



## 1. Project Data

**Project ID**

P094183

**Project Name**

Ag Prod. Prog. for Southern Africa

**Country**

Africa

**Practice Area(Lead)**

Agriculture and Food

**L/C/TF Number(s)**

IDA-52030,IDA-52040,IDA-52050,IDA-H8280

**Closing Date (Original)**

31-Jan-2020

**Total Project Cost (USD)**

82,874,837.70

**Bank Approval Date**

14-Mar-2013

**Closing Date (Actual)**

31-Jan-2020

**IBRD/IDA (USD)**
**Grants (USD)**

Original Commitment

90,000,000.00

0.00

Revised Commitment

89,993,044.69

0.00

Actual

82,898,923.62

0.00

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## 2. Project Objectives and Components

### a. Objectives

The Project Appraisal Document (PAD, 2013, para 9) and the Finance Agreements (FAs, 2013, Schedule 1) of the Agricultural Productivity Program for Southern Africa (APPSA) provided the same Project Development Objective (PDO): "To increase the availability of improved agricultural technologies in participating countries in the SADC region".



The participating SADC countries were Malawi, Mozambique and Zambia. Subsequently (2018), Angola and Lesotho agreed to participate in the APPSA, although there was a separate "project" and documentation for their participation and inclusion (and built on the emerging lessons of APPSA, coupled with relevant improvements).

While APPSA is intended to be a longer-term program, for purposes of this ICRR, it refers to APPSA as the "Project" (equivalent to Phase 1 of APPSA).

**b. Were the project objectives/key associated outcome targets revised during implementation?**

No

**c. Will a split evaluation be undertaken?**

No

**d. Components**

The project had 3 components (PAD, paras. 25 - 46; summarized in the ICR, paras. 11-13). All of these components were aimed at achieving the project's same objectives for each participating country. The priority crops chosen, with each country taking a lead for a major commodity, were: maize (Malawi); rice (Mozambique); and legumes (Zambia).

**Component 1: Technology Generation and Dissemination** (appraisal estimate: US\$37.98 million (M), of which \$37.24 (M) was an International Development Association (IDA) Credit; Actual cost: US\$23.69 M). The objective of this component was to finance technology generation and dissemination activities associated with the commodity group being targeted by the Regional Center of Leadership (RCoL) in at least two participating countries. Technology generation activities took place through sub-projects that were implemented by the RCoL for each targeted crop and financed through the participating country's APPSA budget. The technology generation priorities included 4 sub-components and supporting activities: (1) germplasm collection and characterization, germplasm improvement (plant breeding), crop management, and post-harvest activities, including processing and storage; (2) improvement of content and accessibility of technology messages and knowledge products; (3) capacity building for advisory service providers; (4) dialogue and consultation around technology priorities; (5) improvements in farmer-research-extension feedback mechanisms; and (6) research on technology dissemination methods or tools;

**Component 2: Strengthening Regional Centers of Leadership** (appraisal estimate: \$37.85 M, of which \$37.79 was an IDA Credit; Actual: \$36.38 M). The objective of this component was to strengthen the core capacity of the RCoL for each participating country. It included the following 4 sub-components and supporting activities: (1) upgrading of key research infrastructure; (2) improved administration and performance management systems; (3) enhanced human capital, including post-graduate training, skills upgrading through courses and scientific exchanges; (4) strengthened seed production capacity, seed regulatory functions and related services.

**Component 3: Coordination and Facilitation** (appraisal estimate: \$18.81 M, of which \$14.37 M was an IDA Credit, and \$0.6 M a Regional IDA Grant; Actual:\$22.24 M). The aim of this component was to ensure strengthened and adequate coordination and facilitation of the regional research activities, involving 3 subcomponents and supporting activities: (1) Project coordination at the national level; (2) coordination at the regional level by the Centre for Coordination of Agricultural Research and Development for Southern



Africa (CCARDESA); and (3) facilitating policy harmonization results and associated activities in key areas that affect R&D at the national and regional levels.

**e. Comments on Project Cost, Financing, Borrower Contribution, and Dates**

**Project Costs:** The original project cost shown in the PAD was US\$94.6 M (PAD, para. 48). The revised cost shown in the ICR was \$89.9 M, the difference due to zero counterpart financial contributions from the participating countries. The final costs of the project was \$82.9 M (ICR, Annex 3), with the main difference due to shortfalls in component 1).

**Project Financing:** All direct project financing was provided by IDA, comprised of 3 IDA credits --- one for each of the 3 countries (Malawi: Cr. IDA-5203-MW); Mozambique (Cr. IDA-5204-MZ); Zambia: Cr. IDA-5205-Zbia), and an IDA grant for CCARDESA (Grant IDA-H-828-A3). Each of the countries also was supposed to contribute \$800,000, but these contributions did not materialize. Also, to enable a quick start-up, \$600,000 was made available to CCARDESA in the form of a Regional IDA Grant, for which CCARDESA met the eligibility criteria.

**Borrower Contributions:** Each country had agreed to contribute \$800,000 over six years to finance APPSA-related regional facilitation activities to be carried out by CCARDESA, but these contributions never materialized. The main in-kind contributions from the 3 participating countries included participating in Regional Centers of Leadership (1 for each country), researchers from the National Agricultural Research System (NARS) and other operational funds.

**Dates:** The project was approved on March 14, 2013, and became effective on June 12, 2013. There were two mid-term reviews (MTRs): (1) September 30-November 3, 2015; and (2) April 14-30, 2016. Each of the MTRs and ISR missions were carried out in each of the 3 countries, and also reviewed the performance of CCARDESA and regional aspects and processes of APPSA. The original closing date remained as the actual date: January 31, 2020.

**Restructuring:** There was no formal restructuring, although there were revisions arising from the MTR missions which warranted relatively minor restructuring (e.g., results framework, several indicators). The Borrower, and its main collaborating entities (CCARDESA and the 3 participating countries) did not make a formal request for restructuring, since they assumed that the adjustments arising during the mid-term review were not "substantive", and fully consistent with the PDO and components. Likewise, the Bank's Project team did not deem it necessary to restructure the project on account of changes in some of the project's targets in the RF.

### 3. Relevance of Objectives

#### Rationale

##### a) Relevance of Objectives



Overall, the APPSA objective was very relevant and responsive to: the agricultural sector context and performance in the 3 countries; broader Africa-wide strategic initiatives and programs; to country-level growth and poverty reduction strategies in each of the 3 countries, and World Bank country strategies.

(1) Sector Performance Context: At the time of preparation and appraisal of the APPSA, agricultural performance in Southern Africa was well below its potential. Agricultural growth was driven primarily by expanding cultivation area, rather than through intensification, using available technologies. Food and nutrition insecurity were a persistent challenge, exacerbated by climate-related shocks and droughts, and accompanied by food deficits and food price crisis. Agricultural research and development (R&D) were and continue to be underfunded in Africa, including weak national research systems, which severely limited their technology and service delivery systems. These constraints were evident in the 3 countries, coupled with weak national systems for generating and disseminating improved agricultural technologies. Some of the main causes of these weaknesses were due to inadequate and aging infrastructure for vital research and testing services, shortages of qualified staff, low levels of public investments and budgetary support to maintain aging infrastructure and provide key R&D and extension services.

(2) Strategic Initiatives: At the time of preparation/appraisal of APPSA, the Africa Union and NEPAD, together with the regional economic communities, including the Southern African Development Community (SADC), were pursuing several complementary strategic and investment initiatives, including: Comprehensive Africa Agricultural Development Program (CAADP), which identified low and lagging agricultural productivity growth as a central constraint in all countries; SADC took a proactive role in promoting agricultural productivity agenda, with a regional approach to agricultural R&D. SADC established CCARDESA as a subregional body to lead collaboration in agricultural R&D. CCARDESA became operational in 2012, during preparation of APPSA. Hence, it was timely for the Bank to formulate a regional agricultural research program to help CCARDESA to operationalize its role, and promote more efficient generation and sharing of improved agricultural technologies (ICR, para. 3).

