 seed dryers, 6 motor cultivators and 9 dehuskers/threshers. Procurement of laboratory equipment and office equipment for zonal centres is yet to be undertaken.



Farming equipment at Nampula Research Station

Research infrastructure rehabilitated at the Central Zonal Centre

In Zambia, procurement of materials for construction of security walls/fences at Mount Makulu and at Kabwe research station was done. Agriculture equipment was procured for eight research stations (Golden Valley, Kabwe, Misamfu, Mochipapa, Mongu, Msekera, Mt Makulu and Nanga). The equipment totals 8 tractors; 7 ploughs; 6 disk harrows; 6 rippers; 6 planters; 5 trailers; 6 lawn mowers; 6 boom sprayers; 5 lime spreaders and 4 shellers. Procurement of some crucial equipment such as irrigation equipment, soil moisture and soil fertility measurement equipment was not done.



Refrigerators for the Genetic Resource Bank at Mt Mukulu Research Station

2.2.2 Improving Performance Management Systems

In order to achieve sustainable change in the research and development areas of national importance, viable institutions with strong performance management systems that have clear and workable approaches to performance measurements are required. Questions about the existence and efficacy of the impact of R&D products and services can be answered through demonstration of accountability, cost effectiveness and impact orientation of Agricultural Research and Development Institutions. In an effort to ensure that the RCoL approaches to science are systematically and coherently reoriented and strengthened and delivery performance is improved and measurable, the Regional Centres of Leadership (RCoLs) were requested to conduct institutional assessments and develop Science plans. The Science Plan for the RCoL is expected to be used as a framework for further development of an RCoL-wide Performance Management System (PMS), and will thus form the overall basis for guiding and measuring the contribution of RCoL R&D efforts to the national and regional goals. All three countries engaged consultants to undertake the Institutional Assessments and facilitate

the development of Science Plans. Preliminary assessment results were presented during the Mid-term review, and finalisation of the documents is expected to take place in early 2016.

Other efforts in improving project performance management included the procurement of TOM2PRO Financial management system in Malawi, and having staff trained to use the system. Mozambique also procured IT equipment and software for accounting (Primavera and e-SISTAFE).

During the implementation support mission in April a recommendation was made to the RCoLs to examine ways of strengthening researchers' accountability and performance by integrating APPSA R&D deliverables in a staff appraisal system for the RCoL and the national agricultural research institution it is affiliated to. In the short-term the RCoLs were also urged to explore incentive based mechanisms that reward high performing researchers. A similar recommendation was made to CCARDESA to consider a program-wide incentive based mechanism that rewards high performing researchers in order to motivate them and others to improve the quality of science, reporting and collaboration among scientists.

As a starting point, CCARDESA requested RCoLs to nominate one deserving scientist under each of the following categories: (i) Research for Development (focus was on meeting project objectives, quality of science, dissemination of scientific outputs and reporting) and (ii) Regional Collaboration (emphasis was on effective regional partnerships and collaboration). RCoLs were requested to submit a letter of support outlining the basis for the nomination and the significance of the candidate's work. The following elements were considered during the nomination process:

- Creativity and innovation as reflected through the Scientist's overall contribution;
- Evidence of credibility, integrity, and professionalism;
- Influence or impact of the nominee for a more efficient, environmental friendly and sustainable Agriculture;
- Evidence of the nominee's contributions that result in improved management practices or furthered understanding of agricultural sciences locally and
- In recognition of extraordinary efforts to promote the adoption of agricultural technology locally.

The awards were given during the wrap-up meeting of the mid-term review, and comprised of a certificate and \$100 honorarium provided through CCARDESA. The award nominees were as follows:

Country	Award Category	
	Research for Development	Regional Collaboration
Malawi	Dr Tenyson Mzengeza	Ms Nolipher Mponya
Mozambique	Dr Celestina Jochua	Dr Manuel Amane
Zambia	Mr Ndashe Kapulu	Mr Nathan Phiri

2.2.3 Progress in human capital development

Establishing a critical mass of qualified staff is one of the key requisites for a Regional Centre of Leadership, and is premised on the recognition that quality research and development cannot be achieved without qualified research and development practitioners. Achievements in human capacity development at the 3 RCoLs for the reporting period are shown below.

Thematic area		Male	Female	Total
No. of Diploma		5	4	9
No. of BSc		15	18	33
No. of MSc		27	10	37
No. of PhD		16	2	18
No. of days of technical training delivered to RCoL staff	<ul style="list-style-type: none"> – Planning and implementation of agricultural trials – Financial Management – Procurement – Human resource management, Administration – Pest and disease surveillance (surveillance methodology and related ISPMs) – Safeguards, – Weed identification & management training through WIKWIO portal, – Result based management, – Crop modelling - APSIM – Seed Inspection, – Seed multiplication (rice and legumes) – World Bank Finance training – Laboratory Safety training 	1,067	579	1,646
No. of extension personnel trained disaggregated by gender and thematic area	<ul style="list-style-type: none"> – Establishment of demonstration plots – trial design, data management and collection – seed production – disease surveillance – irrigation water management 	284	204	488
No. of farmers trained, disaggregated by gender and thematic area	<ul style="list-style-type: none"> – Disease surveillance – Participatory variety selection – Legume seed multiplication – Good agronomic practices – Integrated pest management – Post-harvest management – Irrigation water management 	6,050	6,369	12,420

Capacity building is addressing the scientific capacity gaps identified in the 3 RCoLs, and is therefore expected to contribute towards improved delivery of the research and development agenda of the respective RCoLs. While Zambia has made considerable progress in human capacity development (80 staff out of a target of 113 was sent for long-term training), post

graduate level training is still quite limited in Malawi (4 MSc; 5 PhD) and Mozambique (17 selected for training; 2 already in training at MSc level).

2.2.4 Strengthening seed production capacity/seed regulatory functions

Farmers' dependency on weak seed systems result in the slow adoption of new improved varieties, low yields, and heightened susceptibility to crop diseases. Under APPSA, efforts are being made to strengthen the various elements that enable seed systems to function effectively in producing and distributing quality seed so as to ensure improved productivity. The specific seed systems strengthening activities include supporting seed production and distribution, the popularization of new disease-resistant varieties, and capacity building. The rice and legume projects on strengthening seed delivery are empowering smallholder farmers with knowledge and skills in seed production. Seed producing farmers have been mobilized in groups and linked to seed companies to ensure effective delivery of certified seeds to the farming communities at reasonable cost. Formation of seed cooperatives is being promoted in areas where the private sector is not interested. Farmers and extension officers have received training to undertake seed production and quality control. The projects are also promoting agro-dealers to create an effective seed distribution network.

In an effort to strengthen seed regulatory and related services Malawi and Zambia have carried revision of the seed policy and seed act, respectively, taking cognizance of SADC regulations. Zambia has also started implementing the SADC variety registration policy. Training of seed inspectors to decentralize seed quality control service was also undertaken in Zambia. In Mozambique efforts are being made to strengthen the collaboration between IIAM and the Seed Department. The seed certification unit of the Seed Department from MASA has also been involved in the basic seed production efforts by the research projects.



