TECHNOSERVE
BUSINESS SOLUTIONS TO POVERTY

FINAL EVALUATION REPORT

Sustainable Agriculture Improvement Project (MAS)






September, 2017

CONSORCIO EJECUTOR

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ACRONYMS AND ABREVIATIONS

Abbreviations	Definition
AFS	Association of Seed Funds
AHPROCAFE	Honduran Association of Coffee Producers
ANACAFEH	National Association of Coffee Growers in Honduras
CSB	Community Seed Bank
BID	Inter-American Development Bank
BM	World Bank
BSR	Beneficio Santa Rosa
CAP	Knowledge, Attitude, Practice
CC	Chain Coordinators
CE	Training Coordinator
CG	Control Group
CRAC	Savings and Credit Groups
DICTA	Agricultural Science and Technology Directorate
ECLAC	Economic Commission for Latin America and the Caribbean
CT	Community Trainer
FAO	United Nations Food and Agriculture Organization
FUNDER	Foundation for Rural Development
FE	Final Evaluation
FG	Focus Group
FS	Field School
GAP, GP	Good Agriculture Practices
HCB	Honduras Central Bank
GoH	Government of Honduras
Kg or kg	Kilogram
Ha or ha	Hectare
IHCAFE	Honduran Coffee Institute
IHMA	Honduran Agriculture Marketing Institute
HRNS	Hans R. Neumann Stiftung
INE	National Statistics Institute
BL	Base Line
L or l	Liter
MAS	Sustainable Agriculture Improvement (Project)
MdH	Molinos de Honduras
MSU	Michigan State University
MTE	Mid-term Evaluation
Mz or mz	Block of land
PO	Producer Organization
PH	Wet parchment
PI	Producers assisted by MAS Project
PROGRANO	National Association of Stable Grain Producers
Qq or qq	Quintal **(100 lbs)**
RED PASH	Network of Artisanal Seed Producers of Honduras
TOR	Terms of Reference
MT	Metric Ton, 1000 kilograms
UNA	National Agriculture University
UNAH	National Autonomous University of Honduras
US	United States
USDA	United States Department of Agriculture
SAG	Ministry of Agriculture and Livestock

SERNA	Ministry of State in the Dispatch of Natural Resources and Environment
WFP	World Food Program

EXECUTIVE SUMMARY

This document is the report for the final evaluation of the Sustainable Agriculture Improvement (MAS for its acronym in Spanish) Project. The United States Department of Agriculture (USDA) funded and TechnoServe (TNS) implemented the MAS program, to provide assistance to 9, 000 smallholder and medium coffee and bean producers in the departments of Comayagua, Francisco Morazán, El Paraiso, Yoro and Olancho.

The Final Evaluation (FE) methodology consisted of a quantitative and a qualitative analysis – comparing producers in the coffee and bean chains benefited by the MAS Project versus a Control Group (CG), the Mid-Term Evaluation (MTE) and the Base Line (BL). The methodology sought to validate changes observed in the producers with respect to the following variables: level of organization, productivity, sales, adoption of good practices, funding and sustainability of results.

The main findings of the evaluation are summarized below:

The Statistic Variance Analysis (ANOVA) showed that the differences in the level of adoption of good practices among MAS producers and the CG were significant; therefore, they can be attributed to the MAS intervention. MAS producers showed a medium to very high level of adoption (with the adoption of six or more good practices). On the other hand, CG producers showed medium to very low adoption (they adopted 6 or less good practices).

In terms of the significance tests and in comparing the yields from the first (*primera* in Spanish) 2016 bean harvest between MAS producers and the CG, there was a significant statistical difference with a level of confidence of 95%. The result validates that the difference is due to the assistance from the MAS Project.

MAS helped producers achieve yield improvements in both coffee and beans. The evaluators observed that MAS coffee producers obtained 47.1 QqPH/Ha in the 2016-2017 harvest, in comparison with 31.9 QqPH/Ha obtained by the CG during the same period, and achieved an increase in yields of 55% with regard to the BL, in which the producers obtained 30.4 QqPH/Ha in 2012-2013.

In the bean value chain's first harvest, MAS producers obtained 20.7Qq/Ha in the 2016-2017 harvest, in comparison with the 17.9 Qq/Ha obtained by the CG. Baseline data was not reliable, so data was compared against the Mid-term Evaluation (MTE), which registered 11.4 qq/ha for the first harvest. An increase of 81.6% was observed with regard to the MTE. In terms of the second annual harvest (*postrera* in Spanish), the result from the significance test affirms that the difference between MAS producers in the FE (17.4 Qq/Ha) and the MTE (12.7 Qq/Ha. MTE – second harvest 2013) was due to the assistance from the MAS Project. However, the difference in the FE between CG producers (16.9 Qq/Ha) and MAS Producers (17.4 Qq/Ha) was not significant.

With regard to the coffee value chain, as a result of the market linkages promoted by MAS, the total sales value achieved by coffee beneficiaries reached US$ 49.2 million after four harvests, surpassing an initial target of US$ 13.3 million. At the same time, this had positive repercussions in the income of assisted producer families, which had an average income of US$ 4,359, twice the income of families in the CG. The variance analysis showed significant levels of differences in income between MAS producers and CG producers. This showed that the difference in income between MAS coffee producers and the control group could be attributed to the MAS project intervention.

In the bean chain, the FE found an average income of US$ 1,366 per producer with a difference of $ 473 relative to the income obtained by the control group ($ 893), which was statistically different due to the MAS project contribution.

Data from the FE showed that 46% of the MAS producers affirmed that they cupped their coffee (to evaluate quality), while only 4% of the CG producers cupped their coffee. MAS producers who cupped their coffee obtained an average yield of 50.9 Qq/Ha PH, while those who did not cup their coffee obtained a yield of 41.1 Qq/Ha PH. The producers in the CG who cupped their coffee obtained lower yields than MAS producers, estimated in 36.5 Qq/Ha PH. Those who did not cup and produce quality coffee obtained yields of 30.5 Qq/Ha PH.

In terms of employment, during the 2016-2017 harvest, MAS strengthened 15,386 post-production jobs in the coffee chain, surpassing the target (12,300) by 125 percentage points. MAS also strengthened 12,181 on-farm jobs. In the bean chain, 2,367 jobs were strengthened, surpassing the target (389) by 500 percentage points. On the other hand, jobs created due to the project in the coffee chain reached 2,404 jobs, surpassing the target (1,300) by 84.9 percentage points. In the bean chain, jobs created due to MAS were 534 jobs, surpassing the target (313) by 70.6 percentage points.

The evaluation also showed an important technological difference between MAS producers and the CG. While 27% (N=247) of MAS beneficiaries have coffee dryers, only 2% of CG Producers have them (N=95), which in comparison to the BL, only 0.1% of producers reported having dryers.

With respect to the application of good agricultural practices, data suggests that for every hectare of coffee, MAS beneficiaries applied 392 kilograms of chemical fertilizer, while the CG applied 325 kilograms. This difference is attributed to the efficient use of fertilizer from the soil analysis promoted by MAS. A similar result was found in the application of organic fertilizer. MAS beneficiaries applied 2,332 kg/ha in comparison to the 1,109 kg/ha applied by the CG. MAS producers applied 4.3 Lit/Ha of foliar fertilizer against 5.3 Lit/Ha in the CG. MAS producers also used 73 Kg/Ha of calcium lime on their soils against 36 Kg/Ha of the CG, to regulate the acidity of soil and the efficiency in the use of fertilizers.

With regard to the bean chain, 52% of MAS producers used inoculants in their crops, while only 0.5% used it in the CG. Data revealed that 63% of MAS producers used certified seed promoted by the Project, in contrast with 8% from the CG.

The technological innovation in the first link of the value chain, with the improvement of genetic material through the introduction and expansion of the use of improved varieties, performed a key role in the development of coffee and bean farms.

The organization and strengthening of 233 Producer Organizations (POs) facilitated the development of trade and market management linkages, to achieve successful product sales, negotiations and an increase in producers' income. Likewise, the establishment of 16 public-private strategic alliances was successful, which encouraged producers and their POs to explore new financial and market relations. Under this new model, 325 POs sold coffee directly to exporters and other coffee cooperatives, giving continuity and sustainability to the processes conducted throughout the entire productive chain.

Field investigation showed that 65.7% of MAS Project coffee producers received loans. On the other hand, 31.1% of control producers said they had credit assistance for coffee growing activities, translating into a difference of 34.6 percentage points. With regards to bean crops, 42.8% of MAS Producers affirmed having loans, while only 13.7% of control group producers had loans, creating a difference of 29.1 percentage points. This difference reflects the support that the project provided in financial assistance to the production of these crops.

It can be concluded that the resources transferred to producers by the MAS project in technological innovations and financing throughout the different links of the chain were the foundation for the results obtained.

Conclusions and Recommendations

Project implementation was strongly affected by external factors like: i) the coffee leaf rust attack between 2012 and 2013, which reduced the country's exportable production in 24% (HCB: 2016) and ii) drought from 2012 to 2015. These external factors were not considered when designing the project.

Entrepreneurship formation and strengthening for rural youth and women is still at an early stage. For future actions, it is recommended to TNS the definition of an incentive policy and the establishment of broad compliance conditionalities, for women and youth participation aspects.

By incentive policy we mean an internal policy that specifies activities targeting women and youth. These activities should be included in the budget and within the annual or implementation plans. In our context, an incentive could mean interventions such as: training, entrepreneurial development, providing access to credit, and/or any other intervention that is based on the learning that TechnoServe obtained by implementing a pilot project with youth and women in MAS. This policy and these plans should provide better employment opportunities and better incomes, in agricultural and non-agricultural occupations.

Land coverage
MAS Project comprised 31% of municipalities nationwide. This territory is too large to achieve a direct beneficiary population coverage. That is why the MAS project had producer assistance with a high degree of dispersion. Thus, there were dispersion adjustments, influenced also by security issues.

MAS Project needs to continue with both types of producers: who are distributed in disperse areas and concentrated in less disperse areas. What needs to be developed is a differentiated supporting strategy for each case, and thus, guarantee the efficiency and effectiveness of the technical assistance and the achievement of equal opportunities in poorer rural areas.

