PROGRESA Caribe

Mid-Term Evaluation Report

Report prepared by the Nicaraguan Foundation for Economic and Social Development (FUNIDES)[1] at the request of Catholic Relief Services (CRS)

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Contact:	Jorge Brenes, Chief of Party Tel: (505)2278 3808 E-mail: Jorge.brenes@crs.org

[1] This document has been prepared by the Services Unit of FUNIDES (hereinafter evaluation team). The work team has been led by Camilo Pacheco, under the supervision of Juan Sebastián Chamorro. The research team is completed by Magaly Sáenz, Beverly Ruiz and Desireé Ferrey. Álvaro López and Lylliam Huelva, both Funides' economists, provided helpful comments for modeling of the impact and management of the database. Stephanie Huete provided assistance in the research. The preparation of the report has the support of CRS´s MEAL team and the Knowledge Management Division.

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Acronyms and Abbreviations

ADDAC	Asociación para la Diversificación y el Desarrollo Agrícola Comunal
ASIHERCA	Asociación de Iniciativas de Hermanamiento de El Castillo
ATET	Average Treatment Effect on the Treated
BCIE	Banco centroamericano de Integración Económica
BPP	Buenas Prácticas Pecuarias
CIAT	Centro Internacional Agricultura Tropical
COMPROMUB	Cooperativa multisectorial de productores orgánicos de Muelle de los Bueyes
COODEPROSA	Cooperativa Multisectorial de Desarrollo Productivo del San Juan
COOMUNSOL	Cooperativa Multisectorial Nuevo Sol de Yaoya R.L
COOPROCAFUC	Cooperativa de Productores de Cacao Familias Unidas de El Castillo
COOSEMUCRIM	Cooperativa de Servicios Múltiples de Cacao en la Reserva de Indio Maíz
COOSEMUP	Cooperativa de Servicios Múltiples "Unión de Paiwas"
COOSEMUVIS	Cooperativa de Servicios Múltiples de Villa Siquia, R.L
CRS	Catholic Relief Services
EMNV	Encuesta de Hogares sobre Medición del Nivel de Vida
FIDA	Fondo internacional para el Desarrollo Agricola
FUNIDES	Fundación Nicaragüense para el Desarrollo Económico y Social
HDDS	Household Dietary Diversity Score
IFAD	International Fund for Agricultural Development
IPM	Integrated Pest Management
LWR	Lutheran World Relief
MAHFP	Months of Adequate Household Food Provisioning
MEAL	Monitoring, Evaluation, Accountability and Learning
MEFCCA	Ministerio de Economía Familiar, Comunitaria, Cooperativa y Asociativa
NGO	Non-governmental organization
OCSA	Obras de Conservación de Suelo y Agua
PPI	Progress out of Poverty Index
PROGRESA	Program for Rural Enterprise Management, Health and the Environment
RAE	Rural Associative Enterprises
TNS	TechnoServe
UCA Ahmed Campos	Union de Cooperativas Ahmed Campos
USDA	United States Department of Agriculture

FUNDACIÓN NICARAGÜENSE PARA EL DESARROLLO ECONÓMICO Y SOCIAL

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Executive Summary

The Program for Rural Enterprise, Health and Environment – Caribbean Zone (PROGRESA Caribe) is a five-year (2014–2019) value chain strengthening project for the cacao and livestock (dual purpose) sectors in the Caribbean Coast Region of Nicaragua: RACCN, RACCS and Río San Juan. The Food for Progress Program, financed by the United States Department of Agriculture, has a total budget of US$9,511,675 and is under implementation by Catholic Relief Services (CRS) in consortium with TechnoServe (TNS) and Lutheran World Relief (LWR). The first stage of PROGRESA Caribe has been implemented for 18 months (October 2015-April 2017).

The program benefits more than 4,000 smallholder producers from 13 municipalities. The program also works on the strengthening of 17 producer organizations and associations, and in the promotion of 11 commercial relationships under inclusive business models. The project activities are aimed at fulfilling two strategic objectives: 1) increase agricultural and livestock productivity and 2) expand trade of cacao and cattle products. The long-term outcome of the program is to increase the income of the producer families and reduce poverty in the intervention areas.

PROGRESA Caribe considers the economic, political and cultural context of the Caribbean Coast and Río San Juan, which are areas with a high incidence of poverty and historically, they have received fewer resources for socio-productive projects. The program also fits within the Government of Nicaragua's economic and agricultural development policies and programs.

PROGRESA Caribe mid-term evaluation followed a mixed approach, i.e., both quantitative and qualitative methods were incorporated. To measure the impact of the project on families' welfare and farmers' performance, the evaluation team designed an experimental strategy called randomized order of phase-in. The intervention is implemented in two cohorts, making it possible to randomize beneficiaries for early and late treatment. More than 50% of the beneficiary producers were assisted from the beginning of the project (early treatment) and another part began to be assisted as of month 19 of activity implementation (late treatment). This strategy also allowed to randomize the length of time of participation in the program.

On the other hand, a participatory approach was implemented (ADA and Link tools) to measure the impact on producers' organizations (cooperatives) and private companies and the satisfaction of services provided by the program.

Key findings

During its first stage, the program met the needs of the project beneficiaries. The results of the beneficiary satisfaction survey of the early treatment group reveals a positive assessment in all the types of interventions. Also, according to farmers' perception, the main factors that appear as key to facilitation of a better adoption in all types of interventions are training and provision of information.

Farmers' productivity for dairy/beef products increased for the early treatment group compared to the baseline, both in milk and in the weight of live cattle. Nevertheless, there is no effect yet in yields due to the intervention at the mid-term. This result is expected as productive yields do not change so rapidly in just 18 months of intervention.

There is a reduction due to the intervention in livestock and cacao production costs and an increase in gross income for cacao. Also, in the cattle value chain there is an increase due to the intervention in the gross margin of the early treatment group.

The proportion of farmers applying different types of practices evaluated in cacao and/or cattle has increased for most of the cases or at least remained or are relatively constant. In addition, there are substantial increases in the percentage of producers of early treatment compared to the late treatment, in both cacao and cattle, that have savings or investment budgets, who manage debt, record sales, keep track of livestock inventory, and keep records on costs and production. This important progress is due to the effort made by the program in its initiative to strengthen farm management.

Moreover, for early treatment households' poverty was reduced by 3 percentage points at the mid-term. The incidence of poverty was reduced in those households of the early treatment with greater economic vulnerability. However, at the mid-term no statistically significant changes in poverty are found due to the intervention. This result is expected since changes in welfare mostly take place in the long term.

The overall score on the performance of producer's organizations increased compared to the baseline. It is likely that 9 cooperatives could reach the goal in performance at the end of the project. For the remaining cooperatives, whose baseline results were extremely low, it is also expected an increase in their performance at the end of the project.

These results suggest that PROGRESA Caribe is on track to meet most of the development objectives at the end of the intervention.

1. Introduction

The Program for Rural Enterprise, Health and Environment – Caribbean Zone (hereinafter PROGRESA Caribe) is a five-year (2014–2019) value chain strengthening project for the cacao and livestock sectors in the Caribbean Coast Region of Nicaragua: RACCN, RACCS and Río San Juan. The Food for Progress Program, financed by the United States Department of Agriculture, has a total budget of US$9,511,675 and is under implementation by Catholic Relief Services (CRS) in consortium with TechnoServe (TNS) and Lutheran World Relief (LWR). The first stage of PROGRESA Caribe has been implemented for 18 months (October 2015-April 2017).

The program builds upon previous experiences of the consortium partners in the Northern Region and the Caribbean Coast of Nicaragua. It also continues working with producers that participated in previous programs. The idea is to build a critical mass of technical knowledge and commercial capacity that will transform the cacao and livestock value chains in Nicaragua and allow producers to capture greater shares of income and profit as their value chains become better articulated and their participation more proactive and organized.

The project has as target population of more than 4,000 small cacao and/or livestock producers. The activities are focused on existing producers, instead of promoting new plantations. The beneficiaries of the project are from 13 municipalities. The project activities are aimed at fulfilling two strategic objectives: 1) increase agricultural and livestock productivity and 2) expand trade of cacao and cattle products.

The consortium partners have collected quantitative and qualitative data at producer and organizational level for the baseline and mid-term rounds, to evaluate the evolution of intermediate and outcome indicators and to estimate the impact of the intervention in the first stage. The aim is to recommend strategic actions to improve project performance during the second stage.

This report presents the results of the mid-term evaluation of PROGRESA in the Caribbean Coast of Nicaragua. The document is comprised of eight sections. The second section describes the background of the intervention. The third section presents the objectives of the evaluation. The fourth section addresses the quantitative and qualitative evaluation design. Section five addresses the sampling strategy and the data collected. The sixth section presents the validation of the evaluation design. Section seven focuses on the impact of the program on the beneficiaries and key stakeholders. Lastly, section eight discusses the lessons for learning and recommendations.

2. Description of the Intervention

PROGRESA Caribe works to strengthen the value chain of cacao and (dual purpose) livestock in the Caribbean Region of Nicaragua. The program benefits more than 4,000 smallholder producers from 13 municipalities: Waslala, Siuna, Bonanza and Rosita in RACCN; El Ayote, La Cruz de Río Grande, Muelle de los Bueyes, Bocana de Paiwas, El Rama, Bluefields, and Nueva Guinea in RACCS; and San Carlos and El Castillo in Río San Juan.

Furthermore, the program is working to strengthen 17 producer organizations and associations, and in the promotion of 11 commercial relationships under inclusive business models. The duration of the activities with the beneficiaries is approximately of three and a half years.

2.1. Strategic Objectives

The project activities are aimed at fulfilling two strategic objectives:
1) Increase agricultural and livestock productivity.
2) Expand trade of cacao and cattle products.

Improvement in productivity will be addressed by providing inputs and facilitating genetic material, credit to the productive activity, technical assistance and training. This will enable improved production techniques and enhance the administration capacity of the farms. The expansion of cacao trade, dairy products and meat will be sought through training in business management to producers and cooperatives; facilitating construction and improvement of the post-harvest processing infrastructure; increasing access to markets, the activities will promote the participation in national tasting contests and the establishment of public-private and private-private alliances, as well as the leveraging of resources from the private sector and investments from the public sector.

2.2. Program Activities

The consortium partners implement a cohesive set of activities that aim to mitigate value chain weaknesses in four key areas of the cacao and livestock value chains: production, post-harvest handling, processing and marketing.

Activities to increase agricultural productivity in the target value chains are focused on training to improve agricultural production techniques and farm management, as well as fomenting farm-level financial and non-financial services that producers need to implement the best practices.

Activities to expand trade are focused on increasing market access for smallholder producers through improving post-harvest handing and processing, training on certifications and standards, and facilitating private and/or public partnerships for buying and selling, co-investment in infrastructure, and the exchange of market information. Complementary foundational activities include increasing the capacity of cooperatives and trade associations to serve their smallholder members.

The consortium partners explained to the evaluation team that there are ten types of interventions being implemented to varying degrees. These interventions are: 1) technical assistance, 2) trainings, 3) field schools, 4) workshops, 5) informative talks, 6) provision of goods and services, 7) dissemination through ICT, 8) participation in fairs, 9) field days and 10) exchange tours. Each consortium partner works with a different combination of interventions. This implies that some interventions are not implemented by all consortium partners.

TNS works mainly through monthly trainings and does not provide technical assistance in the way that LWR and CRS does. TNS does not conduct exchange tours and does not provide inputs to farmers, except for on the demonstrations plots. TNS supports the provision of goods and services indirectly through facilitation of microcredits by microfinance institutions or producer organizations (cooperatives).

LWR does not provide goods and services and does not implement informative talks and fairs. CRS implements nine types of interventions. CRS and LWR do not implement training in the way TNS does; instead, CRS and LWR apply the methodology of field schools. The intervention approach is diverse due to the territorial extension of the program (13 municipalities).

Figure 1: Types of interventions being implemented in Progresa Caribe

Activity	CRS	LWR	TNS
Technical assistance	X	X	
Training			X
Field schools	X	X	
Workshops	X	X	X
Informative talks	X		X
Goods and services	X		
Dissemination	X	X	X
Fairs	X		X
Field days	X	X	X
Exchange tours	X	X	

Source: Consortium partners.

On the other hand, the evaluation team has reviewed the document of the agreement and the results of the mid-term evaluation for the first 18 months of the program and according to our observation the consortium is operating in line with the scope of the objectives of the program: 1) increase agricultural productivity: increase productivity of the cacao and dual-purpose livestock value chains, and 2) Expand trade of agricultural products: expand trade of cacao, dairy products, and beef. The modifications proposed by the consortia are related to sub-activities, allowing the consortium partners to focus on their combined strengths in addressing the actual needs of the producers and their organizations and respond to the realities on the ground. The modifications are detailed in annex.

Box 1. Monetization

During the first stage of PROGRESA Caribe, the leader of the consortium (CRS) has continued monetizing CDSO. Since the country is not self-sufficient in oil for human consumption, CRS identified in 2013 this commodity as a viable one to be monetized in Nicaragua. At that time, three companies, with relatively small capacity each, were identified as possible buyers. These companies have together imported this product for decades from Pasternak Baum; a U.S. company based in New York that has been willing to buy the product from CRS and to sell to the traditional buyers in the country, assuming the cost of insurance for shipping. Using a commercialization channel already established in Nicaragua, allows the companies involved (seller & buyers) to program a CRS sale in their normal calendar and at the same time maintaining a steady supply of the commodity for the country. For these reasons, PROGRESA Caribe has continued using CDSO to ensure enough funds for the execution of the project.

During the last sale (early April 2017) a small impasse occurred due to an inappropriate handling of the product during the loading process at the US Port. As a consequence, 51 metric tons of CDSO (1.46% of the total amount) had to be destroyed in Nicaragua for having been deposited in a tank of the vessel that did not pass certificate of cleanliness during the loading process. That represented a total loss of US$ 40,000. CRS expects to recover this loss during the final sale. As a lesson learned, CRS is planning to include additional clauses into their sales and freight contracts in order to protect themselves against this type of issues.

Despite this impasse, CRS considers that CDSO continues to be a very good option for monetization in Nicaragua. The evaluation team does not have any objection that this continue to be the first option for the next and final sale.

2.3. Eligibility Rules, Targeting and Selection of Beneficiaries by Chain

The program targets RACCN, RACCS and Río San Juan because they are areas with a high incidence of poverty (50.5% in 2014)[2] and historically, they have received fewer resources for socio-productive projects. In addition, they are areas of interest for the assistance

[2] INIDE (2015).

provided by USDA in Nicaragua, where the members of the consortium and the implementing partners have extensive experience.

The selection of beneficiaries was based on the following criteria: a) cacao growers, dual purpose cattle ranchers, and producers that work in both chains, whose production is fundamental to their livelihood strategy; b) producers that have between 5 and 100 cattle in production (and less than 20 hectares allocated to livestock production) and/or with less than 5 hectares for agriculture; c) families that are willing to actively participate in the program; and d) identification of women farmers who work in these chains in order to achieve 20% participation by women in the program. According to the program beneficiary selection rules, beneficiaries can be supported in one or two chains, as long as they fulfill the selection criteria.

The program also decided to continue strengthening producers who have participated in prior interventions by the consortium members in the area and who meet the selection criteria. The remaining producers were identified by the members of the consortium and by the implementing partners. In practice, the selection of the communities was based on the geographic location of the producers that meet the eligibility criteria and who accepted being part of the program.

The consortium partners selected a total of 4,247 producers to participate in PROGRESA Caribe. At the end of the baseline, a total of 4,134 producers were registered. According to CRS administrative data through April 2017[3], there are a total of 4,401 active producers in the program. The distribution of beneficiaries by chain, department and consortium partner is the following:

Table 1. PROGRESA Caribe. Distribution of beneficiaries

Partner	Early treatment				Late treatment				New beneficiaries				Members of cooperatives				Total			
	Both	Cacao	Cattle	Total	Both	Cacao	Cattle	Total	Both	Cacao	Cattle	Total	Both	Cacao	Cattle	Total	Both	Cacao	Cattle	Total
CRS	321	295	140	**756**	194	179	42	**415**	29	84	28	**141**	-	-	-	**-**	544	558	210	**1312**
LWR	-	795	-	**795**	-	428	-	**428**	-	-	-	**-**	-	78	-	**78**	-	1301	-	**1301**
TNS	190	254	757	**1,201**	128	25	300	**453**	21	16	97	**134**	-	-	-	**-**	339	295	1154	**1788**
Total	**511**	**1344**	**897**	**2,752**	**322**	**632**	**342**	**1,296**	**50**	**100**	**125**	**275**	**-**	**78**	**-**	**78**	**883**	**2154**	**1364**	**4401**

Source: CRS data

At the end of the baseline, the consortium partners expressed interest in including more beneficiaries in the program. In this context, the evaluation team recommended that the new beneficiaries should come exclusively from the early treatment communities in order to avoid contamination in late treatment. A total of 275 new beneficiaries were added during the first phase of the program. A quick review of the database of new beneficiaries suggests that this recommendation was followed.

[3] This information is prior to the mid-term evaluation.

31.0% of the beneficiary producers are supported in the dual-purpose cattle chain, 48.9% in the cacao chain, and 20.1% in both chains. TNS is more focused on cattle producers while LWR works only with cacao producers. CRS has a balance of beneficiaries working in cattle, cacao and both chains. Geographically, most of the selected cacao producers are concentrated in Waslala and El Castillo, while most of the livestock farmers are in RACCS (mainly in Nueva Guinea and Bocana de Paiwas).

3. Objectives of the Evaluation

3.1. Development of the Hypothesis and Theory of Change[4]

The construction of the PROGRESA Caribe theory of change has been based on the results framework, the detailed budgetary lines in the program implementation plan, and the indicators established in the association agreement with the USDA.

The theory of change has been designed in a results chain scheme, where the causal logic is defined from the beginning of the program to its conclusion, taking the following elements into consideration: activities (the how), products (the why), the results (the if), the final results (the then)[5]. Figures 2 and 3 present the results chain for the two strategic objectives: 1) improve agricultural and livestock productivity and 2) expand commerce of agricultural and livestock products.

Based on the results chain, the impact evaluation seeks to confirm the following hypothesis:

- If the program activities as a whole improve agricultural and livestock productivity and if the trade of cacao, dairy products and meat expands, this will increase the income of the farmer families and will contribute to poverty reduction in the areas of intervention.

In this sense, the hypothesis to be confirmed should identify – to the extent possible – the specific effect of the intervention as a whole relative to what the result would be in terms of family income and poverty levels if the beneficiaries were not attended by the program.

[4] The CRS team has prepared an extensive version of the PROGRESA Caribe theory of change, which addresses the results chain for each strategic result, product, input and foundational result.
[5] The sequence of the results chain may also begin with the inputs; in other words, the results that the project makes available (budget, personnel, etc.). PROGRESA Caribe´s theory of change takes this element into account.

Figure 2: Results Chain – Strategic Objective 1

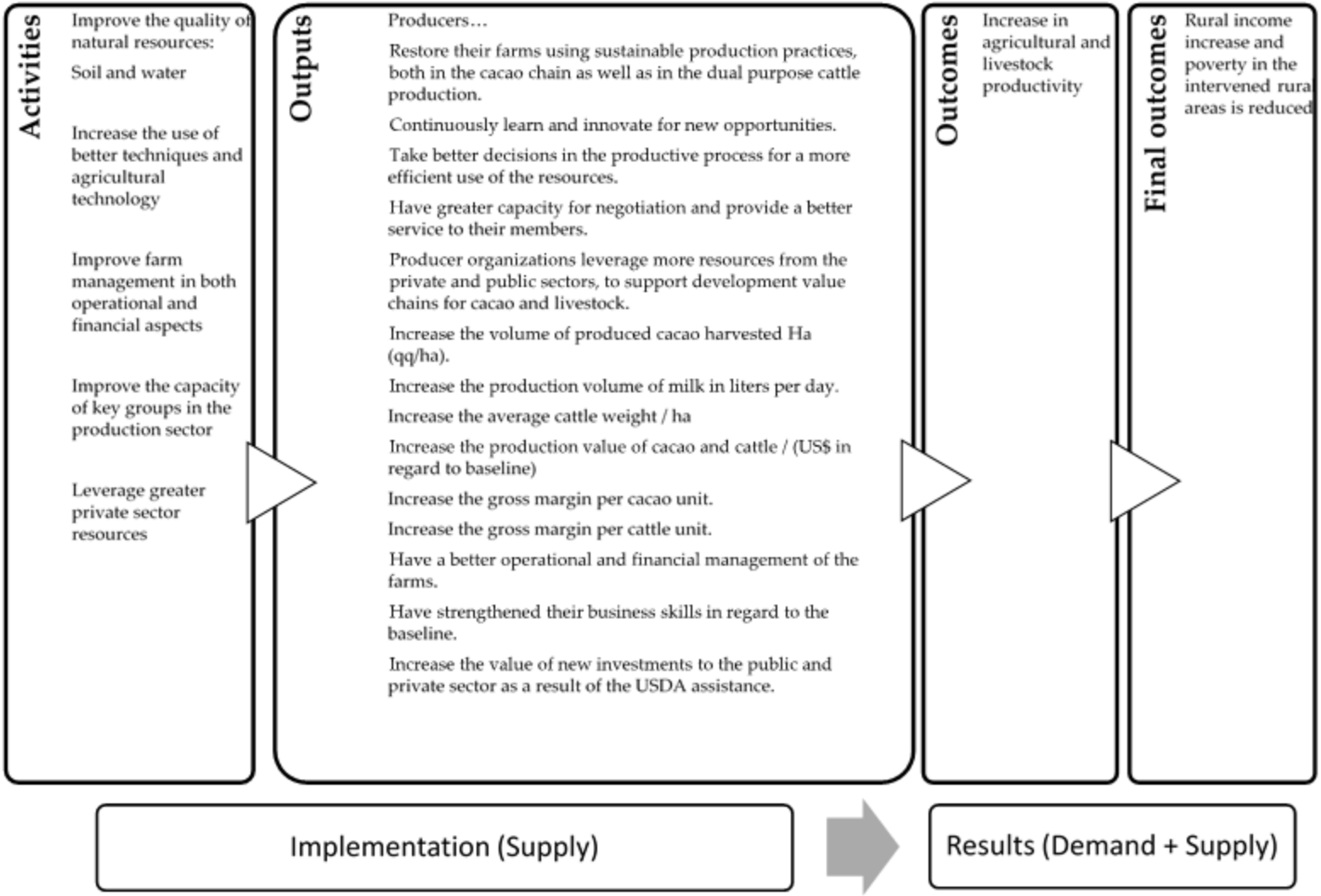
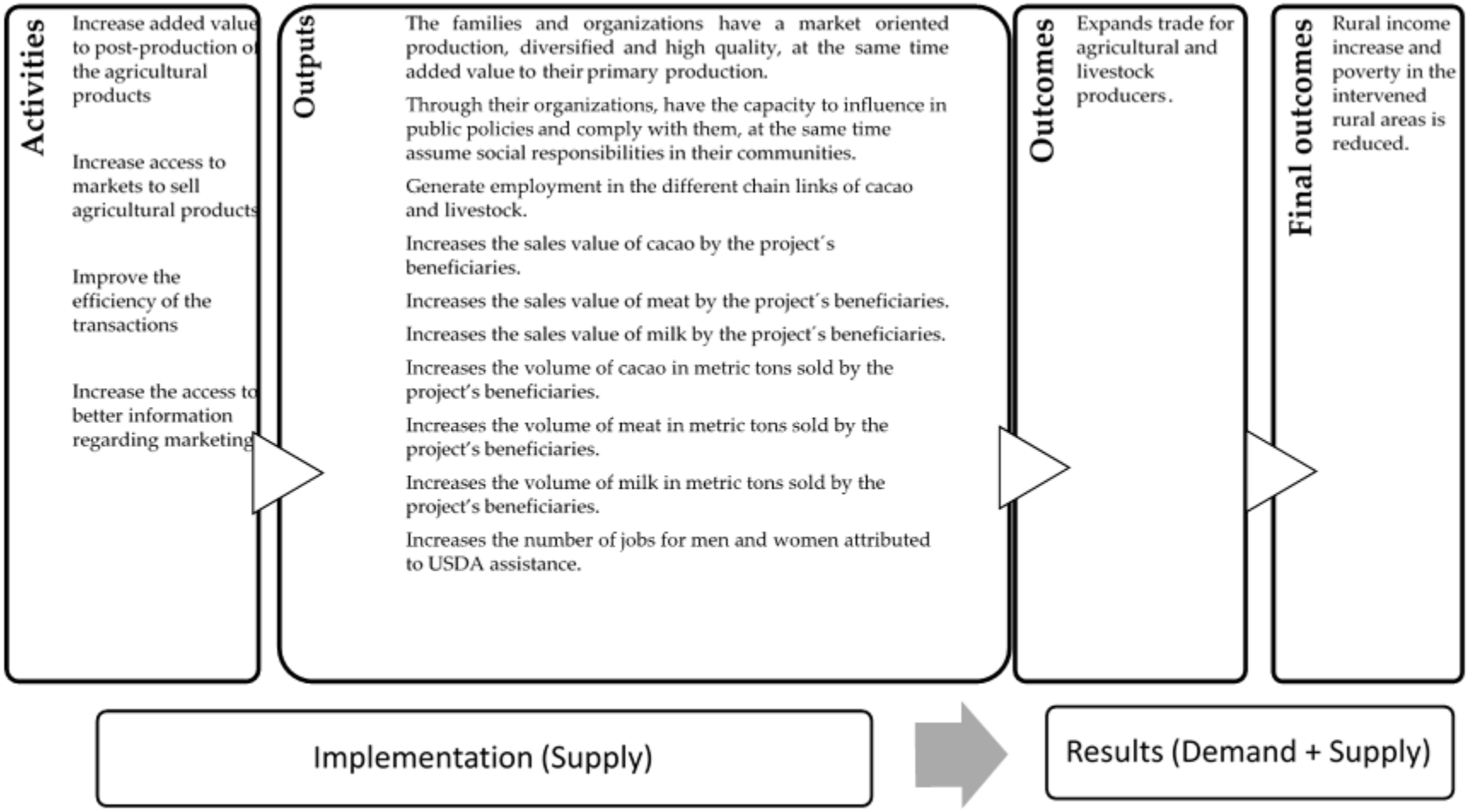


Figure 3: Results Chain – Strategic Objective 2



3.2. Evaluation Questions

The impact evaluation provides responses to key questions about the relevance, effectiveness, efficiency, impact and sustainability of the program, as well as specific questions about learning in the value chains that are important to USDA, the local partners, the donor community and other key stakeholders. For the mid-term evaluation, the questions to be answered are listed below:

Key evaluation questions

Relevance:

- To what extent did the project meet the needs of the project beneficiaries and take into account the economic, cultural and political context?
- To what extent did the project fit within the Government of Nicaragua's economic and agricultural development policies and programs?

Effectiveness:

- To what extent has the project achieved its stated objectives?
- Did the project increase farmers' productivity in cacao and dairy/beef products?
- Did the project enhance the quality and safety of the food produced by participating farmers?
- Did the project increase participating farmers' sale of products?
- Did the project ensure food security of participating farmers' family?
- Did the project increase participating farmers' family income?
- Did the project reduce the incidence of poverty in the intervention areas?