(3) Country-level Growth Strategies: Each of the countries formulated/adopted their own national growth and poverty reduction strategies, which accorded high priority to promoting agricultural intensification and to addressing the underlying constraints to increased productivity, including weak agricultural research and extension systems.

(4) Bank Strategies: During this period, the WB adopted regional and country-level strategies which prioritized improved agricultural R&D programs and effective delivery systems, down to the farmer level. These strategies included: WB's Regional Integration Assistance Strategy (RIAS) for Africa ("supporting targeted R&D efforts and innovations in areas such as agricultural technology development"); Malawi Country Assistance Strategy (2013 - 2016, objective 3.1 which aims to improve sustainable agricultural productivity and commercialization"); Mozambique Country Partnership Strategy (2012-2015, "to increase agricultural growth through access to productivity-enhancing technologies, inputs and expanded irrigation"); and the Zambia Country Partnership Strategy (2013-2016, that "recognizes the availability of technologies for raising productivity as one driver to link rural economies to markets"; Zambia CPS). Moreover, by project closure, the PDO remained highly aligned with the Bank's CPSs for each of the participating countries. Accordingly, the Bank's recognition of the strategic role of promoting regional approaches to strengthening agricultural R&D delivery systems was reflected in the significant funding support for two other regional programs: West Africa Agricultural Productivity Program (WAAPP, 2011); and the East Africa Agricultural Productivity Program (EAAPP, 2009). For further details see ICR, paras. 1 - 5, 20). At preparation of APPSA, many African countries, including all of the southern Africa countries, with country-level support, were pursuing their own agricultural strategies and programs, including strengthening



agricultural technology systems. The strong evidenced-based rationale for supporting APPSA was correctly summarized in the ICR: "Given the link between agricultural growth and poverty reduction, there was a clear rationale for the World Bank to invest in agricultural research in Southern Africa to help the region address shared problems with shared solutions, reduce duplications, facilitate technology exchange and boost agricultural productivity." (ICR, para. 5). As stated above, the role of CCARDESA was to promote expanded and more effective collaboration across its member countries with respect to technology generation and dissemination. During the same time, the Bank had developed a Regional Assistance Strategy (RIAS). The third pillar of the RIAS called for increased Bank support for regional programs/projects which would "boost agricultural productivity, as well as rationalization of regional research" (ICR, para. 5). While the Bank was supporting individual countries to strengthen their technology systems, the emergence of CCARDESA and RIAS highlighted a regional technology gap which the Bank addressed through the formulating and financing of the APPSA project, thereby complementing and enhancing the Bank's support at the individual country level (ICR, paras. 3-5). It is noted that APPSA focused on strengthening the regional generation/availability of agricultural technologies, and did not include promoting improved dissemination strategies and mechanisms.

This review concludes that APPSA's overall objective and supporting components/activities were relevant to increasing the "availability of improved agricultural technologies in the SADC region", and the corresponding expected outcomes outlined in the PAD and ICR. Moreover, APPSA objectives were relevant to the national and agricultural growth/poverty reduction strategies outlined in the CAADP, the regional strategies, and the Bank's country-level assistance strategies, while recognizing that the APPSA did not include explicit support for enhancing the regional sharing/dissemination of technologies to the farmer level, with the assumption that this subsequent technology phase to help achieve farmer-level productivity increases was fully the responsibility of each country.

## **Rating**

Substantial

## **4. Achievement of Objectives (Efficacy)**

### **OBJECTIVE 1**

#### **Objective**

To increase the availability of improved agricultural technologies in participating countries in the SADC region

#### **Rationale**

Theory of Change/ToC: While the project's design included a generally sound results framework/RF (PAD, Annex XX), it did not develop a ToC because it was not required at the time the PAD was prepared. The ICR reconstructed a sound ToC, with a detailed figure (Figure 1), albeit with a limited narrative (ICR, paras. 6 - 8). The ToC illustrates clear connections and complementarity between the three objectives, while also showing the priority activities, outputs and outcomes, which together contribute to the achievement of each objective and the overall PDO. With respect to objective 1, the ToC shows the priority activities using regional arrangements and mechanisms (e.g., Regional Centers of Leadership, farmers' organizations) and



corresponding outputs, which helped generate and increase the availability of appropriate technologies for each country (ICR, paras. 7 and 8).

Given the vague meaning of "availability", the ICR "unpacked" the meaning of "technology availability": (a) APPSA defined technology availability more broadly, with a focus on the regional aspect, while recognizing that "ultimately it is access to these technologies to farmers that matter in increasing agricultural productivity and production" (ICR, para. 8). Also, the ICR defines technology availability at two levels (para. 8): country and regional levels. At country level, the technologies would be generated in the entire cycle, from generation, promotion and distribution of germplasm seeds; at the regional level, the improved technologies, including improved seeds, would be shared across the participating countries (ICR, para. 11). Moreover, the ICR unpacked Objective 1 in terms of 6 sub-objectives and their corresponding outputs and outcomes. These are summarized below, and will provide the basis for assessing efficacy of the overall PDO, also taking into account the 3 project components which are designed to achieve these specific objectives and their corresponding output and outcome targets and performance.

Therefore, as part of assessing the overall PDO, there are 6 specific sub-objectives which are analyzed below, with objectives 5 and 6 providing direct support to achieving and sustaining objectives 1 - 4, consistent with the ToC. For each project objective, the sections below will highlight the progress toward meeting the targets and achievements of specific outputs and outcomes. Overall, the performance measures which were used for the project's objectives were sound.

**Sub-Objective 1: To significantly generate and increase the number of improved agricultural technologies: number of technologies that are being made available to farmers and other end-users: with a target of 93 by year 6 (ICR, paras. 10 and 23).**

**1.1 Outputs (see ICR, para. 23, Annex 1, p. 33-35; Annex 6, p. 51-57, presented according to each of the 3 countries)**

a) No. of Collaborative research/extension subprojects under implementation/completed: original target: 55; achievement; 89, % of target: 162%;

b) No. of Collaborative research or extension subprojects under implementation: original target: 95; achievement: 93; % of target: 98%;

c) No. of Collaborative research or extension subprojects completed: target and achievement were both 61; % of target: 100%;

d) % of collaborative research or extension subprojects completed: target and achievement were both 74%; % of target: 100%;

e) No. of technologies generated: target: 115; achievement: 175, % of target: 152%, and included:

(i) No. of technologies generated for maize-based farming systems: target: 35; achievement 37; % of target: 106%;





(ii) No. of technologies generated for rice-based farming systems: target:14; achievement:16; % of target: 114%;

(iii) No. of technologies generated for food legumes-based farming systems: target: 39; achievement; 50, % of target: 128%;

(iv) No. of technologies generated which were nutrition-related: target: 25; achievement: 25; % of target: 100%;

Annex 6 provides a sample of the specific technologies generated by APPSA.

**1.2 Outcomes:** Improved Regional Technology Generation and Dissemination: From the good performance of the outputs cited above, they generated strategic outcomes in terms of improved regional collaborative R&D which directly generated and promoted the availability and dissemination (and subsequent farmer adoption, per objective 2 below) of a total of 301 improved technologies, well above the original target of 93 (or 323% of the target). This outcome is comprised of the following types of improved technologies (no. and % of the technologies generated): improved seed varieties (177, or 58%); improved agronomic, pest and water management practices (43, or 15%); and post-harvest technologies (81, or 27%). (ICR, para. 23, Annex 6). The other project objectives outlined below contribute to improved access (and subsequent adoption) of the improved technologies to the farmers, across the three participating countries. The Joint Impact Evaluation report of APPSA (JIE, 2020) provides positive evidence of the nature and extent of research collaboration promoted by the project (JIE, Chapter 10). This sub-objective is rated as High.

**Sub-Objective 2: To create significant awareness among farmers about improved technologies: percentage of lead farmers in targeted areas who are aware of an improved technology promoted by the project, with a target of 85% by year 6 (ICR, paras. 10 and 24)**

Theory of Change/ToC: Similar to objective 1, the ToC in the ICR (Figure 1) illustrates the various types of outputs which generated relevant outcomes regarding enhanced farmer awareness of improved technologies, and implied their adoption of these technologies (although farmer adoption was not measured directly by the project's M&E system and evaluations).