Monitoring and Evaluation
The Project had a potent monitoring system, which recorded progress in the implementation. However, it required a greater analysis of the programmed targets. In this case, it was observed that the targets were possibly underestimated since they were overall easily exceeded in the implementation.

The project conducted a baseline, however, the MAS project staff concluded that the baseline was not as reliable as the data collected during the mid-term evaluation. Along with the Evaluation team, the decision was made to use mid-term evaluation data instead of the baseline. For future interventions, faster decision-making is recommended to establish appropriate lines of comparison in the implementation. It is also recommended to strengthen the process of selecting consultants for the baseline survey, in order to have rigorous databases that can be used in subsequent evaluations.

Project design and strategies
The Project developed a series of activities aimed towards the sustainability of interventions. In coffee, MAS organized and strengthened POs, trained local talent as trainers for technical assistance, strengthened the POs for trading and built alliances for trading and assistance with credit. In the bean chain, alliances with IHMA and FUNDER in trading grains, promoted processes for sustainability.

Local economic capital was strengthened in a cross-cutting way with the development and strengthening of savings groups and trust funds for institutions that specialize in credit, like the José Maria Covelo Foundation and FUNDER. However, once the project is completed, all this human, social and economic capital requires integration and further institutionalization.

In response to climate change adaptation, 64% of project beneficiaries implement good practices in soil and water management, use of organic fertilizer, shade management, disease and pest control, and tissue management, which contribute to decreasing greenhouse gas effects. In comparison, only 47% of the CG producers contributed to reducing these effects on the environment. In terms of mitigation, institutionalization with municipal governments and national institutions, it is recommended, in order to promote policies and regulations, to apply good practices, for instance: no burning, the use of organic fertilizer, among others.

Trading

The trading strategy for bean producers through an Alliance with FUNDER and IHMA identified early payment as an excellent mechanism to encourage production. However, it is necessary to explore different paths towards sustainability. IHMA has low capacity to absorb volumes greater than 30,000 quintals of bean and in addition, it operates under a price control system.

Quality improvement for production chains was achieved through the organization and strengthening of 233 POs that attracted US$ 381,000 from strategic partners like TNS, Covelo Foundation and Molinos de Honduras, to be invested in productive infrastructure. In addition, quality improvements strengthened commercial transactions through formal agreements and facilitated the creation of sixteen (16) public private alliances, which mobilized US$ 8.6 million for technical assistance, community banks, seed production, training in good agriculture practices, access to credit, commercialization and local financial capital.

Techniques and technologies

In the coffee chain, an average of 26.2% of the MAS producers adopted up to three key agricultural practices in comparison with only 8.7% of the producers in the control group. It is worth mentioning that 67% of MAS producers adopted six or more techniques and technologies, in comparison the 32.3% of the CG producers. In the bean chain, 31.3% of MAS producers adopted up to three key agricultural practices compared with only 10.3% in the control group. It was observed that 56% of the bean beneficiaries adopted six or more practices versus 10% by the CG. This result shows a transformation in the production systems and in the management of the value chains as being done in a more aware and sustainable way.

The FE found that overall 63% of MAS producers adopted six or more good agricultural practices, in comparison with 32% of the CG. Even though it is common for coffee producers to adopt some practices, we can conclude that MAS has achieved transforming the traditional coffee farm to a more modern one, through tissue, soil and water management, the use of organic fertilizer and improved administrative and accounting record-keeping skills.

The fact that 56% of MAS bean producers adopted six or more techniques and technologies, in contrast with 10% of the CG, explains the improvement in producers' profitability arising from innovation and the use of new technologies associated with fertilization, the use of inoculants and improved and certified seed.

In future interventions, it is recommended that the project continue supplying innovations and new technologies, leading to significant improvements in production systems, the conservation of the environment, and family living conditions. New farming practices matching environmental issues derived from climate change intensification, at this regional level, would be driving next project interventions.

Aside from what was done by the MAS Project, socio-environmental certification procedures may be incorporated since only coffee producers have guaranteed prices and by getting certified they are getting better income in comparison with producers who trade conventional coffee.

Natural resource management

It was observed that coffee producers as well as bean producers conducted practices for the conservation of flora and fauna (93% of coffee producers conducted shade management, 48% of coffee producers and 79% of bean producers conducted good soil and water management). Managing natural resources contributes to quality production and climate change adaptation. In the case of production, good practices on natural resource management established differences between the people who adopt them and those who do not. In coffee, the average yield was 46.6 Qq/Ha PH for those who adopted good practices, in comparison to the 30.6 Qq/Ha PH obtained by the CG who did not adopt any good practices.

Implementing good practices in disease management (70% coffee and 73% bean) and pest management (76% coffee and 82% bean) with organic input and cultural practices contribute to decrease pollution from water sources and improving coffee and bean quality.

Productivity and profitability

FE data shows that the MAS Project achieved improving yield for coffee and bean producers. In coffee, assisted producers had an average of 47.1 Qq/Ha PH, in comparison to the 32 Qq/Ha PH from the CG. Relative to the BL, increase in yield was 55%.

In the first annual (*primera*) bean harvest, MAS beneficiaries obtained yields of 20.7 Qq/Ha in comparison to the 17.9 Qq/Ha by the CG. When comparing yields, MAS producers had an 80% increase in regards to the MTE.

Productivity in terms of the adoption of GAP promoted by the MAS Project made important changes in the coffee and bean chains. Coffee producers adopted 6 GAP or more and obtained yields between 46 and 55 Qq/Ha PH. Bean producers' yields exceeded 21 Qq/Ha.

Coffee producing families participating in MAS obtained an average income of US$ 4,359, which is twice as much as the income of families in the CG. In the bean chain, average income for beneficiaries was US$ 1,366 in comparison to US$ 893 for the CG. The differences in income were significant and are attributed to the MAS Project.

Financial systems

The organization and strengthening of the local financial systems created conditions for producers to have access to credit where the formal financial system is not present and made the local economy more dynamic. The Project transferred US$380,000 to more than 100 first-level entities (savings groups) and, through two second level entities (Covelo Foundation and FUNDER), credit was facilitated to finance productive activities in the coffee and bean chains, as well as non-farming activities.

By the end of the project, 25,960 loans (20% for women) were accounted for from a target of 5,400 granted loans. The value of the loans was over US$15.5 million, which exceeded the programmed target of US$5 million.

With the 16 established alliances, opportunities were created to invest on the improvement of the coffee and bean chains. These alliances mobilized US$ 8.6 million (target was $5 million), to capitalize family assets with productive infrastructure and capacities to improve competitiveness.

Human talent development
Local talent training contributed to the continuity of technical assistance within the territory. MAS trained 100 community trainers and technicians who then strengthened the capacities of 16,000 male (81%) and female (19%) coffee producers and of 10,000 male (87%) and female (13%) bean producers through new knowledge and incentives for behavioral change to adopt new techniques and technologies.

ANED considered that interventions such as MAS that delivered training via community trainers are the most cost-effective and convenient to increase productivity in the country. However, in the case of MAS, the sustainability of the extension model is subject to the exporters' will to continue with the scheme. We recommend that TechnoServe continues with this training system based on community trainers but strengthen relationships with other potential partners so the model is not only reliant on exporters. The evaluators recommend establishing partnerships or agreements with agricultural service providers such as the National Agriculture University, the National Autonomous University of Honduras, the Ministry of Agriculture and Livestock and DICTA, El Zamorano University, FHIA, IHCAFE, non-governmental organizations working in rural areas, independent organized providers, among others. These partnerships would be established between TechnoServe and institutions and companies, projects and programs, service providers and beneficiaries. TechnoServe could contribute to increasing capabilities within the agricultural sector by transferring their training methodology, particularly to municipal government institutions working in agriculture.

In the Honduran agricultural sector, there are technical service providers organized based on the technical assistance model created in the year 1992. This model needs an update since it has not been 100 percent functional and effective.

PO Strengthening
The creation and strengthening of 233 producer organizations (surpassing the target of 200) facilitates market access for their member producers by providing economies of scale and increasing their negotiation capacity.

Strengthening the capacities of 135 POs allowed coffee producers to obtain more than 47% of their income through sales to exporters against 7% of the CG. The strengthened capacities of the POs included administrative and entrepreneurial management, which enabled the signing of 884 (target 180) agreements between buyers and sellers (694 for coffee and 190 for bean) and direct negotiations between 325 POs and 9 exporter companies.

Gender
The Project made significant efforts to promote the involvement of women in different activities, by promoting the acknowledgement of women's work in the rural areas through access to knowledge, technical assistance and markets.

However, the gaps between men and women did not have any variances in terms of land ownership, income or investment. An example of this was income disaggregated by sex in the coffee chain: men had income 1.8 times higher than women. In the bean chain, men had income 1.2 times higher. For future interventions, it is suggested to redirect investment and training in order to achieve: a) more participation from women in investments directed to productive assets and production and b) greater supervision and monitoring in resource allocation, by diversifying financial support sources for women.

Communications and Information Systems
Leveraging the means of communication (radio, cable, others) facilitated the dissemination of actions promoted by the Project throughout the territory. However, it is necessary to have a communication strategy that will give continuity to information exchange of learning and GAP to guarantee sustainable processes.

The implementation of the SMS activity generated interest among the participant stakeholders; however, since the Project was in charge of it, it is still uncertain how the sustainability of the system will continue. The number and frequency of time of the messages must be reinforced, encouraging the participation of the producers, with greater participation by youth, women and seniors.

Budgetary execution

Funds invested and leveraged through the Matching Grant Fund to strengthen the Coffee chain should contribute to the sustainability of the Project. However, procedures are required for the administration of non-reimbursable funds to guarantee sustainability through time in the benefit of the producers.

It is recommended to strengthen the fund leveraging model with the implementation of a properly regulated and permanent mechanism. It is necessary to create a trust fund with a financial institution that will manage funds; in order to develop a control and transparency mechanism in the use and administration of resources for the MAS Project in line with the MGF agreements and with what has been established by the State's controlling agencies, especially the Supreme Court of Audit (TSC).

