



# **AGRICULTURAL SERVICES PROGRAM**

**(BL-L1009; 2220/OC-BL)**

## **Project Completion Report (PCR)**

*Original Project Team: John Horton (INE/RND) and Juan de Dios Mattos (RND/CGU), Co-Team Leaders; Juliana Almeida (INT/INT); Ernani Pilla (INE/ESG); Juan Carlos Pérez-Segnini (LEG/SGO); Willy Bendix (PDP/CCR); Mario Castañeda (PDP/CES); Vanessa Lynch (CID/CBL); and Lisa Restrepo (INE/RND) who helped prepare the document.*

*PCR Team: Juan de Dios Mattos (RND/CPE), Project Team Leader; Michael Collins (CSD/RND); Lisa Sofia Restrepo (CSD/RND); Hernan Rojas (Consultant); Adrian Roccatagliata (Consultant).*

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**ELECTRONIC LINKS**

1. [Development Effectiveness Matrix \(DEM\)](#)
2. [Final version of the Progress Monitoring \(PMR\)](#)
3. [PCR Checklist](#)

**OPTIONAL ELECTRONIC LINKS**

1. [Ex Post Cost-Analysis Report](#)
2. [Ex Ante Cost-Analysis Report](#)
3. [Written Feedback from the Government](#)
4. [QRR Report](#)

## **ACRONYMS AND ABBREVIATIONS**

AI	Avian Influenza (poultry disease)
AOP	Annual Operations Plan
ASP	Agricultural Service Program
BAHA	Belize Agricultural Health Authority
BSE	Bovine Spongiform Encephalopathy
CAO	Chief Agricultural Officer
CBA	Cost Benefit Analysis
CEO	Chief Executive Officer
CGS	Competitive Grant Scheme
CIL	Central Investigation Laboratory
CSF	Classic Swine Fever (pig disease)
DDDI	Distance Diagnostics through Digital Imaging
ERR	Economic Rate of Return
ESS	Environmental and Social Strategy
EU	Executing Agency
FMD	Foot and Mouth Disease (cattle disease)
FSS	Food Safety Services
GDP	Gross Domestic Product
GoB	Government of Belize
HACCP	Hazard Analysis and Critical Control Points
IDB	Inter-American Development Bank
IICA	Inter-American Institute for Cooperation in Agriculture
ISO	International Organization for Standardization
LIMS	Laboratory Information Management System
MAF	Ministry of Agriculture and Fisheries
MAPS	Modified Assessment of Procurement Systems
M&E	Monitoring and Evaluation
NCCARD	National Coordinating Committee for Agricultural Research and Development
OIE	World Organisation of Animal Health
PCU	Project Coordinating Unit
PMR	Project Monitoring Report
R&D	Research and Development
SP	Strategic Plan
SPS	Sanitary and Phyto Sanitary
SS	SmartStream

## BASIC INFORMATION (US\$ AMOUNT)

PROJECT NUMBER: BL-L1009 TITLE: AGRICULTURAL SERVICES PROGRAM LENDING INSTRUMENT: INL-INVESTMENT LOAN COUNTRY: BELIZE BORROWER: BELIZE - MINISTRY OF FINANCE LOAN: 2200/OC-BL SECTOR/SUBSECTOR: AGRICULTURE AND RURAL DEVELOPMENT – AGRICULTURAL HEALTH AND FOOD SAFETY
DATE OF BOARD APPROVAL: 04 NOVEMBER 2009 DATE OF LOAN CONTRACT EFFECTIVENESS: 16 NOVEMBER 2009 DATE OF ELIGIBILITY FOR FIRST DISBURSEMENT: 22 JUNE 2010
<u>LOAN AMOUNT (US\$)</u> ORIGINAL AMOUNT: 5,000,000.00 CURRENT AMOUNT: 3,700,000.00 PARI PASSU: 500,000.00 TOTAL PROJECT COST: 4,200,000.00
<u>MONTHS IN EXECUTION:</u> (TO OPERATIONAL CLOSE OCTOBER, 3, 2015) FROM APPROVAL: 71 FROM CONTRACT EFFECTIVENESS: 70.5
<u>DISBURSEMENTS PERIODS</u> ORIGINAL DATE OF FINAL DISBURSEMENT: 16 NOVEMBER 2014 CURRENT DATE OF FINAL DISBURSEMENT: 16 JULY 2015 CUMULATIVE EXTENSION (MONTHS): 8 SPECIAL EXTENSIONS (MONTHS): 8 <u>DISBURSEMENTS</u> TOTAL AMOUNT OF DISBURSEMENTS TO DATE: 3,700,000.00
<u>REDIRECTIONING.</u> HAS THIS PROJECT? RECEIVED FUNDS FROM ANOTHER PROJECT [No] SENT FUNDS TO ANOTHER PROJECT [No]
EX POST ECONOMIC ANALYSIS METHODOLOGY: BEFORE/AFTER EX POST EVALUATION METHODOLOGY: N/A  DEVELOPMENT EFFECTIVENESS CLASSIFICATION: SATISFACTORY

## **I. EXECUTIVE SUMMARY**

The Agricultural Service Program (ASP) financed by a loan approved by the IDB in November 2009 (loan contract 2220/OC-BL) and the Government of Belize (GoB) sought to strengthen the provision of agricultural services, especially research, innovation, animal and plant health and food safety. The ASP had a budget of up to US\$5 million and was designed for a five-year implementation period. The Ministry of Agriculture and Fisheries (MAF) and the Belize Agricultural Health Authority (BAHA) oversaw its implementation, which required the establishment of two executing units.

The ASP tackled two central problems in the agricultural sector in Belize: (i) innovation and transfer of technology to farmers; and (ii) plant and animal health and sanitation. Stronger and more capable institutions would support growth in productivity and incomes.

The implementation of the ASP was eligible for disbursements in June 2010, but it took two years to start the implementation of most activities. The Competitive Grant Scheme (CGS) planned for Component 1 was not implemented, which resulted in a partial cancellation of funds in 2013. This partial cancellation affected mainly Component 1. Only some activities in Component 1 (training, recruiting of experts and purchase of equipment) were implemented. Component 2 was implemented more successfully. Although the risk of complexity and insufficient number of projects for the CGS was identified during the design, and mitigation measures planned, it was not possible to implement this part of the Program. The delays in the recruitment of the project management unit and in the preparation of the documents needed to implement the CGS reduced the participation of partners, especially from the private sector.

Outcome 2 indicators averaged 83% of completion at the end of the Program. Only one indicator of outcome 3 was completed (out of 4). The main reason for low results for output 3 was the impossibility to finalize the documentation and activities related to requirements to export agricultural products to Mexico. Coordinated efforts among Government Agencies, including the Ministry of Foreign Affairs, reduced the effectiveness of the promotion of protocols between countries. Most activities designed to improve the capacities of BAHA were implemented, which resulted in higher rates of performance, as measured by World Organization of Animal Health (OIE) and Inter-American Institute for Cooperation in Agriculture (IICA) methodologies.

The final evaluation and the ex post economic evaluation found that, for Component 2, implementation of the Program was successful. The Internal Rate of Return (IRR) of the ex post economic evaluation was 18%.

The ASP, together with the authorities of BAHA and the MAF, developed a Strategic Plan (SP) for the period 2015-2020 to ensure the sustainability of the ASP. The methodology incorporated a Balanced Scorecard approach with a focus on the development of strategic objectives linked to four aspects; (i) Customer/Stakeholder; (ii) Financial and Regulatory; (iii) Internal Processes; and (iv) Learning and Growth.

Despite these efforts toward achieving sustainability, continuation of activities started by the ASP demands additional financial resources which are not assured today. BAHA's current budget is only sufficient to finance baseline operations. The SP recommends raising additional financial resources by increasing revenues from services (laboratory). However, and as indicated in the SP, BAHA should increase its resources by combining a higher direct government contribution with increased incomes from services given to the private sector.

## **II. INTRODUCTION**

The Belizean agricultural and fisheries sector has generated an average of over 85% of total exported value over the past decade. The agricultural sector provides an important source of employment, particularly for the 52% of Belizeans living in rural areas (CBB, 2017). Employment in agriculture (as a percentage of total employment, including fishing and hunting) in Belize, was 22.6% in average for the period 2010–2014 (CBB, 2017). The sector's total value of output had remained in step with total economic growth over the last three decades, with agricultural Gross Domestic Product (GDP) contributing an average 10.5% of total GDP, with minor variation over this period. Agriculture represented 8.96% of total output in 2015 (constant prices). The last decade (2005–2015) annual growth in agricultural GDP averaged 0.7%, with several years or negative growth, mostly due to natural disasters (CBB, 2017).

The agricultural sector relied heavily on the performance of three major export commodity groups that represented 75% of total agricultural exports, namely sugar, citrus, and bananas. In the case of sugar and bananas, the concentration of production in a few farms has been the result of trade preferences and grant programs for public investment from the European Union (EU) since the 1980s. The Multi Annual European Commission Assistance Strategy (2006–2013) established a 45 million Euro fund for the sugar adaptation program for Belize, for the period 2006–2010, nine million euros per year. Similarly, a banana support program, provided 13.8 million euros for the period 2012–2017. These resources have averaged over 50% of the total budget managed by the MAF over the last decade and accounted for 80% of the budget allocation for 2009-2010.