Training of seed inspectors in Zambia



A farmer's soybean seed multiplication field at Chulu EPA in Kasungu, Malawi.

2.3 Component 3: Coordination and Facilitation

This component addresses national level coordination and management as well as regional facilitation by CCARDESA. At national level, the APPSA Secretariats are coordinating and managing the APPSA activities. The Secretariat in Malawi has 4 full staff members (Project Coordinator; M&E specialist; Finance Management specialist and Procurement specialist). In addition, there is an M&E officer and an accounts clerk (government counterparts) to support the Secretariat. In Mozambique, staff in the project management unit was as follows: Project Coordinator; Procurement Officer; M&E Specialist; Accountant; Team assistant and driver. The position of finance manager which fell vacant in the 1st quarter of 2015 was yet to be filled. This absence negatively impacted on the accounting process, thereby delaying many activities. Furthermore, the country reported the constraint of understaffing within M&E. This is because the national M&E working group which was envisaged to ease the workload is not operating as expected: the nominated group members have other responsibilities. Given this situation, the PIU requested for an assistant M&E officer to assist with the workload. In Zambia, the Secretariat staff complement was as follows: Project Coordinator; Environmental and Social Safeguards specialist; M&E Specialist; Finance specialist; Procurement Specialist; Centre Manager and Team assistant. Plans are in place to engage a communication specialist and a social economist as well. With this staff complement in the RCoLs, the challenges in coordination are expected to be minimised.

At regional level, the APPSA Coordinator is managing the project, assisted by the project officer who came on board in February 2015. A summary of the progress achieved against the stated activities in the regional work plan for 2015 is provided in Annex 2.

2.3.1 Financial Management

During the year under review CCARDESA received \$180,000 from Zambia in July and \$262,000 from Mozambique in September. Disbursement of funds from Malawi to CCARDESA was not done because of some administrative challenges. With budget carryover from the previous year, the total planned budget for the year was US\$ 788,416 and the amount utilised was 405,796, representing 51 % expenditure.

In Malawi, cumulative disbursements and expenditure reported were up to September because the program was still working on the financial reporting backlog caused by the long absence of the finance specialist. The cumulative disbursements were \$5,650,747 while cumulative expenditure totalled \$5,370,021. In Mozambique, out of the \$10,093,591 budgeted for 2015, total expenditure was \$3,944, 710, representing 39% utilisation. Component one expenditure was \$1,868,847 (52% utilisation), while component two expenditure was \$1,868,847 (28% utilisation). There was an improvement in budget utilisation for Component one compared to the previous reporting period and this is attributed to an increase in the range of activities under implementation. The improvement in utilisation of funds under component 2 was attributed to commencement of some civil works. In Zambia, the cumulative expenditure to date was \$8,919,553.74, representing 30% utilisation. The overall low disbursement rates of funds under *Component 1* were due to the low implementation rate of R&D activities because of the slow start of the agricultural season. Under *Component 2* the low utilisation was a result of delays in procurement of field

equipment, construction of conference hall and guest house at Kabwe and construction of seed facilities for SCCI.

2.3.2 Environmental and Social Safeguards

Planned activities for safeguard implementation were undertaken in the countries. Mozambique received an unsatisfactory rating on safeguards implementation while the other two countries received a 'moderately satisfactory' rating. In order to establish the requisite staffing for safeguard implementation in Mozambique, training on environmental and social safeguards was undertaken in November and was attended by staff from the zonal centres as well as from the University. In Malawi, two trainings on environmental and social safeguards were conducted: one



Figure 1 Staff training in Environmental and Social Safeguards at Lunzu RTC, Malawi

for the grantees for the 2nd cycle of R&D projects (16) and one for land resources conservation officers (52). With the capacity for safeguard implementation built in all three countries, compliance to the policies is expected to be adequately promoted and monitored. R&D project implementers monitored and reported potential environmental and social impacts of their projects as required. The main potential negative impacts were land degradation, contamination of soils by agrochemicals, health and safety risks from chemical poisoning, degradation of air quality from herbicide sprays.

Under component 2, activities that trigger environmental and social safeguards were also identified. The major potential impacts were potential noise pollution, clearing vegetation, soil and water contamination, risk to chemical accidents, over-abstraction of ground water, resettlement and increased use of resources. Requisite mitigation measures were proposed, and compliance with the provisions of the national laws as provided for under the environmental impact assessment regulations is being monitored.

2.3.3 Monitoring and Evaluation

During the year under review, a number of key M & E activities were undertaken as planned. These include, but are not limited to facilitation of the regional M&E working group meetings; facilitation of the World Bank implementation support mission in April and facilitating preparations for the project mid-term review in Oct/Nov; discussions on updating the results framework; preparations towards the development of a web-based M&E system, fine tuning of M&E tools (reporting templates, R&D project performance checklist) and generation of the relevant reports. The checklist that was developed to monitor performance of R&D projects (Annex 3) was used by the RCoLs during scheduled field monitoring visits that were undertaken by a multi-disciplinary team of reviewers.

Other key M&E activities undertaken by the countries included identifying/engaging a consultant to conduct a baseline survey. The consultant in Malawi finished his assignment, but the findings were yet to be discussed at a stakeholder consultative forum. Mozambique and Zambia were yet to recruit the consultants. However, significant pre-baseline activities (development and pre-testing of data collection tools; training of enumerators; digitizing data collection tools) were undertaken in Zambia.

At regional level, several discussions were held on data management systems. While the preferred option is yet to be identified, an agreement was reached that the management system should capture at least two elements: project management and scientific data sharing. Malawi identified a consultant to develop its Management Information System, and work will commence after getting the clearance from the World Bank. Two M&E officers from Malawi were trained in GIS and mobile data collection in Kenya, while R&D scientists were trained in Results based management by the Centre for Development management. Mozambique supported the R&D scientists in the production of detailed annual work plans and budget for each R&D project. In Zambia, two national M&E working group meetings were convened to discuss finalisation of the baseline collection tools and drafting of the APPSA communication strategy.