Efficiency:

- To what degree have the project resources caused the results achieved and whether the same results could have been achieved with fewer resources or alternative approaches?
- Were the project strategies efficient in terms of financial and human resources, as compared to the outputs? What alternatives are there?
- Monetization: Evaluation of the efficiency and effectiveness of the monetization process, capturing lessons learned.
- Was the monitoring system designed efficiently to meet the needs and requirements of the project?
- Coordination: The effectiveness and efficiency of coordination with project partners and other programs and activities carried out by other area stakeholders.

Impact:

Evaluation of the intentional or unintentional medium-term effects of the project and, to the extent possible, evaluation of the degree to which the effects are attributable to the project and not to other factors.

Sustainability of outcomes and impacts:

- To what extent are the project's activities foreseen as sustainable?
- Will project activities continue in the absence of support from both USDA and consortium partners? If so, how? If not, why not?
- Will the effects of the project on producers, producer organizations, partner organization sustain overtime after the project ends?
- To what extent are the outcomes and impacts of the program resilient to risk over time?

Key value chain learning questions

- What is the return on investment (technology, infrastructure, etc.) that the participating families (and their organizations) achieved as a result of their participation in the value chains?
- What is the relationship between infrastructure investment and changes in sales and income at both the household and cooperative level?

- How do the different enterprise models established for value chain development, affect impacts at the producer and cooperative levels?
  - In what measure do the enterprise models generate incentives for private sector businesses to invest in productive infrastructure and provision of services (technical and financial) for smallholder producers?
  - What is the household-level impact of affiliation with cooperatives that are connected with value chains?

- What is the relationship between compliance with Good Livestock Practices (BPP, acronym in Spanish) norms (cattle) and organic or other certifications (cacao), changes in productivity, and income?
  - What are the most effective incentives to promote compliance with sanitary and phytosanitary norms?
  - What are the key success factors for leveraging sanitary and phytosanitary practices into access to higher value markets?
  - Do certified producers have higher net income than non-certified producers?

3.3. Major Intermediate and Results Indicators

The indicators to be evaluated include those (intermediate) results that are achieved when the population served benefits from the program products as well as from the final outcomes of the intervention, which correspond to the strategic objectives. In addition, the implementation indicators agreed upon with the USDA will be evaluated. These have been monitored since the program's baseline study. This ensures evaluation through the chain and better identification of the causes for the program results at mid-term. Figures 4 and 5 present the matrix of intermediate and results indicators to be evaluated, respectively.

Figure 4: Matrix of Intermediate Indicators

	Indicator	Description	Calculation Formula	Measuring Frequency	Means of Verification
Intermediate Indicators	Liters of milk per cow per day	This indicator measures the productive efficiency of cattle herd	$\left(\frac{Total\ milk\ production}{No.of\ cows\ in production}\right)/365$	Baseline survey, mid-term survey, final survey	Module: Livestock production
	Yields in the cacao production	The total cacao production volume in (Metric Tons) by producers divided by the total number of production hectares	$\frac{MT\ of\ cacao\ production}{Total\ production\ in\ hectares}$	Baseline survey, mid-term survey, final survey	Module: Agriculture
	Average cattle weight per hectare	This indicator will measure the total kilos of live animals that the producer has in the herd inventory, and are supported by USDA	$\frac{\sum Cattle\ total\ weight}{Hectares\ of\ livestock}$	Baseline survey, mid-term survey, final survey	Module: Livestock production
	Cocoa Production Costs	Total production cost per hectare measured in dollars for the cacao category. All sales related with cacao (dry and baba) production are included, as well as genetic material	$\frac{Total\ Sales\ Value\ (USD)}{Total\ hectares}$	Baseline survey, mid-term survey, final survey	Module: Agriculture
	Production Cattle Costs	Total cost of milk sales, derived from milk and cattle, by hectare of pasture and measured in dollars	$\frac{Milk\ and\ Milk\ Products\ Sale\ +\ Cattle\ Sale}{Total\ hectares\ of\ pasture}$	Baseline survey, mid-term survey, final survey	Module: Livestock production
	Gross Margin per Hectare (cocoa)	Increase in income attributable to investments made in improving production techniques and technology implementation	$\left(\frac{Gross\ income - production\ costs}{Gross\ income}\right)*100$	Baseline survey, mid-term survey, final survey	Module: Agriculture
	Gross Margin per hectare (livestock)	Increase in income attributable to investments made in improving production techniques and technology implementation	$\left(\frac{Gross\ income - production\ costs}{Gross\ income}\right)*100$	Baseline survey, mid-term survey, final survey	Modules: 1) Livestock Production and 2) Cattle Sales
	Number of hectares managed under sustainable agricultural practices	Number of hectares of cocoa and livestock managed under sustainable practices, such as using eco-friendly fertilizers and pesticides, erosion control, agroforestry, etc.	$\sum hectares\ of\ cocoa\ and\ pasture\ with\ sustainable\ practices$	Baseline survey, mid-term survey, final survey	Modules: 1) Livestock Production and 2) Cattle Sales

Figure 5: Matrix of Outcome Indicators

	Indicator	Description	Calculation Formula	Measuring Frequency	Means of Verification
Outcome indicators	Progress out of Poverty Index	The PPI is a simple index rating of poverty that estimates the probability that a home has costs less than a certain poverty line. The index uses ten simple indicators for collection on-site.	$\left(\frac{Households\ with\ expenditure\ below\ to\ the\ poverty\ line}{Total\ households}\right)*100$	Baseline survey, mid-term survey, final survey	Modules: Poverty Index PPI
	Family Income	Family income received by the sale of production and other income from some family member(s)	$Incomes\ for\ sales\ +\ other\ incomes$	Baseline survey, mid-term survey, final survey	Modules: 1) Agriculture 2) Sale of Livestock and 3) Food Security (socio-demographic characteristics
	Household dietary diversity scores	It collects information about the families´ food safety. Focuses on the composition of the regular family diet, if they suffer some kind of food shortage and in which months this scarcity predominates.	$\frac{HDDS\ sum}{Total\ households}$ ** HDDS: Total number of food groups consumed by families	Baseline survey, mid-term survey, final survey	Modules: Food Security
	Months of adequate supply of food in the household (MAHFP)	Capture changes in the home ability to approach the vulnerability so as to guarantee the procurement above a minimum level throughout the year. Measuring the MAHFP has the advantage of obtaining the combined effects of a series of interventions and strategies, for a better agricultural production, storage and activities that increase the families' purchasing power.	$12 - \sum number\ of\ months\ that\ the\ household\ could\ not\ meet\ their\ food\ needs$	Baseline survey, mid-term survey, final survey	Modules: Food Security
	Return of the producer's investment and processing of cooperatives activities	It measures the reduction in production costs and the increase of income as a result of the quality achieved through the efficiency of processing activities. Evaluates the performance of the investment made by the producer or cooperative in operation (efficiency of spending to maximize sales)	$\left(\frac{Total\ income - Total\ expenditure}{Initial\ Investment}\right)*100$	Annual	Administrative Records
	Number of individuals receiving financial services as a result of USDA´s assistance	Number of producers who have access to financial services, as a result of USDA´s support. Financial services include those that help identify and access funds through formal and alternative channels.	$\sum number\ of\ individuals\ that\ receive\ financial\ services$	Bi-annual	Administrative Records

4. Evaluation Design

PROGRESA Caribe mid-term evaluation followed a mixed approach; in other words, both quantitative and qualitative methods were incorporated. This approach made it possible to a) triangulate the results of the evaluation, which strengthens the validity and credibility of the results; b) utilize information from one method to develop the instrument for another; c) have complementarity in the results; d) have diversity in the value dimensions of the evaluation; and e) generate new knowledge about the evaluation results.

Furthermore, the evaluation followed an Evaluative Thinking approach, which implied close interaction with the Monitoring, Evaluation, Accountability and Learning (MEAL) team from each consortium partner and the CRS Knowledge Management Division. In this regard, the evaluation team conducted several sessions to exchange information about the program, and based on the quantitative and qualitative databases that were generated over the course of the evaluation, they developed a process for critical (and respectful) reflection and discussion from the process of cleaning the data to the identification of results. This made it possible to more deeply understand the assumptions of the program set forth in the theory of change and in the mechanisms for the implementation of activities, to respond to the evaluation questions, and to recommend future actions.

This section is divided in two parts. The first part discusses the experimental methodology to measure the impact of the project on families' welfare and producer´s performance (quantitative approach). The second part addresses the participatory approach to evaluation (qualitative approach) that will measure the impact on producers' organizations (cooperatives) and private companies and the satisfaction of services provided by the program.

4.1. Experimental design[6]

Selection bias

The selection of the beneficiaries of PROGRESA Caribe generated two types of selection bias, due to: a) *administrative rule* (based on observable characteristics) and b) *self-selection.* The first was related to the fact that 14% of the targeted beneficiaries came from previous interventions of the consortium partners. These producers may differ in characteristics compared to those working for the first time with the consortium partners, as they would

[6] This section is a summary of PROGRESA Caribe´s baseline report, section *4.1. Experimental Design*.

have better results due to the capacities built in previous interventions similar to the current one. However, there is no reason to believe that both groups have differences in their motivations to participate in the program. In addition, another slight bias was identified due to observable characteristics, given that 16% of the beneficiaries selected were women, who were encouraged to participate in the program.

Another source of bias came from the selection – under the consortium´s partner criteria – of participants that were apparently willing to actively participate in the program (program placement bias). Finally, a potential self-selection bias might appear if some families with motivation to receive a benefit approached more actively local partners in order to get selected into the program.

Identification of impact

The selection of beneficiaries of PROGRESA Caribe did not follow an experimental design. However, as the activities were not going to start with all producers immediately, the evaluation team proposed an intervention strategy that made possible to randomly identify a temporary control group and also to randomize the duration of time in the program. This strategy is called randomized order of phase-in.

The evaluation team and the consortium partners agreed the intervention had to be implemented in two cohorts, making it possible to randomize the beneficiaries in early and late treatment. For the late treatment cohort, services initiated from the 19th month of the execution of activities (May 2017).

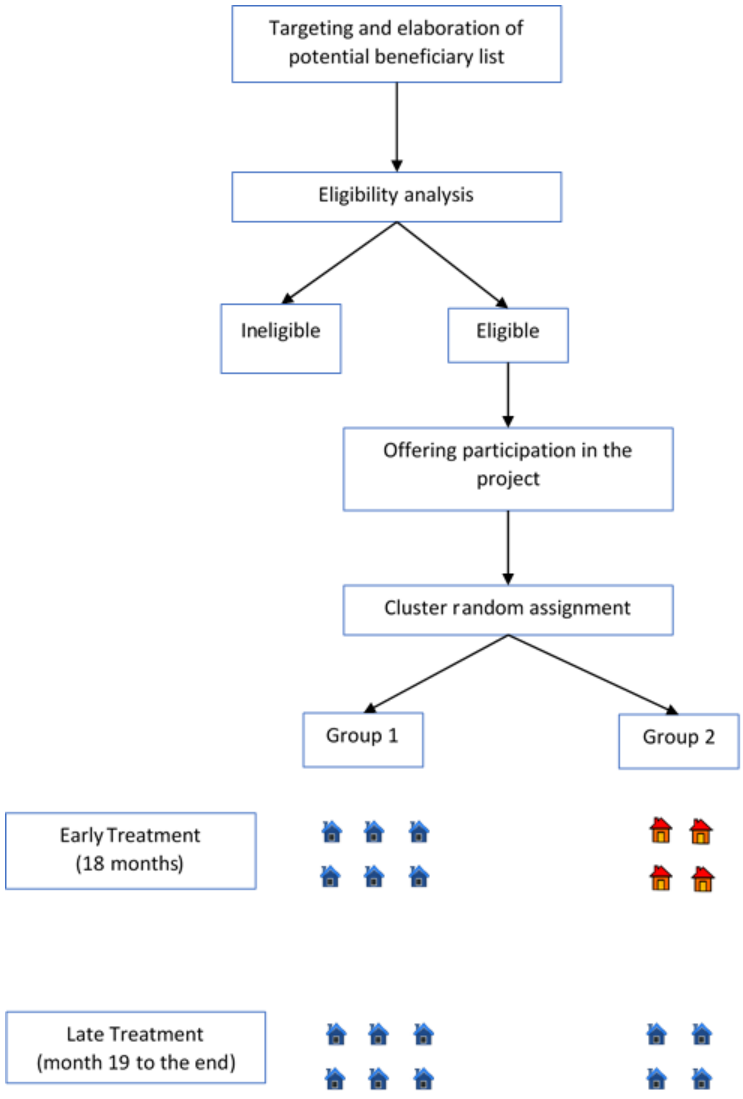
In order to diminish the contamination risk in the program, it was decided to randomize the treatment allocation at the level of 65 groups (clusters) of adjacent communities (cluster randomization). Also, it was decided a (cluster) random selection of 65% for early treatment and 35% for late treatment, which generated an early and late assignment of 42 and 23 clusters, respectively. At beneficiary level, this implied 2,676 beneficiaries for early treatment (63%) and 1,571 for late treatment (37%).

Since all clusters had a similar opportunity to be early treatment, we had a treatment group (early treatment) and a temporary conventional control group (late treatment) with similar characteristics. For the mid-term evaluation, the first cohort becomes the treatment group and the second one corresponds to their comparison group.

A successful experiment requires a clear identification strategy. In this regard, the evaluation team has explained the experimental design and its challenges to the consortium partners, implementing partners and their technicians, so that they inform all beneficiaries and producer organizations about the treatment allocation process.

The diagram below presents the treatment selection process.

Figure 6. Treatment selection process



The cluster random assignment generated the following beneficiaries' distribution by treatment status, partner, value chain, region, sex and repeating producers:

Value Chain	Early treatment																Late treatment														Total
	CRS				LWR								TNS				CRS				LWR								TNS				
	RACNS				RACNS				Río San Juan				RACS				RACNS				RACNS				Río San Juan				RACS				
	New		Repeaters		New		Repeaters		New		Repeaters		New		Repeaters		New		Repeaters		New		Repeaters		New		Repeaters		New		Repeaters		
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	
Both chains	25	194	15	87									28	139		12	21	127	3	43									84	476		4	1258
Cacao	32	171	11	81	38	242			75	296	17	127	65	175	3	5	17	94	7	61	36	161			43	124	21	43		10			1955
Livestock	9	99	5	27									108	571	3	16	4	35		3									13	140		1	1034
Total	**66**	**464**	**31**	**195**	**38**	**242**	**0**	**0**	**75**	**296**	**17**	**127**	**201**	**885**	**6**	**33**	**42**	**256**	**10**	**107**	**36**	**161**	**0**	**0**	**43**	**124**	**21**	**43**	**97**	**626**	**0**	**5**	**4247**

Source: Evalution team calculation based on PROGRESA Caribe adminsitrative records

Table 2. Distribution of beneficiaries by treatment assignment

Econometric methodology

Difference-in-differences estimator

For the mid-term evaluation, we aim at estimating the Average Treatment Effect on the Treated (ATET). Under a standard evaluation of a binary treatment the ATET would be:

$$ATET = E[\Delta_i | D_i = 1] = E[Y_{1i} - Y_{0i} | D_i = 1] = E[Y_{1i} | D_i = 1] - E[Y_{0i} | D_i = 1]$$

The key is to identify the counterfactual$E[Y_{0i} | D_i = 1]$, i.e., the potential outcome as untreated, for the treated ones.

Given that randomization solves the selection problem because it ensures that the treatment assignment be statistically independent of potential outcomes, then:

$$ATET = E[Y_{1i} | D_i = 1] - E[Y_{0i} | D_i = 1]$$

$$ATET = E[Y_{1i} | D_i = 1] - E[Y_{0i} | D_i = 0]$$

Randomization causes that the potential outcome as untreated for those who were actually not treated ($E[Y_{0i} | D_i = 0]$) is a valid counterfactual.

Alternatively, the difference-in-means estimator could be specified through the following regression:

$$Y_i = \beta_0 + \beta_1 D_i + \varepsilon_i$$

Where i corresponds to the unit of analysis (the producer). Randomization ensures that D_i is independently distributed from the unobservable characteristics (ε_i), so it accomplishes

with the zero-conditional mean assumption ($E[\varepsilon_i|\, D_i = 0]$). β_1 measures the causal effect (or average treatment effect):

$$ATET = \beta_1 = E[Y_i|\, D_i = 1] - E[Y_i|\, D_i = 0]$$

Given that the data has been collected for two periods (baseline and follow-up), we can exploit the panel data structure by computing the ATET in the mid-term evaluation using the difference-in-differences methodology. This method consists of the double difference calculation:

$$\hat{\Delta} = \left(\bar{Y}_{\ treatment,\ after} - \bar{Y}_{\ treatment,before}\right) - \left(\bar{Y}_{comparison,\ after} - \bar{Y}_{comparison,\ before}\right)$$

The first difference corresponds to the difference in the after-and-before outcomes for the treatment group (early treatment), which controls for time-invariant characteristics. The second difference relates to the difference in the after-and-before outcomes for the comparison group (late treatment). Subtracting the first difference from the second, it has isolated the effect of time-varying factors, under the assumption that both treatment and comparison groups were exposed to the same environmental conditions (parallel trend assumption); this assumption is plausible in the context of PROGRESA Caribe, given the targeting in the Caribbean Coast and Rio San Juan, which are locations where the producers tend to face the same environmental conditions.

This method provides a more precise estimate of the impact and allows the treatment and comparison group to differ in characteristics, provided that the parallel assumption trend is accomplished and that the unobservable characteristics of the beneficiaries are time-invariant. This is a very important feature, as later we will see that the balance in observable characteristics between early and late treatment was affected by attrition (nonresponse) of the evaluation sample. The evaluation team found a bias in the evaluation sample, as the attrition is correlated with treatment status. More detailed on this issue will be discussed in the following sections.

In the potential outcome framework, the difference-in-differences parameter can be expressed as follows:

$$\delta_{ATET} = E\left[Y_{i,2} - Y_{i,1} \mid T_i = 1\right] - E\left[Y_{i,2} - Y_{i,1} \mid T_i = 0\right]$$

Where $Y_{i,2}$ is the outcome of producer i at the mid-term survey and $Y_{i,1}$ is the potential outcome of the producer i at the baseline survey. The potential outcome depends on whether the producer was assigned to be treated early ($T_i = 1$), i.e. in the first 18 months of the program implementation, or while he was assigned to be treated late ($T_i = 0$), that is, from the 19th month.

The double difference can also be specified in the following regression,

$$Y_{ict} = \beta_0 + \beta_1 t + \beta_2 T_{ct} + \delta\,(t \times T_{ct}) + \mu_{ic} + \varepsilon_{ict}$$

Where Y_{ict} represents the outcome of producer i in cluster c at time t. δ corresponds to the impact coefficient, i.e. the mid-term program impact would be given by the interaction between the variable that captures the time of data collection (t) and the binary variable that captures the early or late treatment assignment (T_{ct}). μ_{ic} corresponds to time-invariant observable and unobservable characteristics of producer families, for example education and producer skills, sex, soil quality, etc. ε_{ict} is a time-varying idiosyncratic error. The parameters β and δ are unknown.

For the proposed experimental design, the difference-in-differences technique will allow the isolation of the self-selection bias (previously discussed), as it can be assumed that the motivation to participate in the program is a time-invariant unobservable characteristic.

In order to ensure robust results and reduce the residual variance of the estimate, additional regressors will be included to test the validity of the random sample[7]. Therefore, the above equation can be rewritten as follows:

$$Y_{ict} = \beta_0 + \beta_1 t + \beta_2 T_{ct} + \delta\,(t \times T_{ct}) + \gamma' X'_{ict} + \mu_{ic} + \varepsilon_{ict}$$

Where X' corresponds to a vector of time-varying observable producer characteristics that may affect the potential outcome.

Matching estimators combined with difference-in-differences

As mentioned previously, the evaluation team found a bias in the evaluation sample, as the attrition is correlated with treatment status. In this case, the combination of two techniques may be used to isolate the bias: matching estimators (which mitigates the bias by observable characteristics) with difference-in-differences (which isolates the self-selection bias)[8].

The idea behind matching estimators is to statistically identify (based on observable characteristics) two "identical" individuals in the data, with the exception that one is treated and the other individual is untreated, so that any difference in the result between the two may be attributed to the program.

[7] If the program effect changes significantly by including additional regressions, then it is probable that the randomization has failed in some way.

[8] The insight behind the application of this method has been explained in the previous section.

Matching requires the assumption that the selection in the program is only based on observable characteristics, which also affect the expected results (conditional independence assumption). If this assumption is fulfilled, conditional on a set of covariates, the allocation of treatment is random. Therefore, it is assumed that two individuals with the same characteristics, one treated and the other not, have the same counterfactual (Caliendo and Kopeing, 2008). The key in this method lies on the careful identification of the "clone" for the treated individual.

Nonetheless, is difficult to identify for each treated individual an untreated one (curse of dimensionality); therefore, the propensity score technique should be applied. This method is one of the most popular in the impact evaluation literature when the experimental design is affected by attrition. It estimates the probability of participation in the program for the sample of treated and controlled individuals, using observable characteristics as covariates, which jointly affect the probability of participation and the potential outcome. Using the estimated probabilities for each individual, the sample is restricted to a region of common support; in other words, to individuals in both groups (treatment and control) that have similar probability of being treated. For this task, different matching algorithms (e.g. nearest neighbor, caliper and radius) are used. Once the matching is successful, we can compute the impact of the program, i.e. the difference in the mean outcome between the treated (early treatment) and control group (late treatment) for the region of common support.

4.2. Participatory Evaluation of Impact[9]

Participatory methods were applied to evaluate the impact on producer organizations and private enterprises, to identify lessons learned and to evaluate the degree of satisfaction with the services provided by the program. Two types of participatory evaluations were used: 1) participatory methods to assign scores (based on opinions and/or perceptions) and 2) survey of perceptions and satisfaction of the beneficiaries.

4.2.1. Evaluation of Producer Organizations: Facilitated Self-Assessment Tool for Management of the Rural Associative Enterprises (RAE)

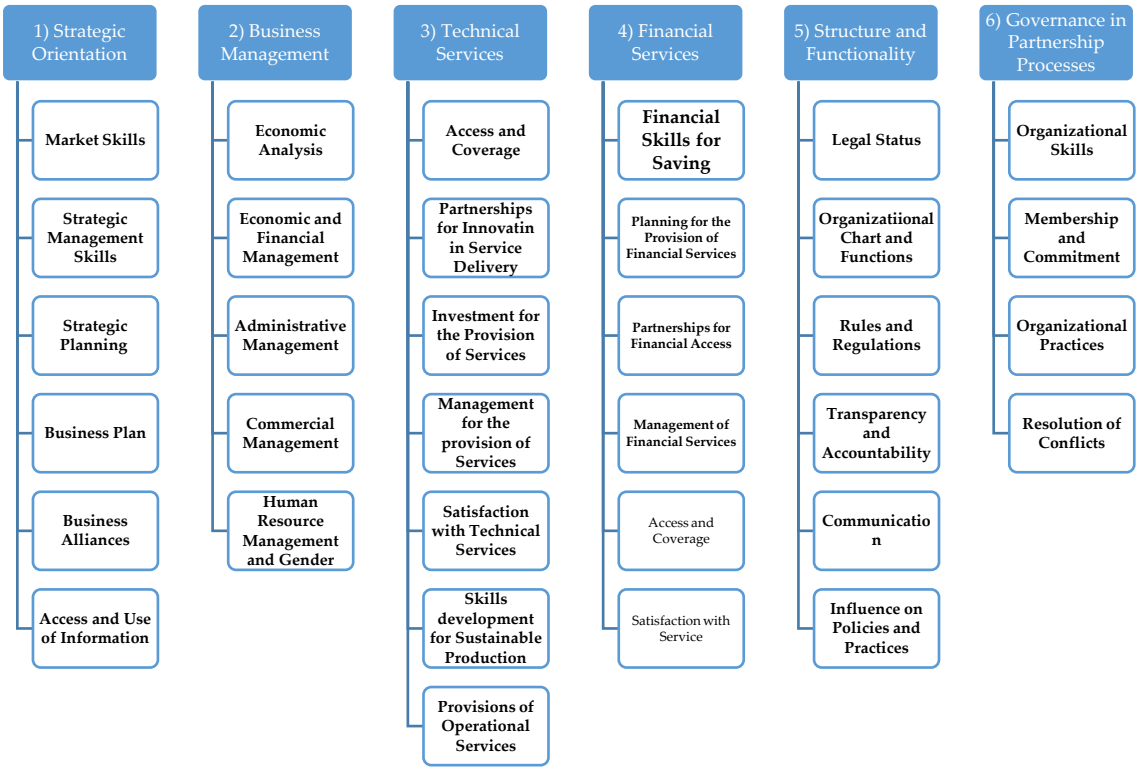
The mid-term performance evaluation of the producer organizations was based on the application of the tool for "facilitated self-assessment of the management of rural associative enterprises (RAE)". This tool enables the producer organizations to conduct a quick analysis of their business management and organizational process. Gottret, Junkin and Ugarte (2011) state that this methodology aims at a participatory self-assessment

[9] The section on results discusses the methodological aspects of each of these tools in greater detail.

process by the leadership bodies, members, and the management, administrative and technical teams of the cooperatives.

The instrument includes different criteria that are summarized in indicators. Each criterion is assigned a score, from one to five, where five is the optimal status for the organization. The self-assessment scores were entered into an Excel file to estimate the average values for each thematic area and for the overall score.

Figure 7: Qualitative Indicators for the Facilitated Self-Assessment Tool



4.2.2. Evaluation of Stakeholders in the Value Chain: Link Tool

The stakeholders in the value chain are linked by commercial relationships in which each act as a buyer and seller for its neighboring links. The Link methodology is used to evaluate the degree of connection (inclusion) in the chain. This methodology is mainly aimed at those stakeholders that play the role of facilitators for the processes between sellers and buyers, the role played by the consortium and implementing partners.

The Link methodology includes the use of four tools: 1) the value chain map, which helps identify the key stakeholders, processes and services within a value chain and how each interacts with the rest; 2) the business model canvas, which enables the organizations and/or enterprises to rapidly sketch their current situation as an entity and to identify

areas for improvement and/or intervention; 3) business model principles for inclusive businesses, to determine whether each business that links rural producers with buyers is truly inclusive; and 4) the prototype cycle, which unites the three previous tools to undertake concrete strategies to expand what is already effective or to apply new innovations to promote the participation of smallholder farmers in the chain. These tools facilitate better understanding of the significant stakeholders, the processes and the relationships within a value chain.

For the mid-term evaluation, as in the baseline, the evaluation team and CRS agreed to apply Tool #3. This exercise also will take place in the final evaluation. The idea is to get different perceptions and opinions, as well as, a better understanding of the context of the value chain for the mid-term. The rest of the tools are applied by each consortium partner throughout the life of the project.

4.2.3. Surveys on the Satisfaction and Perception of Beneficiaries

The success of the program greatly depends upon the efficient and high-quality provision of technical, business and financial services to the producer families and the producer organizations. In this regard, the beneficiaries' perception on the quality of the services provided during the first stage by the consortium and implementing partners is addressed through a survey on satisfaction and perception of the program. This instrument has been developed by the evaluation team and constitutes a module of the mid-term survey. It covers the most-and least-liked aspects of the program and rating each of the major activities developed.