## **2.1 Outputs (ICR, para. 24, Annex 1, 35 and 36; Annex 6, p. 57 - 64, according to each of the 3 countries)**

a) No. and Percentage of lead farmers who are aware of an improved technology promoted by the project, with each country setting a target of 85%. Malawi, Mozambique and Zambia achieved 95%, 80%, and 110% of the target (85%), respectively, thereby each country exceeded this target of 85%; the ICR did not report baseline figures, although implied well below the target of 85%;

b) No. of key dissemination activities which contributed to creating awareness of improved technologies, and included:\* No. of field demonstrations; no. of farmer-research-extension platforms established; No. of field days, demos, and trainings (9,498 client days of training, well above the target of 6,500 client days (146% of the target), including 1,471 female client days, below the target of 2,849 days, or about 52% of the target). Also, researchers, lead farmers and smallholder farmers participated in demonstrations, extension officers and use of digital extension and information communication technologies (ICT); no. of food and seed



fairs, agricultural shows, and use of radio, print and video formats.

\* Surveys of lead farmers during field days were conducted to capture information about farmers' awareness on improved technologies generated and promoted by the project.

**2.2 Outcome:** Significant increased awareness among large number of farmers in all 3 countries, about improved technologies. This increased awareness is reported in various surveys of lead farmers carried out by the project. See below for the assessment regarding farmer adoption. Also, the JIE of APPSA provides positive evidence, while also recognizing some shortfalls, given the timelags involved in agricultural research programs (JIE, Chapters 8 and 10, 2020). This sub-objective is rated as High.

**Sub-Objective 3. To succeed in disseminating technologies within and across the 3 participating countries: the number of technologies generated or promoted by the project in one participating country that are released in another country, with a target of 50 by year 6 (ICR, paras. 10 and 25)**

Theory of Change: The Figure 1 of the ICR illustrates the main types of activities which generated the relevant outputs and outcomes regarding the dissemination of improved technologies, which also contributed to the increased awareness (ref. objective 2 above), including: using the extension systems and lead farmers of each country, strengthening capacities of research and extension, and improving structures and systems for enhanced regional collaboration. The relevant outputs and outcomes are shown below.

### **3.1 Outputs (ICR, paras. 10, 25, Annex 1 and 6):**

a): A total of 83 technologies were generated or promoted in one participating country and were released in another participating country, which is about 66% above the original target (of 50); each of the 3 countries also exceeded their individual targets;

b): Improved legume seed varieties (in Zambia, 32 technologies) accounted for the highest number of shared technologies, followed by maize (in Malawi);

c) Malawi shared the most improved shared seed varieties (21 technologies);

d) Mozambique shared the most (97 technologies) of post-harvest, labor saving and processing technologies;

e) Zambia shared the most legume seed varieties and released two ground nut varieties to Malawi

### **3.2 Outcomes:**

Based on evidence generated by the M&E system and the impact evaluation studies, the project succeeded in disseminating of improved technologies within and across participating countries. See above, whereby the project generated or promoted 83 technologies in one participating country, and which were released in another participating country. However, the ICR also noted that the achievement on the availability and adoption of improved technologies to farmers is "mixed", and therefore, a resulting "gap" (ICR, para. 26). APPSA made improved seeds available at different levels: through the RCoL, improved seeds were made available to the private sector, including: farmers and RCoL breeders for multiplication and production; and





seed companies. However, the ICR correctly notes that the extent of availability of improved seeds to farmers is too early to determine, due to: it takes time for farmers to adopt new seed varieties; APPSA project time period was too short to generate improved technologies and push for effective and widespread of technologies (see para. 26 for further details). The ICR also cites the following 2 factors limited the extent of technologies being made available to farmers under the project: (1) the project emphasized technology generation (especially crop breeding), and placed less emphasis on dissemination, especially of existing technologies generated by the NARS (prior to APPSA). Dissemination efforts to promote farmer adoption of improved seeds came in the project's remaining 2-3 years; the JIE report provides additional evidence (JIE, Chapter 8).

(2) little attention and resources were allocated to enhance the capacity of the national extension systems, and to strengthen generally weak research-extension linkages. There was no joint planning between research and extension in all 3 countries. There were various constraints in using effectively farmer field schools and field demonstrations to disseminate improved technologies, including transport, numbers and ratio of extension staff to farmers, and limited extension training.

The ICR also highlighted that some specific country and commodity level assessments show improved yields for APPSA farmer beneficiaries, compared to non-APPSA farmers (for further details of these assessments, see ICR, para. 27). For example, a field assessment in Zambia found that APPSA farmers had an average maize yield of 2.8 tons per ha., compared to a yield of 1.56 tons per ha. for non-APPSA farmers; there were similar differences (+160% to +185%) for APPSA and non-APPSA farmers shown for other major crops (rice, beans, soybean). Also, the end-line survey data reveals that APPSA farmer beneficiaries showed improved yields and other key outcomes: of the 581 farmers surveyed; 80% reported improved productivity; 67% reported improved farm income; 50% observed changes in farm expenditure; and 74% cited improved changes in researcher and extension technical advice (ICR, para. 28). The JIE report of APPSA also provides relevant evidence (JIE, Chapters 4, 8, 10). This sub-objective is rated as high.

**Sub-Objective 4: To reach a large number of direct project beneficiaries: the number of direct project beneficiaries had a target of 6.1 million (by year 6)**

**Theory of Change:** The ToC shown in Figure 1 shows the various types of activities and outputs to reach the target number of beneficiaries, including a combination of improvements involving enhanced R&E research systems, mechanisms and processes, strengthened capacities of national and regional entities and technical personnel.

**4.1: Outputs** (ICR, para. 10, 29, Annex 1):

Overall, the number of direct beneficiaries reached by the project was below the original target: actual of 4.6 million vs. a target of 6.1 million (or 75%). The project defined "beneficiaries" as "lead farmers", assuming they would promote the transfer of the improved technologies to other farmers. Malawi contributed 50% of the total beneficiaries reached. The percentage of female beneficiaries achieved was 37% of the total beneficiaries, which was 23% above the target of 30%. During the mid-term review (2016), there was recognition that the beneficiary target was unrealistically high, and therefore, informally the project revised downwards this target to 3.7 million direct beneficiaries (in 2017, although this change was not formalized in a project restructuring).

**4.2: Outcomes:**



a) Enhanced and promising adoption rates by the beneficiary farmers. Although the project did not include technology adoption as an outcome, the project's M&E system arranged to commission independent technology assessments (in 2018) and an agro-dealer survey (in 2019) in all 3 countries. The adoption results are "promising" and show high adoption rates of improved maize varieties in Malawi (34%), and very high adoption rates of improved rice and legumes in Zambia (37% and 72%, respectively) and in Mozambique (90% and 86%). Most adopters indicated that improved varieties disseminated under the APPSA Project were high yielding. Agro-dealers were reported to state that farmers liked the traits of APPSA varieties, namely: early maturity seeds for beans; high yielding for rice, and drought tolerance and high yielding for maize (ICR, para. 30).

b) Other outcome-related benefits involving direct beneficiaries and reported in the ICR included (see ICR, paras. 31 - 33): (a) agro-dealers showed interest to continue to stock the seed varieties promoted by APPSA; (b) various emerging partnerships with private companies to expand seed multiplication capacities in all 3 countries, while also noting some constraints to be addressed; (c) adoption in all 3 countries of time-saving fertilizer applicator funded by APPSA. This sub-objective is rated as substantial.

**Sub-Objective 5: To strengthen regional centers of leadership (RCofL) for generating and making available improved agricultural research and development (R&D)**

Theory of Change: The ICR shows the role of the RCofL in generating and disseminating improved technologies, including activities which strengthen the technical and organizational capacities and effectiveness (ICR, Figure 1, and para. 7).