The 2008 Belize National Export Strategy together with the IDB Trade Sector recognized that agriculture holds the potential to remain an economic mainstay, requiring an increased diversification of markets and products with added-value rather than commodities. They also conclude that this view is consistent with the continued expansion of non-traditional markets, such as: tilapia, shrimp, papayas and processed products such as hot pepper sauce, livestock, beans and grains. Furthermore, the sustained expansion of tourism in Belize is creating new demand for higher value export quality foods. This study concluded that to promote competitiveness and market diversification for agricultural products, resources must be reoriented to improve efficiency of two critical agriculture services with public goods characteristics: (i) agricultural innovation; and (ii) animal and plant health.

In 1999, with support of the Bank's Modernization of Agricultural Health Services Program, the GoB moved to consolidate all its phytosanitary, animal health and food safety protection programs into one semi-autonomous institution, creating the BAHA. A loan for US\$3.6 million (1189/OC-BL) assisted in the completion of the legal and operational establishment of BAHA as well as in the

construction of detection posts, quarantine facilities and certified diagnostic labs, resulting in lowering the prevalence of targeted animal and plant pests and diseases. As a result, Belize now holds the “free from” status for Fruit Medfly, Classical Swine Fever, Poultry Newcastle, Foot and Mouth Disease and Bovine Brucellosis.

In 2008, the GoB requested further support from the Bank to finance the ASP. With US\$5 million approved in 2009, the Program’s objective was to strengthen the core public agricultural services that provide access to applied production technology corresponding to market opportunities, while reducing the risks derived from threats to plant and animal health and food safety. This in turn would contribute to the broader goal to enhance the competitive productive base upon which Belizeans depend to increase their income. The Program included the following two components: (i) Applied Production Innovation; and (ii) Plant, Animal and Food Safety Risk Management.

**Component 1: Applied Production Innovation.** This component included the financing of matching grants for agricultural research and extension projects that would be competitively selected. Projects would focus on themes such as improvements in production technologies, effective technology transfer and marketing innovations. The maximum amount to be financed for each innovation project selected was capped at US\$100,000. In addition, the component included: (i) technical assistance for the National Coordinating Committee for Agricultural Research and Development (NCCARD) Secretariat to manage the competitive selection and funding mechanism for innovation projects, including the process of setting agricultural Research and Development (R&D) priorities for the calls for proposals; and (ii) equipment and training to strengthen core MAF R&D and management capacities. The capacity building activities identified included training of NCCARD members in research and extension methodology, project proposal writing skills as well as training workshops for farmers interested in participating in the innovation projects.

**Component 2: Plant, Animal and Food Safety Risk Management.** This component included activities related to: (i) human, physical and financial resources: provide para-legal training to existing BAH staff to support legal and SPS legislative review; prepare its 2010-2015 SP; review and modify its fee structure system; prepare its training plan and implement its continuous education program; upgrade laboratory and offices for various animal and plant health and food safety facilities; (ii) Technical Authority and Capability: establish its Bio-Safety Plan; establish an integrated information system; update its Plant Health surveillance, pest diagnostics and pest risk analysis and certification system; update its surveillance, rapid detection, risk analysis systems; implement an Integrated Food Control system, upgrade its Food Safety diagnostic labs and inspection and certification capabilities; upgrade its Quarantine Inspection Unit and information systems; (iii) Stakeholder Interaction: establish its public communication strategy; implement its accreditation program for private veterinarians and labs; and (iv) Access to Markets: harmonize Sanitary and Phyto Sanitary (SPS) protocols with importing countries and proceed to establish sanitary agreements; set-up the zoning system for all districts for the process of declaring “free from” status and organize campaigns; update its certification system; and implement a traceability program.



In 2012, an assessment by the GoB concluded that accumulated delays and complexity of Component 1: CGS were affecting its implementation. Given this situation, the GoB discontinued all planned activities and outputs and processed a partial cancellation of US\$1.3 million from the Bank funds approved for the Program.<sup>1</sup>

### **III. CORE CRITERIA. PROJECT PERFORMANCE**

#### **4.1 Relevance**

##### **a. Alignment with country development needs**

The ASP goals and objectives were aligned and contributed to the Bank's strategy with the country (GN-2520-2) valid for the period 2008–2012. The strategy included Objective 2: Creating the conditions for continued private sector led growth, which includes expected results for the agricultural sector, namely the provision of tools to prioritize public investment, which encompass plant and animal health and food safety, as well as applied research in agronomic and animal science and food and agro-industry technology. These issues were addressed by the Program, as it proposed to invest in the provision of public goods, namely research and innovation, and improvement in agricultural health and food safety. In effect, the results attributed to Component 2 of the ASP contributed to increased national capability to handle outbreaks and campaigns to eradicate specific diseases. The Program also contributed to achieve the indicator for agriculture “MAF has tools to prioritize public investment based on sector competitive advantage and private sector dialogue,” included in the results matrix of the country strategy.

The Program took into consideration the country's realities and development need during the design. The MAF Mid-Term Plan for the period 2008–2012, defined strategies for R&D that were included in the design. For example, the Mid-Term Plan called for leveraging existing R&D programs; engaging the private sector in the plan and development of research programs; involving regional research agencies (like CIAT, CARDI, CIMMYT, among others); and designing funding schemes for long-term research.

The country strategy approved in 2013 (GN-2746), for the period 2013–2017 does not include a specific objective related to the ASP.

##### **b. Vertical logic**

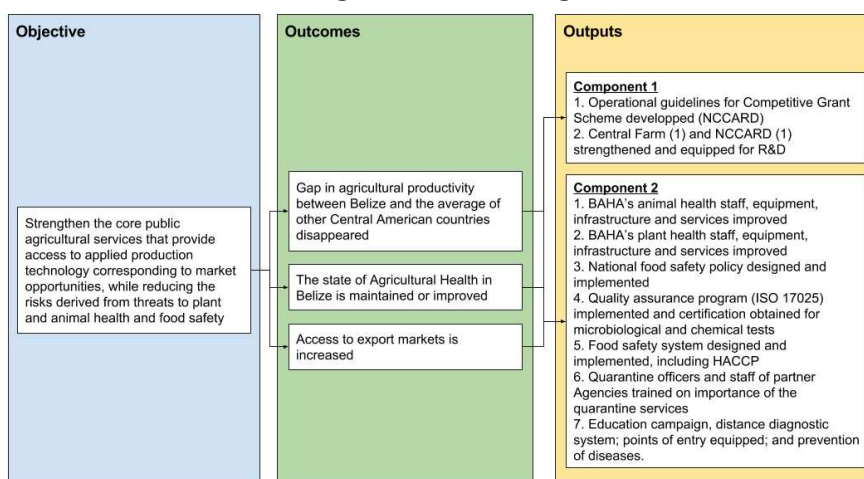
Figure 1 shows the vertical logic of the Program as amended after the 2012 partial cancellation of resources in Component 1. Investments in the components of the Program can lead to improvements in public agricultural services (including animal and plant health) and agricultural productivity, and in this sense, it was aligned with the Bank's Country Strategy and Belize's own development agenda. However, the sequential logic provided for in the design suggests that productivity gains are reached before the strengthening of public agricultural services; the reverse is more likely to take place. Furthermore, while reaching productivity gains in the long-term is a

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<sup>1</sup> See section 3.2.a for more details.

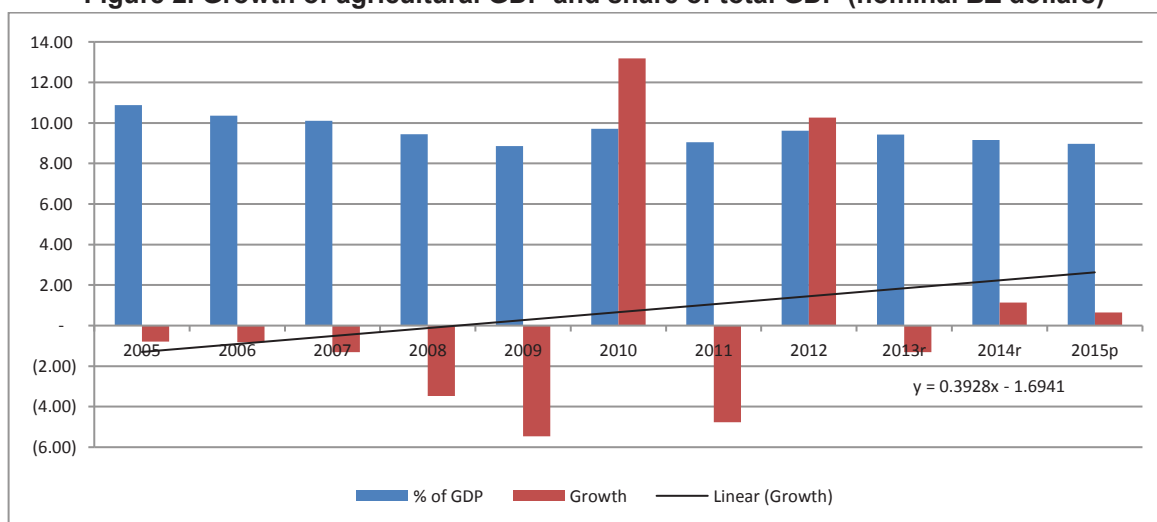
realistic impact statement, doing so during the Program's implementation and affecting the productivity gap (with other countries) are both unlikely.