It is important to remark that results based on perception should be interpreted with caution. Although it may provide relevant information on the quality of the services, it can also show the degree of producers' understanding on the type and quality of services provided by the program. Also, we cannot rule out the possibility of measurement errors in data collection.

5. Sampling and Data

5.1. Sampling Strategy[10]

The information for the mid-term evaluation comes from a panel data that compiles the characteristics of producers and their families for two evaluation rounds (baseline and mid-term). The idea is to compare the outcomes of interest before and after the first stage

[10] This section is a reformulation of PROGRESA Caribe´s baseline report, section *5.1. Sampling Strategy*.

of the intervention. The sampling strategy has been designed to allow the collection of the necessary data to answer key evaluation questions and to analyze the effects of the intervention on intermediate and final outcomes.

For the baseline, it was calculated a representative sample of beneficiaries from the early and late treatment. The sampling strategy was designed to identify minimum impacts on cacao (metric tons per hectare) and milk (liters of milk per day) yields. It considered a confidence level of 95%, a statistical power of 80%, and the intra-cluster correlation of the adjacent communities. The sample size and power was computed using the noncentral t-distribution.

The results suggested a representative sample of 980 observations (490 for each treatment status). Assuming a rate of non-response (attrition) of slightly more than 20% the total planned sample was of 1,210 producers (605 for each treatment status). The sample design used as a framework the list of project participants. The selection of the sample took place at one stage and was based on simple random sampling. Also, a random sample of a 14% of replacements was estimated, which was distributed proportionally to each implementing partner.

5.2. Data Collection

5.2.1. The Process

The data collection for the mid-term evaluation was shared responsibility of the consortium and implementing partners (through the zone supervisors and the enumerators[11]). The process was supervised by the CRS MEAL team.

CRS developed the instruments to be used in collection of the information from the producer families. The evaluation team and CRS MEAL team jointly revised this instrument to ensure that the questions would include all the elements necessary to conduct the evaluation, both those related to the key indicators (intermediate and outcome indicators), as well as the impact mechanisms. The CRS MEAL team suggested adjustments be made to the survey. The evaluation team revised the adjustments in order to guarantee compatibility with the baseline study.

The preparation for the field work included training workshops, preparation of a users' guide, pilot trials, and the creation of route sheets for collection of the information. In addition, the CRS team prepared a protocol for systemic review in order to filter data. This

[11] The enumerators are the same people who work as field technicians in the framework of the program.

makes it possible to reduce measurement errors and to assure quality in the management of the information.

The following databases were obtained from the household survey:

1. Progress out of Poverty Index (PPI)
2. Food security
3. Agriculture: production of cacao
4. Agriculture: sales of cacao
5. Cattle production
6. Cattle inventory
7. Vaccination
8. Cattle sales
9. Infrastructure
10. Credit
11. Employment
12. Socio-demographic information
13. Financial education
14. Perception about the program

5.2.2. Assessment of the Data Quality[12]

The evaluation team and the CRS MEAL team agree that, during the process of field data collection, the same procedures were applied for both the early treatment and late treatment groups. The digital survey system makes the standardized application of the survey possible. This, together with the protocol for systematic review for data cleansing (prepared by CRS), minimized measurement errors.

The quality of the data for the mid-term evaluation is much better than the baseline data. This suggests that the consortium partners put into practice the recommendations and lessons learned from the baseline. Specifically, it improved the information gathering process in the sections on sociodemographic characteristics, infrastructure and livestock inventory, italso, improved the use of filters in the marketing section[13]. As expected, the quantity of information in the different sections of the survey is slightly different for all full interviews.

[12] The evaluation team did not provide direct supervision of the field work; therefore, it only addresses those details regarding data quality that could be seen from the desk, in the visits to CRS in Estelí, and in the discussions with the consortium and implementing partners.

[13] In the baseline, the questions on marketing were applied to all producers irrespective of whether they were selling or not.

A very important aspect of data quality is the process of building and harmonizing the data base. Once the field data had been collected and prior to the delivery of the data base to the evaluation team, the CRS MEAL team conducted two exhaustive reviews of the information collected and requested clarifications and revisions from the consortium partners' and the implementing partners' monitoring teams. After this process, the evaluation team received the data set in Excel and proceeded as follows:

- The evaluation team reviewed the initial database.
- The evaluation team prepared a log of doubts to send to the CRS MEAL team.
- The doubts were reviewed jointly with the CRS MEAL team, which then requested the partners to clarify and revise the indicators under discussion.
- CRS harmonized the clarifications and revisions and presented details of each modification to the evaluation team.
- The evaluation team reviewed the harmonization and expressed it agreement or disagreement with each instance.
- In cases of disagreement, joint decisions were made regarding the changes to be made (or not).
- The process was repeated as new doubts arose.

This process was exhaustive and time-consuming during the evaluation period, but it was conducted this way to ensure the lowest possible data loss, to reduce measurement errors and atypical values in the information, and to ensure transparency in the database-building process.

Although the available information is of very good quality, there are considerable differences among the consortium partners, the implementing partners and even the field technicians themselves in the ability to conduct the survey. In this regard, it could be thought that the training process for conducting the survey did not have the same impact upon all the field technicians. However, the evaluation team considers that the differences in capacity are due to two factors: 1) the field technicians' educational attainment, given that many of them have empirical knowledge and have had limited previous exposure to the use of digital tools; and 2) the turnover of field technicians among some partners has led to a loss of the knowledge that had been gained in the baseline study.

This led to twice as many revisions being made in this evaluation, as compared to the baseline, to ensure the quality of the final data that would be analyzed. The evaluation team suggests improving the hiring process of the field technicians. For example, CRS should prepare an exam for each applicant; the exam can be divided in three parts: technical skills, soft skills and critical thinking. Also, training for data collection should also focuson on the field technicians exercising greater "critical thinking" during the survey.

There are other constraints that should be addressed in the future, which are mentioned below:

- Information was collected for – a few – producers whose identifiers did not match the master for the evaluation sample. These were eliminated from the final sample.
- The database modules imported from the system contained duplicate information from the producers, which implied case-by-case review to ensure that the information was correct.
- The consortium partners decided to conduct the mid-term survey using an evaluation period (6 months) that was different from that of the baseline (1 year). CRS explained that they did not have sufficient technical staff to carry out two simultaneous or near-term surveys. However, this measure required statistical adjustments, which could lead to bias in the information collected (e.g., annualized sales, the reconciliation of agricultural practices).
- The indicator of value of production in dollars (cattle or cacao) by hectare at mid-term can be constructed based on an annualized variable (income) without a statistical adjustment (hectares). However, this would lead to a bias in the comparative results between baseline and mid-term, as the baseline data is constructed using an evaluation period of 1 year and the mid-term data using a period of 6 months. A potential solution is to anualized the hectares, but there is no confident criterion to apply this adjustment. Therefore, the evaluation team will not analyze this indicator in this evaluation, and suggest resuming the analysis of this indicator at the final evaluation.
- The consortium partners made a modification to the format of data collection of the pasture areas for livestock. Basically, instead of raising information for 4 types of pasture areas, they extended the disaggregation to 6 types. The evaluation team considers that this caused some misunderstanding among those producers surveyed, which led to harmonizations from the desktop that could have some degree of bias.
- The variable of average cattle weight is measured based on the producer's perception. The evaluation team considers that this variable may have a bias, although uncertain in wether the producer´s perception in estimating the weight of cattle would be higher or lower than the true weight. Nevertheless, the data on number of animals and their mean weight in kilograms is collected by sex, age class and predominant breed. This disaggregation might reduce to some extent the potential measurement error.

5.2.3. Data Collected

In the baseline, the sample was planned for 1,210 producers; information was collected for 945 producers (78% of the planned sample). These 945 producers constituted the planned mid-term evaluation sample to be used for building panel data from both time periods.

The section from Progress Out of Poverty (PPI)[14] was used as the basis for determining the final sample. Information was collected for 740 producer families (78% of the planned sample). CRS reported that the 205 producers who were not interviewed had left the program. The next section will discuss the causes for attrition from the evaluation sample.

To estimate the number of complete interviews, it was determined that survey should have information on PPI and the inventory of livestock or the area of cacao in development or production[15]. Taking this into account, a total of 735 complete interviews were obtained, and when the mid-term data was harmonized with the baseline, 36 observations were lost[16]. A total of 699 complete interviews were obtained (74% of the planned sample), of which 414 (59%) correspond to early treatment and 285 (41%) to late treatment.

The non-response rate, which corresponds to the percentage of non-responses[17] in comparison with the programmed sample, is 26% (246 observations). This is 4 percentage points greater than the baseline. The construction process for the final sample is shown in the following table.

[14] This criterion was established in the baseline because PPI is the program's most important long-term indicator, and because it is the section with the greatest number of interviewees.

[15] When the producer works in only one value chain, the information required comes from the PPI and the production and sales in the respective chain.

[16] This occurs because for some of the previously described indicators, there are no baseline observations for some of the producers and vice-versa (no mid-term observations), which causes a slight loss of information.

[17] The nonresponse is the sum of the non-interviewed plus the incomplete interviews plus the loss due to baseline harmonization.

Table 3. Evaluation survey: final sample and nonresponse

		Baseline	Mid-Term
(1)	Target Sample	1210	945
(2)	Initial target sample	1040	945
(3)	*Efective Sample*	922	740
(4)	Replacements	165	-
(5)	*Use of replacement*	104	-
(6)	Sample identified by TNS	172	-
(7)	Not interviewed	12	205
(8) = (3) + (5) + (6)	Final Sample	1198	740
(9)	Incomplete Interviews	253	5
(10)	Lost due to harmonization with baseline	-	36
(11) = (7) + (9) + (10)	Nonresponse	265	246
	Nonresponse rate	22%	26%
(12) = (8) - (9) - (10)	Completed Interviews	945	699
(13)	Early treatment	534	414
	Percent intervention	57%	59%
(14)	Late treatment	411	285
	Percent intervention	43%	41%

Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

Furthermore, during the process of constructing the panel data, the evaluation team identified that the information predicted for each value chain changed because the value chains were updated for 105 producers. A similar situation arose with the baseline, which reconfirms that there were shortcomings in the program's targeting process. More importantly, this affects the "power" to make the impact estimates and causes the extrapolations to become approximations with some degree of imprecision.

Table 4. Change of value chain

		Mid-Term			
		Both	**Cocoa**	**Catlle**	**Total**
Baseline	**Both**	64	1	4	**69**
	Cocoa	14	312	0	**326**
	Cattle	83	3	218	**304**
	Total	**161**	**316**	**222**	**699**

Source: Evaluation team calculations based on mid-term survey - PROGRESA Caribe.

5.2.4. Attrition

One advantage of the randomized order of phase-in is that makes it possible for the researchers and those responsible for program monitoring and evaluation to have greater contact with the beneficiaries, which helps reduce potential attrition of the evaluation sample. A potential disadvantage is that the late treatment may be affected by future treatment expectation (Winters et al., 2010). For example, farmers may delay some activities that they normally would have undertaken if they were not part of the project (e.g., seeking technical assistance and access to external markets). In addition, it is possible that producers for late treatment become beneficiaries from other projects, which would seriously affect the comparison in the mid-term evaluation.

That said, as mentioned earlier, CRS reported that the 205 producers who were not interviewed had abandoned the program. All partners in the consortium had dropouts from the evaluation sample for both early and late treatment. However, the most affected was CRS, specifically for late treatment, where it collected only 44.5% of the planned sample.

Table 5. Mid-term´s evaluation survey response

Partner	Scheduled Sample			Complete Interview			Fullfillment		
	Early Treatment	Late Treatment	Total	Early Treatment	Late Treatment	Total	Early Treatment	Late Treatment	Total
CRS	166	128	294	112	57	169	67.5%	44.5%	57.5%
	56.5%	*43.5%*	*100.0%*	*66.3%*	*33.7%*	*100.0%*			
LWR	135	152	287	109	123	232	80.7%	80.9%	80.8%
	47.0%	*53.0%*	*100.0%*	*47.0%*	*53.0%*	*100.0%*			
TNS	233	131	364	193	105	298	82.8%	80.2%	81.9%
	64.0%	*36.0%*	*100.0%*	*64.8%*	*35.2%*	*100.0%*			
Total	534	411	945	414	285	699	77.5%	69.3%	74.0%
	56.5%	*43.5%*	*100.0%*	*59.2%*	*40.8%*	*100.0%*			

Source: Evaluation team calculations based on baseline and mid-term (panel data) household survey - PROGRESA Caribe.

The evaluation team asked the CRS MEAL team to document the causes for attrition in the evaluation sample. The causes of desertion were documented for 167 producers. The reasons were varied, but the main causes were: a) loss of interest, b) migration to other areas of the country or abroad, c) change of economic activity[18], d) distance and insecurity, e) deaths, or f) initiation of work by the NICADAPTA project. The following table presents the causes for attrition in the evaluation sample.

[18] These farmers decided to not grow cacao or raise livestock and instead focus on growing other agricultural products or work outside the farm.

Table 6. Causes of evaluation sample´s attrition (number of producers)

Attrition cause	Partner			
	CRS	LWR	TNS	Total
Change of economic activity	7	16	9	32
Distance and insecurity	21	0	0	21
MEFCCA	30	0	0	30
Passed away	2	1	6	9
Migration	15	0	14	29
Not interested in the project	35	10	1	46
Total	**110**	**27**	**30**	**167**

Source: CRS Data

Box 2. NICADAPTA

"Adapting to Markets and Climate Change Project in Nicaragua - NICADAPTA" is executed by the Ministry of Family, Community, Cooperative and Associative Economy (MEFCCA, by its spanish acronym), with financing from the International Fund for Agricultural Development (FIDA) and the Central American Bank for Economic Integration (BCIE, by its spanish acronyms).

This project is being implemented in areas such as Nueva Segovia, Madriz, Estelí, Jinotega, Matagalpa, Boaco, Río San Juan, RACCS and RACCN. The project targets approximately 40,000 small-scale producers who own coffee or cacao plantations. The duration of the project is from 2014-2020.

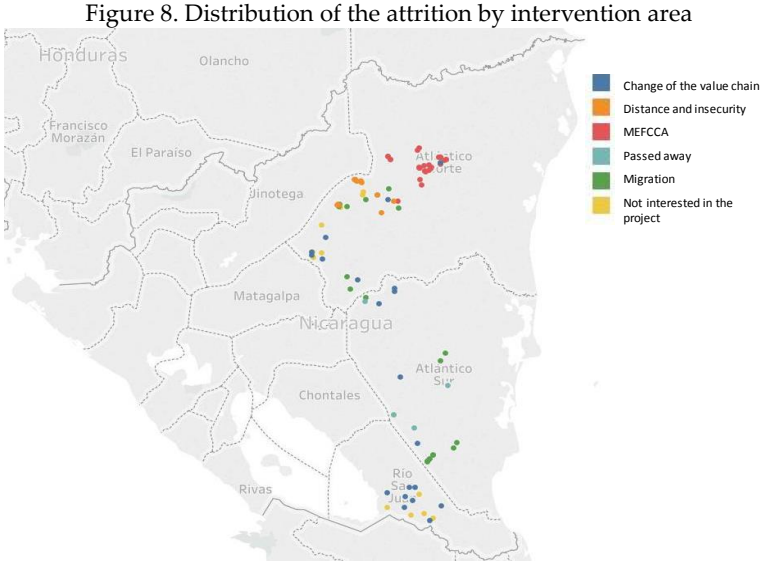
NICADAPTA aims to contribute to the improvement of rural families´ living conditions by assisting them in their production process and making it more complex (value added). The specific objectives of the project are: 1) strengthen the capacity of organizations to improve productivity and quality of coffee and cacao through improved business and productive management; 2) incorporate investments and management practices that allow to improve the quality of raw material produced by reducing the impact on the environment, 3) increase the production of coffee and cacao plantations managed by the small producers and the community, and 4) incorporate good management practices and investment decisions that improve adaptation to climate change, including improved water management efficiency and reduced soil loss.

The project works to accomplish these objectives through the following main activities. Firstly, facilitating access to markets for value added coffee and cacao, introducing crop diversification. Second, by communicating to the participant of the program agro-climatic information. Third, improving the capacity of producer organizations through their training. Lastly, collaborating with the government, cooperation agencies, and private sector to promote and strengthen the coffee and cacao industries.

Source: IFAD (2013). "Adapting to markets and climate change project in Nicaragua (NICADAPTA)", International Fund for Agricultural Development; MEFCCA (2016). "TDR, Proyecto NICADAPTA", Ministerio de Economía Familiar Comunitaria, Cooperativa y Asociativa.

Regarding the distribution of the attrition by intervention area, for both early and late treatment, Siuna, Rosita and Waslala are the municipalities with the highest number of producers who left the evaluation sample.

Figure 8. Distribution of the attrition by intervention area



When high attrition rates are identified, it is important to examine the potential differences in observable characteristics between producers who left the program and those who stayed. Next, univariate tests are presented for different baseline indicators between the deserter group and those remaining in the evaluation sample, separating the results by chain and by assignment to treatment (early and late). Subsequently, there is a discussion of the results of probabilistic models of baseline characteristics, which are also separated by chain and the allocation to treatment.

The following tables present the results of the mean differences between the group of producers who left and those who remained in the evaluation sample. As for the socioeconomic well-being indicators, those producers who remain in the program turn out to be less poor and to have greater diversity in their diet.

Table 7. Two-sample mean-comparison tests (univariate analysis) - General

	Total			Early treatment			Late treatment		
	Attrition	Complier	Difference	Attrition	Complier	Difference	Attrition	Complier	Difference
PPI (%)	56.424	61.718	5.2941**	49.279	59.666	10.3865***	62.558	64.728	2.171
HDDS	6.472	6.979	0.5080***	7.103	7.073	-0.031	5.953	6.848	0.8952***
MAHFP (months)	11.228	11.133	-0.095	11.230	11.175	-0.054	11.226	11.074	-0.152

Notes:

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: Evaluation team calculations based on baseline - PROGRESA Caribe.

For livestock producers, the only difference between those who stayed compared to those who left were among those assigned to late treatment. Those who remain have, on average, higher gross income and more pasture areas, improved pasture, livestock and cows in production.

Table 8. Two-sample mean-comparison tests (univariate analysis) - Cattle

	Total			Early treatment			Late treatment		
	Attrition	Complier	Difference	Attrition	Complier	Difference	Attrition	Complier	Difference
Gross income - cattle ($)	5121.61	9562.85	0.3525***	6559.24	8349.94	0.02	3846.73	11751.77	0.7116***
Milk yields (liters of milk per cow per day)	2.80	2.61	-0.05	2.83	2.50	-0.07	2.78	2.80	-0.01
Total farm area (mzn)	63.94	77.10	0.15	65.89	75.16	0.12	62.38	80.58	0.20
Pasture area (mzn)	45.58	62.56	0.2803***	52.81	60.52	0.10	39.83	66.18	0.4321***
Total livestock (number of heads)	43.20	52.92	0.2929**	55.26	48.90	-0.05	33.59	60.07	0.6052***
Cows in production (number of heads)	17.81	20.83	0.1952*	22.36	19.22	-0.02	13.80	23.68	0.4127***
Average cattle weight per hectare (kg/ ha)	364.13	378.22	0.03	395.39	373.00	-0.14	339.23	387.53	0.18
Improved pasture (% of producers)	0.52	0.60	0.0821**	0.62	0.64	0.02	0.44	0.53	0.0944*
Gross margin - Cattle (%)	-51.13	-38.28	12.86	-39.13	-37.31	1.82	-61.78	-40.02	21.7579*

Notes:

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: Evaluation team calculations based on baseline - PROGRESA Caribe.

For cacao producers, just as with livestock, the main differences are observed among those assigned to late treatment. Those who remain in the program have on average better baseline results than those who left.

Table 9. Two-sample mean-comparison tests (univariate analysis) - Cacao

	Total			Early treatment			Late treatment		
	Attrition	Complier	Difference	Attrition	Complier	Difference	Attrition	Complier	Difference
Gross income - cacao ($)	508.43	855.45	0.2703*	524.89	774.38	0.27	496.22	960.09	0.3263*
Amount harvested (qq)	15.04	21.80	0.1961*	14.88	20.15	0.18	15.16	23.94	0.2505*
Cacao in pulp yields per hectare (tm/ ha)	0.59	0.77	0.0830***	0.62	0.78	0.07	0.56	0.77	0.0881**
Dry cacao yields per hectare (tm/ ha)	0.20	0.26	0.0428***	0.21	0.26	0.0369*	0.19	0.26	0.0464***
Total area of cacao (mzn)	2.17	2.57	0.0897*	2.11	2.33	0.07	2.21	2.88	0.1412**
Amount of sales in dry cacao (qq)	14.72	21.48	0.1936*	14.57	19.78	0.18	14.84	23.67	0.2536*
Value of production per hectare ($/ ha)	444.52	621.58	0.2248*	503.29	627.97	0.23	400.92	613.33	0.22
Application of sustainable agricultural practices (%)	0.00	0.04	0.0355***	0.00	0.05	0.0495***	0.00	0.02	0.0174*
Proportion of area in production (%)	0.86	0.80	-0.0581**	0.85	0.80	-0.05	0.86	0.79	-0.0690**
Gross margin (%)	-177.86	-249.25	-71.39	-172.63	-297.35	-124.73	-181.65	-187.36	-5.70

Notes:

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: Evaluation team calculations based on baseline - PROGRESA Caribe.

On the other hand, in the livestock chain, when controlled by a set of socioeconomic and productive variables[19], it can be observed that for late treatment producers there are differences between those who remained and those who abandoned the program. Specifically, the probabilities of remaining in the program are reduced for those producers with a higher proportion of pasture out of the total farm area, a larger farm size, and a

[19] Probabilistic models of the baseline characteristics.

greater average weight of cattle per hectare. By contrast, greater dietary diversity and a larger herd increase the probabilities of remaining in the program. In turn, belonging to a cooperative reduces the probabilities of remaining in the program.

Table 10. Probability of attrition (marginal effects) - Cattle

	Early Treatment	Late Treatment	General
Water supply all year round (yes=1)	0.052	-0.061	0.031
Area of pasture as proportion of farm (%)	-0.039	-1.030***	-0.278
Improved pasture area as a proportion of total pasture area (%)	0.026	-0.130	0.034
PPI (%)	0.044*	0.008	0.041*
Total area of the farm (mzn)	0.028	-0.562***	-0.146
Non-agricultural income ($)	-0.002	-0.043	-0.013
HDDS	0.021	0.500***	0.248***
Total livestock (number of heads)	-0.017	0.709***	0.186*
Average cattle weight per hectare (kg/ ha)	-0.040	-0.520***	-0.166*
Milk yields (liters of milk per cow per day)	-0.110	0.183	-0.018
Belongs to a cooperative (%)	-0.021	-0.376***	-0.136**

Notes:
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Source: Evaluation team calculations based on baseline - PROGRESA Caribe.

In contrast, in cacao differences can be observed in both early and late treatment. Greater dietary diversity, greater area of cacao planted, and higher production yields increase the probabilities of remaining in the program.

Table 11. Probability of attrition (marginal effects) - Cacao

	Early Treatment	Late Treatment	General
Proportion of area in production (%)	0.099	0.099	0.018
PPI (%)	0.000	0.000	0.028
HDDS	0.302***	0.302***	0.209***
Amount harvested (qq)	-0.193	-0.192*	-0.113*
Total area of cacao (mzn)	0.341*	0.341**	0.175**
Cacao in pulp yields per hectare (tm/ ha)	0.711**	0.711**	0.437***
Belongs to a cooperative (%)	0.030	0.030	0.043

Notes:
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Source: Evaluation team calculations based on baseline - PROGRESA Caribe.

From all the above discussion, the evaluation team concludes that the observed attrition correlates with treatment allocation. In the late treatment "the best ones remained", that is

to say, those producers with the best productive performances and lower probability of poverty. The implications of this issue are addressed in the next section.

6. Validation of the Evaluation Design

In the previous section it was verified that although the causes of attrition were mostly exogenous to the management of PROGRESA Caribe, there is a degree of correlation between attrition and treatment allocation. In the late treatment group, the producers with the best productive performances remained in the evaluation sample.

In this regard, when recalculating the baseline indicators with the sample of producers for the mid-term panel data, it is found that the indicators differ considerably. Thus, to avoid bias in time comparisons, the evaluation team recommends that the new baseline data be used for analysis.

The table below reports the average of the indicators for the late treatment sample, as well as the difference between early and late treatment.

Table 12. Re-estimation of baseline differences between early treatment and late treatment at program level

Indicator	Baseline 2015				New baseline (Producers that remained in the project)			
	Late treatment mean	Early treatment - Late treatment difference	p-value	Observation	Late treatment mean	Early treatment- Late treatment difference	p - value	Observations
Progress out of Poverty Index (PPI) - general	64.13	-6.35	0.145	945	64.42	-5.27	0.305	699
Progress out of Poverty Index (PPI) - extreme	25.26	-5.40	0.130	945	25.73	-5.19	0.180	699
MAHFP (months)	11.13	0.02	0.985	923	11.07	0.10	0.735	680
HDDS	6.57	0.46	0.115	923	6.85	0.23	0.470	680
Percentage of families with insufficient food	0.31	0.04	0.670	923	0.34	0.00	1.000	680
Total sales (dollars)	4,714.77	-64.45	0.995	900	5,765.91	-767.52	0.735	670
Cocoa sales (dollars)	850.62	-79.90	0.655	527	959.07	-185.48	0.450	391
Livestock sales (dollars)	9,668.53	-1800.00	0.705	442	12,300.00	-3820.00	0.460	328
Milk yields (lts of milk per cow per day)	2.76	-0.17	0.475	468	2.80	-0.30	0.305	349
Average cattle weight per hectare (kg / ha)	365.76	7.73	0.870	503	387.53	-14.53	0.825	370
Gross Income - cattle (dollars)	9,232.88	-1470.00	0.635	485	11,800.00	-3400.00	0.485	359
Value of production per hectare - cattle	174.56	21.74	0.395	440	213.12	1.72	1.000	359
Gross margin per unit of land - cattle (%)	-44.44	5.87	0.605	485	-40.02	2.71	0.855	359
Dry cocoa yields (tm/ ha)	0.23	0.02	0.610	532	0.26	0.00	0.910	394
Hectares of cocoa in production (ha)	1.45	-0.21	0.135	533	1.52	-0.27	0.065	394
Hectares of cocoa in develpment (ha)	0.93	-0.11	0.270	241	0.96	-0.10	0.435	192
Gross income - cocoa (dólares)	858.15	-84.12	0.605	532	965.71	-184.29	0.450	391
Value of production per hectare- cocoa (dollar	565.04	71.50	0.670	527	616.91	16.77	0.810	391
Gross margin per unit of land - cocoa (%)	-208.45	-52.86	0.650	532	-187.36	-110.00	0.510	391

Notes: The table reports the difference in each variable between the early treatment and late treatment groups. Inference is adjusted by wild cluster bootstrap standard errors. Penultimate column reports the p-value of tests of differences for each variable.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: Evaluation team calculations based on baseline- PROGRESA Caribe.

The results suggest that there are no statistically significant differences between the characteristics of the early and late treatment group. This apparent "balance" in most sociodemographic and production indicators does not imply that there have been no exogenous flaws in randomization. Rather, it may be revealing an issue with the statistical power required to identify statistical differences between groups. In the baseline report, the evaluation team explained the potential presence of this problem, should a large amount of evaluation sample be lost.