**5.1 Outputs:** (ICR, paras. 34-38; Annex 1, p. 35-36; Annex 6, p. 57 - 64, according to each of the 3 countries)

a) No. of research centers rehabilitated or equipped: an achievement of 24, or about 11% below the target of 27. The ICR clarifies that this number underestimates the extent of rehabilitations, since the number shows aggregate by numbers of research centers. Within the research centers, the project invested significantly in equipping laboratories (especially soil), building irrigation systems and providing other investments. Also, the project funded the strengthening of human research infrastructure of the research centers (e.g., funded 160 students for university level training, at Ph.D., MSc and BSc levels, and numerous short-term courses and diplomas);

b) Outputs which contributed to improved administrative performance management systems of RCoL in the 3 countries: these outputs included short-term trainings of RCoL's staff on management and leadership; human resource/HR and financial management (FM), procurement, safeguard and M&E systems; comprehensive institutional capacity assessment (in Mozambique); enhancing IT and knowledge management systems;

c) No. of countries with re-drafted/revised seed policy in compliance with SADC harmonization framework: All 3 countries achieved this output target, with revising their seed policies to harmonize them with SADC protocols. Mozambique's and Zambia's seed policies were approved by their parliament. Malawi's draft seed policy has been rectified and awaiting parliament approval (due to a political transition); d) No. of client days of training provided:



Direct beneficiaries: target: 6,500 days; actual: 9,498 days: % of target: 146%; Females: target: 2,840; actual: 1,471; % of target: 52%;

## **5.2 Outcomes:** (ICR, paras. 34 - 38, Annex 1, p. 35- 36)

Strengthened regional centers of leadership/RCoL to generate improved technologies in each of the 3 participating countries. Based on the achievement of most of the output targets, and the results of the impact evaluation study, there was substantial progress of key outcomes, including:

(a) improved technical capacities of the lead national and regional research and dissemination agenda;

(b) extent of physical (rehab. and equipping) and human capital improvements (research and advisory service staff, including completed training and application of their expanded knowledge) of targeted national and regional centers of leadership in each of the 3 countries;

(c) improved administrative performance management systems, although the expected results were partially achieved. These improvements enabled the RCoL to generate and disseminate expanded and relevant agricultural technologies to the target beneficiaries of the 3 countries. Accordingly, there was tangible evidence of improved institutional and technical/human capacities, improved performance and results of improved seed systems in each of the 3 countries. The JEI provided positive evidence, while also highlighting the early stages of these improvements which would require follow-up support (JIE, Chapter 10). This sub-objective is rated as substantial.

## **Sub-Objective 6: To provide enhanced coordination and facilitation of improved regional agricultural R&D (including improved dissemination)**

**Theory of Change:** The ICR shows the inclusion of strengthening coordination and facilitation to help ensure improved generation, dissemination and adoption of enhanced regional R&D of key commodities for the participating three countries, including the role of strengthening CCARDESA in helping to generate some of the key outcomes cited above (ICR, Figure 1, paras. 6-8, 41).

## **6.0 Outputs** (see ICR, Annex 1, p. 36 - 37)

a) A common M&E system was established, made operational and used by participating institutions of APPSA in each of the 3 participating countries, by CCARDESA and by 2 other SADC countries (Angola and Lesotho, which were added subsequently as an "extension project"), comprising an important target by the Project. There were significant challenges during implementation to ensure its operational effectiveness, which were addressed and resolved by project closing (see below for further details).

b) No. of APPSA annual work plans/AWPs drafted, discussed and agreed on a timely basis: target: 24, actual: 16; % of target: 66%.

c) Completed activities/outputs, including carrying out coordination activities: to implement the project (and its components), to address the fall army worm disease (FAW), to coordinate seed policy harmonization



## 6.2 Outcomes (ICR, paras. 39 - 41)

An enhanced regional capacity, through a strengthened and more effective CCARDESA, for carrying out improved coordination and facilitation of improved regional agricultural research and dissemination in the 3 participating countries. There was evidence of improved (varying according to each of the countries): planning, implementation and M&E system performance for promoting enhanced R&D; policy harmonization platform performance; regional flow of R&D; regional integration of input and output markets; tangible progress toward sustainable coordination/management of the R&D role of CCARDESA, while also recognizing the early stages of these improvements (ICR, paras. 39-41, Annexes 1, 4; and JIE report, Chapters 8 and 10, 2020). This sub-objective is rated as substantial.

### Rating

Substantial

## OVERALL EFFICACY

### Rationale

As outlined above, the project achieved most of the overall core objective, which was "unpacked" according to the six objectives (and their targets), as outlined above. On balance, project efficacy is rated **Substantial**. With respect to the project's 3 components, the main conclusions include:

- a) Technology Generation and Dissemination (which directly supported four of the objectives outlined above): The project achieved and exceeded most of the output and outcome targets, overall and by each country. There was significant sharing of improved technologies across participating countries. Although there was delayed attention to promoting dissemination of the improved technologies, and weak linkages with extension, which limited the extent of availability of improved technologies at the farmer level, the impact evaluation study and various adoption and impact evaluation studies reveal "promising" adoption rates and growing demand for the technologies promoted by APPSA; the number of direct and female beneficiaries were below ambitious targets. On balance, there was substantial progress;
- b) Strengthening and Effectiveness of the RCoL: There is clear evidence of improved technical capacities and performance of lead and regional research institutions, warranting a "high" rating, although there is a need to ensure strong sustainability;
- c) Enhanced Regional Coordination: Substantial progress was achieved in establishing improved regional collaboration and coordination, with R&D management and M&E activities and performance of CCARDESA experiencing various challenges, but improving toward the end of the project implementation. The biggest challenge will involve the sustainability of the benefits generated by the project (see below).



## Overall Efficacy Rating

Substantial

### 5. Efficiency

The efficiency of achieving the overall core objective of "increased availability of improved agricultural technologies in the participating 3 countries" (and unpacked by the 6 specific objectives) is inherently difficult to determine with precision, because of various conceptual and measurement challenges. Nonetheless, the ICR provides an assessment which is summarized below, together with some additional comments.

(a) Analysis of Project Efficiency: An economic and financial analysis (EFA) was not conducted at preparation or appraisal, and no other efficiency analyses were conducted throughout project implementation. Also, although the project document/PAD included a results framework, there was no theory of change to establish clear linkages between the various components, and their associated impacts, outcomes, outputs and priority activities. The ICR correctly noted that at appraisal it was difficult to predict ex-ante the specific type of improved technologies generated and promoted with project support, or the precise mix of crops, and adoption by farmers. The PAD identified the main result channels, with respect to each of the 3 components, especially component 1 (on enhanced R&D activities, especially increased productivity of target commodities). Components 2 and 3 were intended to "enable" the achievement of component 1's direct impact. Similar to virtually R&D projects, the project's efficiency justification rested on the results of extensive body of empirical literature which concludes: "investments in agricultural research and development frequently generative attractive financial and economic rates of return, often as high as 40-60%" (ICR, para. 44). The PAD concluded that APPSA would generate "attractive returns" to justify the investments, and comply with the EFA requirements (PAD, paras. 73 -75).

(b) EFA at Project Completion: At project completion, an EFA was prepared to estimate the net additional benefits which can be attributed to the increased availability and dissemination of improved agricultural technologies, with project support. Agricultural technology adoption, the main determinant of incremental project benefits, was not included as a measurable outcome throughout the project cycle. Therefore, the ICR based the EFA and the project's return on investment, on a combination of various elements, including: the one-off adoption studies; cost-benefit analyses; agro-dealer surveys and the final joint impact evaluation (JIE). The analyses focused on the APPSA priority crops for each of the 3 countries: maize, rice and legumes (latter was represented by beans). For all 3 countries, the EFA concluded that the adoption of the APPSA technologies is profitable for farmers, generating adequate net incremental financial benefits (ICR, para. 45 and Table 3). There was variability of net financial returns for each of the 3 countries.