**Figure 1. Vertical logic**



As shown in Figure 1, outputs were clearly aligned with outcomes, but indirectly linked with the objective. The objective focuses on public agricultural services, which were supported directly by the Program, but although outputs aim to strengthen these services, outcomes seem to be objectives in their own. A smaller gap in productivity can be linked to a stronger public service, but it is not obvious. The same can be said of better market access. In fact, a smaller productivity gap could have been the objective, which can be linked to both components. At the same time, the objective is ambitious when compared to the size of the loan.

**Figure 2. Growth of agricultural GDP and share of total GDP (nominal BZ dollars)**



The design of the Program highlighted the importance of the investment in maintaining GDP growth and the share of agriculture in total GDP. **Figure 2** shows that growth has been erratic, mostly due to weather conditions (hurricanes in 2009 and 2011), but the share of agriculture on

total GDP has not decreased and even picked up slightly (comparing years 2009 and 2015). The objective was clearly defined and it was reasonable to expect that it would be achieved in the medium-term. However, outputs were optimistic, the size of the loan and the subsequent partial cancellation reduced the likelihood of achieving them.

## 4.2 Effectiveness

### a. Statement of project development objectives

The objective of the Program was to strengthen the core public agricultural services that provide access to applied production technology corresponding to market opportunities, while reducing the risks derived from threats to plant and animal health and food safety. The outcomes and outcome indicators are indicated below.

Outcomes	Outcome indicators
Gap in agricultural productivity between Belize and the average of other Central American countries disappeared	Advances in agricultural innovation attributable to the Program will contribute to reducing the gap in productivity in the long-term between Belize and other countries in the region for production technologies of a series of economically significant selected products
The state of agricultural health in Belize is maintained or improved	Advancement of BAHA consolidation in four key areas of Critical Competencies measured by recognized evaluation tools of the OIE and the IICA will increase from their current good levels to new fully satisfactory levels by the end of the Program, permitting them to have a sanitary risk management system that will maintain and expand clearance status in international trade and domestic commerce
Access to export markets is increased	

Outcomes identified during the design seem to be optimistic. To eliminate gaps in productivity with a small project like the ASP, was an overly ambitious goal. The other two outcomes were more realistic, and in line with outputs proposed during the design.

### b. Results Achieved

The two outcome indicators shown above are associated, respectively, with Components 1 and 2 of the Program.

At the time of preparing the first Project Monitoring Report (PMR), only one impact indicator was identified, which synthesized the previous two indicators: To maintain or improve the contributing position of the agriculture sector in the Belizean economy (despite the upcoming challenges in terms of erosion of preferential trade regimes). This indicator was to be measured through: (i) a ratio of Agricultural GDP / Total GDP maintained; and (ii) Agricultural GDP maintained (in constant 1990 prices). Results at the component level (outcomes) were reviewed, but maintained the original idea (see Table 1). Outputs, remained the same, although some were modified to account for the reduction in funds.

**Table 1. Changes to the results matrix**

Place of change	Name of the change	Type of change	Reasons for change	Date of change	Date of change agreed with Executing Agency
Impact indicator	To maintain or improve the contributing position of the agriculture sector in the Belizean economy (despite the upcoming challenges in terms of erosion of preferential trade regimes)	New indicator (not included in the POD)	Required for the PMR	The modification was introduced at Program Inception	The modification was introduced at Program Inception
Outcome Indicator 1: Advances in agricultural innovation attributable to the program will contribute to reducing the gap in productivity in the long-term between Belize and other countries in the region for production technologies of a series of economically significant selected products.	Strengthen the capacity of the MAF, NCCARD and public/private institutions related to R&D. Results Matrix in POD does not have this outcome but the first and last PMR includes the outcome	Modified text	Better description of the outcome, replacing "Gap in agricultural productivity between Belize and the average of other Central American countries disappeared" as indicator	The modification was introduced at Program Inception	Mid-term review
Outcome Indicator 2	The state of Agricultural Health in Belize is maintained or improved	Modified text	Better description of the indicator	The modification was introduced at Program Inception	The modification was introduced at Program Inception
Outcome indicator 2.3 (Confiscation of exported agricultural products)	Indicator was eliminated	Indicator was eliminated	No targets were included once the indicator changed.	June, 2017	Change was introduced once the Program ended.
Outcome Indicator 3	Access to export markets is increased	New indicator (not included in the POD).	Required to include concepts because of simplification of Outcome 2	The modification was introduced at Program Inception	The modification was introduced at Program Inception

Place of change	Name of the change	Type of change	Reasons for change	Date of change	Date of change agreed with Executing Agency
Output 1.1: More effective and efficient Agricultural and Livestock Production Techniques developed	Operational guidelines for competitive Grant Scheme developed (NCCARD)	Replaced by a new indicator (1.1 in the PMR)	Cancellation of funds	March 2015	March 2015
Output 1.2	New Output – Central Farm and NCCARD strengthened and equipped for R&D	New indicator	Cancellation of funds	April 2015	April 2015
Output 1.3	New Output- MAF extension service officers and farmers trained in R&D	New indicator	Cancellation of funds	April 2015	April 2015
Output 2.1	Plant Health Surveillance System (PSU, PDS, PCEU) implemented	Replaced by Output 2.1 and 2.2 in the PMR	Clarity in data collection	2013	2013
Output 2.1: Plant Health surveillance System (PSU, PDS, PCEU) implemented	Plant Health facilities fully equipped: PSU, PDS, PRAU, ECS	Changed to identify primary output and milestones	Clarity in data collection through the inclusion of specific milestones	October 2014	October 2014
Output 2.2: Improved BAHA's Animal Health Service	Animal Health Services fully equipped, strengthened and operational; Aquatic Animal Health Unit, Disease Surveillance System and Traceability System for Bovine improved	Changed to identify primary output and milestones	Clarity in data collection. Milestones added to clarify process	October 2014	October 2014
Output 2.3: Improved BAHA's food safety service	Revised to: BAHA's food safety service improved	Changed to identify primary output and milestones	Clarity in data collection. Milestones added to clarify process	October 2014	October 2014
Output 2.4: Improved BAHA's Quarantine Service	BAHA's Quarantine Service Improved	Changed to identify primary output and milestones	Output and milestones focuses on core services of the department	April 2015	April 2015

## **Outcome 1: Gap in agricultural productivity between Belize and the average of other Central American countries disappeared**

Outcome 1 was not achieved. Under Component 1 of the program, the National Coordinating Committee for Agricultural Research and Development (NCCARD) mandate was to manage the competitive grant scheme which included setting agricultural research and development priorities for the calls for proposals and the selection of innovative projects in research, extension and marketing in the agricultural sector. The NCCARD was endorsed by Cabinet on December 30, 2009 and members included representatives of national agricultural research and development agencies and their role and responsibility was expanded in detail the program's operation manual.

To support the NCCARD in its capacity as the Secretariat for the Committee Grant Scheme, the Agricultural Service Program subcomponents allocated funds for the provision of technical assistance, capacity building and training in research and extension methodology, project proposal writing skills and workshops for farmers, primarily during the first 36 months of the program. During the first three years of the program, the operational guidelines for the Competitive Grant Scheme were developed; training in project development and project proposal writing implemented; office equipment and two vehicles were procured for the use of NCCARD in the delivery of extension services to farmers. At the outset of the program, it was noted that the competitive grant scheme would not permit the establishment of specific targets and identification of specific products as this would be based on demand. The program allocated funds for 15 innovation projects with an estimated value ranging from US\$65,000 to US\$75,000, however a portion of the funds were cancelled in December 2012 upon the request of the Ministry of Agriculture. Despite this challenge, progress towards the intended impact was partially achieved through the technical assistance, capacity building, equipment and training provided to the NCCARD to continue fostering the public-private collaboration between agricultural research, agricultural extension and market development.

After the partial cancellation, the following activities related to component 1 were maintained: (i) to provide equipment and training to strengthen capacity and management to the MNRA R&D; and (ii) to provide capacity building and training to the National Coordinating Committee for Agricultural Research and Development (NCCARD) members on; research, knowledge spreading methodology, writing skills, as well as the execution of training workshops for farmers interested in participating in future innovation projects. These outputs were completed, but there is no evidence to suggest they had any bearing on the productivity gap outcome.

The main reasons for the partial cancellation were: (i) delays in recruiting consultants to finalize the design of the CGS; (ii) delays in identifying viable projects; (iii) hurricanes (2011 and 2013); and (iv) weak management capacity of MAF Project Management Unit (PMU).

The main causes of delay were:

- The PMU was only completed after a year and was slow in preparing the necessary documents to recruit consultants and start the component.



- Consultancies identified during the design were not implemented because: (i) there was no counterpart at the MAF to prepare Terms of Reference and other procurement documents; and (ii) lack of national consultants to undertake the assignments.
- Potential partners were ambiguous and hesitated to participate in the scheme due to the size of the projects and potential conflicts of interest. The main conflict of interest was that potential partners were also members of the NCCARD.