Although the level of attrition affected the randomization and the statistical power, having a baseline and a follow-up survey (panel data) gives greater statistical power compared to a cross-section data, which mitigates power losses to some extent, even though the final sample is smaller.

Therefore, in order not to affect the internal validity of the evaluation, as explained in previous sections, two types of statistical analysis will be carried out: 1) Difference-in-differences and 2) Matching estimators combined with difference-in-differences. The inference will control by baseline covariables that are associated with outcome indicators, either as regressors in the difference-in-differences estimator or as variables to determine the probability of selection in the program for the case of the difference-in-difference estimator combined with matching methods.

7. Impact of the Program on the Beneficiaries and Key Stakeholders

7.1. Impact of the Program on the Producer Families

7.1.1. Introduction

PROGRESA Caribe was designed under an experimental scheme in which more than 50% of the beneficiary producers were assisted from the beginning of the project (once the baseline was conducted, October 2015) and another part began to be assisted as of month 19 of activity implementation (randomized order of phase-in).

This section discusses the comparison before (baseline) - after (mid-term) to analyze the evolution of key indicators at the end of the first stage of the program and the impact of the program on outcome indicators at mid-term. The idea is to obtain inputs on the services provided by the program and to infer the association between the program and the producers' results.

As mentioned in sections 5 and 6, all consortium partners had dropouts from the evaluation sample for both early and late treatment. This implied the loss of statistical

power to analyze the results separated by consortium partner. For example, CRS does not have enough statistical power to analyze separately its results for cacao and cattle, while TNS does not have enough statistical power to analyze its results for the cacao chain, but it has enough statistical power for the cattle chain. LWR has enough statistical power to analyze its results for the cacao chain. Therefore, the analysis addresses the intermediate and outcome indicators at project level, rather than on a partner level.

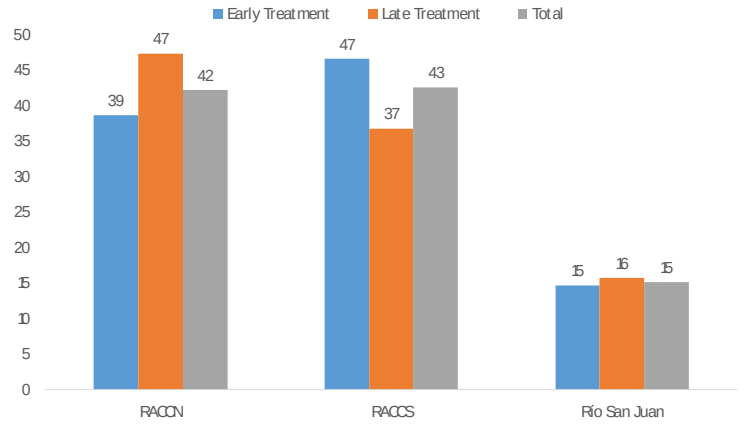
7.1.2. Characteristics of the Producers

At mid-term, information is available for 699 producers, of whom 414 (59.2%) correspond to early treatment and 285 to late treatment (40.8%). Women make up 14.5% of the sample; this proportion is quite similar for both treatment groups.

In terms of geographical distribution, 42.6% of the surveyed producers reside in RACCS, 42.2% in RACCN, and 15.6% in Río San Juan. There is a relatively greater participation of RACCS producers in early treatment, whereas in late treatment the largest proportion of producers is located in RACCN.

Graph 1 Geographical distribution of the evaluation sample

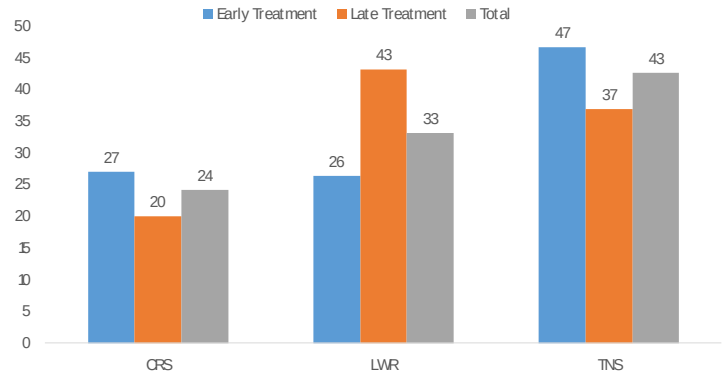
Percentage of producers



Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

TNS assists 42.6% of the evaluation sample, followed by LWR (33.2%) and CRS (24.2%). TNS and CRS have a higher proportion of early treatment producers (64%-66%); in the case of CRS, as was explained in previous sections, this is due to a greater attrition of producers in its late treatment sample.

Graph 2. Distribution of the evaluation sample by consortium partner
Percentage of producers



Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

By chain, 45.2% of the producers surveyed work only with cacao under the program, followed by those working with the livestock chain (31.8%) and those served in both chains (23.0%).

The 12.9% of the evaluation sample corresponds to producers who have previously participated in other projects carried out by the consortium partners. CRS is the partner that assists the highest proportion (31.4%) of "repeaters" among surveyed producers.

Table 13. Distribution of the evaluation sample by repeaters and new beneficiaries (%)

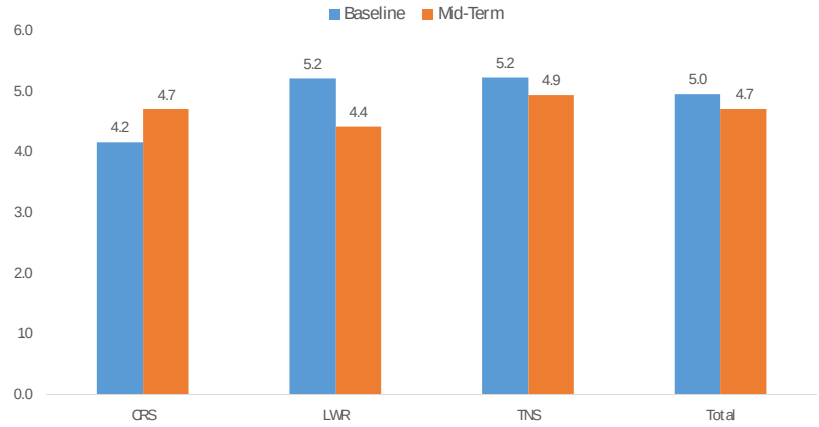
Partners	Beneficiaries for the first time	Repeaters
CRS	68.6	31.4
LWR	87.9	12.1
TNS	97.0	3.0
Total	**87.12**	**12.88**

Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

The average household size is 4.71 persons, and 19.2% of the respondents live in households of 7 or more persons. More persons per household are associated with a greater likelihood of poverty, suggesting that the program targeting is relatively good.

Graph 3. Average household size

Number of persons



Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

The average age of the heads of households surveyed is 46.4 years, and little more than a third of the sampled producers are under 40 years old (12.2% are under 30). Their average schooling level is 3.6 years. In spite of this, the heads of household have almost 20 years of experience working in agricultural production. On average, 2.2 family members are working on the farm.

7.1.3. Productive Practices of the Early Treatment[20] [21]

The application of agricultural practices reflects the knowledge, skills and abilities that the farm families acquire either on their own or by the effect of the intervention. The

[20] As was mentioned in previous sections, the mid-term survey applied an evaluation period of 6 months. The consortium partners indicated that many of the practices evaluated could have a downward bias due to the periodicity, as some practices are carried out only once a year. Considering this issue, the evaluation team and the consortium member monitoring teams decided to evaluate the practices by unifying the data from the last monitoring campaign with the mid-term evaluation data. The evaluation team found that the application of this procedure revealed significant changes in the percentage of producers applying the different practices. However, this approach was only applied to the early treatment, as a constraint of this method is that it does not permit the reconstruction of the productive practices of late treatment, because the monitoring campaign does not cover this group.

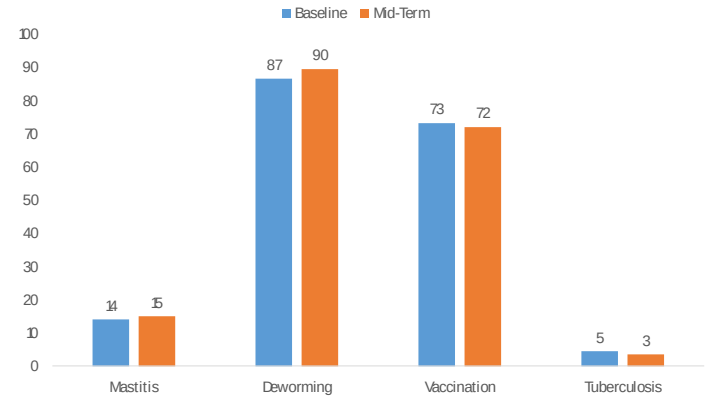
[21] The analysis of evolution in practice indicators is based on simple regressions of a given practice as a function of a binary variable that takes the value of 1 if the observation corresponds to the mid-term round. Hence, the discussion of changes (increases, reductions) in the proportion of producers applying the different practices is based on "statistically significant" changes.

application of these practices reflects the human capital of the producers. This is discussed below for each chain.

Cattle

The deworming and vaccination of cattle are the most relevant sanitary practices carried out by the farmers of the early treatment group. At mid-term, there are no relevant changes in this type of practice. In other words, the proportion of producers applying this type of practice has remained relatively constant.

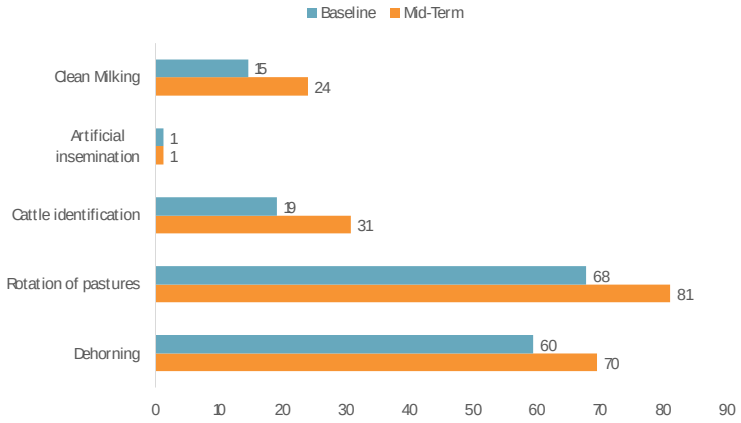
Graph 4. Sanitary practices
Percentage of producers



Source: Evaluation team calculations based on baseline, mid-term survey and CRS administrative records (monitoring campaign) - PROGRESA Caribe

As far as livestock management practices are concerned, the main ones are cattle dehorning and the rotation of pastures. There is a notable increase (10 percentage points or more) in the proportion of producers who perform these two practices. The percentage of producers who practice clean milking and cattle identification also increases. Along with pasture rotation, these two last practices are promoted under the program.

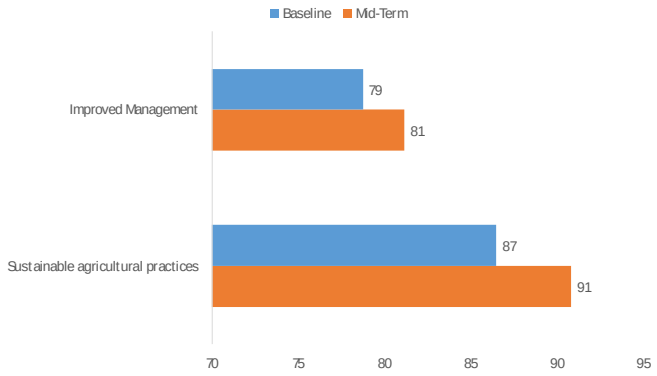
Graph 5. Practices for livestock management
Percentage of producers



Source: Evaluation team calculations based on baseline, mid-term survey and CRS administrative records (monitoring campaign) - PROGRESA Caribe

Livestock practices under improved management are determined by the application of three of the following practices: vitaminization, deworming, vaccination or rotation of pastures. In this respect, no statistically significant changes between mid-term and baseline are identified. At mid-term, the percentage of producers applying livestock practices under improved management is 81.2%. In the same way, the percentage of of producers applying sustainable agricultural practices did not change (in statistical terms) compared to the baseline. 90.8% of the producers were applying this practice at the mid-term round.

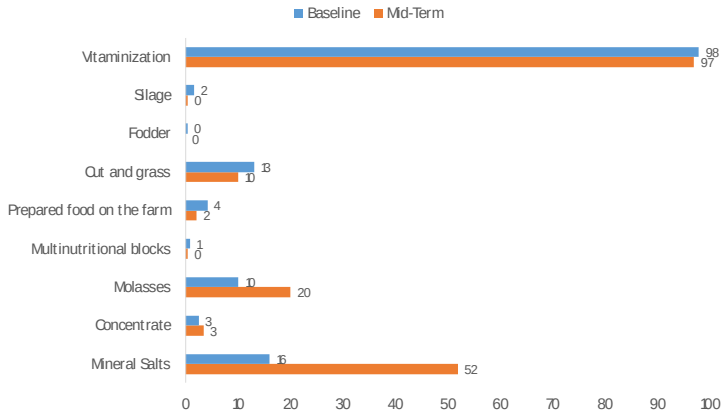
Graph 6. Improved and sustainable practices
Percentage of producers



Source: Evaluation team calculations based on baseline, mid-term survey and CRS administrative records (monitoring campaign) - PROGRESA Caribe

The use of vitamins and mineral salts predominates in cattle feeding practices. Comparing with the baseline, there is a notable increase in the proportion of producers that use mineral salts (35.9 percentage points) and molasses (10 percentage points). At mid-term, the proportion of producers using molasses is 20%.

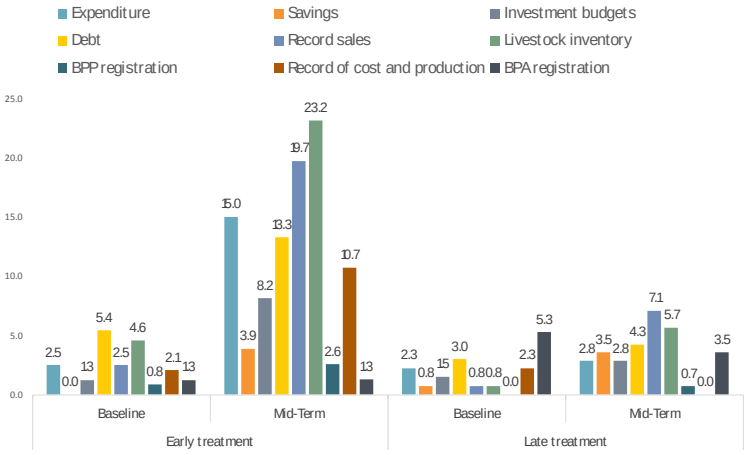
Graph 7. Feeding practices for cattle
Percentage of producers



Source: Evaluation team calculations based on baseline, mid-term survey and CRS administrative records (monitoring campaign) - PROGRESA Caribe

Farm management practices are one of the activities that the program emphasizes the most. As compared with baseline, there are substantial increases in the percentage of producers that make expenditure, savings or investment budgets, who manage debt, record sales, keep track of livestock inventory, and keep records of costs and the production. In fact, at the baseline, the proportion of producers who carried out these practices was lower than 5% in almost all indicators and for mid-term almost all the proportions analyzed had doubled. This important progress is due to the effort made by the program in its initiative to develop farm plans. The comparison of farm management practices between early treatment and the late treatment producers who remained in the program shows that at baseline both groups had very similar adoption levels, and that the relative mid-term increase for early treatment is much greater (more than double) than that of late treatment.

Graph 8. Farm management practices - cattle
Percentage of producers



Source: Evaluation team calculations based on baseline, mid-term survey and CRS administrative records (monitoring campaign) - PROGRESA Caribe.

The evaluation team considers this result to be highly positive considering that only 18 months of activities have passed and that the program is carried out in a context of low educational level among its beneficiaries. In fact, there is no statistically significant association between the educational attainment of the head of the household and the adoption of farm plans. However, it is noteworthy that there is a negative (statistically significant) association between the head of household's years of experience and some of the farm management indicators.

The adoption of the plans depends more on the producer's will or motivation for change (of culture) than directly on his/her previous knowledge. This does not rule out that this has been quite difficult for several producers with low educational levels. In this sense, the evaluation team suggests that the consortium partners make a qualitative evaluation of the difficulties faced by the producers in the implementation of the farm plans and alternatives to overcome them. One option might be to integrate the children - who are likely to have a higher educational level - into farm management activities. For example, in the financial education section, it was noticed (discussed below) that some producers keep records with the support of children.

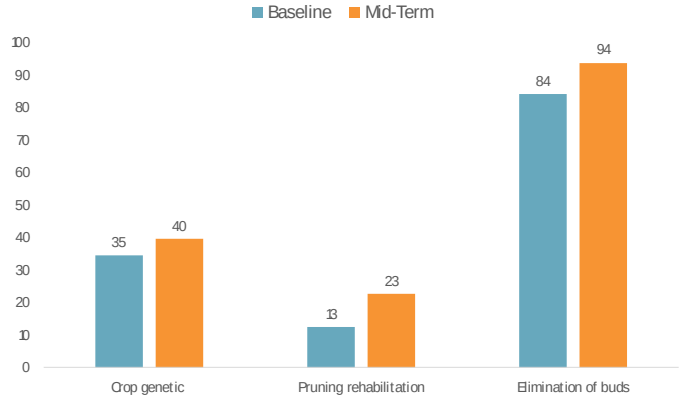
This does not imply that there is no room for improvement in the adoption of farm management practices, but rather the opposite, since the indicator with the highest proportion of producers performing the practice (control of livestock inventory) is below 30%.

Cacao

For cacao production, the program worked on: 1) crop genetics, 2) pest management, 3) disease management, and 4) soil-related fertilization and conservation.

In terms of crop genetics, the elimination of buds is the most common practice among early treatment producers (93.9% at mid-term). Compared to baseline, there are positive and statistically significant changes in the proportion of producers practicing rehabilitative pruning and eliminating buds.

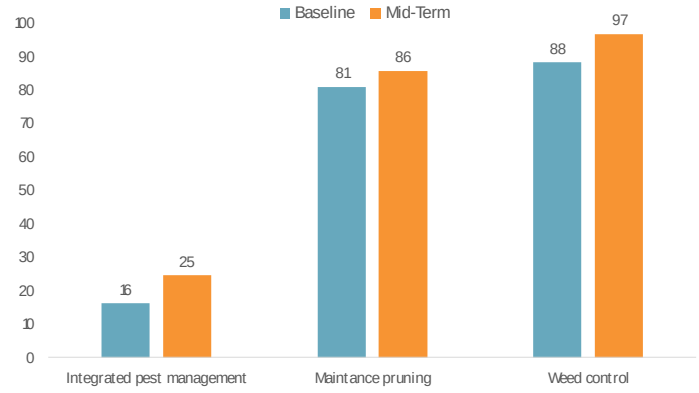
Graph 9. Crop genetic
Percentage of producers



Source: Evaluation team calculations based on baseline, mid-term survey and CRS administrative records (monitoring campaign) - PROGRESA Caribe

Pest management activities focused on maintenance pruning and integrated pest management (IPM). Consistent with the above, this last indicator experienced progress (in statistical terms) at mid-term (8.5 percentage points). Around 85% of producers continue to apply maintenance pruning. It is interesting to note that the percentage of producers that carried out weed control increased (96.8% in the medium term).

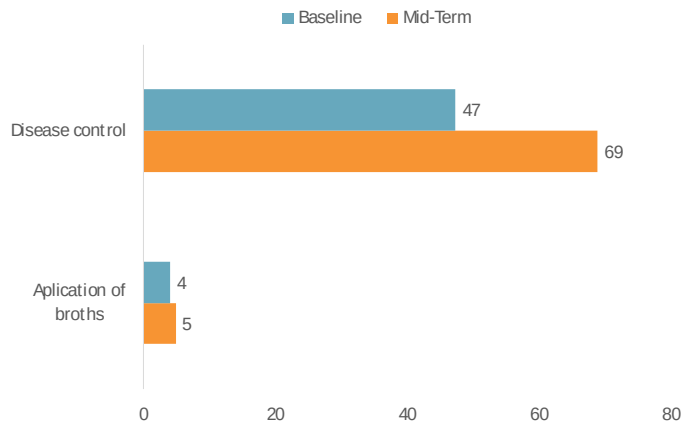
Graph 10. Pest management activities
Percentage of producers



Source: Evaluation team calculations based on baseline, mid-term survey and CRS administrative records (monitoring campaign) - PROGRESA Caribe.

For disease management, the application of broths (bordeaux mixture or bordo mix, which are IPM controls) and disease control was promoted. The former did not show relevant changes in the medium term, but there was a substantial increase in the proportion of producers who carry out disease control (almost 70% in the medium term).

Graph 11. Disease management
Percentage of producers

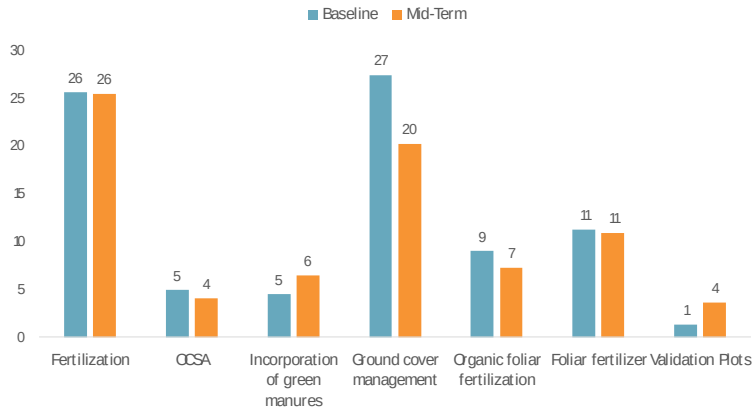


Source: Evaluation team calculations based on baseline, mid-term survey and CRS administrative records (monitoring campaign) - PROGRESA Caribe.

The fertilization and soil conservation activities promoted under the program were: a) fertilization, b) soil and water conservation practices (OCSA, by its spanish acronym), c) incorporation of green manure, d) ground cover management, and e) organic foliar fertilization. At baseline, the proportion of producers applying these practices did not reach 30% in any indicator. At mid-term, there are no relevant changes in the producers who carry out this type of practice. The most common practices performed by the early treatment producers are fertilization (25.5%) and cover management (20.2%). These results

suggest that the consortium partners should make greater efforts to encourage the implementation of these practices among the beneficiaries of both the early and the late treatment.

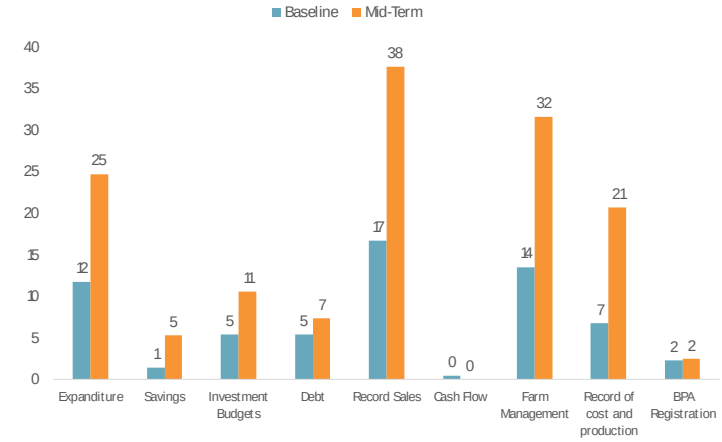
Graph 12. Fertilization and soil conservation activities
Percentage of producers



Source: Evaluation team calculations based on baseline, mid-term survey and CRS administrative records (monitoring campaign) - PROGRESA Caribe.

As mentioned earlier, farm management practices are one of the most important activities promoted by the program. For cacao production, a substantial improvement is also identified in the proportion of producers that carry out different farm management practices. The most notable progress is in the management of expenditure budget, sales record, farm plan, and records of costs and production. As in the case of livestock, there is still ample room for improvement in the adoption of these practices. Also, as in the case of livestock, a comparison of farm management practices between early treatment and late treatment producers that remained in the program shows that the mid-term increase for the former is much greater.

Graph 13. Farm management practices - cacao
Percentage of producers

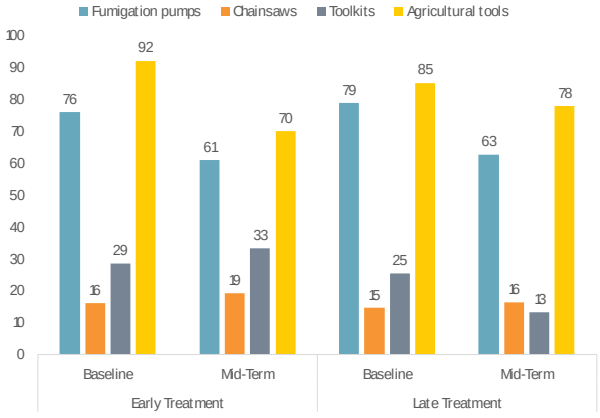


Source: Evaluation team calculations based on baseline, mid-term survey and CRS administrative records (monitoring campaign) - PROGRESA Caribe.

7.1.4. Infrastructure and Equipment[22]

The infrastructure, tools and equipment represent the physical assets held by the producer families. Regarding the infrastructure of the producers assisted in the cacao chain, there are no significant changes in the proportion of producers who have chainsaws and toolkits for cacao cultivation. In contrast, there is a striking reduction in the percentage of producers who possess fumigation pumps and agricultural tools. The late treatment group follows a similar trend, except in the possession of toolkits for cacao cultivation.

Graph 14. Infrastructure and equipment - cacao
Percentage of producers

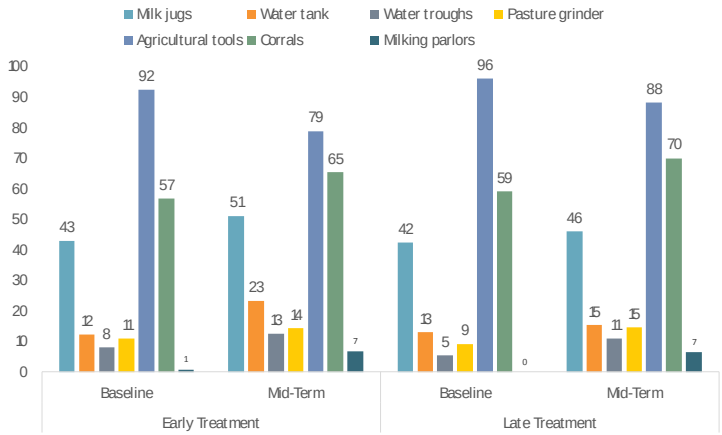


Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe

[22] The infrastructure and equipment data base is broad. In this section, the analysis focuses on indicators selected by the evaluation team.

For the livestock chain producers, there are more notable increases in the percentage of producers who have milk jugs, water tanks, water troughs for livestock, corrals and milking parlors. No statistically significant changes in the possession of grass grinders were identified. In several of these indicators the growth trend in the early treatment group is relatively higher than that of the late treatment producers who remained in the program.