Table 3 Salient recommendations at the MRT regional wrap up

2.3.3.1 Midterm Review (MTR)

One of the project highlights during the reporting period was the execution of the first project mid-term review after two years of implementation. The review is regarded as a mechanism for strengthening project implementation as it provides an opportunity to make adjustments after two years of implementation. The MTR took place between 30 September and 3 November, and ended with a 2-day regional wrap-up meeting (2 and 3 November) which was attended by 75 participants (25 F; 50M) representing a wider group of APPSA stakeholders. The Permanent Secretaries of Agriculture for Malawi, Mozambique and Zambia who attended the meeting signed a

Box 1: Salient recommendations at the MTR regional wrap up meeting

- *Project development objective remains achievable although implementation is slower than expected.*
- *An increased focus is needed on technology dissemination to improve results, reach the project's beneficiary target and achieve impact.*
- *Overall design remains relevant with some adjustment including improving the process of R&D project preparation and peer review, as well as possible expansion of regional collaboration to additional crops and countries*
- *M&E systems are in place but need urgent attention to fully operationalize and capacity required at CCARDESA level*
- *Some additions should be made to the results framework – adding indicators to better capture performance and outcomes and removing those already achieved.*
- *Long term sustainability issues should be discussed now including the need to address improvements in administrative, management and financing systems of the research institutes/implementing agencies.*
- *Regional governance can be improved through the establishment of a regional steering committee to meet once a year.*
- *Greater attention to long term training is required along with a focus on ensuring MSc and PhD research is linked to APPSA priorities. Measures are also needed to replace scientists on training.*
- *APPSA needs to move forward on regional collaboration on data management systems, regional variety release in line with SADC regional policy.*
- *Knowledge management should be scaled up including the establishment of RCoL knowledge repository and further knowledge exchanges.*

Communique committing to support the attainment of the APPSA project objectives (Annex 5).

There are key strategic issues that were discussed and agreed upon that would improve the implementation of the activities in the three countries. These strategic considerations have recommendations and agreed actions that need to be incorporated into the existing activities. Some of the recommendations are indicated in Box 1.

The project shares a consolidated set of performance rating across the three countries and was rated '**moderately satisfactory**'. Ratings for implementation of the project in the individual countries were given as follows:

Aspect	Rating		
	Malawi	Mozambique	Zambia
Overall implementation progress	Moderately satisfactory	Moderately satisfactory	Moderately satisfactory
Monitoring and Evaluation	Moderately satisfactory	Moderately satisfactory	Moderately satisfactory
Safeguards	Moderately satisfactory	Unsatisfactory	Moderately satisfactory
Financial Management	Moderately satisfactory	Moderately satisfactory	Moderately unsatisfactory
Procurement	Satisfactory	Satisfactory	Moderately satisfactory



Participants at the regional wrap up meeting of the mid-term review in Malawi

2.3.4 Communication and Knowledge Management

Effective communication is critical to achieving the objectives of APPSA. In order for the RCoLs to benefit the region, knowledge and information must be communicated and shared across national boundaries. During the year under review, several communication activities were undertaken and these included a raining on technology dissemination and formal discussions towards drafting an APPSA communication strategy.

The identified key stakeholders (those with broader interest in the outcomes of APPSA activities) and partners (institutions/individuals directly involved in project implementation) were: i. National Governments/policy makers, ii. NARS, iii. CGIAR, iv. Farmers Organizations/Farmers, v. Civil Society, vi. Private sector, vii. Academic institutions, viii. Media and ix. World Bank and other donors.

Communication tools proposed or adopted for the project include (a) Websites, (b) Press releases, (c) Emails, (d) Field Visits, (e) Demonstrations and field days, (f) publications, (g) Community radio, (h) Videos, (i) Media tours, (j) Press conferences, (k) Policy briefs, (l) M&E System. The websites are still under construction.

Communication focal persons were nominated to constitute a communication working group to guide the communication activities of the project. The terms of reference for the communication working group were drafted and discussed. To facilitate information sharing among scientists, commodity specific discussion groups (D-groups) were established. While some information was shared through the discussions, the level of interaction through the platform is still low. Templates for sharing success stories were shared with scientists, and some of them produced success stories. Examples are in annex 7

3.0 KEY CONSTRAINTS

While implementation of the APSSA activities has improved with time, there are still major constraints that need to be attended to. The key challenges faced in 2015 include:

- The delayed onset of the season, combined with a poor mid-season rainfall pattern at critical stages of crop development resulted in generally poor crop performance across countries. Some experiments were a write-off as a result of the uneven rainfall distribution.
- Key R&D project management issues that require attention include inadequate monitoring of R&D projects; delayed submission of requests for funds by scientists and delayed clearing of outstanding imprests; delayed processing of requests for funds by Secretariats, and limited funds disbursements. Delays in accessing R&D project funds resulted in delays in acquisition of inputs and some of the specialized equipment, resulting in low utilization rate of funds. The majority of the projects are below 30% budget utilization, despite being in their second/third year of implementation.
- Incomplete, inconsistent and delayed reporting is still a huge challenge that needs to be addressed by all RCoLs. There is a lot of under reporting.
- Limited access to internet or unreliable internet connectivity is hampering information sharing among project teams. And the lack of information sharing is causing inconsistency between research protocols implemented by project teams.

- The quality of science is still an issue, particularly for the teams that do not seem to be communicating often.
- Due to loss of first year of implementation and procurement challenges, a significant number of projects are behind schedule, and might require a no cost extension.
- Some of the crucial equipment required to facilitate research work is still not procured (Irrigation equipment; soil moisture measuring equipment; laboratory equipment; seed storage facilities; data analysis packages etc.)

4.0 LESSONS LEARNED

There are a number of lessons learnt that could improve the implementation of remaining activities in the forthcoming period. These are summarized thus:

- It is crucial to have in place a well-knit project management team which has clear reporting lines and access to resources to be able to manage the project effectively.
- Good communication through meetings, and full participation in project activities is very important. The face-to-face meetings between PIs and co-PIs and the commodity technical meetings improved communication and sharing of information between the implementing teams.
- The involvement of senior scientists in R&D activities helped in mentoring young scientists.
- The involvement of different experts such as CGIARs, and Universities both at programme and project level enhances learning and diversity in execution of assignments leading to better results than when individualistic approaches are used.
- The series of national review, Implementation Support Mission and MTR reflections benefited the three countries through identification of strong and weak areas of implementation. Reviews and reflections are key to learning in project implementation.
- Progress reports produced under the project cannot fully meet their intended purpose, i.e. they cannot be used for effective forward planning as they are being submitted very late.

5.0 RECOMMENDATIONS

The constraints raised above call for a comprehensive approach to the implementation of activities. This implies that all the concerned stakeholders ought to play their roles effectively if the projects are to succeed. The following recommendations need to be implemented as a matter of mitigating some of the risk factors:

- Ensuring a relevant and robust science agenda should be a continual process of improvement. Further efforts to improve the quality of science should include standardization of research protocols and also engaging Biometricians to provide technical guidance with regards to experimental designs, data collection and analysis. Social scientists should also be part of the multi-disciplinary teams required.

- Effective progress and results monitoring of APPSA requires a good data information system. There is need to finalise the data management needs within APPSA and establish management information system (MIS) at country and regional levels, drawing lessons from the Malawi MIS.
- There is need to expedite the process of procuring the much needed research equipment, otherwise most R&D projects will not have meaningful research outputs at the end of the implementation period..
- Since some projects missed one cropping season, there will be need for a no cost extension for those projects showing potential to deliver on the expected outputs.
- To avoid crucial R&D activities being curtailed due to limited funds availability, there is need to disburse a significant proportion (agreed up front with individual projects) of the annual R&D budget before the onset of the cropping season.
- Capacity building efforts, especially at MSc and PhD level need to be fast tracked to enable the R&D efforts to deliver on their expected objectives. Countries are urged to put more efforts to ensure that the capacity building window offered by the project is fully exploited. Sustainability and effectiveness of investments require complementary commitments to human resources and management systems.
- The D-groups that were created by CCARDESA to facilitate an interactive forum for all PIs and Co-PIs to share knowledge and experiences need to be utilised for this purpose, and the commodity lead scientists need to lead the commodity-specific discussions.
- There is need for continued efforts to improve APPSA visibility not only in the implementing countries, but in the region at large.
- There is need for increased ownership and attention at management/Ministry level in order to best guide and utilize APPSA outputs. Better use of the M&E system is required in order to promote a culture of learning.