This risk was identified during the design and two actions were implemented early on to secure the participation of partners: (i) preparation of a dossier with information about the CGS; and (ii) meetings and participation in forums for the agricultural sector distributing information about the CGS. However, the delay in implementation of the CGS was longer than expected.

The partial cancellation of Component 1 compromised the achievement of the objective. The fiscal constraints in Belize during those years reduced the ability of the MAF to redirect resources to Component 2. However, the objective “Strengthen the core public agricultural services,” was still valid with the implementation of Component 2 only. Improvements in SPS measures increase productivity and contribute to trade and exports (see Section 4.2c). Therefore, maintaining Component 2 only, contributed to the development of the country.

## **Outcome 2. The state of agricultural health in Belize is maintained and improved**

The activities in this component were designed to consolidate BAHA in four key areas (animal and plant health service; food safety and quarantine services) of critical competencies, utilizing the OIE/IICA methodology and the 2009 baseline.

The Project Management Report (PMR) includes nine indicators for outcome 2, with an average of 83.03% achieved. The only indicator below 60% was related to the food safety service (2.8), which was expected to reach 82%, but managed only 45.4% (from a baseline of 37%). This low improvement was the result of delays in the execution of the Program to complete training and technical assistance to farmers as planned, for three food risks identified.

Outputs achieved 86.4% of targets. Output related to the Laboratory Integrated Information Systems (LIMS), which was not finalized as planned, was not achieved. Delays in the construction and refurbishment of BAHA’s infrastructure resulted in delays in the preparation of the LIMS. This delay resulted in inefficient data collection and reduced reliability, especially to calculate indices for the OIE/IICA indicators. One plant health facility was not completed, which led to an achievement of 75% of this indicator. Almost a third of the staff identified during the design were not able to receive the planned training. This was the result of a high turnover in BAHA and the need to identify new consultants and staff.

Output 2.6 was not completed as only 10 out of 12 Hazard analysis and critical control points (HACCP) certifications were issued. It was difficult for BAHA to engage other companies, considering the time and resources needed to achieve certification. The small number of firms exporting agricultural products was also a factor for underperforming in this indicator. Also, output 2.8 was not completed, 4 out of 6 tests were developed by BAHA. This was the result of late

implementation of laboratories and changes in the priorities (poultry tests were prioritized after outbreaks in 2008 and 2009).

Outcomes were achieved because of [as a result of] changes in project management and full involvement of the organization's administration team. The budget assigned to BAHA for animal and plant health, food safety, and quarantine services was limited, and project funds helped to improve service delivery through capacity building and infrastructure development. Outcome and output indicators were measured at the beginning of the program and at the end. Administrative reports (i.e. progress reports; supervision reports; MAF and BAHA reports) were used to collect and systemize the information. The design documents outlined the OIE/IICA methodologies to measure improvements in performance for BAHA. The methodologies, including the questionnaires were used for the ex post analysis. However, as recommended by the mid-term evaluation, a simplified methodology was used to calculate the indexes, which resulted in differences between the baseline figures and the end results. The unit of measure of indicators 2.7 to 2.9 should have been changed in the PMR to "improvements over the baseline," to be consistent with data collected. Baseline for indicator 2.9 was calculated ex – post based on data collected at the mid–term evaluation and final evaluation.

### **Outcome 3. Access to export markets is increased**

The development objectives related to the outcome of increase market access were not achieved. While the number of exporting protocols were maintained (outcome indicator 3.1), new export protocols (0 out of 2 planned), processing plant certification (4 out of 17 planned) and export requirements to Mexico (0 out of 13 planned) were not met. Officially, only one agricultural export was reported for the period. The main reasons for these shortfalls are: (i) delays in recruiting specialized consultants; (ii) delays in coordinating activities with the Ministry of Foreign Affairs and the Ministry of Agriculture; and (iii) changes of authorities in GoB. More importantly, outputs and outcome 3 were not clearly aligned. Outcome 3 indicators are related to specific activities, some that are the responsibility of other agencies (i.e. Ministry of Foreign Affairs)

The outputs associated with this outcome are 2.13 - 2.15 in Table 2. As can be seen, they were mostly achieved through training and capacity building. However, specific outputs related to protocols were not included in the results matrix. Outputs could have been designed to reflect the process to validate protocols with trading partners (for example, Mexico). The vertical logic for outcome 3, is based on the activities implemented by BAHA, but fall under the jurisdiction of other agencies (i.e. Ministry of Foreign Affairs). Indicators for outcome 3 describe activities that were not included in the budget or products.

**Changes to the Results Matrix.** A review of the changes introduced to the Results Matrix during Program execution indicates that, these changes did not significantly alter the basic program objectives, nor modify the essence of each of the two components. As Table 1 shows, these modifications were mainly introduced to replace indicators that were not easily measured or verified, or were not sufficiently descriptive of the corresponding output or outcome. In a few cases, the baseline or end-of-program targets were adjusted to more accurately reflect values obtained by further evaluations or through knowledge acquired during program execution. Table 2 shows progress in the achievements of outcomes, based on the PMR.



Outcome 2.3 (Confiscation of exported agricultural products) was eliminated from the PMR and results matrix, although data was available for the baseline and final of project. During the design an indicator was identified, to account for improvements in confiscations. The original indicator was intended to measure percentage changes (reductions) in confiscations. However, the indicator that was introduced in the PMR was, confiscation of exported products, measured by “reports,” then the target was 2, with a baseline of 10. The PCU reported “number of confiscations” in its semi-annual reports, in line with a recommendation from the mid-term evaluation. But EOP planned (P) and adjusted planned (Pa) targets were not updated in the PMR. This means, that it is not possible to assess if there was progress, even when confiscation increased exponentially as a result of the program. At the end of the program, 3821 confiscations were reported.

**Table 2. Results Achieved Matrix - Outcomes**

Outcome/Indicator	Unit of Measure	Baseline value	Baseline year	Means of verification	Targets and Actual Achievement		% Achieved
Outcome 1: Gap in agricultural productivity between Belize and the average of other Central American countries disappeared							
1.1 Yield of priority product (to be prioritized by MAF)	TM/Ha	1,000	2010	Reports of the MAF Extension Unit	P	1500	
					P(a)	0	
					A	0	
1.2 Production costs for (product 2) – See issues section	US\$/TM	20,000.0	2010	Reports of the MAF Extension Unit	P	16000	
					P(a)	0	
					A	0	
Outcome 2: The state of Agricultural Health in Belize is maintained or improved							
2.1 Free status for: (i) Medfly; (ii) classical swine; (iii) foot and mouth disease; and (iv) avian influenza maintained	Free status	4	2009	OIE and BAHA reports; bilateral agreements	P	4	75
					P(a)	4	
					A	3	
2.2: Free status for white spot shrimp disease and yellow head in shrimp and control status for bovine spongiform encephalopathy recognized	Free status	0	2009	OIE and BAHA reports; bilateral agreements	P	3	100
					P(a)	3	
					A	3	
2.3: Appearance of new exotic pest / disease in the country	New pest / disease	0	2010	OIE and BAHA reports	P	0	100
					P(a)	0	
					A	0	
2.4: Prevalence of bovine and canine rabies <sup>1</sup>	Cases	6.0	2009	BAHA reports	P	3	100
					P(a)	3	
					A	0	
2.5: Prevalence of Newcastle disease	Districts with outbreaks	4	2008	BAHA reports	P	1	100
					P(a)	1	
					A	0	
2.6: BAHA's plant health service improved		0	2009		P	80	65
					P(a)	80	

Outcome/Indicator	Unit of Measure	Baseline value	Baseline year	Means of verification	Targets and Actual Achievement		% Achieved
	Improvement over the baseline			IICA PVS evaluation methodology	A	51.9	
2.7: BAHA's animal health service improved	Percentage	0	2009	OIE PVS evaluation methodology	P P(a) A	80 70 48.6	69
2.8: BAHA's food safety service improved	Percentage	0	2009	IICA PVS evaluation methodology	P P(a) A	100 82 37	45
2.9: BAHA's quarantine service improved	Percentage	22.5	2009	IICA PVS evaluation methodology	P P(a) A	100 74.0 69.1	93.3
<b>Outcome 3: Access to export markets is increased</b>							
3.1 Phytosanitary and Food Safety exporting protocols maintained for major plant products exports (papaya, bean, corn, lime, orange, concentrate)	Number of protocols	6	2009	Export reports	P P(a) A	6 6 6	100
3.2: Phytosanitary and Food Safety exporting protocols for non-traditional plant products exports	Number of new approved protocols	0	2009	Export reports	P P(a) A	2 2 0	0
3.3: Hazard Analysis Critical Control Point (HACCP) certified processing plants (fish, shrimp, poultry, meat, hot pepper) increased	HACCP certified plants	4	2010	BAHA reports	P P(a) A	17 17 4	0
3.4: Requirements by Mexico for the export of cattle fulfilled	Requirements	0	2010	Export reports	P P(a) A	13 13 0	0

\* The Mid-term report pointed out that the increase in "confiscations since the beginning of ASP show remarkable achievement of efficacy and improvement in the detection capacity for high risk and threats as sanitary first barriers." Actual increase in percentage is 691%. However, the information in the PMR was not updated with this information.