The project focused on technology generation and dissemination, and not directly on farmer adoption, although this was the intended primary objective. The ICR analyses used 3 complementary approaches to determine the APPSA's economic results, as the main efficiency indicator, using an approach which is commonly used in other agricultural R&D projects. These results of the **3 approaches** are summarized as follows (see ICR, paras. 46 - 48 for details on the methodologies and assumptions, which are considered to be generally sound):

(i) APPSA's economic results are "positive", with an economic internal rate of return (EIRR) of 12.8%, and a net present value of \$27.3 M (using 6% as the assumed social discount rate, and an investment cost of \$90 M). There are some variations among the 3 countries (between 9 % and 14.5 %); it should be noted that these





results are significantly below most other economic returns for similar R&D projects, which suggests the need to probe deeper on the reasons and factors which could generate a higher EIRR, especially in the event there is a follow-up investment project;

(ii) to validate these economic results, the ICR conducted a standard break-even analysis to determine the minimum levels of adoption (by all farmers) required for the project to generate an EIRR of 6% (or preferably higher, given alternative potential uses of limited public funds). The analysis concluded that low levels of adopting farmers are required for the project to break even (between 1.5 and 1.9 percent of total farmers, at national level average). This second analysis reinforces the confidence on the assumption of lead farmers adopting APPSA technologies, as a proxy for other farmers to adopt the improved technologies. Given limited funds, it is desirable to have an adoption target which is well above the "break even" level;

(iii) since adoption of improved technologies is contingent on the availability of inputs at the local markets, the ICR included an analysis of the agro-dealer survey results. The results are variable between the countries, showing that agro-dealers in Zambia did not appear to have sufficient quantities of improved seeds, whereas agro-traders in Mozambique had sufficient quantities of the required inputs to meet the targeted adoption requirements to break even. An important implication of this assessment to ensure the sustainability of APPSA's impact and economic viability is to ensure that national agricultural, research and extension institutions work closely with agro-dealers, seed multiplication businesses and farmers to ensure expanded and sustainability of APPSA technologies.

(c) Other Indirect Efficiency Measures: Other indirect measures of project efficiency include the following aspects: (i) qualitative benefits of enhanced research efficiencies arising from enhanced research collaboration across countries (e.g., role of commodity working groups; role of peer review for enhanced quality of research); (ii) the project got off to a slow start, including a one year delay in effectiveness and disbursement delays (ICR, para. 63), hence demonstrating some inefficiencies in the use and management of the funds, and closing according to schedule; (iii) by the end of the project, APPSA succeeded in disbursing 99 % of its budget, while also achieving and exceeding most of its targets, while also losing about \$8.3 M (almost 10%) due to the depreciation of the Special Drawing Rights (SDR/US\$); (iv) re-allocating financial resources from component 1 to components 2 and 3, due to the higher costs of infrastructure/equipment (component 2) and coordination/implementation (component 3). At the same time, this reallocation did not adversely affect the achievement of the project's benefits from the core component 1, since the project succeeded in generating and disseminating more technologies with fewer resources, thereby implying positive efficiencies.

This ICRR identified some limitations in the efficiency analysis applied in the ICR, including: (a) the ICR did not assess directly whether the objectives were achieved efficiently (for example, in terms of comparing and assessing across countries unit costs and cost-effectiveness of key interventions); (b) a more direct analysis of the institutional efficiencies (of each of the RCoL and CCARDESA) may have provided some relevant insights into the efficiency with which the project's objectives were achieved; (c) the impact evaluation study and the ICR did not endeavor to assess the relative and comparative efficiencies and cost-effectiveness of generating research technologies within and between: each country; the main RCoLs; the main commodities; and similar training programs (degree and non-degree); (d) an explicit distinction between the efficiency analysis using financial and economic prices, to account for possible price distortions, and therefore, a more accurate and rigorous EFA, also considering the relatively low EIRR. A follow-on R&D project should accord greater attention to the different types of efficiency analysis in order to better optimize scarce limited public resources, especially the need to consider more explicitly sustainability aspects. This analyses also would generate strong support





from the Ministries of Finance from the participating countries, given their role in promoting efficient and sustainable public expenditures.

On balance, the ICR concluded that the project's efficiency bordered between "substantial" and "modest", with an **overall rating of "modest"**, due to the project's delayed attention toward dissemination, thereby limiting greater availability of improved technologies to larger numbers of farmers and to other end-users. This conclusion is further reinforced by the project's relatively low EIRR (of only 12.8%, well below the reported EIRRs in most other R&D projects/programs), and the somewhat limited efficiency analysis as highlighted above. The efficiency analysis also reinforces the importance of taking an integrated approach to generating and sustaining benefits, especially regarding the need to expand and strengthen the role of the private sector in promoting competitive input distribution systems, inputs to the priorities of the research agenda and their role in promoting expanded dissemination; accordingly, this expanded private sector role is vital to the widespread adoption of improved technologies, on a sustainable basis. Discussions with the Bank's Project team revealed that during the latter stages of the project, there have been substantive discussions with CCARDESA and the participating countries on different strategies to expand the role of the private sector in future phases.

## Efficiency Rating

Modest

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal		0	0 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	12.80	100.00 <input type="checkbox"/> Not Applicable

\* Refers to percent of total project cost for which ERR/FRR was calculated.

## 6. Outcome

The overall outcome is rated **Moderately Satisfactory** for the following reasons:

1) **The PDO relevance is rated SUBSTANTIAL**, at closing because the overall PDO (and supporting objectives) and design features are strongly aligned with: Africa Region objectives and targets (ref. CAADP and SAADC strategies/targets and Malabo Declaration targets); Government (of the 3 countries) country and agrarian sector growth and poverty-reduction strategies and targets; and with WB regional integration and CPF strategies for the 3 countries.



2) **The efficacy is rated SUBSTANTIAL** due to the project achieving most of the objectives and associated targets (of the overall PDO and 6 supporting objectives), while falling short of some of the targets, and experiencing some challenges and delays in some activities (especially the M&E system).

3) **Efficiency is rated MODEST.** While the EFA demonstrated positive results, the results were not significant and consistent with other R&D programs/projects, which also reflected a delayed and limited focus on promoting dissemination of the improved technologies (until the latter years of the Project).

#### **a. Outcome Rating**

Moderately Satisfactory

### **7. Risk to Development Outcome**

The main risk to the development outcome achievements depends on whether the participating countries and CCARDESA would continue to support, strengthen, address the various emerging challenges, expand and sustain the project's components and activities. Currently, there is no formal proposal for a follow-up support by the World Bank (or other development partner). In the context of the discussion between IEG's Evaluator and the Bank's Project team regarding the risks to development outcomes, the Project team indicated CCARDESA's intention to request WB support for a possible phase 2 involving these 3 countries and CCARDESA. Moreover, the ICR states that the NARS in each country are relying on a APPSA II, to focus on technology dissemination and adoption, especially with respect to seed production and expanded delivery of and adoption of improved technologies to and by farmers (ICR, para. 93). Accordingly, irrespective of their being a follow-up phase 2, it will be important for CCARDESA and the leadership of the agrarian sector for each of the countries (and other member countries of SADC) to ensure adequate financial, technical and political support to sustaining the APPSA collaborative approaches and components, and activities, including stronger linkages with national programs and the expansion of APPSA to other countries in SADC. The overall good implementation of APPSA by the 3 participating countries and the recent addition of Angola and Lesotho to CCARDESA are positive signs of demand and sustainability of APPSA. While the ICR concluded a "low" risk, taking into account the independent assessment of the JIE report (2020), this ICRR assessment concludes a "modest" risk.

The ICR identified three other key risks:

(a) **Adequate completion and operation and maintenance of R&D infrastructure:** there is potential for inadequate O&M of the equipment and infrastructure funded by the Project, as well as for not completing some of the on-going infrastructure works. Some of the newly constructed sites are not yet operational (e.g., new irrigation center in Mozambique; conference center at Chitedze research center in Malawi; pending equipment and furniture in Zambia).

(b) **Completion of Studies/Training:** By Project closing, there were some Project-sponsored students who had not completed their studies, and therefore require funding in the country-level budgets of their ministry of agriculture.