I. INTRODUCTION

Honduras is a small country in terms of territory; it has a land extension of 112,492 Km^2 and a population of 8.7 million people (EHOM/INE/2016). Poverty is one of the highest in the Latin America and Caribbean countries. Figures from the same source show that 60.9% of households are under conditions of poverty and 38.4% under extreme poverty. These proportions are even more critical in the rural area.

The country's economy according to the Honduras Central Bank (HCB)/2016 grows at a 3.6% rate every year and the agricultural sector grows at a 4.2% rate. This sector of the economy is one of the most important ones since it contributes with 13.9% to the national GDP. Its importance stands out since it absorbs 28.5% of the labor of the country, according to the Household Survey from the National Statistics Institute (EPHPM/INE/2016).

In national agriculture, the coffee crop is the most transcendental. According to information from IHCAFE/2016, there are 120, 000 coffee producers, mostly smallholder producers, who grow 30, 70 hectares with an approximate yield of 7.1 million quintals. Coffee has become the main product for export in the country.

With regard to bean, it is a very important crop, since it is a staple grain for the population's diet. It is usually grown by smallholder producers (from less than 1 Ha to less than 3 hectares) distributed in 11 of the 18 departments of the country.

TechnoServe with funding from USDA has promoted the implementation of the **Sustainable Agriculture Improvement (MAS) Project,** aiming to improve income for stallholder coffee and bean producers by leveraging agricultural practices and technologies as well as the trading channels to promote the coffee and bean value chains.

The Project has ended and it is the appropriate time to measure the impact it had by the end of its implementation period. ANED Consultores is in charge of conducting such measurements based on objectives, effects and results stated in the overall programming of the MAS Project.

The fundamentals of the MAS program management are justified, since agriculture in Honduras is the most important activity for the population living in the rural area of the country. This is an emerging activity and it keeps families under higher levels of poverty; nonetheless, significant efforts are being made through institutional development actions, especially through external ones. It is acknowledged that improving life conditions of the farming population needs the highest levels of organization and efficiency in the use of scarce resources and availability of more resources for the production.

1.1 The MAS Project

The United States of America Government (USG) through the United States Department of Agriculture (USDA), funded a three-year program (2012-2015) with an initial extension of two years which add up to five years in total (2012 to June 2017), under the Food for Progress Program, which is known as the "Sustainable Agriculture Improvement (MAS)" in Honduras. It addressed smallholder producers from the coffee and bean value chains.

Therefore, USDA delegated the implementation and monitoring of the MAS program to TechnoServe, which is consistent with the national policies established in the Nation Plan, Country Vision and Government National Plan.

1.2 The Project is structured in three strategic axes:

- Strategic Axis One has the objective of facilitating Access to high quality seed and input and improves income and the level of life of producers and their families by increasing production and productivity in the activity of both crops (coffee and bean).
- Strategic Axis Two has the objective of developing and implementing a training program on better agriculture techniques and technologies and developing the capacities of producers by directly linking them to the market.
- Strategic Axis Three has the objective of strengthening the producer organizations (PO) to provide services that would add value and comply with market standards and support the organization of groups of producers to have Access to greatest possible benefits.

1.3 The project's objectives are:

- Increasing agriculture productivity in the coffee and bean value chains through agricultural practices, expanding access to credit, establishing community seed banks and developing agriculture information dissemination systems.
- Expanding commerce of agricultural products in coffee and the value chains by evaluating the infrastructure of the organizations of producers and strengthening the capacity of the organizations of producers.

II. PROBLEM DESCRIPTION AND NATURE OF THE INTERVENTION

2.1 Affirmation of the problem in the value chains (rationale)

Honduras has been considered for many years a country with forestry and agricultural potential, lately, with forestry potential[1] to guarantee the sustainability of natural resources within the agro-silvopastoral production systems and practices. The rational and sustainable use of resources, would allow decreasing, mitigating and adapting to the effects and impacts of climate change.

The agrarian sector in Honduras is one of the most important food insecurity mitigation elements, since it produces food for family consumption and allows selling surplus within the smallholder and medium producers. Likewise, it generates income in some value chains for export and employment within the sectors of the different productive chains by adding value to the agricultural assets.

However, there are gaps to promote national agriculture, like: i) rural migration to the United States and other countries, ii) Little or no support and lack of technical assistance from the government; and iii) the banking industry considers this sector as *High Risk*, and therefore access to private bank credit is very limited; all of the above provokes the lack of investment on new technologies, infrastructure and restriction to leverage.

2.2.1 Coffee

Coffee growing is an agricultural product for external consumption (export) and a very low percentage for internal consumption. According to the HCB in the year 2016, 6.9 million quintals were exported, which meant an income of 882.8 million dollars, equivalent to 23.5% of the total exports of the country for that year. Due to its income generation, this crop is the most important and the one with greater socioeconomic impact in the country due to the high revenue and permanent and seasonal job creation. It is considered the crop with

[1] Agroforestry is a *discipline and modality of productive land use, where there is spatial and/or temporary interaction of terrestrial and non-terrestrial plant species and animals. Ospina 2008*.

greater social balance, with approximately 120, 000 female and male producers and among those most are smallholder producers.

Coffee growers are facing, just as in other crops, the effects of climate change and its negative impacts, such as: i) pests, especially coffee berry borer (CBB), i) diseases, rust being the most important one, which has lately attacked varieties that were resistant just two harvests ago, ii) erratic rainy seasons and dry seasons, added to the sudden changes of temperature and extreme temperatures, affecting flowering and extending the harvest periods, among other environmental disorders.

Therefore, Hondurans in the rural sector have to face three challenges: i) elevating productivity in the different value chains like staple grains, coffee and others, ii) improving their competitiveness by giving an added value to their products developing the capacities of the producer families to leverage the available markets; and iii) increasing income and profit for producers through a positive change in the relationships between producers and buyers and/or exporters.

In addition to these issues, Honduras is considered, by the consortium of international observatories of climate change, one of the first five most vulnerable countries in the world to the effects of climate change. In some periods, it occupies the first position as the most affected country in terms of economy and socially; the regular cycles of rain or lack thereof, are no longer reliable. The effect of El Niño and La Niña phenomenon has also disrupted the production cycles. For instance, in coffee harvest season for the years 2015 and 2016, rain has made coffee over ripe, which makes harvest more difficult and damages the road infrastructure, added to the fact that producers do not have artificial cherry drying systems.

Other natural effects that have an impact in the national agro-food sector are storms and hurricanes Honduras is exposed to, since they provoke significant losses in harvests, landslides and flooding in the agricultural areas as well as alterations in the micro-watersheds and pollution of the water sources.

2.1.2 Beans

Estimations from INE show that in the year 2015, 114, 700 hectares of bean were grown in the country, procuring production in 1.85 million quintals based on a 16.2 Qq/Ha yield. In the recent past, national bean production allowed covering internal demand. However, in the last few years, considerable annual beans imports have been observed, even so that in 2016 the amount of 264,600 quintals of bean were acquired from the external market, which are necessary to complement the internal demand of this product. Exports of this grain for the same year were approximately 50, 600 quintals. With the national production plus annual imports, the internal demand of the country is covered, which is usually between 2.0 and 2.2 million quintals for an apparent per capita consumption of 11.0 Kg./person/year. The greatest limitations of the crop are related with the adverse effects of climate change as well as the aspects of technology, credit, land ownership and organization to face difficulties presented in the national market and extreme weather conditions.

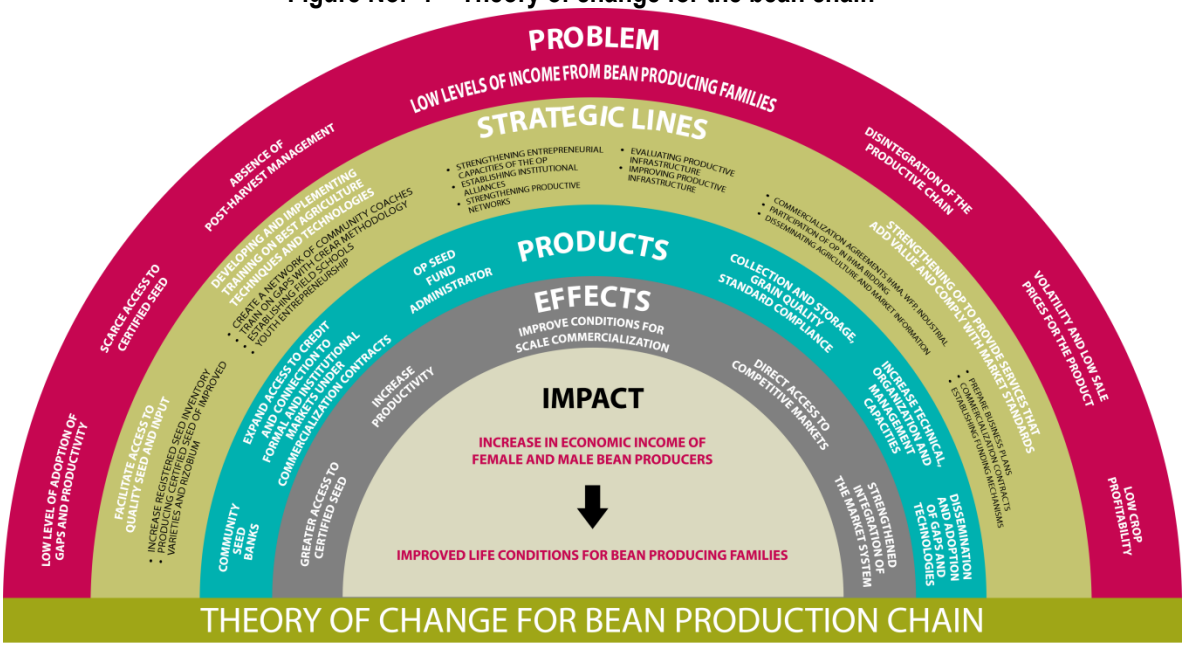
This is the main element for food security in the country and in the nutritional policy of Honduras; bean is a basic grain in Hondurans' diet since it supplies vegetable proteins necessary for consumers. Therefore it is found under the category of "staple grain". As a value chain, it is considered as the crop that needs the most support in technical assistance, credit and support in searching for markets; since its production is in the hands of smallholder producers that are not organized and due to the importance of its consumption by the poorest population in Honduras.