<sup>1</sup> Indicators that imply a reduction. The target was lower than the baseline, indicating an improvement, for example, in prevalence of a disease.

Outcomes 2.7 to 2.10 were modified to reflect changes in the calculation method and results achieved. These four indicators are based on the OIE/IICA methodology to measure performance in agencies charged with plant and animal health control. During the design, the initial measurement used the full methodology and resulted in the baseline figures. However, during the mid-term evaluation, the consultant suggested to change the methodology, considering that it was too comprehensive, hence, expensive and complicated. The simplified methodology looked at "improvements" in each variable, instead of measuring the actual value of each variable. Also, the number of variables for each index was reduced. Although this simplified the Monitoring and

Evaluation (M&E) system, it required an update to the baseline numbers and units of measurement.

**Table 3. Results Matrix - Outputs**

Outputs/Indicator	Unit of Measure	Baseline value	Baseline year	Means of verification	Targets and Actual Achievement		% Achieved
Component 1: Applied agricultural production innovation							
1.1 Operational guidelines for Competitive Grant Scheme developed (NCCARD)	R&D projects	0	2010	PMU Reports	P	0	100
					P(a)	0	
					A	1	
1.2 Central Farm (1) and NCCARD (1) strengthened and equipped for R&D	Units	0	2010	PMU Reports	P	0	100
					P(a)	2	
					A	3	
1.3 MNRA (MAF) Extension Service Officers and Farmer trained in R&D	Participants	0	2010	PMU Reports	P	0	100
					P(a)	150	
					A	250	
Component 2: Plant, animal and food safety risk management							
2.1 BAHA Staff in Plant Health trained (i) Phytosanitary Surveillance Unit (PSU); (ii) Entomologist for Pest Diagnostic Service (PDS); (iii) Pest diagnostic (PD); (iv) Pest Risk Analysis Unit (PRAU); Phytosanitary certification for export unit (PSCEU)	People	0	2010	BAHA reports	P	0	72
					P(a)	32	
					A	23	
2.2 PLANT HEALTH Facilities fully equipped: PSU; PDS; PRAU; ECS	Facilities	0	2010	BAHA reports	P	0	75
					P(a)	4	
					A	3	
2.3 ANIMAL HEALTH Services fully equipped, strengthened and operational: (i) Aquatic Animal Health Unit; (ii) Disease Surveillance System; (iii) Traceability System	Unit	0	2010	BAHA reports	P	0	100
					P(a)	3	
					A	3	
2.4 NATIONAL FOOD SAFETY Policy designed and implemented	Policy	0	2010	BAHA reports	P	0	100
					P(a)	1	
					A	1	
2.5 Quality Assurance Program (ISO 17025) implemented and certification obtained for microbiological and chemical tests	Certification	0	2010	BAHA reports	P	0	100
					P(a)	1	
					A	1	

Outputs/Indicator	Unit of Measure	Baseline value	Baseline year	Means of verification	Targets and Actual Achievement		% Achieved
2.6 FSS: HACCP system implemented at processing plants (fish, shrimp, poultry, meats, hot pepper) and maintained (fish, shrimp, plant)	Certificate	0	2010	BAHA reports	P P(a) A	0 12 10	83
2.7 FSS: Laboratory Integrated Information Systems (LIMS) operating (FS)	LIMS	0	2010	BAHA reports	P P(a) A	0 1 0	0
2.8 FSS: Residues & Microbiology Laboratories operating (with new testing capabilities for poultry, meats, dairy, vegetables, juices, listeria spp.)	Tests	0	2010	BAHA reports	P P(a) A	0 6 4	67
2.9 QUARANTINE Officers and Staff of Partner Agencies trained on importance of the quarantine services	Staff	0	2010	BAHA reports	P P(a) A	0 80 151	100
2.10 Education / Public Relations campaign on Quarantine conducted	Campaign	0	2010	BAHA reports	P P(a) A	0 3 3	100
2.11 New quarantine offices constructed and operational (including upgrade of Placencia Facility)	Offices	0	2010	BAHA reports	P P(a) A	0 4 4	100
2.12 Distance Diagnostics through Digital Imaging (DDDI) systems operating	Units	0	2010	BAHA reports	P P(a) A	0 1 1	100
2.13 Points of entry equipped with functional incinerators for proper disposal of confiscated material (Quarantine)	Units	0	2010	BAHA reports	P P(a) A	0 6 7	100
2.14 Programs of Prevention (BSE, FMD, CSF, AI), of Control (Rabies) and Eradication (Brucellosis, Tuberculosis and NC) executed	Campaign	0	2010	BAHA reports	P P(a) A	0 3 3	100
2.15 BAHA Officers trained in Animal Health, Risk Analysis and Traceability	Participants	0	2010	BAHA reports	P P(a) A	0 31 157	100

### **c. Analysis of results attribution**

The theory of change proposed by the program could be divided in two: (i) research, innovation and technology transfer; and (ii) sanitary and phytosanitary improvements. Both paths increase productivity and, eventually, incomes. At the same time, investments in research and innovation capacity and pest (animal and plant) surveillance, monitoring and control increase the capacity of public and private institutions, strengthening national systems.

Because the Program did not include an impact evaluation, it is not possible to analyze attribution in a rigorous way. However, as the literature shows, investment in public services (research, innovation and SPS) results in higher productivity and higher incomes (see Foster, et. al. 2016). Research in how research and innovation contribute to agriculture productivity is extensive. [Alston, et. al. \(2000\)](#), by using a meta-analysis of 292 studies (comprising 1,886 rates of return) of 67 countries, showed that an average rate of return of 43% for developing countries. [Terrance, et. al. \(2014\)](#), using a similar methodology (372 studies, comprising 2,242 rates of return), find an average of 9.8% rate of return, by adjusting the modified IRR (adjusting for incomplete information).

Failures of the animal health system, whether due to a failure to control the spread of endemic diseases or incursions and outbreaks of exotic diseases or emerging diseases, cause enormous economic losses due to reduced livestock productivity caused by the disease and/or the death of animals, as well as the loss of international markets. In the case of outbreaks of endemic zoonotic diseases or the appearance of emerging zoonotic diseases, the social and economic impact is much more severe due to negative effects on human health. For example, outbreaks of exotic diseases have included cases of bovine spongiform encephalopathy (BSE) in 2003, which resulted in losses of US\$1.5 billion in Canada and US\$3.5 billion in the United States (Fox et al., 2005); outbreaks of foot-and-mouth disease in 2001 in the United Kingdom, which resulted in losses of more than US\$10 billion (Bates, 2016) and US\$80 million in losses in Uruguay (FAO, 2002); outbreaks of classic swine fever in The Netherlands in 1997, causing US\$2.3 billion in losses (Terpstra and de Smit, 2000); and the highly pathogenic avian influenza epidemic in the United States, which caused US\$500 million in losses in 2013 (USDA, 2016). OVE (2015) finds evidence that disease control and eradication campaigns conducted by agricultural health institutions have successfully reduced the effects of disease and pests on production. Regarding animal health, in Peru, the implementation of a program to control mange in camelids reduced the prevalence of the illness in treated versus non-treated animals significantly (1.8% versus 16%), as well as the incidence (3.6% versus 12%) (OVE, 2009).

The PMR is not clear in how outcome 1 (gap in agricultural productivity between Belize and the average of other Central American countries “disappeared”) will be measured. Data from [FAO](#) show that productivity in Belize, measured as an aggregated for different types of crops, does not have a clear trend (see Table 4). Only in cereals (including rice), yields in Belize have improved over time. In the other groups of crops, yield gaps between Belize and Central America have increased.

**Table 4. Differences in yields between Belize and Central America (MT/Ha)\***

	2009	2010	2011	2012	2013	2014
<b>Cereals</b>	-0.1961	-0.219	0.1575	0.2608	0.4662	0.2647
<b>Citrus</b>	1.8000	1.1922	-1.3988	2.6291	-3.2847	-3.3568
<b>Pulses total</b>	0.0081	0.1172	0.144	0.2044	-0.0462	-0.0541
<b>Roots and tubers</b>	-7.7927	-8.1315	-8.0691	-5.5052	-2.8909	-5.7849
<b>Vegetables primary</b>	-8.9874	-10.6314	-11.1116	-12.0922	-12.6014	-12.6353

Source: FAOSTat 2017. Central America is Guatemala, Honduras, Nicaragua, Costa Rica, El Salvador, Belize and Mexico)

\* Values are = Yields in Belize – Yields in Central America

By applying IICA and OIE methodologies to measure performance of animal and vegetable health agencies, the program shows improvements. Vegetable health performance improved from 77% (already a high value) to 80% at the end of the program. Improvements were more important for animal health (from 31.4% to 45.4%) and food safety (from 75.45% to 78.4). The quarantine service improved from a low value of 22.5% to 69.1%.<sup>2</sup> Baseline values were measured in 2009 during program preparation. Final values were measured in 2015, using the same methodologies.

#### **d. Unanticipated outcomes**

None

### **4.3 Efficiency**

The design of the program selected a Cost / Benefit Analysis (CBA), estimating an IRR for each component (a threshold of 12% was used as discount rate). Due to the partial cancelation of Component 1, the ex post CBA has focused on Component 2: Plant, Animal and Food Safety Risk Management (investments of US\$2.4 million). The analysis includes: (i) review of results achieved at project completion associated with the results matrix; and (ii) estimation of impacts expected to be materialized over a period of 15 years after the end of the project.