(c) **While the project has generated many new improved technologies, there are various risks which need to be monitored closely and followed-up by each country to ensure sustainability:** (i) some technologies may be shelved; (ii) improved technologies may be delayed to being disseminated, due to:



weak research-extension linkages; weak national seed systems; the failure to register in the SADC seed catalogues the APPSA-generated and promoted seed varieties; and (iii) expanding the role of a strengthened private sector in the research generation and dissemination "cycle", through appropriate mechanisms and processes. The Bank's project team have indicated that these discussions have been initiated and will continue to be pursued, including as part of the on-going implementation of the follow-on phase involving Angola and Lesotho.

## 8. Assessment of Bank Performance

### a. Quality-at-Entry

The Bank's performance in the identification, preparation and appraisal of the Project is rated **Moderately Satisfactory**. The rationale and design of APPSA was strongly aligned with the policy and strategic frameworks of the Africa Region (CAADP, SADC), of the Governments of the 3 participating countries, and of the WB's CPFs. Increasing agricultural productivity was and continues to be a core pillar to accelerating growth and reducing poverty in all three countries. During preparation, the WB team involved multiple relevant stakeholders in formulating the overall design, setting agricultural research priorities, and crafting a regional approach (using SADC and CCARDESA) to avoid duplication and promote efficiency through research specialization and dissemination. The required assessments of financial management and procurement capacity of implementing agencies (CCARDESA, Chitedze (Malawi); IIAM (Mozambique); and ZARI (Zambia) were conducted and adequately used during preparation and appraisal. Also, the major risks were identified and considered, especially involving technical and fiduciary capacities of CCARDESA, a newly established entity, to support a large regional program.

It appears that the project design considered relevant lessons from other similar regional R&D projects, including: the West Africa Agricultural Productivity Program/WAAPP, the East Africa Agricultural Productivity Program/EAAPP, regional knowledge institutions associated with the CGIAR, especially IFPRI, its regional entity (Regional Strategic Analysis and Knowledge Support System/ReSAKSS), and SADC. The ICR identified a number of key design features which were insufficiently addressed in the PAD, including (ICR, para. 84): clearer operational definition of "availability" of agricultural technologies, and more realistic targets (especially of the total number of beneficiaries); operational support to strengthening the research-extension linkages to help ensure technology dissemination and farmer adoption from the outset, rather than in the latter phases of the project; the type and degree of technical support to the implementing institutions, especially CCARDESA and the country-level NARs, which were relatively weak. An SWOT-type of analyses during the design phase could have generated a more in-depth institutional assessment and priority recommended actions. Also, while the PAD included a comprehensive results framework, it lacked a theory of change, which could have helped sharpen the linkages and priorities of the operational interventions, with potentially stronger results (e.g., stronger emphasis on supporting dissemination activities and stronger institutional capacity building of key entities). The Mid-Term Review/MTR recognized and addressed some of these shortcomings.

**Quality-at-Entry Rating**  
Moderately Satisfactory



## **b. Quality of supervision**

The Bank's performance during implementation is appropriately rated as **Moderately Satisfactory** (ICR, para. 86), taking into account the following factors (for details, see ICR, paras. 86-90):

(a) while the Bank allocated sufficient budget and staff resources, it is not clear from the ICR the adequacy of the composition of technical expertise of the Bank's team, especially considering some of the institutional and technical weaknesses of the implementing agencies;

(b) the Bank's task team consistently responded to the requests of their counterparts, through a team of local and international consultants, while also anticipating future challenges to be addressed by each country;

(c) while there was consistency in the project task team leadership (via two TTLs), there was reported high turnover of team members at the country level (especially in Zambia, with Mozambique being stable), and there was some inconsistent Bank technical support to addressing environmental and social safeguard issues;

(d) the Bank's team conducted regular supervision missions (two per year, covering all 3 countries, for a total of 11 supervision missions), including two mid-term reviews, which identified and addressed key implementation challenges, for each of the 3 countries. The Aide Memoires were well prepared, country-focused, and included clear action plans of key recommendations. The first MTR (2015) highlighted the need for the Project to intensify attention on technology dissemination; to revise selected results indicators and strengthen the corresponding results framework, and also highlighting the weaknesses of the M&E arrangements and activities (at both CCARDESA and country level). The second MTR (2016) identified continued challenges in the implementation of the M&E systems across all 3 countries;

(e) although the Bank arranged for an international M&E consultant expert to provide technical assistance to the various teams, in retrospect the Bank's task team could have dedicated more attention to formalizing relevant changes in the RF and to ensuring CCARDESA employed an M&E expert to provide on-going technical M&E support and enhanced operational coordination across the 3 countries vis-a-vis CCARDESA; (f) delay in ensuring the carrying out and completion of the baseline survey;

(g) non-completion of a formal project restructuring ("level two") to formalize two aspects which emerged during the mid-term review mission: (i) the proposed changes in the results framework, and some of the unrealistic targets; (ii) the expanded role of dissemination of agricultural research findings through providing more explicit emphasis to strengthening the agricultural extension systems in each of the countries, including stronger research-extension linkages. These improvements were carried out, without a formal restructuring. Accordingly, the main reasons for a MS rating in Bank performance was due to the weaknesses in the M&E system performance, and to the "missed opportunity" to restructure the project (ICR, para. 90). As indicated above, the Borrower and Bank Project teams did not see the necessity of conducting a formal restructuring of the Project, although in practice, the relevant aspects (RF/indicators) and extension system improvements were carried out following the MTR mission.



### **Quality of Supervision Rating**

Moderately Satisfactory

### **Overall Bank Performance Rating**

Moderately Satisfactory

## **9. M&E Design, Implementation, & Utilization**

### **a. M&E Design**

The design of APPSA's M&E system was underpinned by the Project's RF, with its overall PDO and intermediate result indicators (which corresponded to the Project components) to track implementation and performance. However, the RF was not accompanied by a theory of change, hence the results chain implied by the RF served a limited role in assessing the project's substantive implementation performance and results. Also, some of the indicators included in the original RF lacked operational clarity to accurately measure them, which weakened the relevance and use of the RF design (e.g., counting and updating of beneficiaries, which was not formalized; absence of baseline values for some key indicators; ICR, para. 70). Also, at project design there was an absence of a focal person for the M&E system, which affected the harmonization of the M&E system and data verification (ICR, para. 66). These weak design issues were improved during implementation by adding a regional M&E framework (managed by CCARDESA) that enhanced the performance monitoring indicators and corresponding measurements. This improvement helped address during early implementation M&E design issues, including the lack of clarity regarding some performance indicators, and also the counting of a more realistic measure of target beneficiaries.

### **b. M&E Implementation**

M&E implementation encountered numerous challenges from the outset, but during implementation, most of the main challenges were addressed in a progressive manner, at regional and country level, with some variance. The poor start of the M&E system was due to the design weaknesses cited above, which was reflected in weak arrangements and capacity constraints both at CCARDESA and country levels (within each RCoL for the overall Project at the country level, and also for each R&D subproject). This resulted in initial poor reporting at the various levels, and therefore, delayed and resulted in partial reporting to each national PIU, which was responsible for aggregating the M&E data. The M&E weaknesses at the country level also were due to the lack of effective leadership by CCARDESA, due to its own institutional weaknesses and to the lack of a M&E expert who could have provided the required leadership and technical support.

By 2014, the above M&E issues were clear and there was a concerted effort to formulate and operationalize a regional M&E framework and system under CCARDESA, to help address the M&E issues at the various levels. With the technical support of the Bank, it was possible to formulate the regional M&E framework in a manner which accounted for differentiated, evidenced-based monitoring or progress and results by each country, along the results chain (and based on the overall RF). The ICR highlighted the valuable role of a newly established regional M&E working group, comprised of the M&E focal persons of the 3 participating countries, together with the CCARDESA M&E officer. They met twice per year to address/resolve technical and relevant harmonization M&E issues. It is noteworthy that the



regional M&E framework provided a guide to ensure coherent and consistent RF for each R&D subproject, to ensure commonly used and relevant indicators aligned with the regional core indicators.