Annex 1: Status of PDO level Results Indicators as at 31 December 2015

PDO Level Results Indicators	Unit of Measurement	Y2 (2015) Target TOTAL	Target Values Y2 (2015)			Actual Values Y2 (2015)			TOTAL	Comments
			MWI	MOZ	ZAM	MWI	MOZ	ZAM		
1. # of technologies ¹ being made available to farmers & other end users	No.	39	13	13	13	47	30	36	113	Out of the 113 technologies made available to farmers, 86 of them constituted “improved varieties” of maize, rice and food legumes. Other key technologies that were disseminated include a range of Agronomic/crop husbandry practices; Post-harvest practices - Improved storage structures; Processing - De-hullers (for all legumes); Driers (cowpea and bean leaves); Legume flour (Bambara nut; soybean); Soybean milk production
2. % of LFs ² in targeted areas who are aware of	%	65	65	65	65	85	TBD	TBD	85	Only Malawi reported on the indicator following completion of their Baseline survey. The indicator is still to be quantified in Mozambique and Zambia.

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	Y2 (2015) Target TOTAL	Target Values Y2 (2015)			Actual Values Y2 (2015)			TOTAL	Comments
			MWI	MOZ	ZAM	MWI	MOZ	ZAM		
an improved technology promoted by the Project										
3.# of technologies generated or promoted by the Project in one country that are released in another country	No.	0	0	0	0	1	2	0	3	Malawi shared the improved rice variety Kilombero that was released in 2014 with Zambia and Mozambique for dissemination. Mozambique promoted 2 rice varieties (Macassane and Tumbeta) in Malawi and Zambia.
Beneficiaries 4. Direct Program beneficiaries ³ ('000)	No.	1,805	602	601	602	2.14 3	57.63 0	55.99 2	115.76 5	There was under reporting with regard to this indicator at sub-project level. The numbers of beneficiaries reached by the projects through awareness creation activities were not quantified.
of which LFs ('000)	No.	5	1680	1640	1680	1.43 6	2.011	1.756	5.203	Lead farmers represent a group of innovative and successful farmers within the local community who are committed to training their fellow farmers on agriculture methods and technologies. The lead farmers were engaged to participate in the field demonstrations, as well as in activities such as rice and legume seed production.
of which other farmers ('000)	No.	1800	600	600	600	0.70 7	55.61 9	54.23 6	110.56 2	These are follower farmers who learn from the Lead Farmers.
of which female (%)	%	>30	>30	>30	>30	33	34	48		All the countries exceeded the set target of 30%.

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.

PDO Level Results Indicators	Unit of Measurement	Y2 (2015) Target TOTAL	Target Values Y2 (2015)			Actual Values Y2 (2015)			TOTAL	Comments
			MWI	MOZ	ZAM	MWI	MOZ	ZAM		
Intermediate Result 1: Collaborative technology generation & dissemination around priority farming systems										
5. # of collaborative research or extension projects under implementation	No.	20	14	7	7	14	14	21	49	The figures indicated for each RCoL indicate the # of projects it is leading (to avoid double counting). The # for Zambia includes the Sorghum project.
6. % of collaborative research or extension projects completed	%	60	0	0	0	Not yet	Not yet	Not yet	Not yet	No projects were envisaged to be completed by then.
7. # of technologies generated	No.	45	15	15	15	0	0	9	9	Zambia released seven new varieties as follows: 1 Rice (SUPA MG); 1 Soybean (Lukanga) 2 Beans (Lunga, Lugwebungu) 3 Groundnuts (MGV-6, MGV-7 and Lupande); 2 Quality Protein Maize (GV682p and GV687p).
Intermediate Result 2: Improved technical capacity to lead national and regional research and dissemination agenda										
8. # of clients (RCoL staff) days of training (disaggregated by gender & type of training)	No.	3600	700	700	1200	65	663	580	1,308	The RCoLs conducted short term trainings over a total of 1,308 days. The actual numbers of staff, extension personnel and farmers trained are provided under 2.2.3. 'Progress in human capital development'
9. # of research centers rehabilitated or equipped	No.	0	0	0	0	0	0	1	1	NB: Some disaggregation of data by type will help avoid the current level of under reporting. Zambia rehabilitated 1 Research Centre.
The current level of 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	Yes/No	Y	Y	Y	N	N	N	N	Efforts are being made to develop data management systems that will be in line with the Research Institutions' reporting systems. Malawi identified a consultant to develop the MIS, and other countries and CCARDESA will draw lessons from that.

PDO Level Results Indicators	Unit of Measurement	Y2 (2015) Target TOTAL	Target Values Y2 (2015)			Actual Values Y2 (2015)			TOTAL	Comments
			MWI	MOZ	ZAM	MWI	MOZ	ZAM		
11. # of APPSA AWP drafted discussed & agreed on time	No.	8	2	2	2	1	1	2	4	The RCoLs drafted annual work plans that were approved by the respective national project steering committees/technical committees. CCARDESA developed a regional work plan which was shared and endorsed by the countries.
12. # of countries with redrafted revised seed policy in compliance with SADC harmonization framework	No.	0	0	0	0	1	1	1	3	Malawi reviewed the Seed Policy which is yet to be approved by relevant authorities. Mozambique has an existing Seed Policy which needs to be aligned to the SADC harmonisation framework. Zambia has a Draft seed law/regulations which have been submitted to the Ministry of Justice.