Beans are grown on hillsides around the country, but mainly in the departments of Olancho, El Paraìso, Yoro, Comayagua and Francisco Morazán.

2.2 Intervention Theory (Theory of Change)

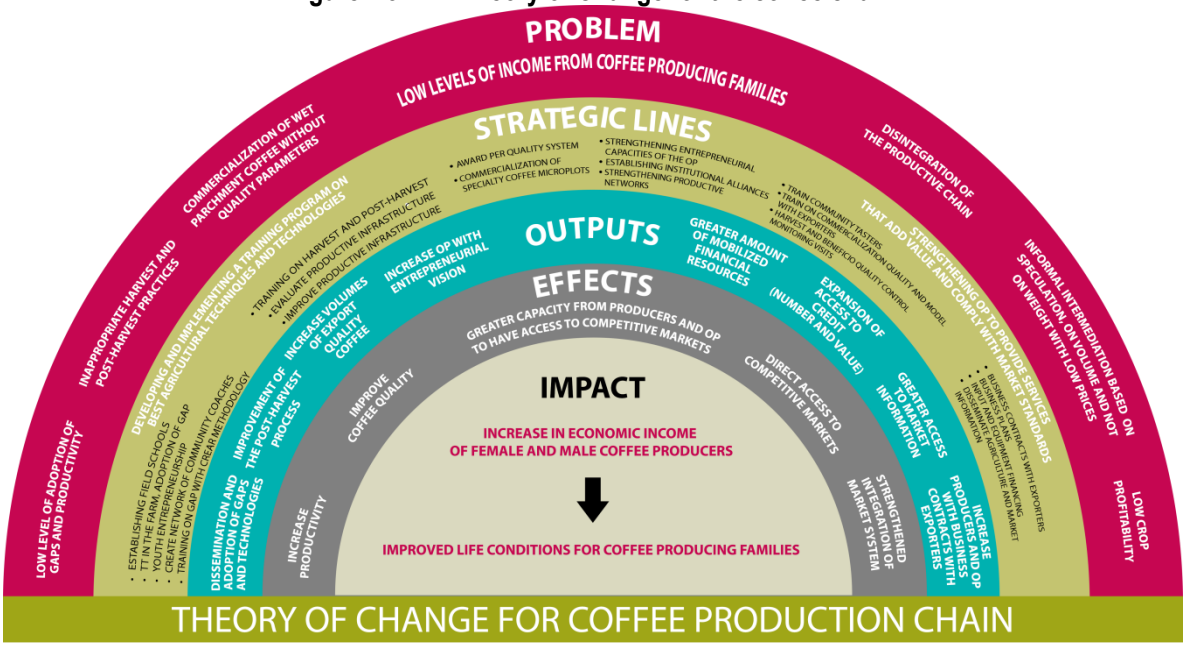
In order to analyze the structure and dynamic of the project from the point of view of the implementation, the theory of change was built, with participation from the TechnoServe team for both productive chains to analyze the interaction between the different interventions conducted by the project. These models reflect, in a summary, the interaction between activities to generate the effects and results in both productive chains.

Figure No. 1 Theory of change for the bean chain



Source: ANED Consultores, 2017 – MAS Project Final Evaluation

Figure No. 2 Theory of Change for the coffee chain



Source: ANED Consultores, 2017 – MAS Project Final Evaluation

The results of this process indicate that:

- The achievement of Project outcomes in terms of increasing income for producers started from: changes in the productivity, offer for technical assistance and integration into the market system. This process demanded establishing strategies to articulate these interventions.

- Understanding the project and its approach was made from a systematic perspective in which social change is the result of the interaction between interventions.

- In Project implementation, it was necessary to create synergies between actions to improve the technical capacity of producers and managing and administrating farms and in their integration into the market system as mechanisms to increase profitability and usefulness of the agricultural activity.

- Project interventions were not developed in a linear way, but looking for the integration to produce combined effects and at a greater scale within the chain of results. For instance, training and technical assistance actions were linked to the organizations of producers' strengthening strategies, access to credit and integration to markets.

- Sustainability of Project outcomes implied the need to articulate the different strategies and actions to achieve synergies among the productive and institutional actors in order to have impacts in time.

III. PURPOSE AND OBJECTIVES OF THE EVALUATION

3.1 Purpose of the Evaluation

The purpose of the final evaluation was to revise and assess the impact and outcomes that the Project had in the activities foreseen with producers from the coffee and bean value chains, as well as in the organizations and companies that render services. Likewise, the evaluation sought to identify lessons learned and opportunities for improvement to replicate them into future interventions of TechnoServe and the donor in Honduras.

3.2 Objectives of the Evaluation

3.2.1 General Objective

To measure the effects and determine the **direct and indirect impact** of the MAS Project and the relevance, effectiveness and sustainability of the program

3.2.2 Specific Objectives

- To ascertain relevant **indicator compliance** as well as the Project targets.

- **To measure Project outcomes** in regards to the production, economic benefits, adoption of new practices and opportunities to increase Jobs in farms, as well as analyzing the impact of the program on outcome and target indicators.

- To value the impact in **gender equity and generational replacement** in the Organizations of producers (POs) and in the households in terms of conditions of Access, conditions of work, decision power, training opportunities, among others.

- To identify strengths and weaknesses in the project's **strategy and implementation.**

- **To identify the best practices,** as well as the project's learning lessons in order to improve the design and implementation of similar future projects.

IV. DESIGN AND METHODOLOGY OF THE EVALUATION

The methodology used in the evaluation contemplates the behavior of indicators from the beginning (Base Line) to the end of the MAS Project. It is worth mentioning that after a revision of the collected information both in the base line and in the mid-term evaluation survey, there was no significant variance in data between both data bases. It was agreed with TechnoServe to compare data from the final survey with data collected in the mid-term evaluation, since it was considered that the data base from this evaluation ensured a better quality in the collected data.

In order to strengthen the analysis and being able to compare the changes produced in the participant producers, the "control group" was incorporated as a measurement element to establish comparisons, under the premise that without the Project, both groups of producers (intervention and control) would report similar results in a comparison analysis. Producers from the control group were selected in different communities close to the communities of the intervention group. The main aspect for the selection was that they had the same characteristics in terms of land ownership, technology and crops as the beneficiaries of the project.

4.1 Methodological priorities for the design

In the first place, the Theory of Change, is established in the Project from the indicators and linked to impacts, effects and results programmed in the monitoring plan, under the perspective of building the logic of change from everyone involved in the implementation processes. *In second place,* gender equality is addressed from a balanced consideration of the needs of both genders and the acknowledgment of at least three gender awareness raising elements relevant in the evaluation: i) women have different needs than men, either individual or special needs; ii) women are a group at a disadvantage With regard to men; and iii) women's development implies working towards increasing equity and empowerment. *In third place,* in priority, Monitoring and Evaluation incorporated into the Project as an ongoing and systematic process.

The evaluation exercise analyzes this system from how it has operated the information-collection mechanisms and follow up, how the information consolidation and validation processes have worked and how the M&E actions have supported decision-making in terms of the strategic direction of the Project and what has been the added value of M&E in the implementation. Finally, two key aspects: the environment and food security. Regarding the first, the interest was identifying and valuating how the application of environment-friendly techniques are promoted, especially knowing how the adoption of environment-friendly practices has worked. About the second one, we tried to analyze the indirect effects of food security within the MAS framework.

4.1.1 Selected evaluation criteria

The methodological design and its application focused on the 6 key criteria for evaluation: ***appropriateness,*** seen from the opportunity, adaptation and convenience of the design, actions and activities of the Project; ***relevance,*** looking to identify the level of alignment with the national and sector development policy and the level of satisfaction of the needs of beneficiaries; ***effectiveness,*** how the capacity to comply in place, time, quality and amount of established targets and objectives: ***efficiency,*** of resource administration and rational use thereof, ***impact,*** considering the valuation of direct-indirect and expected not-expected effects; and ***sustainability***¸ looking for it to remain in time and the level of "irreversibility" of interventions.

4.2 Evaluation Methods Used

4.2.1 Quantitative design and implementation

Quantitative results of the evaluation are obtained through four surveys based on defined probabilistic samples with a 5 per cent error and a 95 per cent level of confidence. Land coverage of the surveys was extended to the five departments of influence of the project (El Paraíso, Olancho, Francisco Morazán, Comayagua and Yoro).

4.2.1.1 Sample definition

This evaluation uses a sample analytical design, which dedicates the development of detailed models describing the relation of dependent variables with self-explanatory variables. Treatment variables are also included here. In addition, the sample framework includes elements from the mid-term survey (assumed as the base line) that must be matched with the collections in the field. In other words, if a subject of study was collected in a base line, the same subject must be collected in the impact measurement.

For a greater sample guarantee, the sample size is determined foreseeing possible sample attrition. Under these considerations an extended sample in 12.5% by sample attrition is:

Table No. 1 Final Evaluation Sample

Department	Impact				Total
	Intervention		Control		
	Coffee	Bean	Coffee	Bean	
Comayagua	88	96	60	120	364
El Paraíso	152	112	132	88	484
Francisco Morazán	56	56	52	48	212
Olancho	88	112	92	88	380
Yoro	88	112	74	88	362
Total	**472**	**488**	**410**	**432**	**1,802**
Final Sample Established	**473**	**484**	**412**	**438**	**1,807**

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

A significant sample size is considered, which has been useful to employ impact measurement models based on probabilistically comparing parameters for each group. The initial target was using the difference model that links the individual from the base line to the individual in the impact measurement, however, due to the difference in information management, the variance analysis or ANOVA method is used, using all the appropriate statistic parameters for the complete analysis (Annex No. 1). [2]

4.2.1.2 Selected Indicators

Indicators that are part of the evaluation were agreed between TechnoServe and the donor (USDA); they were documented in the Project's *Performance Monitoring Plan* (PMP) document. Most of these indicators are the ones the Project Log frame contemplates as impact, outcome and effect indicators. Occasionally, output level indicators will be addressed.