The Project team is commended for providing periodic training and mentoring/coaching to principal researchers on the development of RFs and core indicators for each of their R&D subprojects. The APPSA team formulated a reference guide regarding a common set of progress and results indicators, comprising a guide for clear data collection, aggregation and reporting instructions. Also, the ICR notes that baseline studies were also conducted, followed by collection of relevant data during implementation. This progress of the M&E system is promising evidence of institutionalizing the regional-country level M&E system for R&D. It was timely that CCARDESA and the Bank team commissioned an independent impact evaluation of APPSA (2020), which provided key inputs for the ICR. Operationalizing periodic evaluation aspects of the APPSA (of various components, thematic areas, priority subprojects, overall and by country) would be an important feature of further strengthening and institutionalizing the scope and usefulness of the M&E system.

### **c. M&E Utilization**

The various Bank supervision Aide Memoires and the ICR reveal that the M&E system for APPSA was progressively utilized by Project Management and Bank teams (at the level of CCARDESA and each participating country) to enhance Project performance and results. The ICR provides the following relevant evidence: (a) the use of the harmonized regional M&E system tools and results stimulated critical mutual learning by management and research teams, including common benchmarking and improved compliance with monitoring plans across countries; (b) review of the M&E data, together with the M&E system recommendations arising from an independent assessment of the regional M&E system (in 2016, as part of the MTR), encouraged the Project team to accord increased priority and resources to technology dissemination, following a Project focus on technology generation; (c) progressive use of the delayed MIS data system, initially by Zambia, followed by CCARDES and the two other countries; (d) a harmonized plan for reporting on indicators was adopted and implemented in all three countries; and (e) the regional M&E system strengthening the CCARDESA M&E system. As cited above, aside from CCARDESA arranging for several baseline surveys and the impact evaluation study at Project closing (which was a WB requirement, and used as inputs for the ICR), there were no other evaluation studies carried out during Project implementation. As part of the sustainability strategy and future AWP, it would be desirable for CCARDESA and the RCoL in the participating countries to build on the impact evaluation study findings to conduct periodic evaluation studies on selected themes and commodities to help sharpen Project/resource allocation priorities and results, and to help sustain the APPSA through future phases (with or without Bank follow up financial support).

### **M&E Quality Rating**

Modest

## **10. Other Issues**

### **a. Safeguards**





The Project was classified as Environmental Category B based on the rationale that "no adverse long-term or cumulative effects were anticipated" (ICR, para. 76). Also, there were no safeguard issues anticipated in the Project. However, the infrastructure investments and anticipated research activities related to breeding, germplasm, farm management and processing triggered 4 WB safeguard policies: (i) Environmental Assessment (OP/BP 4.01); (ii) Pest Management (OP/BP 4.09); (iii) Involuntary Resettlement (OP/BP 4.12) for Zambia and Mozambique; and (iv) Safety of Dams (OP/BP 4.09) for Mozambique.

Based on the assessment of the implementation of these safeguard policies, the ICR concluded that the Project complied with these 4 safeguard policies and guidelines, including the following evidence (see ICR, para. 76): Integrated Pest Management Plans (IPMPs) prepared for each country; Environmental and Social Management Plans (ESMPs) prepared for major construction works; environmental, social safeguard and mitigation plans prepared for all R&D subprojects (although with a slow/delayed compliance); training programs carried out for scientists and farmers in IPM; carrying out functional waste disposal systems (in Zambia); carrying out a resettlement policy framework involving land acquisition and resettlement of farmers in Mozambique; and addressing effectively an unfortunate drowning of a young boy involving an unfenced reservoir (in Zambia). Also, CCARDESA established a Grievance Redress Mechanism (GRM), but there was no evidence of its actual use in receiving or processing complaints. This ICRR confirms the soundness of complying with the relevant safeguard policies triggered by the Project.

## b. Fiduciary Compliance

The PAD rated the Financial Management risk exposure at appraisal stage as **Substantial**. Risk factors included: overall capacity weaknesses at the PIU level for each of the 3 countries and of CCARDESA, coupled with inexperience in implementing Bank projects; there was continuous low budget utilization in the initial years of the project, reflecting project start-up delays and slow flow of funds to the PIU accounts. It is notable that the ICR recognized that financial management performance improved progressively during implementation, resulting with **adequate internal systems and controls**. The following evidence was provided in the ICR to substantiate this conclusion (ICR, para. 81): annual project audit reports in all three countries contained an unqualified audit opinion; the annual financial statements and the audit reports were consistently submitted to the Bank in a timely manner, throughout the project's life; all committed contracts were paid; the budget was fully utilized, with no outstanding advances at the end of the project. FM risks were mitigated through training of APPSA staff in WB FM procedures and adoption of sound FM procedures. The JIE highlighted the need for APPSA implementing entities to adopt appropriate FM software to facilitate preparation of harmonized FM reports (JIE, 2020). As stated above, the project experienced a loss of \$8.3 M, due to currency exchanges, and therefore, country and CCARDESA management scaled down on uncommitted budget funds, without compromising key targets. With respect to **procurement**, the ICR noted that initial procurement capacity was weak, and there were delays in the procurement of goods and services in all three countries, due to inadequate understanding of Bank procurement procedures by the PIUs, and limited technical capacities of the PIUs in managing contracts. However, the ICR points out that procurement capacity and performance progressively improved due to: regular procurement training; Bank supervision support; corrective actions during project implementation; technical support; and independent procurement audits (ICR, para. 82).



### c. Unintended impacts (Positive or Negative)

The ICR highlighted several **other important positive outcomes/results**, backed-up by evidence, which merit recognition (ICR, paras. 52-58):

- (a) Gender: The project reached a large number of women as direct beneficiaries (37% of total direct beneficiaries, or 23% above the original target/Annex 1), including their capacity development: gender-sensitive training programs (although the female target was not reached --52% of the target); women farmer groups in seed multiplication training;/production; value-addition initiatives; scientific capacity training.
- (b) Institutional Strengthening, with a strong performance and results-orientation, including: national seed regulations aligned with SADC seed policy regulations; APPSA's regional design of R&D subprojects catalyzed research collaboration and supporting mechanisms among research scientists in the 3 participating countries, which previously did not exist (e.g., commodity-based working groups; cross-country peer review mechanism; knowledge exchange activities, which nurtured a culture of regional research collaboration; use of various innovation approaches to promoting dissemination of improved agricultural technologies, such as digital electronic methods, processes for promoting expanded role of the private sector in different stages of technology development and dissemination.
- (iii) Beneficial collaboration between APPSA and CGIAR centers, which focused on breeding and sharing of germplasm, while also recognizing several weaknesses in order to maximize the potential benefits of expanding this collaboration, thereby also contributing to program sustainability;
- (iv) Mobilizing Private Sector Financing: The new/improved technologies generated by APPSA catalyzed other requirements which involved expanding the role of the private sector (e.g., seed multiplication and distribution, and more competitive input distribution systems). By the end of the Project, there was increased recognition by CCARDES and the participating countries of the potential for expanding the role of the private sector in technology generation and dissemination. This expanded role will form an important agenda for follow up support by the Bank.
- (v) Poverty Reduction/Shared Prosperity: While the Project did not measure the impact on poverty, the contributions of improved agricultural technologies to increased agricultural growth and household incomes have contributed to reduced poverty in these 3 countries;
- (vi) Improved Nutritional Outcomes: The development of pro-vitamin A orange maize by APPSA is significant, because with expanded adoption, it will reduce vitamin A deficiency among the populations of the 3 countries.

### d. Other

N/A

## 11. Ratings



Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Moderately Satisfactory	Moderately Satisfactory	--
Bank Performance	Moderately Satisfactory	Moderately Satisfactory	--
Quality of M&E	Modest	Modest	--
Quality of ICR	---	Substantial	

## 12. Lessons

Based on APPSA's implementation experience and results, the ICR highlighted three core lessons (ICR, paras. 94-96, with some added points shown below), which can enhance APPSA sustainability and also provide useful inputs for enhancing other similar regional R&D programs (i.e., EAPP, & WAPP):

(a) Strong partnerships with the relevant CGIAR centers, a broad-based private sector and producer organizations are essential to successfully increase technology generation and uptake (i.e., dissemination and broad-based farmer adoption). The APPSA showed that collaboration with relevant CGIAR centers was highly beneficial in generating improved technologies through breeding and sharing of germplasm with various international research entities: International Maize and Wheat Improvement Center/CIMMYT; International Rice Research Institute/IRRI; International Crops Research Institute for the Semi-Arid Tropics/ICRISAT; International Center for Tropical Agriculture/CIAT; and International Institute of Tropical Agriculture/IITA. With the successful development of pro-vitamin A orange maize by APPSA, formal partnerships and collaboration with Harvest Plus, local milling and seed companies were instrumental in the expanded uptake of the pro-vitamin A orange maize in Zambia and Malawi. This positive experience paves the way for promoting the uptake of other commodities supported by APPSA.