Graph 15. Infrastructure and equipment - cattle
Percentage of producers

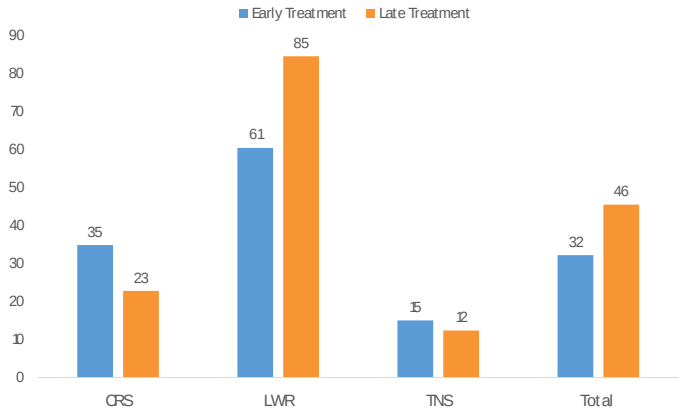


Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe

7.1.5. Social Capital and Assistance

The social capital of producer families is partly due to their link with local organizations and other development projects. A little over a third of the early treatment producers are enrolled in a cooperative. This proportion is higher for the late treatment group that remained in the program (45.6%). LWR is the partner with the highest proportion of producers belonging to cooperatives.

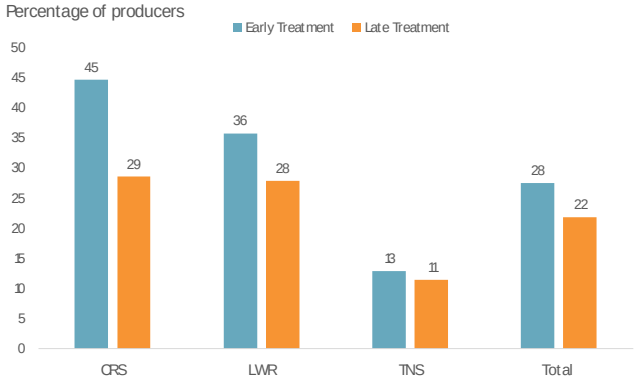
Graph 16. Enroll to a cooperative
Percentage of producers



Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

On the other hand, at mid-term it was found that nearly a third of the producers of early treatment report receiving some type of assistance from other organizations. This percentage is 21.9%. for the late treatment group that remained in the program. There is no single organization that serves all these producers.

Graph 17. Producers that received assistance from others organizations
Percentage of producers



Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

Upon detailed examination of the type of technical assistance that beneficiaries report receiving, it was found that a good proportion benefited from government programs such as Zero Usury, Productive Bonus, Roof Plan, and School Shoes and Supplies. Others are served by the programs of local NGOs (e.g. IPADE, ADDAC) and international NGOs and by the MEFCCA program called NICADAPTA.

In order to explore the potential contamination by the presence of these programs[23], the evaluation team made a brief documentary study and discussed the nature of these programs with the consortium partners. It was concluded that, by their nature and degree of coverage, most of these programs would not have a significant effect on the productivity of the beneficiaries compared to the effect that PROGRESA Caribe could have generated. In addition, there is no evidence that these organizations work on commercialization issues.

7.1.6. Productive Yields and Its Association with Agricultural Practices

Strategic Objective 1 of PROGRESA Caribe is to increase agricultural productivity. Activities to increase agricultural productivity are focused on training to improve agricultural production techniques and farm management, as well as fomenting farm-level financial and non-financial services that producers need to implement the best practices.

The combination of practices discussed above, including those for which there was a higher degree of adoption and those for which there was not, allowed the following mid-term average yields per producer[24] to be achieved:

Table 14. Average yields per producer

	Baseline	Mid-Term
Milk yields (lts of milk per cow per day)	2.39	3.20
Average cattle weight per hectare (kg/ ha)	382.10	615.11
Dry cacao yields (tm/ ha)	0.27	0.17

Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

The average milk yields for the early treatment group increased by 0.8 liters compared to the baseline, reaching an average of 3.2 liters per cow per day. This positive change is statistically significant. The average weight of live cattle also experienced major increases compared to the baseline, as the average weight in kilograms almost doubled.

In contrast, for the case of dry cacao production the average yield per producer for the early treatment group fell by 0.09 metric tons per hectare. The drop in yield is widespread in both the North Caribbean Coast and Río San Juan and for CRS and LWR. Detailed examination of the variations in cacao yields reveals that the areas in production remain constant (in statistical terms), while the amount harvested in metric tons dropped.

[23] This potential effect is isolated in the impact estimates.

[24] The indicators are calculated for producers who present performance data for both the baseline and the mid-term.

Upon documenting the possible explanations for this drop, the evaluation team considers that it is due to low yields of newly planted and old cacao trees that have been replaced but that have yet reached their production potential; in addition, and in part to the negative effects of Hurricane Otto, which occurred in late November 2016. This hurricane affected parts of the Caribbean Coast and the entire area of Río San Juan.

This hypothesis acquires greater validity because, as discussed above, the proportion of producers who applied the different practices of cacao production promoted by the program increased or remained constant (in statistical terms).

In addition, the fact that cacao plantations in production are very young (10 years on average, and less for CRS and TNS) causes them to be more vulnerable to exogenous factors and also require more attention from producers.

By applying the difference-in-differences and the matching estimators combined with difference-in-differences, no statistically significant changes are found due to the intervention in any of the above discussed yields. The evaluation team considers that this result is expected as productive yields do not change so rapidly in just 18 months of intervention. In this regard, it is positive that livestock yields have grown over time. Also, for the cacao yields, the reduction was observed in both early treatment and (weighted) late treatment; this implies that negative exogenous factors played an important role during the first stage of the intervention.

For the three performance indicators discussed above, at the project level[25] the results are qualitatively similar to the average per producer.[26]

Based on the mid-term yield levels and their change from the baseline, a cluster analysis[27] was used to construct ranges of yields of the early treatment group for the three indicators discussed above.

[25] The project-level indicator uses in its division the sum of the formula components of all of the producers under study.
[26] The comparison between these formulas does not necessarily produce similar results.
[27] The methodology used is based on the method of hierarchical conglomerates proposed by Ward (1963) and uses as an approximation measure the Euclidean distance squared.

Table 15. Categories of yields and agricultural practices – milk

	1	2	3	Average
Milk yields (lts of milk per cow per day)	3.2	8.9	1.5	3.2
Changes in Milk yields (lts of milk per cow per day)	1.2	6.3	-1.2	0.8
Mineral Salts	65.9%	43.8%	55.7%	59.5%
Concentrate	3.5%	6.3%	4.1%	4.0%
Molasses	20.0%	31.3%	22.7%	22.5%
Multinutritional blocks	1.2%	0.0%	0.0%	0.5%
Prepared food on the farm	1.2%	0.0%	4.1%	2.5%
Cut and grass	7.1%	12.5%	13.4%	10.5%
Fodder	0.0%	0.0%	0.0%	0.0%
Silage	0.0%	6.3%	0.0%	0.5%
Vitaminization	98.8%	100.0%	99.0%	99.0%
Deworming	89.4%	81.3%	95.9%	92.0%
Vaccination	72.9%	75.0%	79.6%	76.6%
Cattle identification	29.4%	43.8%	31.6%	32.3%
Rotation of pastures	91.8%	68.8%	85.7%	87.1%
Tuberculosis	4.7%	0.0%	4.1%	4.0%
Clean milking	29.4%	12.5%	20.4%	23.4%
Mastitis	14.1%	25.0%	14.3%	15.9%

Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

Table 16. Categories of yields and agricultural practices – average cattle weight

	1	2	3	Average
Average cattle weight (kg/ ha)	282.8	1432.5	4479.2	615.1
Changes in average cattle weight (kg/ ha)	-82.3	909.7	4164.8	233.0
Mineral salts	48.9%	72.4%	71.4%	52.4%
Concentrate	3.7%	0.0%	14.3%	3.5%
Molasses	17.4%	34.5%	42.9%	20.3%
Multinutritional blocks	0.5%	0.0%	0.0%	0.4%
Prepared food on the farm	2.1%	3.4%	0.0%	2.2%
Cut and grass	9.5%	10.3%	14.3%	10.1%
Fodder	0.0%	0.0%	0.0%	0.0%
Silage	0.5%	0.0%	0.0%	0.4%
Vitaminization	98.4%	96.6%	85.7%	97.8%
Deworming	88.9%	100.0%	85.7%	90.3%
Vaccination	72.1%	86.2%	71.4%	73.6%
Cattle identification	31.1%	34.5%	42.9%	31.7%
Rotation of pastures	82.6%	86.2%	85.7%	82.8%
Tuberculosis	3.7%	3.4%	0.0%	3.5%
Clean milking	25.3%	20.7%	14.3%	24.2%
Mastitis	15.8%	13.8%	14.3%	15.4%

Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

Table 17. Categories of yields and agricultural practices – dry cacao

	1	2	3	4	Average
Dry cacao yield (tm/ ha)	0.06	0.16	0.13	0.33	0.17
Changes in dry cacao yields (tm/ ha)	-0.04	-0.19	-0.64	0.12	-0.10
Crop genetic	34.9%	54.1%	41.2%	54.0%	46.6%
Pruning rehabilitation	28.6%	23.0%	17.6%	26.0%	25.1%
Elimination of buds	98.4%	100.0%	94.1%	96.0%	97.9%
Integrated pest management	31.7%	36.1%	5.9%	16.0%	26.7%
Maintance pruning	90.5%	96.7%	88.2%	90.0%	92.1%
Aplication of broths	6.3%	6.6%	5.9%	4.0%	5.8%
Disease control	74.6%	86.9%	76.5%	78.0%	79.6%
Fertilization	41.3%	26.2%	5.9%	20.0%	27.7%
Incorporation of green manures	9.5%	6.6%	11.8%	6.0%	7.9%
OCSA	7.9%	4.9%	5.9%	0.0%	4.7%
Ground cover management	31.7%	23.0%	11.8%	20.0%	24.1%

Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

As the previous results show, there is no clear association between the categories of yields analyzed and the practices carried out by producers - which are promoted by the program.

The evaluation team considers that this result could be due to a weakness in the measurement of the performance indicator of practices. At the moment, this indicator only counts the practices that the producer considers to carrying out, without checking if it does or does not. In addition, it is important to incorporate two additional indicators: 1) the intensity on the application of the practice, measured as the number of months that the producer has applied the practice; and 2) an indicator of performance quality of the practice.

7.1.7. Commercialization of Production

Strategic Objective 2 of PROGRESA Caribe is the expansion of trade in agricultural products. Activities to expand trade are focus on increasing market access for smallholder producers through improving post-harvest handing and processing, training on certifications and standards, and facilitating private and/or public partnerships for buying and selling, co-investment in infrastructure, and the exchange of market information. Complementary foundational activities include increasing the capacity of cooperatives and trade associations to serve their smallholder members. Furthermore, through the promotion of good agricultural practices, marketing is affected by the positive effects on yields and the improvement in production quality.

The average income from the sale of cacao[28] in the case of early treatment grew by mid-term due to a higher volume of average production. The average price per producer for dry cacao remained practically constant (from the statistical point of view).

In the case of livestock and milk sales, there are no statistically significant changes, even though the average prices of the liter of milk and of live cattle showed increases during the evaluation period. It should be noted that a reduction was identified in the average amount sold (kilograms) of standing cattle.

Table 18. Average sales, quantity sell and prices

	Milk			Cattle			Dry cacao		
	Sales ($)	Quantity sell (lts)	Price ($)	Sales ($)	Quantity sell (kg)	Price ($)	Sales ($)	Quantity sell (tm)	Price ($)
Baseline	4,251.5	15,130.6	0.26	8,135.9	4,341.1	1.80	773.6	0.30	2,379.2
Mid-term	4,801.9	16,952.2	0.28	6,315.4	2,246.2	2.80	1,098.9	0.50	2,374.9

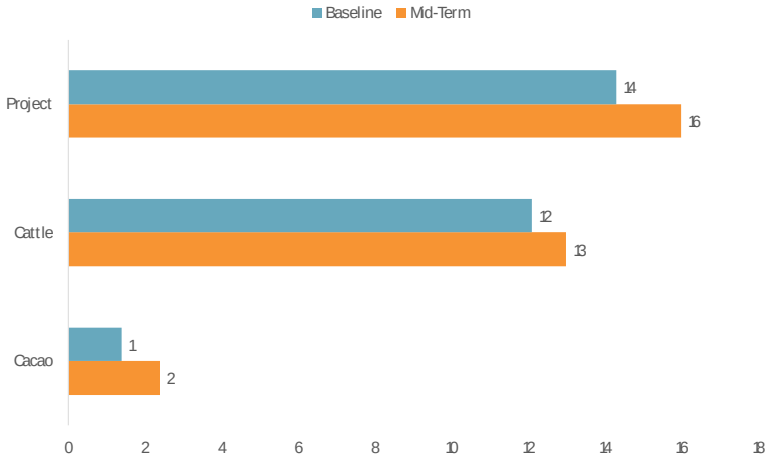
Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

On the other hand, at the project level[29], there is a 12.0% growth in the total value (income[30]) of cacao and livestock production of the early treatment group. This suggests

[28] The quantity sold is taken into account. Sales are multiplied by the unit price to obtain the value of sales, which corresponds to sales revenue.

that low performances are offset by high performers, mainly of larger producers and in live cattle production. These results were determined by revenue growth in both value chains. In relative terms, the increase in income was greater for cacao (66.4%).

Graph 18. Production´s value
Millions of dollars



Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

The increase in income at the project level was due to a positive (relative) change in the production volumes of all items (mainly cacao) and increases in the prices of liter of milk and livestock.

By applying the matching estimators combined with difference-in-differences, no statistically significant changes are found, at the mid-term, due to the intervention, in total income (value of production) and total cost. However, by chain, there is an increase in cacao income due to the intervention compared with the evolution of the late treatment in around 40 percentages points. This positive change in cacao income is accompanied with an increase in cacao cost (more than 40 percentages points). The evaluation team considers that this increase in the production costs is reasonable because: 1) cacao producers are relatively new in the value chain and therefore are learning from the project to improve their production cost records, which makes the information more truthful; and 2) the producers have invested in new productive technologies that naturally push up the production costs.

[29] In its formula, the project-level indicator uses the sum of the income of all the producers under study. This indicator is extrapolated to the universe of early treatment.
[30] The entire production is taken into account – that which is sold, that which is used as seed, and that which is consumed by the household.

In contrast, there is no effect of the intervention at the mid-term in the livestock income, but the evolution of livestock production costs has reduced by more than 50 percentage points for the early treatment as compared to the evolution of the late treatment group.

A direct result of the growth in marketing is the average gross margin, which is defined as the ratio of net income (gross income minus production costs) to gross income. The average margin per farmer for the early treatment group in cattle changed from negative (-37.3%) to positive (30.7%). For cacao, no statistically significant changes are identified in the gross margin. Given the strong dispersion in the margins estimated for each producer, this indicator is best analyzed using the median and also at the project level[31]. In this way, margins in cacao change from negatives in baseline to mid-term positives, which is in line with the increase in income discussed earlier. At the project level, the margins for both chains have grown considerably compared to the baseline, mainly due to the good dynamism in livestock.

Table 19. Average gross margin and median per farmer and by project level

Value chain	Baseline			Mid-term		
	Average	Median	Project	Average	Median	Project
Cattle	-37.3	-40.6	19.5	30.7	52.7	57.1
Cacao	-297.4	-34.3	-15.0	-480.0	-18.1	13.5

Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

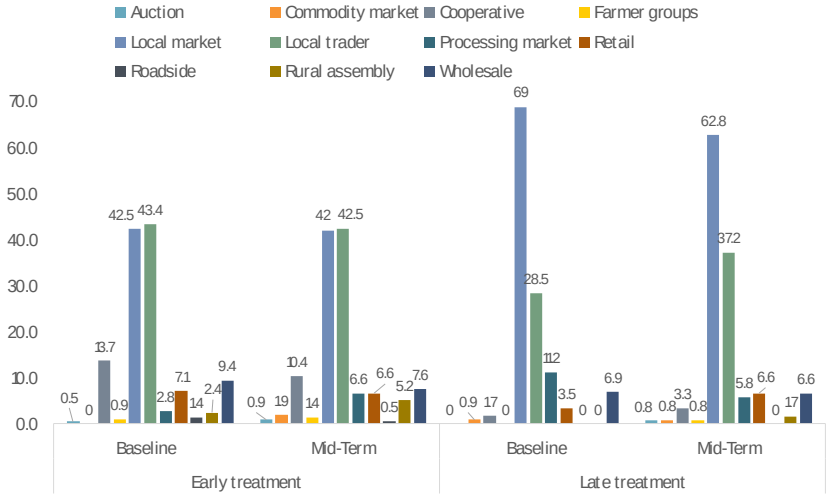
At mid-term, 80% of the producers assisted in livestock in the early treatment group have positive margins. In contrast, only 45.6% of the cacao farmers present positive margins. This suggests that there is still much room for improvement for the second stage of the program in the cacao chain. It is should be noted that for the case of cacao, the fact that the margin is positive at project level compared to the average and the median (which are negative) implies that the increase in net income was higher for the relatively larger cacao growers.

By applying the matching estimators combined with difference-in-differences, no statistically significant changes are found, at the mid-term, due to the intervention, in the evolution of the gross margin of cacao, as both income and production costs show a positive trend during the period of analysis. For cattle, there is an increase in the gross margin due to the intervention compared with the evolution of the late treatment in more than 30 percentages points. This effect is due to a considerable reduction in production costs for the early treatment.

[31] In its formula, the project-level indicator uses the sum of the income and costs of all the producers under study.

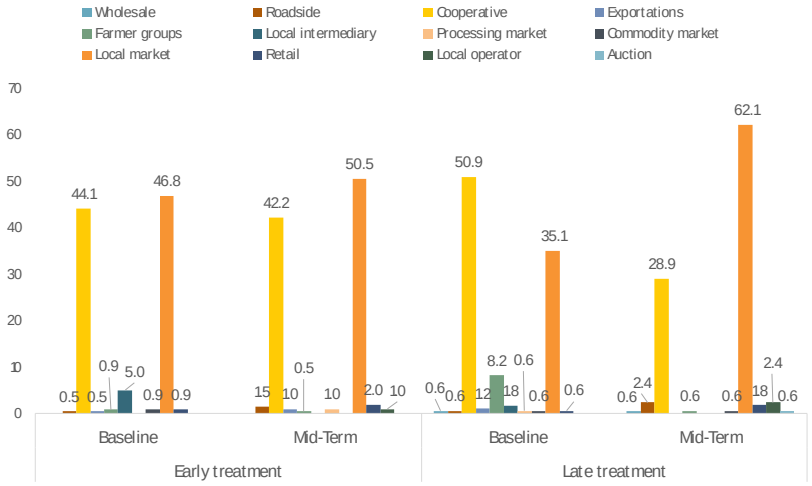
The program promotes the marketing of production through producer organizations. Despite this, most livestock production is marketed in the local market or with local traders. At mid-term, only 10% of early treatment producers sell their production to producer organizations. No relevant changes are identified in livestock marketing mechanisms at mid-term. In contrast, most cacao production is marketed in the local market or through cooperatives. As in livestock, at mid-term no significant changes in the marketing mechanisms of cacao are identified.

Graph 19. Marketing mechanisms for livestock
Percentage of producers



Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

Graph 20. Marketing mechanisms for cacao
Percentage of producers



Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

In this regard, the evaluation team suggests that the consortium partners examine in greater detail why the marketing mechanisms under the program are so rigid. A relevant point is to analyze if the program has supported the marketing of all the beneficiaries equally.

7.1.8. The Socio-economic Well-being of the PROGRESA Beneficiaries

The PROGRESA Caribbean theory of change states that if program activities as a whole improve agricultural productivity and if trade in dairy products and/or beef and cacao is increased, the income of farmers' families will be increased and a contribution will be made to poverty reduction in the areas of intervention.

The transmission channel of agricultural programs with poverty reduction and food security are not so obvious. First, poverty is a structural problem and its dynamics of change are slow in the short term. Second, food security depends not only on producers' incomes but also on their consumption patterns, which in rural areas are usually determined by cultural factors and the availability of food in the area.

Taking this into account, this section discusses the evolution of the final outcomes of the program, poverty, and food security, and address to what extent their behavior could reflect the impact of the mid-term intervention. The following table presents the evolution of these outcomes.

Table 20. Evolution of the program outcomes

	Early treatment	
	Baseline	Mid-Term
PPI general (%)	59.15	56.01
HDDS	7.06	5.84
MAHFP (months)	11.17	11.52
% of families with insufficient food	34.51	17.39

Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

The measurement of poverty is based upon the 2015 version of the PPI (Progress Out of Poverty Index)[32]. The results indicate that early treatment households, poverty was

[32] The PPI methodology for Nicaragua was updated by Mark Schreiner in 2013 using the 2009 EMNV [standard-of-living survey] as a reference for estimating the probability of being poor.

reduced by 3 percentage points at the mid-term. This change is statistically significant at 10% level.

The PPI reflects that the incidence of poverty is (statistically) higher in the producers assisted in the cacao chain as compared to those who work only with livestock. The greatest statistical reduction of poverty between the baseline and mid-term is observed in the producers who are assisted in both value chains.

The panel data allows the estimation of transition matrices[33] of poverty levels for the early treatment between the baseline and mid-term, using poverty quintiles. The calculations show a greater mobility towards more favorable poverty ranges[34]. In other words, the greatest number of deprivations were reduced in those households with greater economic vulnerability.

Table 21. PPI (%) - Transition matrix

		Mid-term					*Total*
		0-20	*21-40*	*41-60*	*61-80*	*81-100*	
Baseline	*0-20*	57.0	15.2	17.7	6.3	3.8	100
	21-40	29.3	17.2	31.0	15.5	6.9	100
	41-60	15.0	14.3	43.6	25.7	1.4	100
	61-80	7.4	5.5	18.0	59.0	10.1	100
	81-100	2.0	2.0	10.7	32.2	53.2	100
Total		**14.7**	**8.3**	**22.0**	**34.9**	**20.0**	**100**

Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

Examination of PPI components found that the incidence of poverty in the early treatment group was reduced by the reduction of household size and the increase in household assets. As for the household size, this could be due to migratory flows and changes in the family composition (e.g. marriage or unions of children) during the 18 months of intervention. This indicator contributes with little more than 30% in the effective score of the general index. On the other hand, the greater asset holdings could be influenced by the intervention and the income from other activities.

Exploring income from other activities shows that at the mid-term, almost one-third of beneficiary households had family members who earned income from other sources. This

[33] The transition matrix is a Markov process that estimates the conditional probability of finding a household in a specific range of poverty at midterm, conditioned on the fact that this household was in another range at the baseline.

[34] The transition matrix is a Markov process that estimates the conditional probability of finding a household in a specific range of poverty at the midterm, conditioned on the fact that this household was in another range at the baseline.

income represents just over a third of total family income[35]. There are no statistically significant changes compared to baseline in the proportion of households generating income from other activities or in the levels of this income. Revenue from other activities came mainly from both agricultural and non-agricultural temporary and self-employment. In contrast, net income (value of production minus production costs) more than doubled in comparison to the baseline. This reflects that, although poverty changes are effectively a combination of several factors, the effects of the intervention might have a significant weight because of the importance of the chains in which they work vis-à-vis the average income of the beneficiary households. It is worth noting that livestock producers or those who are assisted in both chains depend to a greater extent on income from agricultural activities, as compared to those working with cacao.

To complement the analysis, food security indicators such as the number of Months of Adequate Household Food Provisioning (MAHFP) are also discussed. In this regard, at mid-term the MAHFP reached an average of 11.5 months for the early treatment group (0.35 months longer than baseline). The changes were statistically positive for all chains under analysis and are relatively higher for producers who work exclusively with livestock.

Another indicator on food security is the Household Dietary Diversity Score (HDDS), which is constructed with a group of 12 foods associated with balanced nutrition. HDDS results show that producers consume an average of 5.8 food groups per day at mid-term (7.1 food groups at baseline). This reduction over time is statistically significant. An analysis by chain showed no statistically significant differences in dietary diversity among producer families. The drop in the indicator (in statistical terms) was generalized for all the chains analyzed and is relatively higher for producers who work exclusively with livestock.

The previous result should be treated with caution, given that in the baseline the evaluation team warned of a potential bias in HDDS results. This is because women tend to have a better knowledge of the household food situation but when the survey was conducted, the majority of respondents to this section were men. Since there was no field supervision in the mid-term round, the evaluation team was not able to verify whether the recommendation made in the baseline to request the presence of a person familiar with the household food situation while filling out this section was fulfilled.

On the other hand, the food shortage indicator is measured by the proportion of households that faced food shortages in some month during the last year. At the mid-term,

[35] The diagonal highlighted in yellow corresponds to the probability of remaining in the initial poverty range.

only 17.4% of early treatment farmers underwent food shortages at some point during the year, representing a reduction of 17.1 percentage points over baseline.

By applying the difference-in-differences and the matching estimators combined with difference-in-differences, no statistically significant changes are found due to the intervention in any of the above discussed outcomes (poverty and food security). As in the case of yields, this result is also expected as changes in welfare mostly take place in the long term. Moreover, as mentioned before, poverty changes are a combination of several factors. As mentioned before this channel of transmission is difficult to prove directly, as the PPI methodology does not allow to prove this link easily. The evaluation team considers that positive changes in welfare due to the intervention will be found at the final evaluation of PROGRESA Caribe.

7.1.9. Summary of Intermediate and Outcome Indicators

The following is a summary of the intermediate and outcome indicators discussed above for the case of early treatment between baseline and mid-term, and the impact estimation.

Table 22. Matrix of Intermediate and Outcome Indicators

	Indicator	Baseline	Mid-Term	Difference (MT vs BL)	Impact (ET vs LT)
Intermediate Indicators	Milk yields (liters of milk per cow per day)	2.4	3.2	0.8**	No
	Dry cocoa yields (tm/ ha)	0.27	0.17	-0.10**	No
	Average cattle weight per hectare (kg / ha)	382.1	615.1	233.0**	No
	Gross income - cacao ($)	781.4	1,277.9	496.5***	40%
	Gross income - cattle ($)	8,349.9	8,753.3	403.4	No
	Cacao production Costs ($)	892.2	1,124.2	232.0*	< 40%
	Cattle production Costs ($)	6,931.5	3,970.4	-2961.1***	< 50%
	Gross Margin per Hectare (cocoa) (%)	-297.4	-480.0	-182.6	No
	Gross Margin per Hectare (livestock) (%)	-37.3	30.7	68.0***	> 30%
Outcome Indicators	Progress Out of Poverty Index (%)	59.2	56.0	-3.1*	No
	Household dietary diversity scores (HDDS)	7.1	5.8	-1.2***	No
	Months of adequate supply of food in the household (MAHFP)	11.2	11.5	0.3***	No

Notes: The table reports the difference in each variable between the baseline and mid-term for the early treatment group. Inference is adjusted by wild cluster bootstrap standard errors. Last column reports the difference for each variable between the two periods. Impact indicators are estimated by applying the difference-in-differences and the matching estimators combined with difference-in-differences.
BL: baseline, MT: mid-term, ET: early treatment, LT: late treatment.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Source: Evaluation team calculations based on baseline and mid-term survey (panel data) - PROGRESA Caribe.

Also, it is important to remark that farm management practices are one of the activities that the program emphasizes the most. As compared with baseline and the late treatment, there are substantial increases in the percentage of producers of early treatment, in both cacao and cattle, that contribute to costs, have savings or investment budgets, who manage debt, record sales, keep track of livestock inventory, and keep records on costs and production. This important progress is due to the effort made by the program in its initiative to strengthen farm management.