[2] A variance analysis allows determining if different treatments show significant differences and if these differences are attributable or not to an intervention.

Table No. 2 Matrix 1. MAS Project performance indicators

Dimension	Level of indicator	Indicator
Income	Impact	1.1. Increased income coming from productive value chains 1.2. Increased income coming from value chains assisted by MAS
Productivity	Outcome	2..1. Increased wet parchment coffee yield
	Outcome	2..2. Increased bean yield
Community Banks and use of bean seed	Output	3.1. Number of community Banks for bean seed established
	Output	3.2. Number of seed validation plots established
	Outcome	3.3. Number of producers that use Certified seed, classified and/or commercial
	Output	3.4. Number of producers with Access to improved bean seed
Loans	Outcome	4.1. Number of producers that benefit from the use of financial services promoted with the assistance of MAS
	Outcome	4.2. Value of farming loans given to farmers as a result of MAS assistance
	Output	4.3. Number of loans disbursed to farmers as a result of MAS assistance
Job	Outcome	5.1. Number of Jobs strengthened with MAS assistance
	Outcome	5.2. Number of Jobs attributed to MAS assistance
Commercialization	Outcome	6.1. Increased value of sales from coffee producing organizations.
	Outcome	6.2. Increased value of sales from coffee producers
	Outcome	6.3. Increased value from sales of bean producing organizations
	Outcome	6.4. Increased value of sales from bean producers
	Outcome	6.5. Sales value in MT of coffee producers to the PO
	Outcome	6.6. Sales value of bean to the PO
	Outcome	6.7. Average Price reached by coffee co-ops in regards to the New York stock market
Training	Effect	7.1. Number of producers who have applied better farm management practices (organization, administration, financial management) as a result of MAS assistance
	Output	7.2. Number of people who receive training on short term productivity from the farming sector or in food security as a result from USDA
	Output	7.3. Number of established Field Schools
Adoption	Effect	8.1. Number of producers who have applied new techniques and technologies as a result of MAS assistance
	Effect	8.2. Number of hectares under improved techniques and technologies as a result of the MAS Project
	Effect	8.3. Number of organizations of producers that have applied new technologies or administrative practices as a result of MAS assistance
Value chain	Outcome	9.1. Number of signed agreements (contracts, memorandum of understanding, etc.) between buyers and sellers.
	Outcome	9.2. Percentage of producers selling to co-ops and other organizations of producers.
	Impact	9.3. Number of organizations of producers selling directly to exporters

Dimension	Level of indicator	Indicator
	Outcome	9.4. Number of public-private alliances created
	Outcome	9.5. Value from leveraged public-private alliances
Access to market information.	Output	10.1. Number of producers who receive market information through SMS
	Output	10.2. Number of organizations of producers with a working SMS Messaging System
	Output	10.3. Number of conducted SMS messaging campaigns
Infrastructure	Output	11.1. Number of post-harvest infrastructure assessment conducted to organizations of producers (PO)
	Outcome	11.2. Number of organizations of producers linked to investors in infrastructure

Source: Prepared by ANED Consultores – Sigil Consulting consortium based on the MAS Project Monitoring and Evaluation Unit.

4.2.1.3 Evaluation indicator building

Indicators from the evaluation have been built through mathematical formulas that are homogeneous in regards to the calculations that have been employed in the base line and mid-term evaluation, in order to allow comparability. It is ratified that indicators are expressed in the same units exposed in the Project's log frame, which is commonly in percentages, in absolute amounts, in monetary units, in quintals per hectare, in scale-based valuations, etc. This is essential to compare the indicators of the evaluation with the ones exposed for the control group and assisted group (Annex No. 2)

4.2.1.4 Information Collection Tool

Four surveys were designed. Two tools to be applied to coffee producers (assisted and control) and two tools to be applied to bean producers (assisted and control). These tools respond to 37 indicators selected for this evaluation, which are stated in the field information analysis plan part of the Project evaluation (Annex No. 3).

Table No. 3 Tools and stakeholders

Tool	Stakeholders	Context
Survey to coffee producers in the assisted group and control group (2).	Population over 18 years old, men, women who live in selected households (assisted and control)	In 5 departments of Honduras in the programs influence area.
Survey to bean producers in the assisted group and control group (2).	Population over 18 years old, men, women who live in selected households (assisted and control)	In 5 departments of Honduras in the programs influence area.

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

4.2.1.5 Design of the Data Base and typing collected information

In order to conduct the information-typing process of the ballots, work was done at different stages or phases. The process was stated to guarantee data quality and compliance of the proposed time. The process was compiled in the following way: 1) ballot revision, 2) data entry program design, 3) ballot typing process, 4) internal cleansing and consistency, 5) exit table generation.

Data entry, consistency and validation program design, has been operated in the "Census and Survey Processing System" (CSPro) program. Control variable identification is included as well as the incorporation of consistency rules, like the validation of closed response ranges and flows and leaps. Afterwards SPSS (Statistical Package for the Social Sciences) was used to process the information (Annex No. 9).

4.2.1.6 Data base cleansing and preparation

It was prepared based on the logic-mathematical Consistency Rules and ranges of entry questions, likewise, flow leaps from the ballot were revised, checking on consistency of the questions with each one of the responses. This activity was conducted in different processes, the process sequence was to employ a program of inconsistencies when entering data, which will send a list of errors; the second was the revision of frequencies and cross variables that reveal extreme values and values out of range; and then, the inconsistency program was applied showing incongruent information between different values, i.e., data revision was made, from macro to micro.

4.2.1.7 Information-analysis method

Method selection is made under the perspective of analyzing impact and causality. Therefore, the reference is the following:

Impact analysis method: ANOVA statistic method; indicators to analyze: yield, sales income and adoption of practices (Annex No. 4).

Causality Analysis Methods: Statistic method of indicators based on percentages: adoption of practices vs. Yield, market condition (Linked Not linked) vs. Sales income, quality (Differentiated per value chain) vs. Sales income, participation in technical practices vs. Adoption of practices, Access to credit vs. Adoption of practices.

Considerations for variables are: *Adoption of Practices* defined as a weighted indicator established by the hiring party. *Market Condition* defined as being or not linked to a buyer. *Coffee Quality,* the cupping index, only for the ones who sold dry parchment. *Bean quality,* for the ones who used improved seed. *Participation in practices and techniques:* percentage of adopted technical practices.

4.2.2 Qualitative evaluation design

The Sustainable Agriculture Improvement Program's Qualitative Evaluation was explanatory and analytical on how the processes works and effects and impacts achieved with the outcomes. The approach was focused on responses from the people involved in the project and valuating evaluation criteria during its implementation. Regarding the program, this qualitative evaluation research took into account the following criteria: Effective participation of producers and community instructors, of their life conditions. It was sought for producers to participate in the results' analysis, effects and impact of the project from their perceptions and personal experiences and shared work between investigators and producers (Annex No. 5).

4.2.2.1 Collection tools

Data collection was mainly made in the rural area, where the ones selected are part of the subjects from which information was taken (qualitative) and implied two phases or stages: (a) initial immersion in the field and (b) data collection for analysis, for which two kinds of tools were implemented, each one of them with its own characteristics, in which their scope is explained:

Focus groups

18 focus groups were conducted in all with an average participation of 15 members included by geographic convergence and significance of the value chain, in accordance to geographical areas.

Table No. 4 Matrix of informants involved in focus groups

No	Participants	Selection criteria	Total Groups	Total participants
1	Coffee producers	Women and Men with at least a year of having participated in the Project and with at least two services rendered by MAS. At least 4 producers were selected per municipality, for a total of 15 per focus group.	3	45
2	Organizations of coffee producers	Organizations with a commercialization relation with an exporter linked to the Project for more than one year and with at least two purchase-sale negotiation contracts. At least two board members per organization and 2 or 3 organizations per municipality. For a maximum of 15 participants per focus group and with a representation of at least two exporters linked to MAS.	3	45
3	Bean producers	Women and Men under a year of participating and with at least two services rendered by MAS. At least 4 producers were selected per municipality, for a total of 15 focus groups.	3	45
4	Seed Banks and seed funds	Producers of Certified bean seed and board members from the Association of Seed Fund (AFS) with more than a year of being strengthened by the MAS Program, from at least 3 municipalities. Equitable participation of men and women board members of CSB and AFS.	3	45
5	Youth from 15 to 25 years old	More than a year of participating in the program, men and women (5 women and 5 men). According to the experiences: **El Paraiso:** youth from the coffee value chain; **Olancho:** input sale; **Yoro:** entrepreneurs: input of fertilizer, sales of materials and equipment, organic fertilizer, plantain chip sales, small grocery stores and school supply stores.	3	45
6	Community trainers	With more than a year of hiring by the MAS Program, equitable participation per department.	1	15
7	MAS's technical and management staff	With more than a year working in MAS and six months in the position. Ensuring participation of: 1 departmental advisor (total 5), 1 from training, 1 from communications, 2 from monitoring, 2 chain coordinators, 1 from finance section, 1 program manager and 1 country manager.	1	14
8	Cuppers	Support cuppers from the Project and from exporters in the departments of Olancho, El Paraiso and Comayagua who are the most representative from the coffee.	1	6

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation.

Interviews for different informant categories

Donor-USDA: the purpose was to achieve valuations in terms of efficiency, effectiveness, impact, monitoring, follow-up and transfer and compliance of agreements in order to highlight facilitating and limiting elements towards following program interventions similar to MAS (Annex No. 6).

MAS Management Staff Counterpart with USDA: perceptions at strategic and technical level are collected about the program, aligned with the results, processes, efficiency, effectiveness, impact, monitoring and evaluation, learning and relation with the donor.

Coffee and bean buyers and exporters: visualizing the contribution of the relationship highlighting the magnitude of the benefit, on the other hand, measuring relation formalization mechanisms, potentiating strategic alliances, sustainability and at the same time projecting sales and income with entrepreneurial management between the parties.