(b) The potential impact of agricultural technology generation and dissemination of R&D activities is enhanced significantly when dissemination and delivery mechanisms are developed and considered early on/from project design stage. While the APPSA was successful in generating improved technologies, attention to dissemination to farmers was introduced mid-way, thereby limiting and delaying achievement of tangible production benefits at the farmer level. Also, the Project focused dissemination on "lead farmers", assuming that adoption would "spill over" quickly to other farmers, rather than taking a more direct approach to accelerate scaling up with "follower" farmers, also recognizing that the adoption process take time (JIE, 2020). While lead farmers can and should play a key role, there can be supporting actions to accelerate the dissemination activities through lead farmers and other complementary processes. Accordingly, a key lesson is that R&D type of projects/programs should include in the design phase dissemination component/activities through integrating program/project design with the national extension program/services, seed multiplication, the expanded private sector, farmers groups and input providers. When there are many technologies on the shelf, more attention should be given to new technology generation (and to be reflected in the priorities of the annual research agenda/work plan), and to including explicit dissemination



mechanisms **and activities**, including adequate budgetary allocations from public expenditures (which the Bank team also included as a topic of discussion during implementation).

(c) Regional R&D **program**/project can catalyze a strong culture of regional collaboration, facilitating applied research to efficiently address well identified shared problems with appropriate shared solutions. The ICR highlighted 2 good examples of the importance of promoting this regional collaboration, which also can help expand and sustain APPSA for the entire SADC region: (a) collaborative research to address the FAW outbreak and other common cross-border diseases affecting key commodities/staples (e.g., maize lethal necrosis disease) and nutrition deficiency problems, as addressed by the pro-vitamin A maize variety demonstrated the clear benefits of investment in regional R&D projects, and at the same time, to contribute to higher level food and nutrition security objectives in the region; (b) the regional M&E framework developed through regional collaboration and led by CCARDESA is being used to improve the M&E of regional R&D projects in the SADC region.

**Three additional lessons were** implied by the ICR (paras. 65-69), but not included as lessons, and merit inclusion.

(a) the importance of **deriving and strengthening the most appropriate and effective institutional arrangements and roles for guiding APPSA implementation and making timely adjustments**, while finding the **right balance** between developing and using country-level and regional arrangements and mechanisms, and their linkages. The ICR recognized that the Project experienced various institutional coordination challenges during the early years; with the support of the findings of the MTR, Project Management progressively found and used various institutional arrangements and mechanisms to promote improved and effective coordination at the regional AND country levels (e.g., role and effectiveness of APPSA Regional Steering Committee, balanced with appropriate country-level institutional coordination arrangements, mainly through the NARS/PIU at the country level, relevant working groups, and strong linkages between the regional M&E system and the decision-making entities and actors at the regional and country levels). Expanding the number of countries to participate in APPSA and meeting the challenges of sustainability of regional "public goods" will require close attention to sharpening and strengthening the most appropriate institutional arrangements for effective, efficient and sustainable program coordination;

(b) the strategic role of promoting an expanded role of the private sector, in different aspects of technology generation and dissemination (including as a key actor in the subprojects supported by the Project), building on some of the emerging discussions with and initiatives by CCARDESA and the participating countries. The Project team shared some of these initiatives which merit follow up support by the Bank, especially in the on-going follow up support (for Angola and Lesotho), and in the event there is a follow up phase of APPSA for the 3 countries, and possibly other countries who are members of SADCC; and

(c) the value of completing a formal restructuring of a Project in the event relevant findings arise during implementation (such as a mid-term review) and are also carried out as part of project implementation. In the case of this project, there were 2 strategic areas which were recognized during the MTR which warranted a formal restructuring, for purposes of transparency and accountability: making relevant adjustments to the RF and several outcome indicators, to reflect more realistic expectations; and strengthening various project actions to enhance various aspects of



agricultural extension at the country level, and therefore, to improve the dissemination aspects of enhanced technologies regarding the project's PDO. At the same time, it was recognized that the APPSA and Bank Project teams implemented these adjustments during the remaining life of the project.

### 13. Assessment Recommended?

No

### 14. Comments on Quality of ICR

Overall, the quality of the ICR was **Substantial**, for the following main reasons: (i) it complied with OPCS guidelines; (ii) the content was candid, well balanced, internally consistent and supported by relevant evidence on both the project's achievements and shortcomings, which were drawn from the regular ISRs, MTR reports, and especially from the Joint Impact Evaluation (JIE) Study of APPSA (at the end of the project period, 2020, while noting some important omissions cited below); (iii) reconstructed a much needed theory of change, which complemented the RF, and provided an improved basis for assessing the results chain and key outcomes; and (iv) provided realistic ratings, taking into account positive and "mixed" evidence of program performance and results.

ICRR concludes that there are two aspects of the ICR which could have been further clarified in the ICR:

(a) Efficiency Analysis: The efficiency assessment (Section 5) suggests that the ICR could have provided more in-depth and explicit analysis regarding the project's efficiency. While the ICR provided 3 complementary measures of efficiency, which are common practice for many agricultural R&D projects, there was scope for providing a more explicit efficiency assessment regarding the project's institutional and capacity building performance and efficiencies. This type of analysis is warranted because of the importance of ensuring program sustainability, and possible scope for promoting program efficiency improvements, including comparative cost-effectiveness across countries and organizational effectiveness and efficiency of CCARDESA (with its regional change management role). This type of analysis also can help strengthen the evidence for the rationale and prospects for program sustainability, by persuading the Ministries of Agriculture and of Finance in the countries to provide adequate financial support in their public expenditure allocations, and to persuade other countries from SADC to participate in APPSA.

(b) Integration of Relevant Key Findings/Recommendations from the Joint Impact Evaluation/JIE: While the independent JIE study (2020) of the APPSA provided valuable inputs for the ICR, the ICRR review of the JIE suggests that there were five important relevant findings and commendations which were not fully incorporated in the draft ICR, including (as examples, drawing from the conclusions/recommendations, pages 143-150, which can also be included in the annexes, given page limitations in the text):

- the urgent need for CCARDESA/participating country RCoL, guided by the APPSA Regional Steering Committee, to develop an "exit strategy", or equivalent of a sustainability strategy, in the form of a Phase 2 of APPSA, following Project closure in January, 2020. The JIE report states: "Without additional support in terms of APPSA Phase 2, all of the achievements in skills acquired through



training, infrastructure and technology generation will have been in vain and resources wasted" (JIE, section 11.1);

- recognizing a more appropriate operational meaning of "adoption" of technologies by farmers, which takes time, well beyond the 6 years of the project, hence reinforcing the importance of promoting a Phase 2; as stated above, the Project team indicated that CCARDESA and the member countries plan to convey to the Bank for follow up support;
- "JIE surveys/interviews found that extension messages about the new technologies were running ahead of the actual availability of the technologies." (JIE, p. xvii), followed by important recommendations on the importance of taking an integrated approach to technology generation;
- the importance of strengthening key aspects of the APPSA M&E system, including thematic evaluations on strategic topics, such as farmer adoption, post-harvest research, seed systems and commodity impact studies; and
- rationale and strategies to strengthen the role of stakeholder partnerships and the governance arrangements involving clear mandate and stakeholder composition of the APPSA Regional and country Steering Committees (also to help pave the way for a Phase 2).

**a. Quality of ICR Rating**

Substantial