7.2. Farmers' Perception Surveys

This section discusses the results of the beneficiary satisfaction survey and farmers' perception on financial education. Both modules were included in the mid-term survey.

The results are valid only for those producers surveyed and do not necessarily reflect the perception of all farmers assisted by the project, as the sample was designed to capture objective indicators (e.g. yields, income) and not for subjective indicators. Also, the results are only informative and should be treated with caution, since as explained in section 5.2.2, the data for both modules was collected with a certain degree of error; the measurement errors were isolated to some extent from the desktop. Nevertheless, despite the measurement errors, the evaluation team considers that the results could be useful for the consortium partners.

7.2.1. Beneficiary Satisfaction on the Program

This section discusses the results of the beneficiary satisfaction survey of the early treatment group surveyed with reference to each of the types of interventions being implemented. The interventions that have a higher level of adoption are identified, along those issues that are constraining and leave room for improvement.

As mentioned in section 2.2, each consortium partner works with a different combination of interventions. Therefore, some interventions are not implemented by all consortium partners. However, in the process of data collection the information was recorded without taking this aspect into account. The consortium partners explained that this happened because the perception survey was sent to them after the general training process of the entire survey.

Efectively, due to time constraints, the consortium partners received the survey tool one week after the evaluation had already begun and this limited the consortium partners to implement the tool as expected. Firstly, the language of the questions was not adjusted to the language used by each consortium partner in their activities with farmers. Secondly,

the main type of intervention that TNS does (monthly trainings) was left out of the survey; although we cannot rule out that the respondents could have confused this type of intervention with other ones (e.g. workshops). Third, there was no extensive training on the way of collecting this type of data.

Due to these issues, it is likely that enumerators and respondents had several confusions on how to fill and respond to this module. Nevertheless, the evaluation team isolated the measurement error to some extent by filtering the information considering only the types of interventions carried out by each partner.

For the final evaluation, it is important to redesign this questionnaire considering all the aforementioned aspects and make an extensive training in methods to collect data on farmers' perception.

On the other hand, it is important to mention that in some interventions the percentage of farmers who recall not receiving this activity is high, e.g. exchange tours (73.2%) and fairs (63.5%). However, this is normal since some type of activities do not involve the participation of many beneficiaries.

Table 23. Farmers who recall not receiving the activity… (percentages)

	%
Technical assistance	5.2
Field schools	26.3
Workshops	16.5
Informative talks	28.0
Goods and services	14.2
Dissemination	49.3
Fairs	63.5
Field days	31.8
Exchange tours	73.2

Source: Evaluation team calculations based on benefeciaries perception survey.

The information is presented as follows: positive evaluation (excellent or good) and negative evaluation (regular or bad). For each indicator, the calculation excludes the number of producers who recall not receiving the activity.

In general, the early treatment group surveyed gives a positive assessment in all types of interventions, as technical assistance, field schools, workshops and informative talks.

Regarding the dissemination of information through ICT and the exchange tours, there is a positive assesment for each consortium partner, although there is room for improvement. For the fairs, the satisfaction is highly positive for CRS and TNS (more than 90%). Field days in general earned a positive appraisal for the three consortium partners. The table below shows the detail of the respondents' assessment to each type of intervention.

Table 24. Perception of beneficiaries - valuation by Component and consortium partners (percentages)

	CRS	LWR	TNS
Technical assistance			
Positive evaluation	90.6	87.7	-
Negative evaluation	9.4	12.3	-
Field shools			
Positive evaluation	93.8	86.8	-
Negative evaluation	6.2	13.2	-
Workshops			
Positive evaluation	96.8	93.0	93.5
Negative evaluation	3.2	7.1	6.5
Informative talks			
Positive evaluation	97.3	-	70.1
Negative evaluation	2.7	-	29.9
Goods and services			
Positive evaluation	92.3	-	-
Negative evaluation	7.7	-	-
Dissemination			
Positive evaluation	92.9	63.2	70.3
Negative evaluation	7.1	36.8	29.7
Fairs			
Positive evaluation	100.0	-	90.8
Negative evaluation	0.0	-	9.2
Field days			
Positive evaluation	100.0	88.6	89.2
Negative evaluation	0.0	11.4	10.8
Exchange tours			
Positive evaluation	100.0	77.2	-
Negative evaluation	0.0	22.9	-

Source: Evaluation team calculations based on benefeciaries perception survey.

The main factors that appear as key to facilitation of a better adoption in all the project components are training (83.7%) and provision of information (83.6%). This may suggest that more consistent and timely communication channels contribute to more optimal performance of the producers. In this sense, the visualization of benefits also contributes to

the adoption of components. The behavior is homogeneous among the consortium partners.

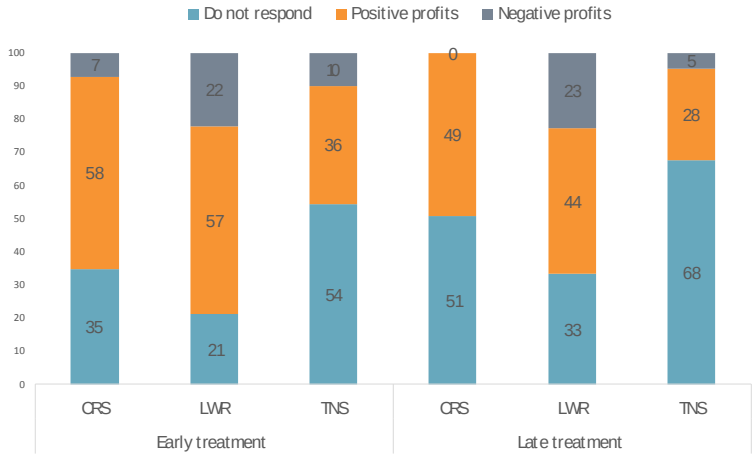
The main factors that appear as impediments or constraints to the adoption of the components are lack of resources (65.4%) and lack of time (58.1%). To a lesser extent, climatic conditions are reported as affecting component compliance by 20.7%, while 17.0% of the producers surveyed report feeling discouraged to participate in the focus areas of the program.

7.2.2. Farmers' Perception on Financial Education

This section discusses the basic knowledge of financial management that the producers report to understand and to apply in their farm management. The module is constructed based on 10 questions, developed by the consortium partners, to which a rating is assigned according to the indicated answers. The analysis is aimed at evaluating farmers' perception on: the obtaining and investment of profits, the control of expenditures and investments, the formulation of a family budget, savings, and the frequency of and access to credit.

Regarding surveyed farmers perception of having positive profits, less than 60% of the producers consider having positive profits from their economic activity in the 2016-2017 cycle. It is important to remark that this figure is influenced by the fact that a great share of farmers (more than 40%) were not able to answer this question in the module of financial education, for both early and late treatment. Therefore, this result does not provide information on the real financial gains of the producers. Instead, it highlights the importance of providing greater tools of financial education to producers, so that they have a better understanding of the financial gains or losses in their economic activity. Excluding the number of producers that did not answer this module, for all consortium partners, the percentage of producers consider having positive profits from their economic activity in the 2016-2017 cycle is greater than 70%, for both, early and late treatment.

Graphic 21 Farmer´s perception on profits
Percentage



Source: Evaluation team calculations based on mid-term survey , financial education module- PROGRESA Caribe.

The financial module shows a non-response rate greater than 40% for all the consortium partners and for both, early and late treatment. Thus, the results for the rest of the section exclude the number of producers that did not answer to the module on financial education.

The perception on the investment of profits reveals that for the early treatment producers, the three main destinations are health (60.8%), education (46.0%) and debt payment (40.0%). Investment components related to farm management, such as the purchase of animals, land or equipment, are low.

On the other hand, when analyzing how many of the early treatment producers surveyed consider keeping some type of account of the activities on their farm, it was found that only 3 out of 10 consider keeping any type of record. When specifically asked whether a family budget was prepared, the responses did not differ from the aforementioned.

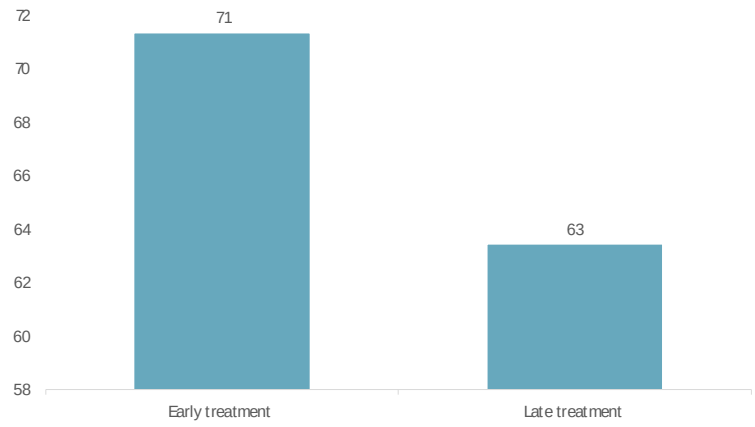
With reference to savings, slightly more than half (52.0%) of early treatment beneficiaries mentioned having ever saved. The most common frequency is monthly, and the two main ways of saving are by buying animals and keeping cash at home.

Regarding access to credit, less than 20.0% of the early treatment producers surveyed reported having accessed to some type of credit in the last year (compared to the date of the survey). This result must be interpreted with caution as it might reflect farmers' understanding on their credit situation rather than the real status of their access to finance.

It should be mentioned that the association between the perception on access to credit and financial knowledge score was analyzed. The results are not significant, which is to say, there is no relation between these two variables.

Finally, the general score of the financial knowledge assessment shows that the early treatment beneficiaries had a stronger performance in financial practices in comparison with the late treatment group. The difference was nearly 8 percentage points.

Graphic 23. Financial education score
Average score



Source: Evaluation team calculations based on mid-term survey, financial education module- PROGRESA Caribe.

The evaluation team considers this result is in line with the growth in the management practices discussed in previous sections, which is highly positive considering that only 18 months of activities have passed.

7.3. Producers Organizations Performance

7.3.1. Introduction

The performance evaluation of the producer organizations is based on the application of the tool for "facilitated self-assessment of the management of rural associative enterprises (ADA)". This tool enables the producer organizations to carry out a quick analysis of their business management and organizational process. The methodology is based on a participatory self-assessment process by the leadership bodies, partners, and the management, administrative and technical teams of the cooperatives.

The importance of the application of this tool relies in the fact that the different stakeholders (partners, leadership, contracted personnel or collaborators) that comprise

these rural cooperative enterprises, understand the status of their organization and the progress that it experiences over time.

7.3.2. Methodology

The Learning Alliance tool is based on six areas: 1) Strategic orientation, 2) Business management, 3) Technical services, 4) Financial services, 5) Structure and functionality, and 6) Governance in partnership processes.

Each area, in turn, is disaggregated into five, six or seven sub-areas with questions for each. Each sub-area is evaluated through Likert items from one to five, with one being when the cooperative enterprise does not fulfill the optimal description of the indicator and five when it fulfills it in its entirety.

The baseline assessment applied the original version of the ADA (Learning Alliance) tool developed by Gottret, Junkin and Ugarte (2011). This assessment reported low producer organizations performance levels in all the "Financial Services" sub-areas, particularly among the organizations assisted by CRS and TNS. For example, most of the producer organizations analyzed in the baseline did not carry out financial planning training processes, lacked financial savings skills, showed weaknesses in terms of access and coverage due to the few (if any) services provided, or had failed to introduce client satisfaction feedback mechanisms.

The baseline self-assessment findings informed the design of the organization-strengthening plans for the organization assisted by the project. However, because most of these organizations do not include the provision of financial services within their work focus, activities to strengthen this area were not included in the project framework. For this reason, the evaluation team and consortium partners agreed to exclude the "Financial Services" area from the mid-term evaluation[36], as its inclusion would have misrepresented the actual performance levels achieved by the organizations with the project's support. This measure required the recalculation of the ADA baseline indicators.

For the interpretation of the results and trend analysis, a standard normalization index was constructed for the sub-areas that comprise each area, obtaining percentage values from zero to 100.

[36] CRS is an active member of the Learning Alliance, which created the methodology and tools for the facilitated self-assessment. CRS explained to the evaluation team that the ADA member organizations' directors and partners have the authority to determine which areas should be included in the ADA tool, as defined by the context of interventions and the thematic focus of each project.

$$Normalized\ Indicator = \frac{Current\ Value - Minimum\ Value}{Maximum\ Value - Minumum\ Value}\ x\ 100$$

The score for the areas was constructed through a simple average of the sub-areas that comprise them. Likewise, the overall score, henceforth called the Learning Alliance score, was obtained through a simple average of the five standardized areas considered in this analysis.

$$Score\ by\ Areas = \frac{\sum Sub - areas}{n\ Sub - areas}$$

$$Learning\ Alliance\ Score = \frac{\sum Assessment\ Areas}{n\ Assessment\ Areas}$$

Thus, the tool makes it possible to compare the results of the self-assessments with the results obtained by other rural associative enterprises and among themselves over time. For the evaluation of the tool, the methodology suggests that a score greater than or equal to 70 points places the cooperative in a positive situation.

The consortium partners and the implementing partners, with support from their business technical advisors, acted as facilitators of the process for the baseline and mid-term evaluation but not as evaluators or verifiers. Following the methodology, they formed groups with the boards of directors and the technical, management and administrative teams. Once this phase concluded, a meeting was held where the different groups shared and came to a consensus on the final score for each assessment area.

Information[37] was collected for 17 producer organizations (cooperative businesses) in both baseline and mid-term rounds. Ten producer organizations left the project. Two of them were supported by TNS and LWR. The remaining 8 cooperatives were supported by CRS.

A process of verification of the status of the producers was made for the mid-term. CRS found that there were producers that, although were part of the cooperative businesses selected to be part of the program, were inactive or did not meet all the requirements. Some of the reasons are: 1) they did not live in the community assisted by the program anymore; 2) their value chain was not cattle or cacao; 3) they did not have an interest in participating in the program. For these reasons, CRS decide to exclude these 8 organizations from the Learning Alliance.

[37] The tool also compiles quantitative performance indicators. However, this data is not available for most of the producer organizations. Therefore, these indicators are not evaluated in this report.

The evaluation team reviewed and validated the database and constructed a panel data to analyze the trend in the performance of the producer organizations toward fulfillment of the proposed goals. This identified pending challenges and future actions for improvement in the second part of the project.

7.3.3. Results for Management of Producers Organization

This section analyzes the major results obtained from the application of the Learning Alliance self-assessment tool. It compares the information for the mid-term with the baseline study to identify progress and areas of improvement in the organizational development of the cooperatives.

7.3.3.1. Producers Organization Aggregate Performance

At mid-term, the cooperative businesses assisted by the project had increased their aggregate average ADA score by 5.7 points, bringing it to 47.6 points. The cooperative businesses with the highest scores are *Cooperativa La Pradera* with 71.6 points, *Cooperativa de Servicios Múltiples de Cacao en la Reserva de Indio Maíz (COOSEMUCRIM)* with 66.8 points, and *Unión de Cooperatives (UCA) Ahmed Campos with* 66.5 points. *COMPROMUB* is the cooperative with the lowest score (18.8 points). This same cooperative had one of the lowest scores in the baseline, and its performance level actually dropped at mid-term.

Table 25. General Score AdA
Normalized Indicator

Cooperatives	Baseline	Mid-term	Growth
La Pradera	66.45	71.60	5.14
COOSEMUCRIM	65.57	66.80	1.23
UCA Ahmed Campos	71.27	66.53	-4.74
Nueva Waslala	54.40	64.25	9.86
COODEPROSA	41.54	61.87	20.33
CACAONICA	64.06	59.47	-4.59
COOSEMUP	44.26	54.10	9.84
COOPROCAFUC	59.06	52.32	-6.73
ASIHERCA	32.38	51.73	19.35
COOPROCAR	38.00	45.11	7.11
COOSAGRO	41.58	38.03	-3.55
COOMUNSOL	19.33	37.18	17.84
COOSEMUVIS	32.12	37.01	4.88
COOMUSALWI	18.13	29.34	11.22
COOPELACTME	15.46	29.31	13.85
COMULVAN	14.18	25.89	11.71
COMPROMUB	34.34	18.83	-15.51
Overall Score	41.89	47.61	

Source: Elaboration based on participatory tool ADA, FUNIDES

The only cooperative that obtained a mid-term score higher than the goal of 70 points was *Cooperativa La Pradera*, which had nearly reached this score in the baseline. Although UCA *Ahmed Campos* was the only cooperative with more than 70 points in the baseline report, its mid-term score dropped 4.5 points, due to deterioration in most areas with the exception of "Strategic Orientation."

The cooperatives that showed the greatest growth in comparison with their baselines were *COODEPROSA, ASIHERCA,* and *COOMUNSOL*. Although these cooperatives do not yet surpass 70 points, they have improved their positions significantly. *COODEPROSA* and *COOMUNSOL* improved in all the areas. In contrast, ASIHERCA deteriorated in "Strategic Orientation" and "Structure and Functionality" while growing considerably in the other areas.

Five cooperatives scored lowered at mid-term when compared to baseline (UCA, CACAONICA, COOPROCAFUC, COOSAGRO, COMPROMUB). One possible external factor identified by the consortium partners that can explains this performance is the fall in the price of cacao, which caused the closure of the central of producers. These factors discouraged producers' partners and organizations.

Looking into the different areas, all the cooperatives that scored lower at mid-term, dropped their score in the area of "Governance in Partnership Processes", and 80% of these five cooperatives also dropped their score in "Structure and Functionality".

7.3.3.2. Producers Organization Performance by Area

At the mid-term, none of the aggregate ADA thematic area scores managed to exceed 70 points. "Structure and Functionality" obtained the highest rating with 60 points, while "Technical Services" received the lowest score at 33.8 points.

In terms of comparative growth between baseline and mid-term, "Business Management" stands out with 24.9% improvement. The areas that had the lowest growth are "Structure and Functionality" and "Governance in Partnership Processes," with 7.7% and 7.4%, respectively. In spite of this, these two areas have the highest scores for both assessment periods.

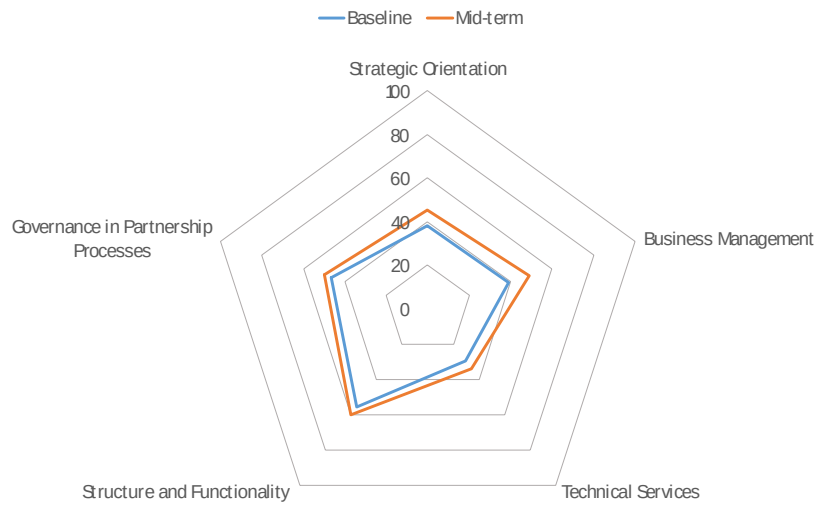
Table 26. Evolution of score per area
All the cooperatives

	Baseline	Mid-term	Growth
Strategic Orientation	38.30	45.11	17.76%
Business Management	39.27	49.07	24.94%
Technical Services	29.61	33.85	14.33%
Structure and Functionality	55.70	60.00	7.71%
Governance in Partnership Processes	46.56	50.02	7.44%

Source: Elaboration based on participatory tool ADA, FUNIDES

The following web graph also presents the aggregate performance by area[38]:

Graph 24. Score per evaluation area- ADA
Comparison between base line and mid-term evaluation



Source: Elaboration based on participatory tool ADA, FUNIDES

The following table presents each cooperative's performance by area.

[38] The area of "financial services" was included by CRS' suggestion only for visual representation. However, as explained before, this area is not part of the analysis.

Table 27. Overall Score per area and chain value
All organizations – Mid-term

		Strategic Orientation	Business Management	Technical Services	Structure and Functionality	Governance in Partnership Processes	Overall Score
Cattle	La Pradera	84.4	73.3	61.0	76.9	62.5	71.6
	COOSEMUP	50.0	70.5	41.7	54.2	54.2	54.1
	COOSAGRO	41.7	51.8	2.4	56.3	38.0	38.0
	COOMUNSOL	28.1	30.3	20.3	59.8	47.4	37.2
	COOSEMUVIS	39.6	48.8	0.0	58.7	38.0	37.0
	COOMUSALWI	29.2	29.3	0.0	55.5	32.8	29.3
	COOPELACTME	25.0	34.5	8.5	37.9	40.6	29.3
Cacao	COOSEMUCRIM	70.8	70.0	54.5	75.1	63.5	66.8
	UCA Ahmed Campos	74.0	65.0	50.5	80.6	62.5	66.5
	Nueva Waslala	65.5	68.6	58.1	71.8	57.3	64.3
	COODEPROSA	58.4	69.6	67.7	60.6	53.0	61.9
	CACAONICA	41.7	58.8	73.1	59.2	64.6	59.5
	COOPROCAFUC	64.3	62.9	29.8	58.6	46.1	52.3
	ASIHERCA	34.9	59.4	45.0	58.3	61.1	51.7
	COOPROCAR	35.4	29.0	38.1	64.2	58.9	45.1
	COMULVAN	17.7	6.3	21.6	51.6	32.3	25.9
	COMPROMUB	6.3	6.5	3.3	40.6	37.5	18.8

Source: Elaboration based on participatory tool ADA, FUNIDES

- Strategic Orientation: Only three cooperatives earned a score higher than 70 points. This is the strongest area for the *La Pradera* and *COOPROCAFUC* cooperatives and the weakest area for the *CACAONICA* and *ASIHERCA* cooperatives.

- Business Management: Only four cooperatives earned a score higher than 70 points. This is the strongest area for the *COOSEMUP* and *COODEPROSA* cooperatives and the weakest area for the *COOPROCAR* and *COOMULVAN* cooperatives.

- Technical Services: As previously mentioned, this is the weakest area; 60% assign their lowest score to this area (10 of the 17 cooperatives) Only *CACAONICA* reports a score higher than 70 points.

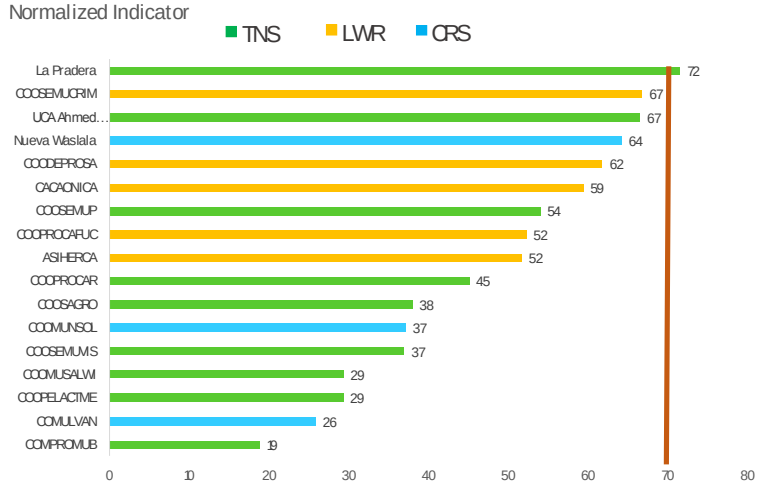
- Structure and Functionality: Approximately 60% of the cooperatives recognize this as their strongest area (10 of the 17 cooperatives earned their highest score in this area.) None of the cooperatives identified this as its weakest area.

- Governance in Partnership Processes: None of the cooperatives earned a score higher than 70 points in this area. This is the strongest area for the *ASIHERCA, COOPROCAR, COOPELACTME* and *COMPROMUB* cooperatives.

7.3.3.3. Producers Organization Performance by Consortium Partner

The cooperatives with the highest scores were assisted by TNS and LWR. The cooperative with the lowest overall score is *COMPROMUB*, which was assisted by TNS. The cooperatives assisted by TNS have a heterogeneous score distribution, and no specific pattern can be found between the highest and lowest performance. Similarly, the score distribution of the few cooperatives assisted by CRS does not present a pattern; they have high, intermediate and low performance ratings. The cooperatives assisted by LWR all have scores higher than 45 points. This result reflects the project's focus, which is to work with cooperatives with heterogeneous performance levels.

Graph 25. Overall Score by Partner



Source: Elaboration based on participatory tool ADA, FUNIDES

Partner's performance in the different areas as well as the factors that have contributed to their change is addressed as follows: as previously stated, the partners assist cooperatives

with widely heterogeneous characteristics. For this reason, while it would be misguided to compare the partners, it is relevant to assess the development of the cooperatives they assist. In the first place, each of the partners strengthened its mid-term ADA score, as compared to the baseline.

Table 28. Comparison among the score per area
Score per area

Partner	Strategic Orientation		Business Management		Technical Services		Structure and Functionality		Governance in Partnership Processes		Overall Score	
	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term
CRS	18.9	37.1	23.4	35.0	17.5	33.4	47.4	61.0	39.3	45.7	29.3	42.4
LWR	55.1	54.0	55.3	64.1	40.1	54.0	62.6	62.4	49.4	57.7	52.5	58.4
TNS	35.4	42.8	35.6	45.4	27.8	22.8	54.6	58.3	47.4	47.2	40.2	43.3

Source: Elaboration based on participatory tool ADA, FUNIDES

By evaluating the partner's scores over time, it can be concluded that CRS represents the partner with the highest overall growth (13.1 points) compared to the baseline. This increase in their score is due to a significant improvement in all areas of the evaluation. The second partner with the highest growth compared to baseline is LWR, with an increase of 5.9 points; it should be taken into consideration that the score declines in the areas of Strategic Orientation and Structure and Functionality (-1.1 and -0.2 points, respectively). TNS is the partner that has the lowest growth in its score (3.1 points); the areas of Technical Services and Governance, decrease -5.0 and -0.2 points, respectively.

Table 29. Score's evolution in time according to partner and area

Partner	Strategic Orientation	Business Management	Technical Services	Structure and Functionality	Governance in Partnership Processes	Overall Score
CRS	18.2	11.6	15.9	13.6	6.4	13.1
LWR	-1.1	8.8	13.9	-0.2	8.3	5.9
TNS	7.4	9.8	-5.0	3.7	-0.2	3.1

Source: Elaboration based on participatory tool ADA, FUNIDES

Performance of the Producers Organizations Assisted by CRS

The business cooperatives supported by CRS grew in all the areas. *"Cooperativa de Servicios Múltiples Nueva Waslala"* obtained the highest overall performance score, although it has not yet reached 70 points.