Financing funds: financing mechanisms and conditions are valued and out of these, the level of coordination with technical assistance in order to guarantee influencing production and productivity.

Counterpart: a contrast of the institutional vision and program vision to be able to demonstrate compliance of objectives and targets from both parties for formal management established in the inter-institutional agreements. On the other hand, measuring if the alliance is guaranteeing benefits to smallholder producers.

Cuppers: the perception on the methodology, strategy and transfer mechanisms of knowledge, field school methodologies of the producers, managing information systems and migration, equity and sustainability are rescued.

4.2.2.2 Information processing

Qualitative information was organized, first it was organized individually according to the stakeholder from whom it was collected. In second place, according to the group of informants and in third place, according to the category of analysis through which the tool was designed. Two processing mechanisms were employed, on one hand, the traditional analysis matrix and on the other hand, the use of Software Atlas.ti (Annexes 1, 8, 10 and 11)

V. MAS PROJECT RELEVANCE ANALYSIS

5.1 Profile of the producers according to the agreement with USDA

General criteria defined to select beneficiaries from the coffee and bean value chains, are the following:

- Being members of families with food insecurity.
- Living in the areas of intervention
- Having access to land and water
- Attending trainings and applying technical recommendations
- Having a per capita income under $10/day.
- Having the capacity to implement improved farming practices
- Participate voluntarily in project activities.
- Working and collectively contributing with other families, especially in the farm production market. Adopting innovative practices.
- Having deeds of property for their farm or being on the process.
- Having access to the farm year-round
- Being committed with the project and willing to participate in the trainings
- Not receiving similar technical assistance from other organizations or IHCAFE.

5.2 Project design relevance

It is said, that a rural development Project is relevant, appropriate and congruent with the needs of the beneficiary population when it adjusts to the strategic guidelines of public policies. In a country that is characterized by high levels of poverty in the rural sector that derive from the low levels of productivity in their plots and their deficient connections with the market which makes them live under conditions of high poverty.

The project gives assistance to these insufficiencies and they incase under the policy lines that lead to: i) fostering chaining between the producer, agro-industry, commercialization and consumers to reduce margins of intermediation and disloyal market competition; ii) strengthening entrepreneurial development and improving mechanisms of organization and training of producers and developing "Strategic alliances with NGO, cooperating agencies, the academia and strengthening both chains. The Strategic Plan of the Agro-food Sector of Honduras 2014-2018, also places gender equity and youth at a preferential position, allowing them access to production assets and technology, loans, land use and ownership.

5.2.1 Selection of beneficiaries involved

Coffee producers were selected according to the following specific criteria:

1. Producers with 5 hectares or less (exploited) – farm size
2. Area grown under 3.5 Ha in coffee and up to 2.1 Ha in bean.
3. Having plantations with a minimum age of 3 years
4. Belonging to a group of producers or not.
5. Years of plantation (plantation at least 3 years old)
6. Main source of income in coffee. Not in beans (producers have other sources of income)
7. Control group producers must be from neighboring communities (different) from the communities of the treatment group.
8. Not receiving similar technical assistance from other organizations.

Bean Producers and organizations were selected according to the following specific criteria:

1. Capable of growing beans in the geographic area of intervention
2. They are organized groups either legally constituted or in process, as well as co-ops or companies
3. Capacity to incorporate at least 100 new stallholder producers as members and/or suppliers
4. Organizational capacity to hire administrative and support staff
5. Willing to invest their own resources and/or attract investors
6. Willing to pay awards to producers for best quality products
7. Attitude of social responsibility shown toward the rural community.
8. Willing to share information of the performance of their business.
9. Not receiving similar technical assistance from other organizations

5.2.2 Response to priorities from the Government, USDA, TECHNOSERVE and other key partners

5.2.2.1 Response to the priorities of the Central Government

Honduras is among the top five most vulnerable countries in the world, and it is found in a region where the greatest climate changes are foreseen; in a preliminary study of climate change in the country, it was estimated that by the year 2030, the annual average temperature of the country will have increased 1.4ºC. According to the results from the models, in the year 2016, temperature increase in the planet had reached 1.4ºC in regards to the initial year of the Industrial Revolution (1750).

This increase in temperature, accompanied by the intensified dry and hot periods and the reduction of rain, provoked a water deficit and consequently, a change in the areas fit for different crops. This is added to the probable increase of frequency and intensity of extreme events (drought and tropical storms) and climate variability that has been observed in the last years in Honduras. (CIGAR 2015).

The situation of the country in regards to Central Government priorities for agriculture is based on key aspects like:

• Increase of the annual median temperature and decrease in the precipitation foreseen for the year 2030, due to the effects of climate change, which will have significant impact in the agriculture of the entire country.

• In consequence, it is likely that areas that are currently fit for crops that support farm exports and food security will change in the future. Some municipalities will gain productive aptitude for certain crops, others will lose it.

• The capacity of the rural population to adapt to these changes, both if they represent a loss or profit, depend on their Access to basic services, Access to information, resources for innovation and healthy ecosystems.

• Honduras has greater vulnerability to climate change in Central America, but it also has a regulatory and institutional framework favorable to work in its reduction; in particular in the agro-food sector, as shown in the content from the Nation Plan (2010-2022), the Climate Change Adaptation National Strategy (2010), the Climate Change Adaptation National Strategy for the Agro-Food Sector in Honduras (2014-2024) and the Food and Nutritional Security Strategy (2010-2022); the Climate Change Adaptation Plan has been prepared.

Several government initiatives, like the Committee of Agriculture Insurance or the Adaptation Fund Project, support inclusion of social and economic benefits at local level as part of the adaptation agenda, complementing with efforts from the civil society and technical cooperation.

5.2.2.2 Response to USDA's priorities

USDA sought to support the Honduras Government, to face challenges that implied responding to a problematic area of the agricultural sector in the two value chains (coffee and bean), which has a high socioeconomic impact and motivates people to stay in their place of work. It was arranged for USG resources to be allocated in order to assist five strategic geographic areas (Olancho, Yoro, Comayagua, Francisco Morazán and El Paraíso), avoiding technical and resource dispersion. USDA's priorities were defined in terms of the size of farming exploitation, low technological level, low income level, and not enough negotiation capacity in the market.

There was a statement to solve weaknesses, obstacles and needs from the productive chains and on how to improve the quality of products, added value, contribute new technological knowledge and its application by producers, strengthening the organization, improving access to markets, valuing storage capacities, among others.

MAS strengthened strategic alliances between stakeholders from the value chains and others at level of governmental agencies and the academia in order to form human capital that will support the organizational and entrepreneurial development.

The project facilitated several behavioral changes in coffee and bean value chains, specifically:

- **Developed capacity to negotiate directly with buyers:** With the MAS Project, beneficiary bean producers are now organized to receive and manage technical assistance. As a result, they organized Community Seed Banks and developed capacities to negotiate directly with buyers such as IHMA. IHMA provided a better guaranteed price to producers.

- **MAS Producers adopted more practices than the control group:** data suggests that 47% of MAS coffee beneficiaries adopted 6 to 7 practices in comparison with 32% of the control group. The level

of adoption of MAS producers imply a greater capacity to deal with rust and CBB issues in coffee management, including proper tissue management (e.g. eliminating axillary buds, topping and middle-pruning), soil and water management to avoid erosion, water conservation. In the case of beans, producers incorporated into their practices new technologies like the use of inoculants, they apply specific fertilizer according to crop's needs, make soil analysis, apply soil fertility amendment and apply a value chain conceptual vision within their agricultural practices

Producers increased their understanding of the quantity and quality they sell: in coffee, MAS supported farmers to understand how selling their coffee by weight rather than volume could significantly increase their incomes. Additionally, it was observed that MAS producers adopted key practices that lead to an improved quality.

- **Producers increased their participation in formal credit schemes:** the MAS program facilitated favorable financial agreements between producer and buyers, medium term agreements, that allowed the loan allocation in both productive chains and promoted payment in kind loans (supplies), as fertilizers, in accordance to requirements derived from soil analysis implemented in participant farms.

With the MAS Project, beneficiary producers are now organized to receive and manage technical assistance, they have organized Community Seed Banks, they maintain commercial and financial agreements with coffee trading companies and with IHMA for beans. They receive a guaranteed price for bean trade from that same institution; now they participate in a more organized way in periodic access to market information; they have incorporated into their practices new technologies like the use of inoculants in bean crops, they apply specific fertilizer according to the crop's needs, make soil analysis, apply soil fertility amendment and apply a value chain conceptual vision within their agricultural practices, among other behavioral modalities.

At the adoption level of 6 to 7 practices, there was the greatest quantitative leap of MASP producers, by increasing the producers' percentage with a greater response capacity to rust and CBB issues in coffee management, including proper tissue management (e.g. eliminating axillary buds, topping and middle-pruning), soil and water management to avoid erosion, water conservation. MAS Project achieved the transformation from traditional farm to modern farm.

5.2.2.3 Response to TechnoServe's priorities

TechnoServe has had presence in Honduras since 2003, supporting farming projects in the value chains with a considerable volume of producers and with great potential to scale the effect of interventions. The main objectives of TechnoServe is improving income of rural families and thus, guarantee their food security by increase productivity in crops like coffee, beans and others, promoting business development and developing strategic alliances among the actors of the coffee and bean value chain. Likewise, TechnoServe adds technological components and good agricultural practices, with a vision of respect to the environment and the preservation of resources, progress in the productive organization and commercialization of agriculture and increase local capacities to have access to seeds with better genetic quality and to other improved input.

TechnoServe designed the Sustainable Agriculture Improvement (MAS) project, for Honduras to support poor families from the coffee and bean chains and implement practices and innovative technologies, for an implementation period of five years (2012-2017). Now, those experiences allow creating lessons learned, of what was done and learned, allowing examining how the project helped families of coffee and bean producers make and build solid agriculture business relations and with promising sustainability opportunities in both value chains, to replicate them both in Honduras and in other countries where TechnoServe works.