For the assessment, all costs are expressed in real terms, since all benefits have also been evaluated in real terms. Costs and benefits are calculated based in US Dollars (the exchange rate to be used is the current exchange rate of BZ\$2 = US\$1). No future real exchange rates are modelled in this analysis. The prices used to calculate future revenue for the various food products are the average prices observed in the past five years as per the Central Bank of Belize or MAF.

Cost Benefit approach analyses incremental costs and benefits associated with the program. Then, cost estimation must cover the life of the project and include all costs required to produce the flow of benefits accrued during that period. After project completion, it is assumed that funding for additional net recurrent cost will be provided by the public sector to maintain BAHA's capacities.

That BAHA set-up costs to maintain benefits when ASP ends are estimated in Table 5.

<sup>2</sup> Baseline data was collected during Program preparation (2009). Final numbers were calculated in 2015, for the final evaluation of the Program. See annexes for more details.

**Table 5. GoB additional resources needed to cover ASP staff and operational costs (USD)**

2016	2017	2018	2019	2020	2025	2030
305,000	314,150	320,670	327,385	332,467	359,085	387,834

Source: Based on BAHA's budget and consultant estimations

**Economic return of the project.** The ex post economic evaluation uses the same methodology used for the ex ante economic analysis. Avoided costs of an outbreak are compared with project costs (including operating costs and maintenance). This result is modelled based on the likelihood of an outbreak, so the probability of occurrence weighs the results. In the present analysis, it is assumed that returns depend on the state of national animal health system preparedness and the existence of prevention and contingency plans. Then, health risk management is based on prevention, contingency planning and investments. Benefits are the costs a country avoids by spending and investing to bolster prevention, surveillance, and control. In the present analysis, benefits depend basically on two issues: (i) significance or size of impact; and (ii) likelihood of an outbreak.

**Table 6. Ex-ante and Ex-post analyses**

	Ex-ante	Ex-post
Internal Rate of Return	48%	18%
Period of analysis	20 years	20 years
Expected events	1 in 10	1 in 10
Method	Scenarios and Montecarlo	Montecarlo
Without project	Events ranging from 1/5 to 1/20 (average 1/10) and losses from 40% to 60%	Avian influenza outbreak of 2015, full impact (estimated)
With project	Events ranging from 1/5 to 1/20 and losses from 40% to 60%	Avian influenza outbreak of 2015, full impact (actual)

**(a) Size of impact.** This factor depends on several variables (geographical dispersion, managing practices, scale of production, production systems). For the ex post economic analysis, the 2015 outbreak of avian influenza provides the reference point for avoided costs. The other outbreak (citrus leprosis virus) was very mild and economic losses were not estimated by the MAF. Benefits are calculated as follows:

- If Belize would have decided not to invest in the aforementioned management measures it could have stand to lose US\$8.8 million as a consequence of the 2015 outbreak, which is an estimation of losses in Without Project scenario (more conservative estimation).
- As Belize did make these investments, thus the losses to the country significantly decrease to US\$3 Million (this is With Project Scenario).
- Losses avoided account US\$ 5.8 million (as a difference between US\$ 8.8 million less US\$ 3 Million).

**(b) Likelihood of an outbreak.** The second factor that introduces changes into the CBA is the likelihood of occurrence of an outbreak, which affects the final benefit amount in the complete time of life of the ASP. For the ex post economic analysis a 20-year horizon was chosen (the same of the ex ante economic analysis). The chief problem then becomes that there is no proper historical information to estimate when a new outbreak would happen. In the ex-ante, economic evaluation, the likelihood of an outbreak used was based on expert judgement. The same strategy

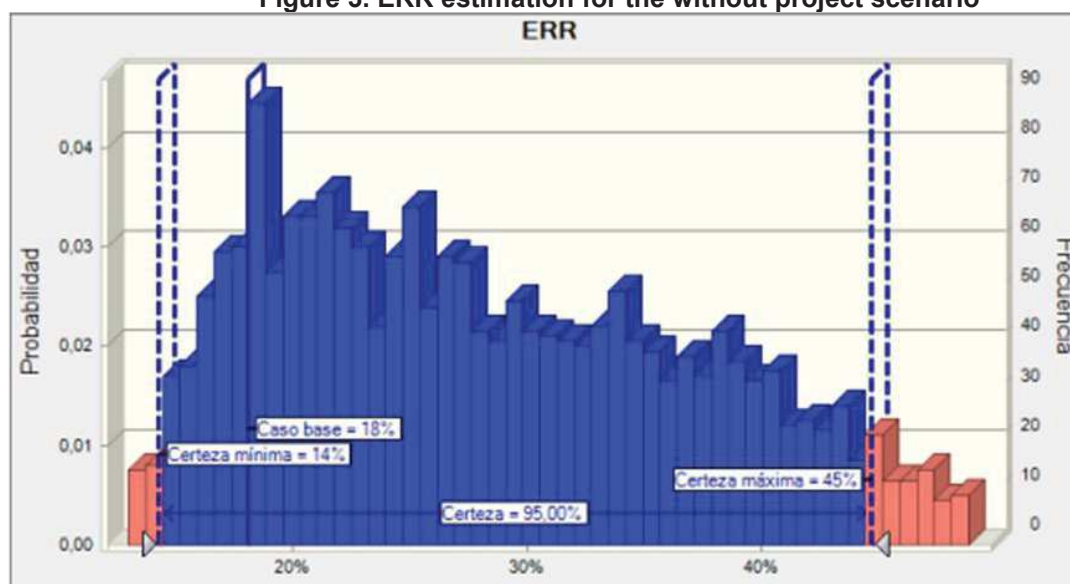


was used for the ex post economic analysis.<sup>3</sup> A 1 in 10 probability was used to estimate economic benefits, which is the same assumption made in the ex ante analysis.

Economic Rate of Return (ERR) is calculated based on a cash flow of the ASP program including the before mentioned concepts:

- ASP investment and administration costs related to Component 2. After project completion, additional net recurrent costs, which will be provided by the public sector to maintain BAH's capacities, are included in this calculation
- Benefits arise from forgone losses from: (i) the reduction between actual impact of animal health outbreaks in comparison with a without project theoretical scenario; and (ii) an estimation of future benefits for the period of analysis (20 years) keeping the frequency of an event at a level of 1 event each 10 year (equal estimation for With Project and Without Project scenarios).

**Figure 3. ERR estimation for the without project scenario**



Monte Carlo simulation forecasts the entire range of results for the project. Each bar in Figure 4 represents the probability of reaching a specific ERR. Here, the display range includes values from approximately 14% to 45%.<sup>4</sup> Monte Carlo methods are a broad class of computation algorithms that rely on repeated random sampling to obtain numerical results. Their essential idea is using randomness to solve problems that might be deterministic in principle. In our case, thousands of calculations were performed, using different outbreak likelihoods, starting with zero

<sup>3</sup> Note on ex ante Economic evaluation: According to ex-ante Economic Evaluation, benefits arise from forgone losses because of: (i) the reduction in the probability of animal or plant health outbreaks and exposure to natural disasters; and (ii) the reduction in expected losses once an outbreak or natural disaster occurs. Then, ex ante evaluation assumed that project scenario entails additional preventive costs and investments, while at the same time, saves costs in the case of an adverse event.

<sup>4</sup> Note: There is a small chance of getting a result below 18% (Base Case). That is because Base Case was calculated based on more conservative estimation of potential loss in counterfactual scenario (or without project scenario). The bigger would have been the economic impact (in the absence of ASP), the higher is the ERR.



up to 99% likelihood. This results in infinite results for the ERR, given the cost of the Program. The average results are shown in Figure 4.

ERR shows that even after suffering implementation delays, return of the public investments reached a satisfactory level of 18% (NPV: US\$ 0.7 Million).<sup>5</sup> These benefits have been the result of appropriate management of outbreaks in most recent events. After a quick delimiting survey of the immediate area, the problem was confined to a controlled region and was not widely distributed, reducing its negative economic impact on the productive chains.

Additionally, economic benefits can be estimated from maintaining export markets (lobster, shrimp, bananas, citrus juices, sugar) and open opportunities for several industries (beef, red palm) in which sanitary status is a critical issue. However, there is not sufficient data to calculate benefits related to Program interventions. These benefits were not included in the analysis.

Table 6 shows the planned, revised costs, and actual cost, for each of the project components. As can be observed, with all activities completed, except for Component 1, the loan resources were reduced by 26% due to the partial cancelation.