Table 30. Comparison among the scores per area, according to partner (CRS)
Score per area

	Strategic Orientation		Business Management		Technical Services		Structure and Functionality		Governance in Partnership Processes		Overall Score	
Partner	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term
Nueva Waslala	43.2	65.5	56.5	68.6	50.9	58.1	67.1	71.8	54.3	57.3	54.4	64.3
COOMUNSOL	11.5	28.1	10.0	30.3	0.0	20.3	42.9	59.8	32.3	47.4	19.3	37.2
COMULVAN	2.1	17.7	3.8	6.3	1.5	21.6	32.3	51.6	31.3	32.3	14.2	25.9
Promedio Total	**18.9**	**37.1**	**23.4**	**35.0**	**17.5**	**33.4**	**47.4**	**61.0**	**39.3**	**45.7**	**29.3**	**42.4**

Source: Elaboration based on participatory tool ADA, FUNIDES

At mid-term, the area with the highest rating is "Structure and Functionality," which can be attributed to improved performance in the "Organizational Chart and Functions" and "Legal Status" areas. The area with the lowest score is "Technical Services", although it does show progress in comparison with the baseline. The importance of CRS's emphasizing this area is indicated by the fact that the lowest scores are found in its sub-areas ("Provision of Operational Services" and "Investment for the Provision of Services.")

Table 31. Sub-area with highest score – CRS
Mid- term

Area	Strategic Orientation	Business Management	Technical Services	Structure and Functionality	Governance in Partnership Processes
Subareas with 1st Best Score	Market Competencies	Commercial Management	Access and Coverage	Organizational Chart and Functions 78.7	Organizational Practices
Subareas with 2nd Best Score	Strategic Planification	Economic Analysis	Satisfaction with Technical Services	Legal Status 72.7	Membership and Commitment

Source: Elaboration based on participatory tool ADA, FUNIDES

Table 32. Sub-area with the lowest score – CRS Mid-term

Area	Strategic Orientation	Business Management	Technical Services	Structure and Functionality	Governance in Partnership Processes
Subareas with 1st Worst Score	Business Plan	Administrative Management	Provision of operational services 16.1	Influence on practices and policies	Organizational Competencies
Subareas with 2nd Worst Score	Access and use of information	Management of human Resources and Gender	Investment for the provision of services 17.5	Communication	Conflict Resolution

Source: Elaboration based on participatory tool ADA, FUNIDES

Performance of the Producers Organizations Assisted by LWR

The business cooperatives assisted by LWR show growth in all the areas except "Strategic Orientation" and "Structure and Functionality." The cooperative with the highest overall score is *COOSEMUCRIM* with a score of 66.8.

Table 33. Comparison among the scores per area, according to partner (LWR)
Score per area

	Strategic Orientation		Business Management		Technical Services		Structure and Functionality		Governance in Partnership Processes		Overall Score	
Partner	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term
COOSEMUCRIM	69.3	70.8	72.4	70.0	49.7	54.5	73.9	75.1	62.5	63.5	65.6	66.8
COODEPROSA	47.6	58.4	43.0	69.6	32.0	67.7	47.3	60.6	37.8	53.0	41.5	61.9
CACAONICA	58.3	41.7	58.8	58.8	69.3	73.1	67.2	59.2	66.7	64.6	64.1	59.5
COOPROCAFUC	64.7	64.3	62.9	62.9	45.0	29.8	64.8	58.6	57.9	46.1	59.1	52.3
ASIHERCA	35.6	34.9	39.7	59.4	4.8	45.0	59.8	58.3	22.0	61.1	32.4	51.7
Overall Score	**55.1**	**54.0**	**55.3**	**64.1**	**40.1**	**54.0**	**62.6**	**62.4**	**49.4**	**57.7**	**52.5**	**58.4**

Source: Elaboration based on participatory tool ADA, FUNIDES

The highest average score earned by the cooperatives assisted by LWR is in the area of "Business Management," which assesses administrative, financial, environmental, commercial, technical and communication management. The sub-areas with the highest performance are "Economic and Financial Management" and "Economic Analysis." The areas with the lowest scores are "Strategic Orientation" and "Technical Services," although the latter is the area with greatest growth.

The "Strategic Orientation" sub-areas that reflect the greatest weakness and require further reinforcement are "Strategic Administration Competence" and "Strategic Planning." The weakest "Technical Services" sub-areas are "Investment for the Provision of Services" and "Management for the Provision of Services."

Table 34. Sub-area with the highest score – LWR
Mid-term

Area	Strategic Orientation	Business Management	Technical Services	Structure and Functionality	Governance in Partnership Processes
Subareas with 1st Best Score	Access and use of information	Financial and Accounting Management 76.26	Partnerships for innovation in service delivery	Rules and regulation	Organizational Practices
Subareas with 2nd Best Score	Business Aiances	Economic Analysis 76.2	Access and Coverage	Transparency and accountability	Membership and Commitment

Source: Elaboration based on participatory tool ADA, FUNIDES

Table 35. Sub-area with the lowest score - LWR Mid-term

Area	Strategic Orientation	Business Management	Technical Services	Structure and Functionality	Governance in Partnership Processes
Subareas with 1st Worst Score	Strategic management's Competencies 37.12	Management of human Resources and Gender	Investment for the provision of services 25	Influence on practicies and policies	Organizational Competencies
Subareas with 2nd Worst Score	Strategic Planification 44.75	Commercial Management	Management for the provision of services 30	Communication	Conflict Resolution

Source: Elaboration based on participatory tool ADA, FUNIDES

Performance of the Producers Organizations Assisted by TNS

La Pradera is the only cooperative assisted by TNS that obtained a score higher than 70 points. The cooperatives assisted by TNS reported an average growth in every area except "Technical Services" and "Governance in Partnership Processes".

Table 36. Comparison among the scores per area according to partner (TNS)

Score per area

	Strategic Orientation		Business Management		Technical Services		Structure and Functionality		Governance in Partnership Processes		Overall Score	
Partner	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term	Baseline	Mid-term
La Pradera	74.0	84.4	65.8	73.3	50.0	61.0	74.1	76.9	68.4	62.5	66.5	71.6
UCA Ahmed	74.0	74.0	68.5	65.0	54.3	50.5	83.1	80.6	76.6	62.5	71.3	66.5
COOSEMUP	33.3	50.0	52.3	70.5	45.1	41.7	50.6	54.2	40.1	54.2	44.3	54.1
COOPROCAR	28.1	35.4	15.3	29.0	39.1	38.1	58.1	64.2	49.4	58.9	38.0	45.1
COOSEMUVIS	33.3	39.6	39.8	48.8	0.0	0.0	49.5	58.7	38.0	38.0	32.1	37.0
COOSAGRO	29.2	41.7	33.0	51.8	54.2	2.4	46.3	56.3	45.3	38.0	41.6	38.0
COOMUSALWI	12.5	29.2	15.0	29.3	0.0	0.0	38.1	55.5	25.0	32.8	18.1	29.3
COOPELACTME	12.5	25.0	15.3	34.5	4.0	8.5	25.7	37.9	19.8	40.6	15.5	29.3
COMPROMUB	21.9	6.3	16.0	6.5	3.6	3.3	66.2	40.6	64.1	37.5	34.3	18.8
Overall Score	**35.4**	**42.8**	**35.6**	**45.4**	**27.8**	**22.8**	**54.6**	**58.3**	**47.4**	**47.2**	**40.2**	**43.3**

Source: Elaboration based on participatory tool ADA, FUNIDES

The cooperatives assisted by TNS are strongest in the area of "Structure and Functionality." Their highest performance is in the "Rules and Regulations" and "Organizational Chart and Functions" sub-areas. They are weakest in the area of "Technical Services" and particularly in the "Investment for the Provision of Services" and "Management for the Provision of Services" sub-areas, which are important spaces for improvement.

Table 37. Sub- area with the highest score - TNS
Mid - term

Area	Strategic Orientation	Business Management	Technical Services	Structure and Functionality	Governance in Partnership Processes
Subareas with 1st Best Score	Strategic Planification	Economic Analysis	Partnerships for innovation in service delivery	Rules and regulation 76.3	Organizational Practices
Subareas with 2nd Best Score	Business Aiances	Administrative Management	Provision of operational services	Organizational Chart and Functions 74	Membership and Commitment

Source: Elaboration based on participatory tool ADA, FUNIDES

Table 38. Sub- area with the lowest score - TNS Mid – term

Area	Strategic Orientation	Business Management	Technical Services	Structure and Functionality	Governance in Partnership Processes
Subareas with 1st Worst Score	Business Plan	Management of human Resources and Gender	Investment for the provision of services 14.8	Communication	Organizational Competencies
Subareas with 2nd Worst Score	Strategic management's Competencies	Financial and Accounting Management	Management for the provision of services 19.4	Influence on practicies and policies	Conflict Resolution

Source: Elaboration based on participatory tool ADA, FUNIDES

7.3.3.4. Comparison of ADA's Score with Operational Start-up Date

Most of the lowest-scoring cooperatives, such as *COMPROMUB, COOMULSALWI, COOPROCAR, COOPELACTME, COMULVAN, COOSEMUVIS* and *COOMUNSOL*, have been in operation for less time than the others or are still in the process of starting up. This suggests that years of experience is a factor in the variation of strengths among the cooperatives.

Table 39. Start date of operation[39] and overall score

Cooperatives	Start Date of Operation	Overall Score
COMPROMUB	In Process	18.8
COOMUSALWI	In Process	29.3
COOPROCAR	In Process	45.1
COOPELACTME	2016	29.3
COMULVAN	2016	25.9
COOSEMUVIS	2014	37.0
COOMUNSOL	2013	37.2
La Pradera	2012	71.6
COOSEMUP	2012	54.1
COODEPROSA	2008	61.9
COOPROCAFUC	2008	52.3
Nueva Waslala	2006	64.3
COOSEMUCRIM	2004	66.8
COOSAGRO	2003	38.0
ASIHERCA	2001	51.7
CACAONICA	2000	59.5
UCA Ahmed Campos	1992	66.5

Source: Elaboration based on participatory tool ADA, FUNIDES

An examination of the correlation between the ADA score and the start-up date of the cooperative reveals a coefficient of determination of 42.5%, which indicates that the cooperative's higher performance has a positive correlation with the greater number of years of operation. The following graph better illustrates this affirmation.

[39] The cooperatives for which the start date of operations appears as "In process", refers to cooperatives that are performing some operations but are in the process of legalization before the regulator. These cooperatives were part of the baseline study, so they can also be part of the mid-term evaluation.

Graph 26. Correlation between start date of operation and overall score

Source: Elaboration based on participatory tool ADA, FUNIDES

At least six cooperatives could have trouble advancing quickly in the organizational strengthening process due to their lack of experience. For these cooperatives, the consortium partners should design specific plans that will facilitate greater assimilation of the project-provided services.

7.4. Impact of the Participation and Practices of the Private Sector in Improving Market Links and Income of Smallholder Producers

7.4.1. Introduction

Parties involved in a value chain are linked by an exchange relationship in which each act as a buyer and seller at different stages. For example, while producers are sellers and the cooperatives are buyers in the first link in the chain, the cooperatives are sellers and the companies are buyers in the next link.

The Link methodology has been used within the framework of PROGRESA Caribe. This methodology was developed by the International Center for Tropical Agriculture (CIAT) to evaluate the impact of the program over time on the participation and (inclusive) business practices of the private sector on the different links of the chain.

The Link methodology is based on an innovation process that involves the use of four tools:

1) the value chain map, which helps identify the key stakeholders, processes and services within a value chain and how each interacts with the rest; 2) the business model canvas, which enables the organizations and/or enterprises to identify their current situation as an entity and to identify areas for improvement and/or intervention; 3) the principles for inclusive business models, to determine the level of inclusion in the business between producers and buyers; and 4) the prototype cycle, which unites the previous tools to determine strategies for expansion or to put new innovations into practice to promote the participation of smallholder farmers in the chain. These tools facilitate a better understanding of the major stakeholders, the processes and the relationships within a value chain during the process of innovation in the commercial relationship. This enables all the stakeholders involved to attain greater benefits.

Tool #3 has been applied for the mid-term study to the companies that have worked with the cooperatives targeted by the project. The tool was applied to a total of 10 vendors (cooperative enterprises) and 4 buyers (companies). From the vendor´s side 11 commercial relationships were evaluated and 5 from the buyer's side[40] [41].

Compared to the baseline study, one seller (UCM) and three buyers (CARSA, COAGROPEK, QUEBAR) were not evaluated. UCM withdrew from the project, and the baseline had identified that these three buyers did not meet the criteria for inclusion (they showed no interest in carrying out such an inclusion process) in the Link process.

The consortium partners and the implementing partners, with support from their business technical advisors, acted as facilitators of the process for the mid-term evaluation but not as evaluators or verifiers; the evaluation team carried out the entire process for the baseline.

7.4.2. Methodology

Tool #3 of the Link methodology is a participatory instrument designed to analyze the principles for inclusive business models. The methodology serves a double purpose:

[40] The CACAONICA cooperative assessed its business relationship with the Ethiquetable and Ritter Sport companies. Ritter Sport evaluated its business relationship with the cooperative Nueva Waslala and the other cooperatives that trade cacao and are assisted by the project using this methodology.

[41] The ten sellers mention above are: ACAWAS, ASIHERCA, CACAONICA, COODEPROSA, COOPROCAFUC, COOSEMUCRIM, Nueva Waslala, UCA AHMED Campos, COOSEMUVIS, COOSEMUP. Eleven commercial relationship are established because CACAONICA has commercial relationships with: Ritter Sport and Ethiquetable. The four buyers are Gente del Cacao, Ritter Sport, La Perfecta and Nilac. Five relationship are evaluated, as Ritter Sport has two separate evaluation: 1) Ritter – Nueva Waslala and 2) Ritter – the rest of producers organizations.

helping the buyers as well as the sellers to assess their commercial relations under inclusive criteria and serving as a point of departure in the promotion of the inclusion of small-scale producers in the value chain in which they participate.

This tool assesses six principles:

1. Collaboration among Stakeholders: establishing the level of common goals that exists between buyers and sellers.
2. Effective Market Linkage: evaluating the relations that form among the stakeholders to access market information and quality products.
3. Transparent and Consistent Governance: establishing the level of sharing of the rules of negotiation.
4. Access to Services: measuring the impact of the buyer company in collaborating with the cooperative to access diverse services.
5. Inclusive Innovation: evaluating the joint promotion of innovations in the products and in good practices.
6. Measurement of Results: incorporating customized indicators and monitoring plans to assess the health status of the commercial relations of a for-profit company, as well as its effectiveness in promoting development.

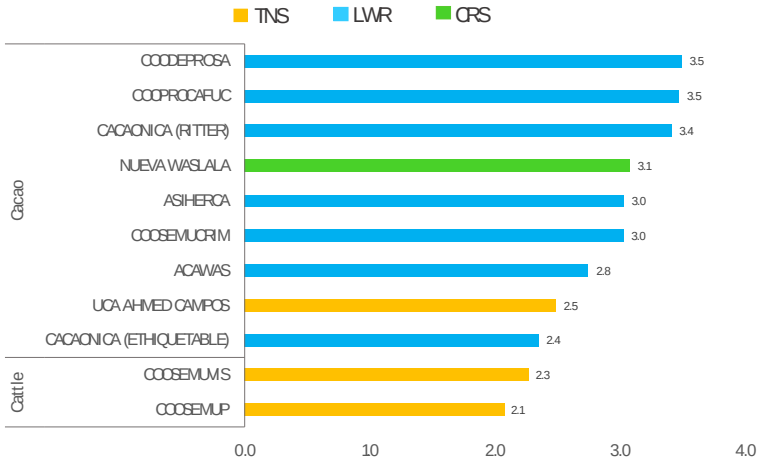
Each principle is disaggregated in sub-indicators and the score for each of the principles in this case, is achieved through self-assessment based on the perceptions of the cooperative's representatives (or the company´s representatives). The score ranges from zero to five, with zero signifying that the parties are in "strong disagreement" with the sub-indicator and five signifying that there is "strong agreement." The scale is designed to not have a neutral score; in other words, each response will have a positive or negative inclination. There are some criteria that may not be applicable (N/A), which depends on the context in which the business model is developed.

7.4.3. Performance Assessment for the Cooperative Enterprises (sellers)

The aggregate average Link score for the cooperative enterprises (sellers) rose slightly (0.4), increasing from 2.5 at baseline to 2.9 at mid-term.

The cacao chain cooperatives with the highest scores are *COODEPROSA*, *COOPROCAFUC* and *CACAONICA* (linked with Ritter Sport), with 3.50, 3.48 and 3.42 points respectively. They are all assisted by LWR. There are only two livestock chain cooperatives, *COOSEMUVIS* and *COOSEMUP*, which earned 2.3 and 2.1 points, respectively, and are assisted by TNS.

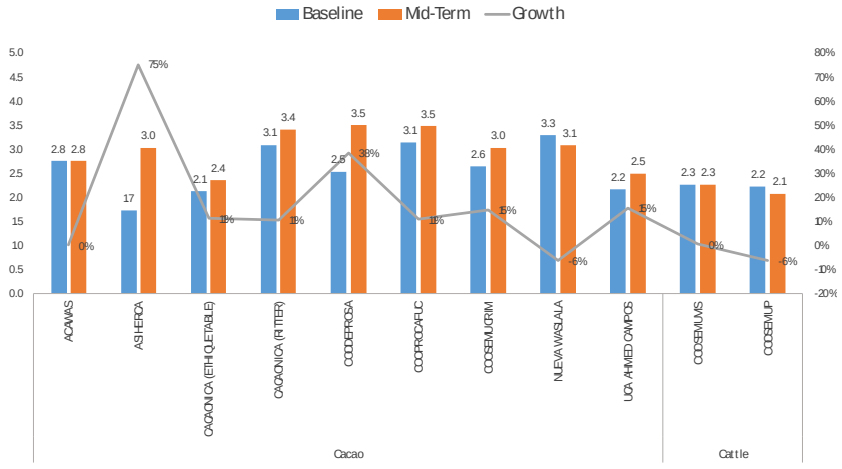
Graph 27. Overall Score by cooperatives and partners
Sellers



Source: Elaboration based on participatory tool Link, FUNIDES

The cooperatives with the greatest baseline-to-midterm growth are *ASIHERCA* (75.0%) and *COODEPROSA* (38.4%), both of which belong to the cacao chain, are linked with Ritter Sport, and are assisted by LWR. Two cooperatives reported a downward trend: *COOSEMUP* (-6.4%), which belongs to the cattle chain, is linked with La Perfecta and is assisted by TNS; and *Nueva Waslala* (-6.3%), which belongs to the cacao chain, is linked with Ritter Sport and is assisted by CRS. The performance of the remaining cooperatives is mixed; for example, *COOSEMUVIS* shows a slight increase (0.5%).

Graph 28. Overall Score - Link
Sellers



Source: Elaboration based on participatory tool Link, FUNIDES

The following heatmap provides further detail on the mid-term results per principle for each cooperative enterprise. The principle "Collaboration among Stakeholders" earned the highest aggregate average score (3.5). In contrast, the principle "Inclusive Innovation" holds the lowest aggregate average score (2.2).

Table 40. Disaggregation by principle, mid-term score Sellers

Value Chain	Cooperative	Collaboration among Stakeholders	Market Linkage	Transparent and Consistent Governance	Access to Services	Inclusive Innovation	Measurement of Results	Overall Score
Cacao	COODEPROSA	4.1	3.4	3.0	2.9	3.6	4.0	3.5
	COOPROCAFUC	3.8	3.8	3.3	2.8	3.6	3.6	3.5
	CACAONICA (RITTER)	3.8	3.8	2.4	2.6	4.3	3.6	3.4
	NUEVA WASLALA	3.4	3.9	3.5	2.6	2.1	3.0	3.1
	ASIHERCA	3.7	2.8	2.0	2.9	3.6	3.2	3.0
	COOSEMUCRIM	3.2	3.6	3.0	2.1	3.6	2.8	3.0
	ACAWAS	3.8	3.3	2.4	1.9	3.1	2.0	2.8
	UCA AHMED CAMPOS	2.9	3.0	3.1	2.4	0.0	3.5	2.5
	CACAONICA (ETHIQUETABLE)	4.2	2.9	2.9	1.9	0.0	2.3	2.4
Cattle	COOSEMUVIS	3.0	2.8	2.5	2.5	0.0	2.9	2.3
	COOSEMUP	2.7	2.7	2.3	1.9	0.0	2.9	2.1
	Overall Score	**3.5**	**3.3**	**2.7**	**2.4**	**2.2**	**3.1**	**2.9**

Source: Elaboration based on participatory tool Link, FUNIDES

- Collaboration among Stakeholders: As was previously mentioned, this is the principle with the highest aggregate score and is the strongest principle for the *COODEPROSA, COOPROCAFUC, ASIHERCA, ACAWAS, CACAONICA* (linked with Ethiquetable) and *COOSEMUVIS* cooperatives. No cooperative identified this principle as its weakest. Although it is the principle with best score, there are still areas for improvement. Specifically, increase the agreement on the environmental objectives established between sellers and buyers, and to exchange information formally and more frequently.

- Effective Market Linkage: This is the principle with the second-highest aggregate score for sellers and is the strongest principle for the *COOPROCAFUC* and *Nueva Waslala* cooperatives. It is not the weakest principle for any of the cooperatives. The areas for improvement in this principle are the joint (sellers and buyers) conservation of environmental resources. Likewise, the frequent review of the seller's position in the market.

- Transparent and Consistent Governance: This principle has an aggregate average score of 2.7, and is not the strongest principle for any of the cooperatives. It is the weakest principle for the *CACAONICA* (linked with Ritter Sport) and *ASIHERCA* cooperatives. The actions that should be taken to improve this principle is to increase the knowledge

on the quality standards demanded by the customers, as well as to share the productive risks with the buyers.

- Access to Services: This principle has an average score of 2.4, which is the second-lowest aggregate score. It was not reported to be the highest performing principle for any of the cooperatives. It was the weakest principle for *COODEPROSA, COOPROCAFUC, COOSEMUCRIM* and *ACAWAS* cooperatives. The areas for improvement suggested by the sellers are the supply of inputs for production and post-harvest and to improve the access to suitable transportations.

- Inclusive Innovation: This principle has the lowest aggregate average score. The *Nueva Waslala, UCA Ahmed Campos, CACAONICA* (linked with Ethiquetable), *COOSEMUVIS* and *COOSEMUP* cooperatives perceive it as their weakest principle. Since it is the principle with the lowest average score, it is necessary to pay special attention to improve in this area. Specifically, the joint innovation with the buyer, and to turn it into a continuous and recurring activity.

- Measurement of Results: This principle has an aggregate average score of 3.1, and is the strongest principle for the *UCA Ahmed Campos.* To improve the score of this principle, it is necessary to implement evaluation processes designed and jointly tested with the customer and to discuss the information generated by the buyer.

The principles "Access to Services" and "Inclusive Innovation" reflect the greatest relative progress in the baseline-to-midterm comparison. These results are very positive in that these principles encompassed the lowest scores in the baseline. The "Effective Market Linkage" principle, which has the second-highest performance level, also showed relatively modest growth. "Transparent and Consistent Governance" is the principle in which the greatest number of cooperatives' performance level dropped.

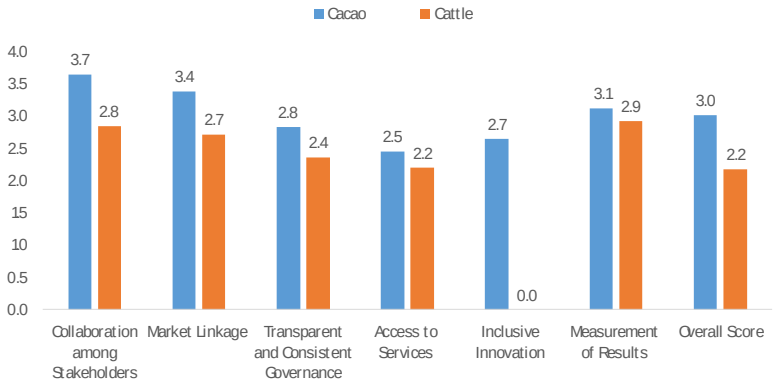
Table 41. Collaboration between stakeholders – sellers
Growth between baseline and mid-term

	Cooperative	Collaboration among Stakeholders	Market Linkage	Transparent and Consistent Governance	Access to Services	Inclusive Innovation	Measurement of Results	Overall Score
Cacao	ASIHERCA	7.78%	56.25%	0.00%	123.08%	*	75.00%	75.35%
	COODEPROSA	0.00%	14.81%	0.00%	107.14%	*	8.33%	38.39%
	UCA AHMED CAMPOS	15.15%	8.00%	5.71%	71.43%	*	6.98%	15.49%
	COOSEMUCRIM	0.00%	14.29%	-1.39%	16.67%	212.50%	-22.12%	14.80%
	CACAONICA (ETHIQUETABLE)	0.00%	4.00%	-4.17%	144.29%	*	15.38%	11.14%
	COOPROCAFUC	0.00%	0.00%	-3.51%	0.00%	108.33%	9.30%	10.86%
	CACAONICA (RITTER)	16.28%	25.93%	-12.92%	13.04%	15.38%	3.30%	10.52%
	ACAWAS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	NUEVA WASLALA	-16.98%	6.06%	27.27%	-16.13%	-40.00%	15.38%	-6.32%
Cattle	COOSEMUVIS	8.33%	0.00%	-15.63%	13.64%	*	0.00%	0.56%
	COOSEMUP	2.94%	-7.69%	-3.85%	-34.48%	*	15.15%	-6.40%

** Indicates that there are no variations in the percentage growth, since the cooperatives in baseline report a score of 0.
Source: Elaboration based on participatory tool Link, FUNIDES

For the cacao chain, the principles showing greatest relative strengthening at midterm are "*Collaboration among Stakeholders*" (3.7) and "*Effective Market Linkage*" (3.4). The greatest weakness was identified in "*Access to Services*" (2.5). For the livestock chain, the strongest principle is also "*Collaboration among Stakeholders*" (2.8), while the weakest is "*Inclusive Innovation*" (0). The following graph shows each chain's average score for each principle.

Graph 29. Disaggregation comparison by principle and value chain
Sellers



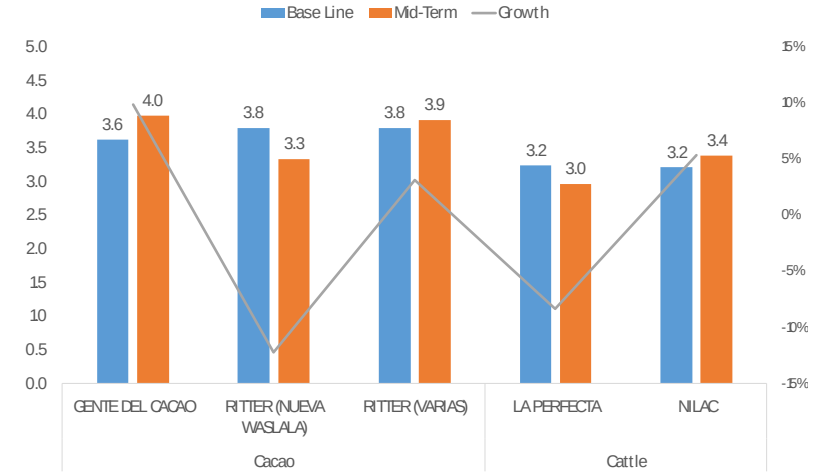
Source: Elaboration based on participatory tool Link, FUNIDES

7.4.4. Performance Assessment for Businesses (buyers)

The assessment of the general score from the buyers' perspective reflects a downward or low-growth trend in all the businesses for both chains. The buyers who report slight increases are *Gente del Cacao* (0.4 points), *Ritter Sport* in its business relations with some of the cooperatives (0.1 points) and *Nilac* (0.2 points). For its part, *Ritter Sport* reported declines in its business relations with *Nueva Waslala* in the period under study. The lowest

midterm scores were observed in *La Perfecta* (2.9), in *Ritter Sport* in its business relationship with *Nueva Waslala* (3.3), and in *Nilac* (3.4). This suggests there is much room for improvement in inclusive business relations.