In order to achieve its objectives, TECHNOSERVE provided technical assistance through "Community Trainers and Cuppers" and trained producers to improve their yields, designing a technological approach that

started from soil analysis to practices in density management of the shades in the farms, managing tissues from the coffee plants up to how to manage density from the shade of the farms, managing coffee plant tissue, suing new varieties of beans resistant to drought. Aside from developing the relationship between producers and the market, it sought to create a link in the chain through inclusive business. In order to achieve proper ownership, TECHNOSERVE implemented a methodology to develop abilities and competencies in adults from the rural area based on the learning cycle, known as CREATE (Connect, Reflect, Engage, Activate, Try/ Test out, Encourage).

5.2.2.4 Response to partners' priorities

Within partners TECHNOSERVE identified for the success of the MAS Project, we can find the sector rendering financial services to small entrepreneurs like the José María Covelo Foundation and the Foundation for Rural Entrepreneurial Development (FUNDER). They created loan mechanisms with a revolving fund to create sustainability; TECHNOSERVE signed tripartite agreements involving loaners of financial services, export companies and TechnoServe.

Coffee exporters that bet for the development of smallholder and medium producers along with TechnoServe were: Beneficio Santa Rosa, Molinos de Honduras, COMSA, COCAOL, Louis Dreyfus Commodities and OLAM.

In the case of bean, the strategic partners were the Honduran Agriculture Marketing Institute (IHMA for its acronym in Spanish) and the World Food Program (WFP).

These complementary sectors, along with the academic sector, prefer acting with groups of producer families organized solidly with evident stability and institutional support. These preferences are covered through the entrepreneurial and social model defined by the MAS Project.

VI. CHARACTERISTICS OF THE BENEFICIARY POPULATION

6.1 Household Composition

The MAS project's target population was made up of smallholder and medium-sized producers of coffee and beans. The heads of households were in 85% men and 15 % women; the average age of the heads of household was 45 years of age, schooling 4.6 years and the literacy rate 84%. Households were made up of 5 members of different ages (Final Evaluation 2017).

6.2 Land Ownership

In case of the coffee chain, target producers owned an average of 6.5 hectares and out of these an average of 3.0 hectares are cultivated with coffee in production. The producers of the control group had an average area of 3.7 hectares in exploitation, and of these, 2.4 had coffee in production. When disaggregating data by sex of the target population, women owned 2.9 hectares and 2.0 hectares cultivated with coffee, on the other hand men had 7.3 hectares and 3.2 with coffee in production. In the control group in the disaggregation by sex, women had 1.9 hectares and 1.9 cultivated with coffee, men had 4.1 hectares and 2.6 cultivated with coffee.

For the bean chain, the average area of exploitation is 2.7 hectares and 1.5 of these are planted with beans. In the producers of the control group, the average area of exploitation is 2.2 hectares, and of these 1.3 hectares were planted with beans.

In case of women, there is a 20% more land ownership in the coffee chain than in the bean chain. In the case of men, the differential percentage is only 8%, in favor of the coffee chain.

6.3 Population stability and mobility

6.3.1 Migration

Migration is a social phenomenon that in recent decades has been accentuated in the country, and is generated mainly from rural to urban areas and to other countries. The fundamental cause of migration lies in the ancestral poverty of the population, which is forced (particularly youth) to look for other optional places for education and labor. Violence, lack of access to land, urban and rural unemployment, among others add to these conditions of poverty.

In the beneficiaries of the MAS project, the results of the final evaluation reveal that 14.8% of coffee producers' households reported migration over the past 5 years. On the other hand, bean producers' households reported 16.3 % of migration in the same period. (Table No. 9).

Table No. 5 Percentage of households with migration in the last five years. MAS 2017

Head of Household	MAS Project		Control		Differences	
	Coffee N=473	Bean N=484	Coffee N=412	Bean N=438	Coffee	Bean
Total	14.8	16.3	15.3	17.1	-0.5	-0.8
Women	23.3	21.9	24.4	21.0	-1.1	0.9
Men	12.8	14.6	13.2	16.2	-0.4	-1.4

Source: Final Evaluation of MAS Project August 2012 to March 2017

The figures shown in this Table show small differences between the MAS project beneficiaries and the non-beneficiary group of producers, in the sense that more non-beneficiaries migrate. This difference is -0.5 in the coffee chain and -0.8 in the bean chain. A similar behavior is shown in the data regarding men and women. The data clearly shows that migration is higher in households headed by women than in households headed by men, so much so that, in the beneficiaries of the project, both in coffee and beans, there is a difference of 10.5 and 7.3 percentage points respectively; likewise, in the control group, the difference between women and men who migrate is 11.2 and 4.8 percentage points respectively.

Usually, households headed by women live under more precarious conditions, obliging families to a greater migration, which is usually internal, since they are not able to do it abroad due to economic conditions. They migrate to maquilas (men and women) and for household services (women). The statistical significance was only obtained to measure aspects of impact of the project (productivity, income and others). The differences between households headed by men and women might not be significant. It is also true that the social behavior of the population is not always short term, usually medium and long term. Measurement of migration coincided with the MAS Project life, meaning that recent migration was measured which covers the last 5 years, in beneficiary households of the project and in the control group.

Migration prior to the period of the project was not explored. Migration is considered a social and economic phenomenon that can be altered with long-term interventions or with intensive public policy actions specifically addressed to this occurrence. In order to measure MASP effects on migration in a durability scale, these effects would have to maintain a consistent long-term trend comprising a long period.

Migration of the population in the country (men and women) has two main reasons, labor (mostly) and schooling in a lesser proportion. Women migrate because agriculture activities keep men in the field more than women. Traditionally, agriculture is an activity developed by men. People migrate due to various reasons, but mainly for work. In the rural area, women work on house chores and helping men in agriculture work; the availability of well-paid job opportunities for women is much less than men. Therefore, the pressure to migrate

(to improve economically and socially) is greater for women than men. If the rural area does not offer the youth improvement in: income, education, household, health, energy services, water, etc. they are obliged to look for answers elsewhere.

6.3.2 Migration destination

Within households that report migrant population, the destination of migration is within the country and abroad. In the beneficiaries of the project, there is more internal migration (51 and 58 per cent in coffee and beans, respectively) than external (49 and 42%, respectively); in contrast, in non-beneficiary producers' households, internal migration is lower (37 and 39 per cent in coffee and beans, respectively), and external migration is much higher (63 and 61% respectively). The migration to the United States is greater in households owned by non-beneficiaries of the project, by reporting 52 and 47 per cent in coffee and beans, respectively (Table No.10).

Table No. 6 Percentage of migrants according to place of destination. MAS 2017

Place of Destination	MAS Project		Control	
	Coffee N=70	Bean N=79	Coffee N=63	Bean N=74
Elsewhere in Honduras	50.6	57.9	36.9	39.0
USA	32.5	29.9	52.4	47.0
Another country	16.9	11.2	10.7	14.0
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: MAS Project Final Evaluation august 2012 to March 2017

In conclusion, internal migration was higher in households from project beneficiaries, and the opposite happens for external migration which was greater in those families who are not project beneficiaries. Part of the internal migration is justified due to education, search for better paid jobs and professional occupations. Likewise, it can be concluded that in the households of coffee producers benefited by MAS, external migration is greater (49%) than in the bean producers (42%), due to the greater difficulties that households that cultivate beans have to afford the travel cost of their migrants abroad.

6.3.3 Reason for Migration

Economic reasons prevail in the decisions for migration, which is stimulated by the gap in the income that a wage earner receives in the country and the salary received in the country of destination. The study from CEMLA[3] (2017) shows that the average monthly income of Honduran migrants surveyed resulted in $3,156, the amount of the average monthly remittance is $384.5 with an average of 13.5 remittances per year. This income scenario establishes the main reason for migration in Hondurans. The final evaluation carried out to beneficiaries and non-beneficiaries of the MAS project clearly showed that the main reason for migration is to search for job opportunities. Within the beneficiary households of the project, both in coffee and in beans in 74% of the cases migration is defined by the search for labor opportunities, with the same happening in the cultivation of coffee for the group of non-beneficiaries (control). Also the information highlights that in the control group, 92 per cent of households that reported migration do so for the same reason. Personal security has no significant impact on the migration of the population surveyed to be reported by about 1.0 percent of households (Table No. 11).

Table No. 7 Reasons for Migration. MAS Project, 2017

Reason	MAS Project		Control	
	Coffee N=70	Bean N=79	Coffee N=63	Bean N=74
Studies	14.5	14.0	13.1	1.0
Work	74.7	73.8	73.8	92.0

[3] http://www.cemla.org/PDF/remesaseinclusion/2017-04-migracion-remesas-inclusion-honduras.pdf

Reason	MAS Project		Control	
	Coffee N=70	Bean N=79	Coffee N=63	Bean N=74
Security	1.2	0.9	0.0	0.0
Other	9.6	11.2	13.1	7.0
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: MAS Project Final Evaluation August 2012 to March 2017

Job opportunities in the rural area are very limited. Agriculture is the main economic activity, and in many cases is the only one, however, rural employment is temporary and does not meet the expectations among the population, especially young people, who are forced to seek opportunities outside of their place of origin. When there are more permanent employment opportunities, the population settles permanently in the rural area. This perception is confirmed by coffee cupper Félix Ponce, who worked with the MAS project and said: "It has never crossed my mind to migrate from this country, I have a visa, and I have not traveled to the United States. It has helped me a lot to work in the coffee area. All my colleagues are working, and having work, there is no room for such thoughts".

6.3.4 Rooted to family assets

The fact that rural households do not have access to social security or retirement and pension system generates a dilemma in the transition of family wealth in the hands of parents to the children, a situation that becomes a challenge that affects the establishment of daughters and sons to continue with the cultivation of the land. This situation is shown in the population assisted by the MAS project, where on average 1.5 members of the coffee producing families and 1.2 members of the bean-producing families think about continuing with these activities. A similar scenario was found in the families of the control group (Table No. 8). The economic opportunities that the coffee activity generates slows down the exit process of family members - compared to what happens to the bean-producing families. This means, that the coffee producing families, will retain more members of the household, due to the fact that the crop (coffee) generates greater economic resources, making families more stable with regard to the need of migrating within or outside the country.