Annex 2: 2015 APPSA Regional Work Plan and Progress Achieved

COMPONENT 1: TECHNOLOGY GENERATION AND DISSEMINATION	
Regional Workshop on Endorsement of Project concept notes	It was agreed to defer the call for the 3 rd round R&D projects to 2016 to allow proposals to be developed over a longer time frame and start in the 2016/17 season. Additional activities addressing gaps in the current R&D projects (dissemination, socio-economics, climate smart agriculture and other gaps) would be prioritized
Peer review of approved project proposals	This activity was subject to the implementation of the above activity
Regional Planning and Review Workshop	This activity was subject to the implementation of the above activity
Regional meeting with broader groups of APPSA stakeholders	This meeting took place during the Mid-term Review in November 2015. This meeting was attended by key APPSA stakeholders such as CG Centres, (CYMMIT, CIAT, ICRISAT, ILRI, IRRI) Regional partners (SADC Seed Centre AATF, AGRA), USAID, representatives of countries interested in joining APPSA (Madagascar and Swaziland)
Regional Technology Dissemination activities	<ul style="list-style-type: none"> - Guidelines for inventory of existing technologies were developed - template for Technology Description was circulated to R&D staff for completion - “Inventory” of technologies under APPSA undertaken however, feedback from R&D officers was incomplete - A Technology development specialist was engaged to facilitate inventory of technologies through national consultations with project staff. A report on Technology Description and Dissemination Pathways was drafted - A Technology Dissemination Workshop was conducted by the FAO Technology Expert (Brent Simpson) during the Midterm Review in November 2015. Technology Dissemination experts from the three RCoLs were requested to update the technology descriptions and dissemination action plans
COMPONENT 2: REGIONAL CENTRE OF LEADERSHIP STRENGTHENING	
Facilitate the convening of Commodity Technical Group Meetings for RCoLs	<ul style="list-style-type: none"> - The meetings were convened in the three APPSA countries as follows: Food Legume group in Malawi, Maize group in Mozambique and Rice group in Zambia. The key expected deliverables were:

COMPONENT 2: REGIONAL CENTRE OF LEADERSHIP STRENGTHENING

	<ul style="list-style-type: none"> (a) Final Result Frameworks for each R&D project (b) Updated R&D Result Framework Report (c) Agreed Work Plans & Budgets for 2016 (d) Agreed Research Protocols (e) Monitoring schedule for each R&D project (f) Draft Technology dissemination action plans (g) Documentation on emerging research issues (h) Prioritized List of capacity development needs (i) Including preferred timing for training (j) Agreed next steps and timelines <ul style="list-style-type: none"> - Participants included PIs/Co-PIs and invited key stakeholders. - Meeting reports for the maize and food legume groups were submitted and shared with the RCoLs
Facilitate exchange visits for Scientists	It was agreed that exchange visits are crucial and should be facilitated by RCoLs. Scientists were urged to develop schedules for monitoring visits to ensure appropriate planning for monitoring visits by the national technical committees, M&E working group and other invited stakeholders.
Benchmarking exercise with CORAF and EMBRAPA	The benchmarking visit to CORAF was deferred due to the Ebola outbreak. Consultations were held with EMBRAPA representatives but concrete plans were not confirmed
Facilitate participation in key EAAPP/WAAPP workshops by RCoEs with similar commodities	CCARDESA facilitated participation of APPSA National Coordinators and Directors of Research at the EAAPP End of Phase 1 Conference in Nairobi
Create awareness about APPSA Programme in other SADC countries	<ul style="list-style-type: none"> - Discussions held with countries that expressed interest in joining APPSA (Angola, Lesotho, Madagascar and Swaziland) - Interested countries were invited to the Midterm Review wrap-up meeting in November 2015 to express their interest - APPSA reports were included in the CCARDESA Secretariat reports for the CCARDESA Board and in the CCARDESA Secretariat annual report - Information on APPSA was shared at regional fora

Develop and maintain a dynamic M&E online system	This is yet to be developed. However, various options have been explored (e.g. aWhere, Dev Results, Kashana platforms) and this is still work in progress
Prepare APPSA semi-annual and annual reports	The January to June 2015 semi-annual report was produced and shared. The annual report for 2015 was also developed albeit late due to late submissions by the RCoLs
Regional M&E working group meetings	Two meetings were convened, one in June and one in September 2015. The objectives of the meetings were to finalise regional M&E documents, reporting templates and plan for the Midterm Review mission that was to take place in October/November 2015
Project Implementation Support and Midterm Review Mission	<ul style="list-style-type: none"> - Participated in the Implementation Support Mission in April/May 2015 to assess progress in implementation of planned activities at RCoL level - The Midterm Review took place in October/November 2015. Representatives of the WB, CCARDESA, RCoLs, Governments and invited key stakeholders participated in the mission and Wrap-up meetings
Develop APPSA Communication strategy	<ul style="list-style-type: none"> - Initial stakeholder mapping undertaken - Tools for information generation and dissemination identified - Key Stakeholders/Partners identified - Communication needs for different stakeholders identified including sources and tools to be used - ToRs for communication WG drafted and finalized - CCARDESA requested RCoLs to nominate communication focal persons to constitute the regional APPSA communication working group. Nominations were received from Malawi and Zambia - ToRs for consultant to develop a regional communication strategy were developed and shared with the countries
Provide a forum for networking and exchanges [commodity-specific D-groups].	<ul style="list-style-type: none"> - Rice, Maize and food Legume Discussion groups (D-groups) were created & are now functional. - Commodity Lead Scientists were identified and requested to lead the discussions in their respective commodities
Produce APPSA visibility/outreach materials	<ul style="list-style-type: none"> - Translated APPSA brochure into Portuguese & French - APPSA R&D summaries were updated and uploaded on the CCARDESA website

	<ul style="list-style-type: none"> - Template for APPSA success stories was developed and shared with the countries. Only two submissions received to date - Work on improving the draft APPSA regional logo which was developed and shared with the countries is in progress
COMPONENT 3: COORDINATION AND FACILITATION	
Facilitate participation in Training Events for scientists	<ul style="list-style-type: none"> - CCARDESA in the process of identifying institutions of excellence for the various trainings proposed by RCoLs - CCARDESA shared information on training courses offered by various service providers in the region and international - CCARDESA facilitated the training of 78 scientists on weed identification and knowledge management using the WIKWIO (Weed Identification and Knowledge in the Western Indian Ocean) portal
Policy Harmonization and Advocacy	<ul style="list-style-type: none"> - The planned seed policy harmonization experience sharing workshop was deferred to 2016 due to time constraints - CCARDESA invited SADC Seed Centre to provide an update on harmonization of seed regulations in the SADC region and the implementation of the SADC/COMESA policies

Annex 3. R&D Project Performance Assessment Criteria

Criteria	Suggested score
1. Meeting Project Objectives	20
2. Quality of Science	20
3. Collaboration	10
4. Timeliness	10
5. Financial & Procurement Management	5
6. Monitoring and Evaluation	5
7. Dissemination of Scientific Outputs	20
8. Adherence to Environmental Mgt. Issues	10

Annex 4: Possible Areas of Capacity Building for R&D Scientists

Skills required	
1. Information & Data Management; Knowledge management skills	2. Scientific writing
3. Proposal Development and resource mobilization	4. Packaging/Dissemination of research outputs and scaling-out
5. Project Monitoring & Evaluation; Results based Monitoring	6. Research strategy and Priority-setting
7. Research Methodology	8. Research Management and Leadership
9. Participatory Policy Formulation and Analysis	10. Participatory Technology validation
11. Facilitating partnerships and networking	12. Team building and networking skills
13. Value chain analysis	14. Disease and pest diagnostics, handling and surveillance
15. Geographical Information System	16. Statistical planning, analysis and error reducing techniques
17. Communication skills	18. Resource Management (Human, Financial); Procurement
19. Food safety (toxicology, microbiology of pathogens, chemical contaminants)	20. Mainstreaming gender & environmental issues in AR&D
21. Agro-chemicals and environmental safety	22. Germplasm evaluation and characterization
23. Molecular breeding/ marker assisted selection	24. Research farm management
25. Machinery maintenance and management	26. APSIM simulation in CA
27. Participatory Extension Methods	28. Training in MLND Diagnostics