**Table 6. Original and final program budget (US\$)**

		2010	2011	2012	2013	2014	2015	2016	Cost
<b>Component 1: Applied Agricultural Production Innovation</b>									
1.1 Operational guidelines for Competitive Grant Scheme developed (NCCARD)	P								-
	P(a)			100,000					100,000
	A			9,250					9,250
1.2 Central Farm (1) and NCCARD (1) strengthened and equipped for R&D	P								-
	P(a)			25,000	220,000	78,000			314,384
	A			52,059	184,325	93,802	-		330,186
1.3 MNRA (MAF) Extension Service Officers and Farmer trained in R&D	P								-
	P(a)				40,000	30,000	35,000		81,135
	A			20,813	4,322	21,000	21,307		67,442
<b>Component 2: Plant, Animal and Food Safety Risk Management</b>									
2.1 BAHA Staff in Plant Health trained (i) Phytosanitary Surveillance Unit (PSU); (ii) Entomologist for Pest Diagnostic Service (PDS); (iii) Pest diagnostic (PD); (iv) Pest Risk Analysis Unit (PRAU); (iv) Phytosanitary Certification for Export Unit (PSCEU)	P								-
	P(a)			30,000	25,000	30,000			55,086
	A			16,432	8,654	24,944	-		50,030
2.2 PLANT HEALTH Facilities fully equipped: PSU; PDS; PRAU; ECS	P								-
	P(a)			100,000	155,000	290,250			468,029
	A			88,020	89,759	355,468	304,757		838,004.24
2.3 ANIMAL HEALTH Services fully equipped, strengthened and operational: (i) Aquatic	P								-

<sup>5</sup> Details in Annex D - Final Economic Evaluation, October 2015.

		2010	2011	2012	2013	2014	2015	2016	Cost
Animal Health Unit; (ii) Disease Surveillance System; (iii) Traceability System for Bovine	P(a)			57,000	220,000	397,465			593,638
	A			82,990	113,183	425,248	151,728		773,149.32
2.4 NATIONAL FOOD SAFETY Policy designed and implemented	P								-
	P(a)				75,000				75,000
	A				54,320		-		54,320
2.5 Quality Insurance program (ISO 17025) implemented and certification obtained for microbiological and chemical tests	P								-
	P(a)			100,000	100,000	56,000			89,169
	A			33,169	-	100,068	-		133,237
2.6 FSS: HACCP system implemented at processing plants (fish, shrimp, poultry, meats, hot pepper) and maintained (fish, shrimp, plant)	P								-
	P(a)				70,000	10,000			50,250
	A				40,250	111,508	-		151,758
2.7 FSS: Laboratory Integrated Information Systems (LIMS) operating (FS)	P								-
	P(a)						250,000		250,000
	A						-		-
2.8 FSS: Residues & Microbiology Laboratories operating (with new testing capabilities for poultry, meats, dairy, vegetables, juices, listeria spp.)	P								-
	P(a)				48,000	6,000			31,832
	A				25,832	25,321	-		51,153
2.9 QUARANTINE Officers and Staff of Partner Agencies trained on importance of the quarantine services	P								-
	P(a)			15,000	25,000	20,000			67,197
	A			25,245	21,952	35,488	-		82,685
2.10 Education / Public Relations campaign on Quarantine conducted	P								-
	P(a)				35,000	40,000			92,209
	A			30,128	22,081	23,041	-		75,250
2.11 New quarantine offices constructed and operational (including upgrade of Placencia Facility)	P								-
	P(a)				130,000	100,000	700,000		1,345,442
	A				83,353	562,089	451,892		1,097,334.44
2.12 Distance Diagnostics through Digital Imaging (DDDI) systems operating	P								-
	P(a)				23,500	-			4,803
	A				4,803	-	-		4,803
2.13 Points of entry equipped with functional incinerators for proper disposal of confiscated material (Quarantine)	P								-
	P(a)				140,000	20,000			90,840
	A			25,450	45,390	49,121	-		119,961
2.14 Programs of Prevention (BSE, FMD, CSF, AI), of Control (Rabies) and Eradication (Brucellosis, Tuberculosis and NC) executed	P								-
	P(a)				5,000	10,000			20,504
	A			5,252	5,252	15,252	-		25,756
	P								-
	P(a)				16,000	30,000			79,150

		2010	2011	2012	2013	2014	2015	2016	Cost
2.15 BAHA Officers trained in Animal Health, Risk Analysis and Traceability	A			20,760	28,390	56,965	-		106,115
<b>3 Administration - Evaluation - Audit – Others</b>									
Administration - Evaluation - Audit	P	2,739	105,000	150,000	105,000	145,000			527,739
	P(a)	5,000	105,000	150,000	250,000	286,000	55,500		174,251
	A	22,739	19,600	21,262	18,049	37,101	65,500		184,251
Capitalization of interests	P		100,000	100,000	100,000	100,000			400,000
	P(a)	100,000	100,000	100,000	100,000	-			-
	A			-		-	-		-
<b>Total Costs</b>	P	31,160	2,388,829	1,174,500	911,500	680,671			5,186,661
	P(a)	1,369,00	2,388,829	687,000	1,677,500	1,403,715	1,040,500		4,245,315
	A	1,161	56,493	430,830	749,915	1,936,416	95,185		4,200,000

#### 4.4 Sustainability

The design document identified two risks: (i) availability of resources to maintain activities (both at the NCCARD and BAHA); and (ii) availability of viable projects for the competitive grants scheme. However, only the first risk is relevant for the sustainability analysis. Additionally, the delay in the implementation of Component 1 materialized as a risk during Program implementation.

In the case of resources for BAHA, the ASP program has improved the performance and will continue improving BAHA's delivery of services. Its infrastructure has evolved and technicians have developed new skills. In addition, the program has been able to hire specialized staff to complement the work.

The ASP together with the authorities of BAHA and the MAF developed an SP for the period 2015-2020, which increases the likelihood of sustainability of the ASP. The preparation of this plan was open, and included BAHA staff, technical directors, and members of the Board of Directors. This plan will increase the capacity of BAHA to become more effective in their mission, and will also allow BAHA to position itself strategically to increase financial and institutional sustainability. These actions will result in achieving a sustainability plan for its development in the medium and long term.

The fulfilment of sanitary services demands additional financial resources, which are not assured today. BAHA's current budget is just enough to finance baseline operations. The SP identifies additional resources by increasing revenue from services (laboratory). However, and as indicated in the Strategic Plan, BAHA should increase its resources by combining a higher direct government contribution with increased incomes from services given to the private sector. The planning process included a detailed analysis of the current financial situation of BAHA, involving the lack of revenue, identification of new sources of funding and financial projections based on two scenarios: (i) no increase in service tariffs; and (ii) increased utility rates of 15 % spread over

three years from 2016-2017. During the preparation of the SP, the Bank provided support to BAHA and the MAF, both in the preparation of Term of Reference and the identification of potential consultants.

In the period 2013-2014, fee income accounted for 65% of BAHA's operating costs, and, therefore, the remaining 35% operating costs must finance with external funds. (GoB annual subsidy for staff contributed 26.3% of total costs, donor funding 7.49% and GoB non-recurrent funding 3.9 %). The funds planned for the coming years should result in the need for a smaller contribution from donors. At the same time, it is important to keep salaries competitive to retain staff to increase institutional sustainability. Revenues were also affected because, despite inflation, the services fees have not increased in over 10 years.

Proforma budgets were prepared implementing the strategic plans using scenarios for the source of funds and potential new sources of funding were also identified. The results were used to develop a strategy for medium to long-term financial sustainability. BAHA's operations which are necessary to fulfill its extensive mandate covering animal health, plant health, food safety and quarantine cannot be financed from service fees alone (an income gap of around under 35% is usually funded by the GoB and donors).

Delays in the implementation of Component 2, can result in a risk for the sustainability of the results. Coordination between agencies can result in delays, not only for Program implementation, but also, for the provision of services. BAHA will need to coordinate closely with the Ministry of Foreign Affairs and other agencies of the MAF to secure market access and validation of protocols and activities implemented by BAHA.

As always, changes in authorities can result in a risk for sustainability. In the case of BAHA, its status as a quasi-public agency, with a strong support from the private sector. Also, the institutional framework designed with support from the Bank, reduces the likelihood of changes resulting from political cycles.

Belize is prone to hurricanes and tropical storms. Between 2008 and 2016, six major events have been recorded. The Bank, and other agencies, have been supporting the Government in the planning to reduce this risk. A comprehensive plan for the agriculture sector was approved in 2014, that includes support for insurance for small farmers (yet to be implemented). For BAHA, the risks are related to outbreaks that result from diseases, especially for animals (flooding; vectors; and reduction in the capacity of animals to fight diseases).

#### **IV. NON-CORE CRITERIA**

##### **4.1 Strategic alignment**

The Program is aligned with the CRF (contribution) through the improvement of public animal health services (under outcome 2), through indicator "providing adequate infrastructure and reliable and affordable public services".

Activities of both components increased the likelihood of higher productivity through better training and quality human resources and better infrastructure. Also, research networks were strengthened through exchanges and consultancies. Moreover, BAHA's strengthening facilitated the consolidation and expansion of trade agreements and increased collaboration with trade partners in the region (i.e., Mexico and Guatemala).

#### **4.2 Monitoring and Evaluation**

**M&E Design.** Program monitoring was based on the Results Framework originally prepared, periodic evaluations of the PMR, and reviews of the Annual Operation Plans (AOP). The ASP team submitted semi-annual progress reports, a mid-term evaluation and a final evaluation, as required by the contract. Additionally, a final economic evaluation was contracted to measure some of the indicators of the Results Matrix. However, no impact evaluation was included in the design and no impact evaluation was implemented.