Graph 30. Overall Score- LINK Buyers



Source: Elaboration based on participatory tool Link, FUNIDES

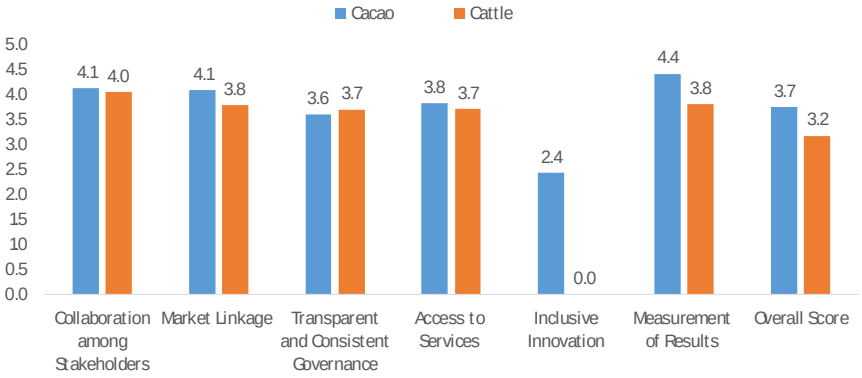
Table 42. Disaggregation by principle, mid-term score Buyers

	Cooperative	Collaboration among Stakeholders	Market Linkage	Transparent and Consistent Governance	Access to Services	Inclusive Innovation	Measurement of Results	Overall Score
Cacao	GENTE DEL CACAO	4.23	4.78	4.00	4.40	1.43	5.00	3.97
	RITTER (NUEVA WASLALA)	3.85	3.25	3.58	3.33	2.14	3.85	3.33
	RITTER (VARIAS)	4.27	4.22	3.21	3.70	3.71	4.38	3.92
Cattle	LA PERFECTA	3.69	3.33	3.73	3.40	0.00	3.62	2.96
	NILAC	4.38	4.22	3.67	4.00	0.00	4.00	3.38

Source: Elaboration based on participatory tool Link, FUNIDES

Within the cacao chain, the companies consider that their business relations have been most strengthened in the principles "Measurement of Results" (4.4), "Collaboration among Stakeholders" (4.1) and "Effective Market Linkage" (4.1). The lowest performance level is observed in "Inclusive Innovation" (2.4). Within the livestock chain, "Inclusive Innovation" (0.0) is the weakest performing principle as well. "Collaboration among Stakeholders" (4.0) shows the highest performance level. The aggregate average scores are shown by chain in the following table.

Graph 31 Disaggregation comparison by principle and value chain
Buyers



Source: Elaboration based on participatory tool Link, FUNIDES

The baseline-to-midterm comparison of chains by principle yields different results. For example, the performance levels of *Nilac* and *Ritter Sport* (in its business relations with *Nueva Waslala*) dropped in nearly all the principles, while *Gente del Cacao* and *La Perfecta* experienced growth in almost all areas. No systematic growth patterns can be identified for a specific area, reflecting the heterogeneity among the business relationships analyzed from the buyers' perspective.

Table 43. Collaboration between stakeholders – Buyers
Growth between baseline and mid-term

	Buyers	Collaboration among Stakeholders	Market Linkage	Transparent and Consistent Governance	Access to Services	Inclusive Innovation	Measurement of Results	Overall Score
Cacao	GENTE DEL CACAO	17.02%	0.00%	2.33%	0.00%	*	0.00%	9.84%
	RITTER (VARIAS)	4.72%	5.56%	-1.97%	0.00%	8.33%	1.79%	3.13%
	RITTER (NUEVA WASLALA)	-5.66%	-18.75%	9.49%	-9.91%	-37.50%	-10.71%	-12.22%
Cattle	LA PERFECTA	3.64%	5.56%	9.01%	5.26%	*	4.00%	5.37%
	NILAC	-9.43%	-6.25%	-2.38%	-17.07%	*	-6.00%	-8.40%

** Indicates that there are no variations in the percentage growth, since the cooperatives in baseline report a score of 0.
Source: Elaboration based on participatory tool Link, FUNIDES

It is important to remark that Lala, a large mexican company, purchased La Perfecta during the evaluation period. The company restructured its operations and changed key staff. This influenced the relationship with the cooperatives assisted in the program. For example, Lala/La Perfecta reduced the commercialization with different cooperatives, including those assisted in the program, afecting negatively the perception in the Link evaluation.

8. Conclusions and Lessons Learned

PROGRESA Caribe is an agribusiness program that has thus far been implemented over 18 months (October 2015-April 2017) in consortium by Catholic Relief Services (CRS), TechnoServe (TNS) and Lutheran World Relief (LWR). The program aims to strengthen the value chain of cacao and livestock (dual purpose) in the Caribbean Coast of Nicaragua and Río San Juan. The program benefits more than 4,000 smallholder producers from 13 municipalities. The program also works on the strengthening of 17 producer organizations and associations, and in the promotion of 11 commercial relationships under inclusive business models.

The project activities are aimed at fulfilling two strategic objectives: 1) increase agricultural and livestock productivity and 2) expand trade of cacao and cattle products. The long-term outcome of the program is to increase the income of the producer families and reduce poverty in the intervention areas.

Relevance of the Program

The program takes into account the economic and political context. It targets RACCN, RACCS and Río San Juan, which are areas with a high incidence of poverty and historically, they have received fewer resources for socio-productive projects. The beneficiaries are producers who work on dual-purpose cattle, cacao or both chains, and whose production is fundamental to their livelihood strategy. These value chains have high regional impact, not only because of their high presence in the area, but also because of their potential growth in demand for workers. According to data of the National agricultural census (2010), the Caribbean Coast accounts for 39% of the country's cattle and 53% of the area planted with cacao.

The program also considers the cultural context. The specific activities stipulated in the original agreement between CRS and USDA changed slightly in part because, once on the ground, the consortium partners identified that minor adjustments should be made in some activities to better fit the context of the different areas of intervention. The evaluation team considers that the modifications made to the activities should not diminish the expected results. To the contrary, the adaptation to the context of the different areas of intervention should enhance the results.

During its first stage, the program met the needs of the project beneficiaries. The results of the beneficiary satisfaction survey of the early treatment group reveals a positive assessment in all the types of interventions. The intervention approach is diverse, involving approximately 10 major activities, ranging from technical assistance, training, field schools, exchange trips with farmers, to participation in trade fairs. However, as the

beneficiary satisfaction survey demonstrates, each consortium partner works with different combination of interventions. This implies that some interventions are not implemented by all consortium partners. The consortium partners explained that the intervention approach is diverse due to the territorial extension of the program (more than 200 communities in 13 municipalities). This approach creates a heterogeneity among the producers in terms of the impact of the assistance provided, which should be examined very closely when learning is assessed at the final evaluation.

The program fits within the Government of Nicaragua's economic and agricultural development policies and programs. The Caribbean Coast is a region of high interest for the Government and PROGRESA's components are in accordance with other programs executed by the Government with funding from international cooperation agencies. For example, NICADAPTA, which is executed by MEFCCA.

Effectiveness and Impact of the Program

As for the effectiveness and impact of the program, the evaluation team considers that the project is on track to meet the development objectives. Farmers' productivity for dairy/beef products increased compared to the baseline, both in milk and in the weight of live cattle. Cacao yields fell in both the North Caribbean Coast and Río San Juan, for both early and late treatment, in part to the negative effects of Hurricane Otto, which occurred in late November 2016. Cacao plantations currently in production are a combination of old producing trees and some very young replacements, and therefore are more vulnerable to exogenous factors and require more attention from farmers and will take longer than 18 months to come into full production potential.

At the mid-term, there are no statistically significant changes in farmers' productivity of the early treatment compared to the late treatment. Nevertheless, the evaluation team considers that this result is expected as productive yields do not change so rapidly in just 18 months of intervention.

At the project level, there is an increase in the total value of cacao and livestock production of the early treatment group. This suggests that low performances are offset by high performers, mainly from larger producers and in live cattle production. These results were determined by revenue growth in both value chains. In relative terms, the increase in income was greater for cacao. The increase in income at the project level was due to a positive (relative) change in the production volumes of all items (mainly cacao) and increases in the price per of liter of milk and livestock.

At average producer level, even when there is no effect of the intervention at the mid-term in the livestock income, there is a reduction in livestock production costs due to the

intervention. The incomes from sales only grew (in statistical terms) for the case of cacao due to a higher volume of average production. In fact, there is an increase in income for the early treatment due to the intervention compared with the evolution of the late treatment. This positive change in cacao income is accompanied with an increase in cacao cost (more than 40 percentages points). The evaluation team considers that this increase in the production costs is reasonable because: 1) cacao producers are relatively new in the value chain and therefore are learning from the project to improve their production cost records, which makes the information more truthful; and 2) the producers have invested in new productive technologies that naturally push up the production costs.

Consistent with these results, in the cattle value chain, there is an increase in the gross margin of the early treatment due to the intervention compared with the evolution of the late treatment. This is due to a considerable reduction in production costs for the early treatment. At the project level, the margins for both chains have grown considerably compared to the baseline. Nevertheless, at mid-term, 45.6% of the producers assisted in cacao in the early treatment group have positive margins. This suggests that there is still much room for improvement for the second stage of the program in the cacao chain, as the increase in net income was higher for the relatively larger cacao growers.

PROGRESA Caribe´s theory of change states that if program activities as a whole improve agricultural productivity and if trade in dairy products and/or beef and cacao is increased, the income of farmers' families will be increased, and a contribution will be made to poverty reduction in the areas of intervention. Compared to the baseline, the results indicate that for early treatment households' poverty was reduced by 3 percentage points at the mid-term. Also, the calculations show that the incidence of poverty was reduced in those households of the early treatment with greater economic vulnerability. There is an increase for the early treatment in the number of months of adequate household food provisioning. But, at the mid-term no statistically significant changes are found due to the intervention in poverty and food security.

These results are expected since changes in welfare mostly take place in the long term. Moreover, poverty changes are a combination of several factors. The evaluation team considers that positive changes in welfare due to the intervention will be found at the final evaluation of the program.

Sustainability

Sustainability of the actions might be affected by the context of low educational levels in the intervention area, the limited time to continue promoting the process for awareness and change in the behavior of the producers, and the heterogeneous attention to the producers. These latter two aspects are due to budgetary limitations.

The evaluation team considers that there is room for the achievement of greater yields and income from production. An important element is the knowledge that will be transfered to the producers and producer organizations over the remaning course of the program.

Other similar experiences in Nicaragua (for example, PROGRESA Norte) suggest that PROGRESA-style programs should have a minimum duration of five years, and between six and seven years to achieve significant changes at producer and producer organizations levels.

As the mid-term evaluation did not include field work, the evaluation team was not able to explore if the implementing partners are developing a sustainability strategy. The evaluation team suggest that this should be addressed by the consortium partners during the second stage of the program.

Efficiency of the Program

The evaluation team considers that it is not possible to explore whether the same results could have been obtained with fewer resources or alternative approaches during the first stage, for several reasons: 1) the program made adjustments in the original activities to better fit the context of the different areas of intervention, 2) the activities delivered by the program are not the same for the all the producers served, given that the intervention approach was planned in this way, and 3) negative exogenous factors took place at the end of 2016 (Hurricane Otto), especially in Río San Juan. Furthermore, there was no comparison project with a design, context and situation similar to the one experienced in PROGRESA Caribe.

The first issue discussed above is a very important aspect of efficiency. The evaluation team considers that the modifications made to the activities should not diminish the expected results. To the contrary, the adaptation to the context of the different areas of intervention should enhance the results.

Efficient strategies were implemented in terms of financial and human resources. In financial terms, a cost-share system was designed for the provision of goods for production so that it was possible to double the goods delivered compared to the original plan. This system provided a subsidy of between 50% and 80%, depending on the type of asset, the value chain, and the stratum of the producer. Even more important, this strategy helped encourage the producers to value the investment and put more effort into the production activity.

In terms of human resources, the program strove to provide more coverage to the beneficiaries through workshops for groups of producers, farmer field schools and informational talks. Nevertheless, it cannot be stated whether this strategy had a differentiated impact (whether it diluted the effects or not), as there was no comparison group attended exclusively in an individual manner.

Regarding the monetization process, despite a recent problem with the freight company, the evaluation team does not have any objection that CDSO continue to be the first option for the next and final sale. CRS is planning to include additional clauses into their sales and freight contracts to protect themselves against future problems during the process of monetization.

Good Agricultural and Commercialization Practices

The application of agricultural practices reflects the knowledge, skills and abilities that the farm families acquire either on their own or by the effect of the intervention. The application of these practices reflects the human capital of the producers.

For most of the cases, the proportion of producers applying different types of practices evaluated in cacao and/or cattle has increased or at least remained or are relatively constant.

In cattle, there is notable increase in the following practices: dehorning, rotation of pastures, clean milking and cattle identification. These last three practices are promoted under the program. Other important practices in cattle are improved management and sustainable agricultural practices. Both remain constant at mid-term and the percentage of producers applying these practices is above 80%. In cattle feeding practices, the proportion of producers that use mineral salts and molasses show a significant increase.

In cacao, there are significant changes in the proportion of producers practicing: rehabilitative pruning, eliminating buds, integrated pest management (IPM), weed control and disease control. The fertilization and soil conservation activities, which are promoted under the program, show no relevant changes in the proportion of producers who carry out this type of practice. These results suggest that the consortium partners should make greater efforts to encourage the implementation of these practices among the beneficiaries of both the early and the late treatment.

Farm management practices are one of the activities that the program emphasizes the most. As compared with baseline and the late treatment, there are substantial increases in the percentage of producers of early treatment, in both cacao and cattle, that contribute to costs, have savings or investment budgets, who manage debt, record sales, keep track of

livestock inventory, and keep records on costs and production. This important progress is due to the effort made by the program in its initiative to develop farm plans. The evaluation team considers this result to be highly positive and one of the most important, considering that only 18 months of activities have passed and that the program is carried out in a context of low educational level among its beneficiaries.

This does not imply that there is no room for improvement in the adoption of farm management practices, but rather the opposite, since the indicator with the highest proportion of producer performance (control of livestock inventory) is below 30%. In this context, the evaluation team suggest that the consortium partners make a qualitative evaluation of the difficulties faced by the producers in the implementation of the farm plans and alternatives to overcome them. One option might be to integrate youth - who are likely to have higher educational levels - into farm management activities.

On the other hand, it is important to mention that the evaluation team found that there is no clear association between the categories of yields analyzed and the practices carried out by producers - which are promoted by the program. The evaluation team considers that this result could be due to a weakness in the measurement of the performance indicator of practices. At the moment, this indicator only counts the practices that the producer is considering in carring out, without checking if farmers actually do or not. In addition, it is important to incorporate two additional indicators: 1) the intensity on the application of the practice, measured as the number of months that the producer has applied the practice; and 2) an indicator of performance quality of the practice.

Finally, the program promotes the marketing of production through producer organizations. Despite this, most livestock production is marketed in the local market or with local traders. For cacao, most of the production is marketed in the local market or through cooperatives. No relevant changes are identified in livestock and cacao marketing mechanisms at mid-term. The evaluation team suggests that the consortium partners examine in greater detail why the marketing mechanisms under the program are so rigid. A relevant point is to analyze if the program has supported the marketing of all the beneficiaries equally.

Business Models in Value Chains and their Impact at the Level of Producers and their Organizations

- *ADA*

- The average overall score of ADA increased by 13% compared to the average score recorded in the baseline.

- Overall, the strongest areas at the mid-term evaluation are "Structure and Functionality" and "Governance in Partnership Processes". This indicates that, in general, the cooperatives are doing well in terms of legal composition, distribution of duties, and in their business relationship.
- The area with the lowest score is "Technical Services". In this specific area, the consortium partners need to improve, specifically in the investment and management for the provision of services.
- The areas that experienced the biggest growth at the mid-term compared to the baseline are "Strategic Orientation" and "Business Management". On the other hand, the areas that experienced the smallest growth are "Structure and Functionality" and "Governance in Partnership Processes".
- The cooperatives with lowest scores are the newest ones, with recent star-up entry into operations, this indicates that the cooperative's higher performance has a positive correlation with the greater number of years in operation.
- Five cooperatives scored lower at mid-term when compared to baseline (UCA, CACAONICA, COOPROCAFUC, COOSAGRO, COMPROMUB). One possible external factor identified by the consortium partners that can explain this performance is the reduction in the price of cacao and an unsustainable price-differential, which caused the closure of one of the umbrella association of producers (UCM). Additional efforts must be made for these cooperatives to regain the growth path.

The evaluation team considers that 9 out 17 cooperatives (those above 50 points) could reach the score of 70 points at the final evaluation. For the remaining cooperatives, whose baseline results were extremely low, a positive achievement reaching at least 50 points should be expected in the final evaluation.

LINK

- Overall, the principle with a better score was "Collaboration among Stakeholders" and the principle with the worst score was "Inclusive Innovation".
- The principles with the biggest growth compared to the baseline were "Access to Services" and "Inclusive Innovation". These were the principles with the lowest scores in the baseline, which is an indicator of the impact of the results in good practices.
- The value chain that had the biggest growth is cacao, this is partly because Ritter Sport has been an active player in the inclusive business processes.
- For the cacao value chain, the principles with the highest score were "Collaboration among Stakeholders" and "Market Linkage". The greatest weakness was "Access to Services".
- For the cattle value chain, the highest strength is "Collaboration among Stakeholders" and the greatest weakness is "Inclusive Innovation".

- The overall score from the buyer's perspective shows a decreasing trend, or small growth in all organizations and in both value chains. This implies that the consortium partners must work more closely with the companies in order to achieve better future outcomes in terms of inclusiveness.

There is a lot of space for improvement, especially in cattle and in the areas of inclusive innovation and access to services.

Program Monitoring System

PROGRESA Caribe monitoring and evaluation system is a latest generation system and uses a series of complementary tools that provide better information management and ensure better quality while reducing measurement errors in the ongoing monitoring (campaigns) and the evaluation rounds. For data collection, the system includes user guides, pilot tests, and creation of roadmaps for information gathering. Also, systematic review protocols were prepared for data filters and consistency in the different data modules, which allowed measurement errors to be reduced and ensured the quality of information management.

The quality of the data for the mid-term evaluation is much better than the baseline data. This suggests that the consortium partners put into practice the recommendations and lessons learned from the baseline.

Although the available information is of very good quality, there are considerable differences among the consortium partners, the implementing partners and even the field technicians themselves in the ability to conduct the survey. In this regard, it could be thought that the training process for conducting the survey did not have the same impact upon all the field technicians. However, the evaluation team considers that the differences in capacity are due to two factors: 1) the field technicians' training, given that many of them have empirical knowledge and have had limited previous exposure to the use of digital tools; and 2) the turnover of field technicians among some partners has led to a loss of the knowledge that had been gained during the baseline study.

This led to twice as many revisions being made in this evaluation, as compared to the baseline, to ensure the quality of the final data that would be analyzed. The evaluation team suggests improving the hiring process of the field technicians. For example, CRS should prepare an exam for each applicant; the exam can be divided in three parts: technical skills, soft skills and critical thinking. Also, training for the data collection should focus on the field technicians exercising greater "critical thinking" during the survey.

On the other hand, there are aspects of the system management that should be considered in the continuous improvement processes:

- Improvements in the digital data collection surveys should not be made at the cost of losing elements for comparison with previous rounds. It is important to maintain harmonization in the questionnaires and the evaluation period of the different evaluation rounds.
- Improve the identification of the value chains to which the producers belong.
- Create a change to the protocols in the digital surveys to improve the supervision of the surveyors.
- Identify why some information was collected for – a few – producers whose identifiers did not match the master of the evaluation sample.
- Although it was appreciated that the data quality control applied by the CRS MEAL team is based on expert judgement, it took more time than planned. It is recommended that part of the quality control be performed in specialized statistical programs to catch measurement errors more quickly (for example, Stata or R).
- Develop explicit rules for consistency in the analysis of the databases.
- The variable of average cattle weight is measured based on the producer's perception. The evaluation team considers that this variable may have a bias, although uncertain in wether the producer´s perception in estimating the weight of cattle would be higher or lower than the true weight. Nevertheless, the data on number of animals and their mean weight in kilograms is collected by sex, age class and predominant breed. This disaggregation might reduce to some extent the potential measurement error.

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Annex

Change in the activities of PROGRESA Caribe

Original text from the cooperative agreement Attachment A	How the activity is developed or would be developed during the life of the program	Proposed adjustments pending USDA approval
Capacity Building: Trade Associations *CRS will assist with the formation of, and strengthen existing non-profit and for-profit national trade associations for both cacao and livestock products. CRS will integrate trade associations into existing value chains, facilitate value chain discussions and collaborations, provide training in value chain analysis, manage each link in the chain, and assist with forging relationships with business actors. CRS will assist trade association stakeholders to develop competitiveness plans and advocate for support of those plans from secondary actors such as the government, universities, investigative centers, and service providers. CRS will help trade associations to increase the quantity and timeliness of market information for their members, including pricing trends, sales volumes, buyer tenders, and quality requirements.*	CRS will assist the strengthening of existing non-profit national trade associations that promote cacao and dairy products. CRS will integrate non-profit trade associations into the existing value chains. For example, it is working with FAGANIC and CONAGAN to strengthen their linkages and services to local cattle associations. It is also working with APEN and CANICACAO with cacao farmers and their cooperatives. CRS will also facilitate value chain discussions and collaboration between the actors linking the different levels in the chains through the participation in fairs, congresses, and commercial missions. Additionally, CRS will assist trade association and cooperative stakeholders to develop competitiveness plans and advocate for support of those plans from secondary actors such as the government, universities, investigative centers, and service providers. CRS will help trade associations and cooperatives to increase the quantity and timeliness of market information for their members including pricing trends, sales volumes and quality requirements.	CRS proposes not assisting with the formation of new non-profit and for-profit national trade associations since the program has found at mid-term that it is more efficient to strengthen those that already exist such as CANICACAO, APEN, CONAGAN, and FAGANIC. In addition, at mid-term, CRS proposes to not directly "manage each link of the value chain", but to instead "facilitate linkages between the different levels of the chain".
Financial Services: Facilitate Agricultural Lending *CRS will establish a loan facilitation fund that helps buy-down financial institution risk, yielding more affordable interest rates. This fund may be used for partial loan guarantees, co-financing of collateral, buy-down of interest charges, and the co-investment in private-private partnerships. CRS will also train producer cooperatives in the basic business skills necessary to obtain formal credit, including improved*	CRS will promote the co-investment in private-private partnerships. CRS will also train producer cooperatives in the basic business skills necessary to obtain formal credit, including improved record keeping, basic production and business plans, and the preparation of bankable loan dockets. Additionally, CRS will coordinate with microfinance agencies to facilitate relationship building with producer cooperatives and help them to develop and offer appropriate loan products that will	As discussed previously with USDA representatives, CRS proposes eliminating the activity related to the loan facilitation fund due to budget cuts at the beginning of the project. The original intent of the fund was to lower risk for financial institutions to invest in small-scale farmers. Even without the fund, we have found that presence of the program team in the field and the program´s

record keeping, basic production and business plans, and the preparation of bankable loan dockets. Additionally, CRS will coordinate with microfinance agencies to facilitate relationship building with producer cooperatives and help them to develop and offer appropriate loan products that will meet the needs of the producer organizations.	meet the needs of the producer organizations.	support for the activities at the farm level has helped to lower the perception of risk that the financial institutions have regarding program participants.
Infrastructure: Post-Harvest Processing *CRS will facilitate the construction and improvement of post-harvest cocao processing infrastructure including fermentation trays, drying tunnels, and ovens through direct investments, co-investments with private companies, assisting with obtaining credit for equipment purchases, and providing technical training. CRS will also develop dairy cold chains, chilling stations, producer-level milking rooms and handling equipment, smaller milk collection centers closer to target producers, and improved cheese processing equipment by co-investing with producer cooperatives and private investors.*	CRS will facilitate the construction and improvement of post-harvest cacao processing infrastructure including fermentation trays, drying tunnels, and ovens through direct investments, co-investments with private companies, assisting with obtaining credit for equipment purchases, and providing technical training. CRS will also develop chilling stations at farm level, producer-level milking rooms and handling equipment, smaller milk collection centers closer to target producers, and improved cheese processing equipment by co-investing with producer cooperatives. The effort will focus on investments in milking rooms at the farm level and developing collection centers through co-investment between private companies and cattle farmers' associations or cooperatives. The program will invest in small cheese processing equipment in order to provide the cooperative with the opportunity of utilizing raw milk when the companies (LALA or NILAC) are not able to get to the collection center due to extreme weather or other events.	At mid-term, CRS proposes to not develop dairy cold chains. Private companies are establishing this kind of facility with their own funds in the area where they buy raw milk. New investments in the dairy cold chain depend on the demand of raw milk and while prices are low there is not much incentive for farmers to co-invest in this particular intervention.
Inputs: Develop Agrodealers and Other Input Suppliers *CRS will assist producer organizations and associations with obtaining working capital to develop supply infrastructure, purchase inputs, and build business*	CRS will assist producer organizations and associations with obtaining working capital to develop supply infrastructure, purchase inputs, and build business relationships with input suppliers to obtain inputs on	CRS does not propose changes in this activity.

relationships with input suppliers to obtain inputs on credit. Additionally, CRS will identify individual producer input and service needs and negotiate for an entire group in order to increase bargaining power and reduce the cost of acquiring inputs.	credit. Additionally, CRS will identify individual producer input and service needs and negotiate for an entire group in order to increase bargaining power and reduce the cost of acquiring inputs.	
Inputs: Increase Access to Improved Genetic Material *CRS will establish cacao nursery and plant propagation sites within producer cooperatives and small private enterprises in order to increase the availability of improved genetic material in target municipalities. CRS will provide technical assistance, facilitate access to finance for start¬ up costs, and train nursery enterprises in basic business management skills. For the cattle value chain, CRS will improve bull breeding, expand stud farms, and promote the use of artificial insemination services by training independent specialists in improved techniques, small business management skills, and for-fee services to cattle producers.*	CRS will establish cacao nursery and plant propagation sites within producer cooperatives and small private enterprises in order to increase the availability of improved genetic material in target municipalities. CRS will provide technical assistance, facilitate access to finance for start-up costs, and train nursery enterprises in basic business management skills. For the cattle value chain, CRS will promote the use of artificial insemination services by training independent specialists in improved techniques, small business management skills, and for-fee services to cattle producers.	As discussed previously with USDA, CRS proposes eliminating the bull-breeding activities and expanding stud farms. Given the realities on the ground and time it takes to do bull breeding and expand stud farms, CRS believes that it is better to focus on training farmers to use better criteria for the selection of bulls on their farms or the purchase of new animals that are going to be used as studs.

Source: CRS.