Annex 5: APPSA Communique by Permanent Secretaries of Agriculture



Communiqué

AGRICULTURAL PRODUCTIVITY PROGRAMME FOR SOUTHERN AFRICA (APPSA) REGIONAL WRAP UP MEETING OF THE MID-TERM REVIEW 2 - 3 NOVEMBER 2015 Lilongwe, Malawi

Preamble:

We, the Permanent Secretaries of Agriculture in Malawi, Mozambique and Zambia have gathered in Lilongwe, Malawi from 2nd to 3rd November 2015 at the Regional wrap up Meeting of the mid-term review of the Agricultural Productivity Programme for Southern Africa (APPSA). The general objective of the meeting is to bring together key representatives of APPSA implementing countries to facilitate a broader consultation on the implementation of the project. The mid-term review is viewed as a mechanism for strengthening implementation of the project as it provides an opportunity to make adjustments, where required. It is also an opportunity for higher level management to interact and reach higher level agreements where necessary.

In this regard:

1. We, the Permanent Secretaries of Agriculture for Malawi, Mozambique and Zambia are committed to meeting the APPSA project development objective of increasing the availability of improved agricultural technologies in the APPSA implementing countries. Sustainable improvement of agricultural productivity through adoption of improved agricultural technologies is pivotal to attaining sustainable food and nutritional security at household, national and regional levels. We therefore support all the interventions that APPSA has initiated to support improved agricultural productivity.
2. We maintain that Agriculture has the potential to drive economic growth and is a major sector for reducing poverty in our countries and the Region at large. We also know that there is no country that has developed its agriculture and economy without concerted use of science and technologies. Therefore, there is the need to create the conditions that enable development of appropriate technologies for increasing and sustaining agricultural productivity. Investments in agricultural research and technology development are among the most important determinants of increasing agricultural productivity. Furthermore, adaptation measures, particularly the adoption of climate-smart agricultural practices, are needed to maintain productivity and ensure resilience

in the face of more frequent and more severe shocks. We support the promotion of such measures by the project.

3. We commend the activities on technology generation and dissemination that have resulted in 49 research and development projects being implemented by the three countries in a collaborative manner. We understand that these projects, that are at various stages of implementation are addressing national and regional research priorities under various thematic areas that include germplasm collection and characterization, germplasm improvement (plant breeding), crop management, and post-harvest activities including processing storage. While progress is being made towards achievement of APPSA project development objectives, we want the research outputs to be relevant to the needs of all stakeholders, especially to the government for policy and decision making and to the smallholder farmers, whose livelihoods are dependent on farming. As our countries have very high stunting levels, we appeal that your work also focuses on developing more technologies on post-harvest management, food safety and addressing malnutrition. We hope we will soon find the orange maize, high quality protein maize and nutrient fortified varieties of all crops on the markets in all countries.
4. We endorse the technology dissemination approach being implemented under APPSA, which includes: use of lead farmers as technology dissemination agents; improving the capacity of advisory service providers through technical training of lead farmers and extension agents; development and testing of techniques for farm-level adoption of research outputs; improving accessibility of technology messages and knowledge products; farmers' participation in evaluation of technologies. We stress the need for close involvement of extension and other technology dissemination agents right from the beginning of the project in order to improve farmer-research-extension feedback mechanisms. We urge the project to conduct research on technology dissemination methods or tools that facilitate a better analysis of farmer preferences and improved exchange of information and experiences with other participating countries.
5. We welcome the progress on implementation of the various R&D projects. The project has taken shape, and has become visible to outsiders. We urge the implementers to pay more attention to the factors critical to the success of the project, namely: the quality of science, collaboration, timeliness of project activities, adherence to financial & procurement procedures, adherence to environmental management issues, dissemination of scientific outputs, monitoring and evaluation. We note with concern the challenges faced in implementing some of the R&D projects such as the work on Maize Lethal Necrosis Disease (MLND) which is already causing havoc in East Africa region and is a big threat to our region. We are aware that this kind of work requires collaboration with CIMMYT in Kenya, and we are therefore endorsing our support for concerted efforts to collaborate with East Africa region in fighting expansion of MLND into the region.

6. We further welcome the progress in strengthening the RCoLs (civil works, procurement of equipment, human capacity development). We encourage fast track implementation of the long term training plans to ensure that candidates complete their studies within the timeframe of the project.
7. We stress the need for close monitoring of the project for accountability, informing decision-making and more broadly, for learning purposes. Recognising the differences in the M&E capacity levels at the RCoLs, we recommend the strengthening of the capacity of national M&E systems to foster their responsiveness to the APPSA obligations. We further recommend the timely submission of progress reports to facilitate availability of accurate and up-to-date information on project progress. There is need for concerted efforts to standardise methodologies used in R&D projects to ensure comparability of results among the implementing countries and within specific themes.
8. We highlight the need for increased collaboration between countries and the critical work of international organisations (e.g. CGIAR, AATF and AGRA) in collaborative international research. APPSA is expected to complement investments made by the CGIAR centers and to support the ongoing CGIAR, AATF, AGRA reform process by building strong partnerships in the Region. To this end, we recommend that concerted efforts be made to deepen partnerships with CGIAR in some of the following key areas (i) Increasing the amount of collaborative research, (ii) Conservation, characterization, distribution, and stewardship of genetic resources, (iii) Bio-safety and IPR issues, (iv) Engaging in joint training activities, (v) Promoting knowledge sharing and joint learning, (vi) Technology dissemination - ensuring that research results move from laboratories to farmers' fields, (vii) Ensuring Quality of Science in R&D Projects
9. We note with great concern the general shortage of improved seed in the region, and how this negatively impacts on implementation of agricultural development work. We therefore pledge to support the national seed authorities in Malawi, Mozambique, and Zambia to build their capacity to respond to the needs. We note that Malawi, Mozambique and Zambia are signatories to the MOU on the Implementation of the Harmonised Seed Regulations in the SADC Region which entered into force on 7th July 2013. We further note that the three countries are reviewing their seed legislation taking cognizance of the SADC (and COMESA) regional harmonized seed agreements that they are party to. We reaffirm our support for SADC regional seed regulatory system, and our commitment to complying with the SADC seed policy harmonisation initiatives. We hope that the review and subsequent enactment of the seed legislation will be timeously completed to facilitate seed exchange.
10. We call upon all APPSA implementing countries to strive to maintain high quality research and development activities at all times. We need to move the improved technologies off the shelves and facilitate their adoption. Recognising the importance of learning from other countries' experiences, we support the need for study tours/exchange visits to relevant countries/regions for benchmarking.