**M&E Implementation.** Nevertheless, the ASP did not have an efficient M&E system during the first two years of the Program. BAHA used information from different uncompleted sources such as their internal systems which led to difficulties for the establishment of Program baseline. Regarding the Program baseline, assumptions were not always clearly documented so its definition wasn't easy to achieve.

To ensure the maintenance of services and sustainability of ASP activities, an M&E system was developed by BAHA with the support of the Bank by hiring a consulting firm specialized in monitoring and evaluation systems. This tool will assure a high standard information management for health activities, representing an important support for opening and maintenance of international markets.

**M&E Utilization.** The M&E was used at the end of the project and helped BAHA to maintain records of activities and products. As the final evaluation points out, the M&E was only a tool to collect data but was not used for management of continuous adjustment of plans and activities. BAHA complemented their monitoring system (for quarantine and surveillance) with the system developed during Program implementation.

#### **4.3 Use of Country Systems**

The country systems for budget and accounting were utilized. During the program implementation period, Belize has been building its public financial management around SmartStream (SS). SmartStream is the Enterprise Level Application used by the GoB for its finance, accounting, personnel and payroll processes. SmartStream provides a range of solutions for all back-office operations. Providing the right information to the right person at the right time, SS can empower rapid results to maximize efficiency. Its unique enterprise design encapsulates individual tasks associated with a business process into configurable workflows that enable GoB to efficiently automate its processes.

Therefore, the Program design and execution allowed the country to use a parallel accounting system (QuickBooks), while developing modules and functionalities in SS using the live conditions of the program. Hence, in due course it is expected that the accounting function on programs will be carried out solely in SS.

Issues during Program implementation. Training and use of SS by BAHA and the MAF was slow at the beginning, but it was standardized and fully implemented by the end of the Program.

In the area of procurement, the use of country systems has not yet been approved for Belize since the GoB has been working to implement the necessary procurement reform as outlined in the Modified Assessment of Procurement Systems (MAPS) 2014 Report and Addendum. Therefore, for the life of the ASP program, all procurement was conducted in accordance with the Bank's Policies.

No country systems were used for environmental and social monitoring or for planning purposes.

#### **4.4 Environmental and Social Safeguards**

An ESS for the Program was prepared during the design. The ESS rated the Program as a Category B in accordance with the IDB Environment and Safeguards Compliance Policy. The principal risks identified during Program preparation were: (i) use of agrochemicals during for crop production (Component 1 and Component 2); (ii) local impacts of infrastructure (Component 2); and (iii) likelihood of natural disasters and resilience. Of these risks, only natural disasters materialized, hampering efforts to start-up the competitive grants scheme of Component 1.

Mitigation measures. Although the CGS was not implemented, several prevention measures were included in the call for proposals, including (i) restrictions in the kind and number of agrochemicals to be financed; (ii) training in the use and disposal of agrochemicals, including fertilizers; and (iii) promotion of agricultural practices that do not use agrochemicals. Training of innovation and extension personnel, included agrochemicals management and use of alternative technologies. BAHA also included mitigation measures aimed to: (i) collect and recycle containers and residues of medicines and vaccination tools; (ii) training of technical staff in handling of chemicals and risk management; and (iii) pest and disease outbreak control.

During the implementation, no additional environmental and social risks were identified. The classification of the Program as "B" was adequate.

Design and construction of infrastructure for BAHA followed Belize's environmental regulation and included management plans for the construction and implementation periods. All work has the necessary environmental permits.

## **V. FINDINGS AND RECOMMENDATIONS**

Based on the considerations, this report concludes that the program constituted a suitable response to the urgent needs of the agricultural sector in Belize. The precarious conditions of the research and innovation institutions in Belize and the need to strengthen BAHA to promote trade

and exports were the main drivers of the design and the implementation. The needs of the beneficiaries, as well as the priorities of the country, were appropriately considered in defining the scope of the program in relation to the financial resources available. In addition, a review of the factors that contribute to program sustainability revealed that no significant or insurmountable risks exist that could undermine long-term benefits, or that identifiable risks could not be properly mitigated.

The principal finding of the PCR is related to the CGS. The design included a CGS to promote research and innovation, with a strong participation of the private sector. During the design phase, consultations were held with potential partners, including international research agencies. However, the limited capacity of the MAF delayed the implementation of this part of the Program, leading to a partial cancelation in 2013. The decision to cancel this part of the Program was the result of considering the time required to complete research and innovation programs, considering the other activities still pending. Although the competitive grant scheme strategy has been used in other countries with a high success rate (see [OVE 2015](#); [Gurria, Boyce and De Salvo, 2016](#)), the context of Belize seems to require a different approach. Future projects in Belize should include in the design at least two options to implement innovation projects, in this way, it is easier for the implementing unit to modify or redirect resources based on actual performance. One of these options could be a scheme similar to the CGS, but implementation of research projects by the national authority should also be included.

The success of BAHA has been used to facilitate the design and implementation of similar projects in the region (i.e. Sustainable Agricultural Development Program - 3798/BL-GY). However, the IICA and OIE methodologies to measure institutional and technical strength seem to need an update to accommodate behavioral changes at the farm level and improvements in agricultural and livestock management practices. The evolution of SPS and food safety agencies into a promoter of best practices and their direct relation with extension services, require a more overall experience with project management

The ASP together with the authorities of BAHA and the Ministry of Agriculture developed a SP for the period 2015-2020, which ensures the sustainability of the ASP. The methodology incorporated a Balanced Scorecard approach with a focus on the development of strategic objectives linked to four aspects; (i) Customer/Stakeholder; (ii) Financial and Regulatory; (iii) internal Processes; and (iv) Learning and Growth. This Strategic Plan as part of the ASP is the result of a public/private interaction and agreements.

Despite these efforts to ensure sustainability, continuation of activities started by the ASP demands additional financial resources, which is not assured today. BAHA's current budget is just sufficient to finance baseline operations. The SP considers additional resources by increasing revenue from services (laboratory). However, and as indicated in the SP, BAHA should increase its resources by combining a higher direct government contribution with increased incomes from services given to the private sector.



**Table 7. Findings and recommendations**

<b>Findings</b>	<b>Recommendations</b>
<b>Technical – sectorial dimension</b>	
1. Diagnostic and design were adequate to the needs of the agricultural sector in Belize, but the approach to promote research and innovation proved to be too complex. The competitive grant scheme did not materialize. Implementation of each research project required at least three years, which meant that projects needed to be designed and approved during the first two years of implementation.	2. Extend the period of Program design to prepare research and innovation projects, with partners, which will reduce the risk of implementation.
3. Although the objective of the loan was to strengthen the core of agricultural public services, there is no clear relation with changes in behavior or expected improvements at the farm level.	4. 2. Include results in the design that are related to the service to be provided, but reflect improvements or changes in behavior at the farm level. This facilitates the evaluation.
5. Objectives were clear, but ambitious considering available resources.	6. A shorter – term, tailored objectives could be more effective for monitoring. In this way, results can be easier to catalogue.
<b>Organizational and managerial dimension</b>	
1. The first two years of the Program the Executing Unit (EU) needed constant support from the Bank and lacked the necessary skills to implement a large investment program.	2. Additional resources, either locally or through the Bank, might be needed when consultants cannot be identified in the country.
3. Limited availability of professional staff in Belize reduces the likelihood of success. Small programs like BL-L1009 have limited resources for management, which result in compromises between the quality of consultants and budget management.	4. A centralized implementation unit, either at the line Ministry or at the Ministry of Finance or an independent agency might result in a better scheme to implement loans and large projects in Belize.
<b>Public processes and actors</b>	
5. Because guidelines for the competitive grant scheme took a long time to be designed and approved, interest and trust from private research and innovation institutions diminished over time. Lack of engagement at the beginning of the Program also reduced the capacity of these agencies to work with the MAF in the preparation of the competitive scheme.	6. During the design of the program, allocate resources to prepare research and innovation projects with a selected number of research and innovation institutions.
<b>Fiduciary dimensions</b>	
7. The design was not clear whether each agency would have a fiduciary/procurement unit or if they would share a single procurement service. By lack of resources, only one procurement unit was created, under MAF structure, but it created unnecessary coordination costs and was not effective.	8. In general, in “multisector” operations, with components under the responsibility of different institutions, a total autonomy of each institution should be recommended (having several independent projects in one).
9. With several co-executing agencies involved, each managing the revolving fund sub – account, adds another level of complexity to the fiduciary dimension. The project management unit therefore needs to depend on the co-executors to supply the necessary	10. For programs with several co-executing agencies, designate one project management unit with clear administrative and financial responsibilities for both components provided approval mechanisms



Findings	Recommendations
financial information to be entered in their parallel financial system using Quickbooks and/or SS which can create delays and reduce the accuracy of information entered in the system.	from the respective co-executors are built into the financial control structure of the program.
<b>Risk management</b>	
1. Early decisions were made when activities related to the competitive grants scheme did not materialize. These decisions resulted in a partial cancelation of funds. Although this risk was identified during Program design, no additional funds (i.e. technical cooperation) were available to kick – start the scheme, in parallel with MAF efforts to prepare guidelines and approve them.	2. Although funds were cancelled, there was a decision not to transfer these funds to Component 2. This streamlined the implementation, but compromised the expected results.