11. We reiterate that APPSA remains an integral component of the implementing institution which it is meant to strengthen. There is need for the implementing institutions in each country to take full ownership and assume the overall responsibility for implementation of the Program in order to ensure sustainability of the RCoLs.
12. We call upon CCARDESA to continue with the regional facilitation, and ensure the expansion of APPSA so that more countries in the region can benefit.
13. We appreciate the facilitation by the World Bank team in helping our countries access the credit facility. While we are mandated through the Maputo Declaration to allocate 10% of our national budgets to agricultural development, we are failing to make this a reality due to competing priorities. Through the Malabo declaration, our Heads of State further committed our governments to allocate more resources to agricultural development. We therefore have to utilise these resources efficiently and effectively for the purposes that they are intended for in order to achieve the development outcomes. This calls for good leadership, team work, collaboration and creating effective partnerships.

Annex 6: APPSA Commodity Lead Scientists

COUNTRY	COMMODITY	LEAD SCIENTIST	CONTACTS	EMAIL ADDRESS
Malawi	Maize	Dr Kesbil Kaonga**	+265 8883 61970	kaongak2@gmail.com
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	Rice	Dr Tenyson Mzengeza	+265 9991 45004	tmzengeza@gmail.com
Mozambique	Maize	Dr Pedro Fato	+258 8298 68189	fatopedro@hotmail.com
	Legume	Dr Manuel Amane	+258 8230 38760	mivamane@gmail.com
	Rice	Dr Marcos Langa**	+258 8297 48530	marcoslanga@yahoo.com
Zambia	Maize	Dr Mwansa Kabamba	+260 966 725959	mwansakabamba@yahoo.com
	Legume	Dr Kennedy Muimui**	+260 977 636498	Kmuimui04@yahoo.co.uk
	Rice	Dr Chitambi Musika	+260 950 981582	chitambimusika@yahoo.co.uk

** Overall Lead for the Commodity

Annex 7: Sample Success Stories



Groundnut Seed Production Saves Farmers Against Falling Prices Of “White Gold” in Petauke, Zambia

Falling cotton prices **mostly** referred to as “white gold” is not good news for small-scale farmers in Eastern province, as the crop has been a source of livelihood to them. A significant decrease in the number of small-scale farmers’ currently growing cotton in the province, has resulted in an increase in poverty levels. This has exposed small-scale farmers whose livelihood is derived from farming to much more challenging lives.

When groundnut seed production was introduced in Minga area in Petauke district, it relieved farmers of the pressure of having to rely on cotton as the only valuable cash crop. Unit Seed company in partnership with small-scale farmers in Minga area engaged in seed production for groundnut. The farmers were provided with groundnut basic seed by Unit Seed company and produced certified seed, which the company buys and re-sales to prospective markets. However, this initiative was marred by obstacles such as the limited basic seed supply, lack of knowledge in seed production and limited capacity to provide seed quality control services. As part of the APPSA funded “Strengthening Food Legume Seed Delivery Systems in Malawi, Mozambique and Zambia” project, small-scale farmers in Minga area of Petauke in 2014 partnered with Unit Seed Company in order to address some of these issues. The project in partnership with Unit Seed

Company conducted farmer recruitments and provided them with basic seed to plant 68 hectares of seed for two varieties namely, MGV4 and MGV5. The project also provided quality control services and trained an extension agent as a Seed Inspector. The yield of the farmers was good despite the drought experienced in the area. Indeed, it represented a great opportunity and avenue to improve farmers’ livelihoods and income.

The project also provided seed quality control services through conducting seed inspections in the field during the growing season. The farmers were excited to receive this support and were eager to show case their fields during field visits as they posed in front of one field (Fig 1). The Group Leader Mr. Leonard Daka, from Felesiano village says “ I have found production of groundnut certified seed very beneficial and over the past few years bought cattle and a plough, built a house, and managed to purchase 22 bags of fertiliser” As of now, farmers have already bulked 30 X 50kilogramme bags of MGV4. He says he is proud to be associated with the programme as it assures them of a readily available market for the seed.



Mr. Leonard Daka, from Felesiano village, Petauke Eastern Province of Zambia, with farmer group members

Despite, drought being characterized during the season, farmers managed to attain good yields and are looking forward to good returns from their investment. The seed is already secured for purchase at K7.00 per kilogramme (*compare this with the price of maize the main crop grown by rural smallholders- K1.50/kg offered by FRA for 2015/16 marketing season*), which is a fairly reasonable and profitable prize, that will assist to meet their needs such as the purchase of cattle, iron sheets, build houses, pay school fees and pay other family needs.

Mr. Daka recalls how most farmers in the past struggled to meet their needs before the programme was introduced. At the time, they were unemployed and could not meet their basic needs such as having sufficient food for their family or school uniforms and other necessities for their children. However, seed production has improved their lives dramatically and they appreciate APPSA's interventions and the benefits they have derived from the programme. The seed project is fostering strong partnerships between small-scale farmers and the emergent seed enterprises through capacity building and empowerment.

The project is creating a model that will deliver seeds through the emerging private sector. This will have long-term sustainable positive effects as opposed to previous initiatives, where farmers were encouraged to be both producers and traders. Our past experiences have proved that small-scale farmers are unable to do both. The project is also making available quality and certified seed for groundnuts both within Petauke and other areas through wider distribution network.

The experience with Minga farmers provides a good platform to learn on what

works best for small-scale farmers. From this case study, the project learned that small-scale seed producers are nurtured by: government support, access to basic seed of improved varieties, entrepreneurship, technical skills and capacity, sustaining demand for quality seeds, enterprise ownership and profitability, and links between farmers and the formal seed entrepreneurs. The partnership with the private sector is worth recognising as one that would work best to empower small-scale farmers. Team building is also very critical to the success of seed production to facilitate viable linkages through contract marketing. Basic seed access still remains a challenge for most rural smallholders and requires adequate measures to ensure accessibility and affordability. Therefore, seed companies will be encouraged and motivated to ensure they grew a portion of basic seed for their use.

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Adaptation of Drought Tolerant and Pro-Vitamin A Maize Varieties under adverse agro-climatic conditions: Experiences from Zambia

Maize which remains the major staple food in Zambia is faced with a number of challenges. These challenges can be classified into socio-economic and bio-physical. The primary socio-economic factors hindering improved maize productivity at smallholder farm level include among others the following: limited access to extension services and support inputs for maize production, weak extension- research-farmer linkages, poor rural infrastructure development, poor market infrastructure and access, low investment in improved maize dissemination programmes and uncoordinated private-public partnerships.

In particular, the bio-physical maize production challenges are centred on agro-climatic conditions and low farmer adherence to the agronomy of maize production. From the agronomic perspective the key issues include: poor quality seed, mono-cropping, poor soil fertility management practices, poor tillage methods coupled with inappropriate weed management practices. The past three decades have experienced the worst impacts of the socio-economic and bio-physical challenges on maize production in the agricultural sector. These challenges have exacerbated by adverse effects emanating from adverse climate change particularly increased incidences of drought conditions.

In cognizant of the role of maize in food security and income generation and the key challenges that the crop faces, the private-public sector research and extension organizations have pooled their resources together to address the problem of maize production. A specific case in Zambia is the Department of Agriculture led Maize Dissemination Project under Agricultural Productivity Program for Southern Africa (APPSA) that is spearheading robust information dissemination of drought and low nitrogen tolerant, pro-vitamin A improved maize varieties, soil fertility improvement, minimum tillage and weed management.

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The sub-project adopted the Lead-Follower Farmer (L-FF) Approach in reaching out to the farming communities with the supported technologies. Lead Farmers (LF) hosted the on-farm crop demonstrations with the active participation of Follower Farmers (FF) in implementing the technologies.

In Zambia, the sub-project is operating in 5 provinces with a total of ten districts, namely:- Northern Province (Kasama), Muchinga Province (Mpika); Central Province (Mkushi, Kabwe, Chibombo, Mumbwa); Eastern Province (Chipata, Katete); Southern Province (Choma, Monze). In each district, five (5) agricultural camps are targeted with an average of four demonstrations per camp.

In the last two seasons, the main thrust of the project has been to demonstrate best practices through increased farmer

awareness on existing maize technologies through 373 on-farm and 12 on-station maize variety demonstrations; 385 green manure maize legume rotation demonstrations, 8 field days, 450 information brochures. Twelve (12) improved maize varieties among them MMV 409, ZMS 402, ZM 421, ZM 521 and 665A were promoted prior to evaluation using Participatory Variety Assessment Criteria. Smallholder farmers themselves assessed the maize varieties on a number of characteristics such as cob/grain size, grain filling and grain texture.

One of the positive outcomes of the project has been the involvement of farmers in variety evaluation. This approach has also strengthened farmers' resolve to adopt and adhere to best farming practices, as they were accorded an opportunity to plant their preferred variety based on the results of their own evaluation.

In spite of low rainfall experienced in the last two seasons due to incidence of dry spells, the evaluated varieties demonstrated resilience implying that smallholders could in the short to medium-term reap significant benefits in terms increased production of preferred maize varieties but also socially acceptable maize varieties.

Additionally, the use of participatory approaches such as on-farm and on-station demonstrations to demonstrate best farm practices coupled with information brochures was quite effective in reaching out to 1,400 smallholders of which 46% were women farmers. Women play an important role in most agricultural activities. This project will ensure that more women farmers are involved farm decision-making processes with regard to their preferred maize varieties which also have a bearing on family nutrition.

- Need to support and encourage farmer exchange visits and strengthen the Lead Farmer-Follower farmer concept
- Consistency in the variety package is critical across seasons
- Regular Extension-Farmer interactions at field level (i.e. during demo implementation, field days, farmer field schools, seed fairs, agricultural shows)
- Support needs to be given to private sector partners who are willing to multiply and market the farmer preferred varieties. This support could mainly be centred around strengthened linkages.

- Need to intensify technology publicity through print and electronic media (Brochures/flyers, Community radio stations)

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A group of Lead Farmers with the Principal Investigator in Eastern Province (Chipata, Katete)



Scaling up smallholder soybean productivity in Zambia

Soybean has the potential to transform rural livelihoods due to the several utilization options both at household and community level. The crop offers a variety of potential benefits to the production systems, diets, and incomes of smallholder producers. Soybean can be grown as a cash crop owing to the growing demand for the crop in the livestock and oil processing industries in the country. At the same time the crop is a cheap source of vegetable protein and oil when processed, households can also process it into feed for their poultry and livestock.

Despite these advantages soybean yields among smallholder farmers remain low (0.5 – 0.9 t/ha) estimated at about 30% of the potential yield; this is notwithstanding the availability of high yielding varieties on the market, improved production technologies, and ready markets for the crop.

Through partnerships with the department of Agriculture and other players, the World Bank funded project has supported smallholder farmers with necessary information and technologies to transform the way they grow their soybean in order to increase farm yields and income. The project has been implemented in eight districts across three provinces in Zambia.

In collaboration with the Department of Agriculture under extension services the project mobilised lead farmers to host demonstration plots showcasing improved

soybean production technologies. Thirty two (32) Camp Extension Officers were trained on farmer and site selection, demo layout, installation and management at the start of the 2014/15 season.

One hundred and ninety two (192) lead farmers were identified to host the demonstrations and to each work with 3 farmer groups with an average membership of 20 farmers per group. Side by side demonstrations showcasing Lukanga (an improved soybean variety) and improved management technologies were planted in 32 camps in Chibombo, Chikankata, Chipata, Choma, Kabwe, Katete, Monze, and Mumbwa districts of Central, Eastern, and Southern provinces.

The demonstrations were established to create awareness among smallholders on the available improved production technologies for soybean and thus increase their soybean productivity. The technologies demonstrated included use of improved varieties, use of inoculant, fertilizer application, and crop rotation. The aim was to show the use of improved soybean production technologies increases yields.

Site inspection visits to the site were conducted, and farmer's field days were held to assess how the demonstrations were being managed as well as the perception of the participating farmers on the technologies that were promoted at the demos. Visits were made to 180 demonstration sites to assess the levels of participation and engagement at farmer level; 14 field days were held across the participating districts where farmers interacted with different stakeholders and shared knowledge and experiences.

- The project successfully established 180 demonstration sites out of 192 targeted.
- About 10,800 smallholders were reached using 180 demonstrations showcasing improved soybean production technologies established across 8 participating districts.
- 32 camp extension officers were trained on how to manage and implement demonstrations.
- About 1,100 households were reached with improved soybean production technologies through field days.
- There is a growing interest and awareness on the importance of using inoculant and improved seed among the smallholder farmers in the participating camps.

Costwell Chisowa a lead farmer in Mwachisompola Camp of Chibombo district had never grown soybean in his life; after participating in the demo planting he used the remaining inoculant to plant soybean in his own field just at the demo site. After seeing how the crop performed he plans to increase the area this coming season.

Damiano Daka a lead farmer in Chisitu Camp of Chipata district has increased his area under soybean to over 2 hectares after seeing crop performance.

Elizabeth Phiri, a female lead farmer in Kalichero camp of Chipata district successfully hosted a field day where there was full participation by the farmers. About 193 farmer attended the field day of which 142 were female and 51 male. The farmers are very eager to grow soybean this coming season.

Lessons Learnt:

- Sustainability: more work was required to link smallholders to input and output markets through either bulking centres or warehousing schemes and agro-dealer development at community level.
- Access to credit schemes: smallholder farmers need training in agribusiness principles as well as linkages to financial institutions to access credit.
- Partnerships: there is need to strengthen partnerships at implementation level with other stakeholders targeting the same farmers to avoid duplication or conflicting messages.
- Timeliness: Timely distribution of inputs and training of lead farmers is essential to successful establishment of demos
- Regular field visits and engaging with farmers and extension staff is important for driving the dissemination of information to smallholder farmers.



Costwell Chisowa (in a black waist coat) a lead farmer in Mwachisompola Camp of Chibombo district hosting a field day.

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