Table No. 8 Average household members who will continue the coffee and bean activity. MAS 2017

Sex	MAS Project		Control	
	Coffee	Bean	Coffee	Bean
Total	1.49	1.17	1.34	1.11
Women	1.58	1.21	1.35	1.19
Men	1.47	1.15	1.34	1.10

Source: Final MASP Evaluation August 2012 to March 2017

This was the question asked in the survey: "Excluding yourself, how many people who live in your household will continue with the technical management of the farm (coffee or bean) as household inheritance?"

The overall average of people per household in the sample of the evaluation was 5, similar to the national average for the rural area (INE).

In average, 1.5 people per household would continue with the technical management of the farm, for coffee and 1.2 for bean in project beneficiaries. The answer to the question is subjective, based on the perception of the rest of family members. These two values also include a unit corresponding to the head of household, who answered the question.

Among departments, the highest rooting in the beneficiary population happened in the coffee producers of Olancho and Comayagua, with 1.9 and 1.6 members that would continue with these assets, the same happens for the control group of the same value chain. The opposite happens in the departments of El Paraiso

for the intervention group and the control group of the bean value chain. In summary, the results suggest that in the coffee chain there is more family rooting than in the bean chain.

The efforts to strengthen the productive chains, in this case coffee and beans, must be accompanied by initiatives with investments on utilities (water, access roads, energy, health, education, housing, land, etc.) in order to increase the rooting, especially of the youth.

In regards to the impact of the MAS project in this field, it can be said that there is a greater tendency of rooting by household members of the coffee chain, due to the support received from MAS in strengthening the systems of production and in increasing the productivity and income that has been achieved. In contrast, in the bean chain, the progress of productivity does not exceed the income needs of families, and makes migration a survival strategy. It is important that in future development interventions, strategies that integrate opportunities for generational replacement with retirement and pension are defined and to incorporate the young men and women to technical and financial education linking them to their family assets and livelihood.

VII. STRATEGIC LINES AND COMPONENTS

7.1 STRATEGIC LINE 1: Facilitate the Access to high quality seeds and input

In this strategic line, TechnoServe focused operations in the establishment of Community Seed Banks as a single component of the strategic line. Community banks worked for the bean chain. The purpose of the strategy was to generate its own institutionalism of the Communities for artisanal seed production, at low cost, and with certified quality. There were several alliances in this regard. See section 6.4.3.2., page 38; section 8.1.1., page 49; section 8.1.1.4., page 51 and section 8.1.1.7., page 54.

7.1.1 COMPONENT 1: Community Seed Banks

The global target of the MAS project was to establish and continuously operate 60 Community Seed Banks (CSBs) for beans. MAS established 150 CSBs, with 133 of them certified by SERTISEM / SENASA / SAG. Within these CSBs, the project promoted three varieties of beans: Amadeus – 77, Deorho and Carrizalito.

Two hundred twenty five (225) individual seed producers were incorporated into 42 groups of producers. During the years of the project, the CSB produced 8,787 quintals of certified seed. The CSB became the main supply source of certified bean seed. Through the Associations of Seed Fund, the service was extended to communities that were not directly addressed by MAS.

The MAS project, also achieved establishing 350 farmers' plots for the validation of technical seed production. This method made the use of the three varieties of certified seed popular, faster.

7.2 STRATEGIC LINE 2: Develop and implement a training Program in technical improvement and farming technologies.

In this line, the main adopted method was the establishment of the Field Schools (FS), using demonstration plots in farmers' fields. MAS designed 13 training modules for farmers. See sections 8.2., page 55; up to section 8.2.2.2., page 72.

The project organized a field technical team to provide training to farmers, in each of the five departments.

7.2.1 COMPONENT 2: Field Schools

In the farms owned by coffee and bean producers, MAS established 452 FS. The global goal included a total of 400 FS, 226 in coffee and 174 in bean.

To continue with this FS model, it is recommended to promote agreements with the cooperating agencies of support services for the farmers, such as the National Agriculture University, National Autonomous University of Honduras, the Ministry of Agriculture and Livestock, the El Zamorano University, FHIA, IHCFE, among others.

7.3 STRATEGIC LINE 3: Strengthening the PO to provide services that add value and comply with market standards

Under this line, the project sought to address the funding aspects of the agricultural activity, facilitating credit to producers, market relations to have access to centers of consumption or export with better recognition of value in the price of coffee and beans, storage facilities and other infrastructure in the farm, linking the elements of value chains in both crops, a basic system of information exchange using the infrastructure of existing commercial digital communication, and the administrative and accounting capabilities of individual producers.

The strategic line focused on four implementation components: Component 3, Strengthening the capacities of Organizations of producers (PO's); Component 4, Expanding access to credit; Component 5, Developing an agricultural information system; and Component 6, assessing the storage infrastructure of Organizations of producers. See sections 8.3.1.1., page 75, section 8.3.3.7., and page 92.

7.3.1 COMPONENT 3: Strengthening capacities of Producer Organizations (POs)

The strengthening areas included increasing the PO's market management capacity by linking them to coffee exporters, the Honduran Institute of Agricultural Marketing, the World Food Program, and other actors in the chain; conducting infrastructure assessments and linking producers with infrastructure investors; the improvement and adoption of Good Agricultural Practices; The adoption of technical procedures for administrative controls.

The number of producer organizations considered as an initial goal was 210 units. At the end of the MAS project, 233 POs joined, all of which are linked to investors of infrastructure.

For the next coffee harvest, 153 associations of coffee producers have already established marketing agreements with the following companies: Molinos of Honduras, COMSA, OLAM, COCAOL, Louis Dreyfus Co., and waiting for Beneficio Santa Rosa, Coffee Planet Corporation, Co. Honducafe.

The total number of agreements signed by the PO with companies, IHMA, and others, was of 884, 694 for coffee and 190 for bean.

The POs achieved 126 infrastructure assessments, of an initial goal of 80. The funded infrastructure projects add up to 42.

9,013 coffee producers applied new techniques and technologies. In beans growing, progress came up to 5,552 producers that apply best practices. The initial goals were 6,000 coffee producers and 3,000 bean producers trained.

Administrative controls have been adopted on average by 40% of coffee producers assisted and in the control group only 16% keep some type of administrative record. In the assisted population, 73% adopted production records, 38% with inventories of input, and 33% with costs, 34% payroll and 24% sales; on the other hand the GC does not exceed the 10% in all these types of records.

7.3.2 COMPONENT 4: Expanding Access to Credit

Access to credit, according to the final evaluation survey, 77% of project beneficiaries were reached and the amount exceeded US$ 18.4 million, surpassing the target of US$ 5 million. 77% of women, under the MAS project intervention had access to productive credit versus the 44% of the CG.

The initial target was 5,400 credits to coffee producers, which in the end became 20,319 credits granted. In the bean production the stated target was 1,406 credits facilitated for producers, which in the end became 5,822 credits facilitated.

7.3.3 COMPONENT 5: Developing an Agriculture Information System

The basic information system was to collect and share information on markets through electronic communication (via cell phone or SMS) between central offices with organizations of producers and with the producers; as well as between the organizations, institutions and companies allied with the producers and central offices.

The project goal was to incorporate at least 10 POs to the permanent operation of the information system. In the end, 14 POs have been incorporated.

The project proposed reaching 15,000 people with at least one up-to-date source of market information; at the end of the project, reached the amount of 16,068 people were reached.

According to project beneficiaries, coffee producers expressed that 43.3% (205/473) received information via SMS text message and bean producers received the information in 18% (70/388).

The system is still at its initial stage. The amount and frequency in the time of the messages must be reinforced, encouraging the participation of the farmers themselves, and with an emphasis on greater participation from youth, women and senior adults.

7.3.4 COMPONENT 6: Evaluate the POs' storage infrastructure

The MAS project secured the involvement of strategic partners to assess the storage infrastructure of the POs. The partners were: Beneficio S. M and R DE H, IHCAFE and Michigan State University (MSU). These public/private partnerships implemented a funding of US$5,000 in the activity.

The purpose of the evaluation was to obtain information that served to link the POs with investors in infrastructure. MAS linked 233 organizations in this regard. The investments will be directed to the construction or improvement of warehouses, drying patios, grain dryers, coffee processing facilities, and water harvesting and irrigation systems.

The 126 infrastructure assessments also included the exploration of the ease of use and management of silos, warehouses, etc., with the purpose of facilitating the subsequent credit efforts.

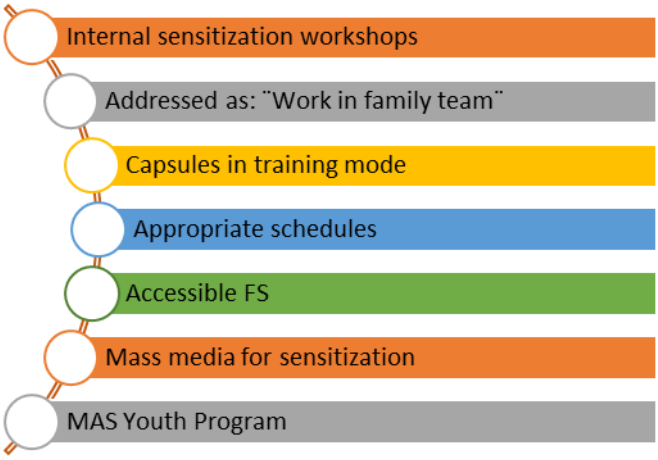
7.4 GENDER COMPONENT

The incorporation of gender into the MAS project was designed to make it easier for women to take advantage of the knowledge and skills provided by the project just as men do and that their contributions to the sector were valued. In addition, an approach was promoted for families to manage the farms as a unit and not only having the man with all the knowledge about growing and managing the farm. In this context, the promotion of gender equality and equity was taken as a commitment within the framework of the MAS project implementation. As a cross-cutting axis, a target was set to include the participation of 20% of women as project beneficiaries, both in the production of coffee and beans. During the year 2014, a rapid assessment was made on gender and an action plan was developed that would guide actions to achieve incorporating the gender approach into the various project actions. In this regard, one of the participants in the focus group from management and a technician pointed out the following. "Properly speaking, we cannot say that we have looked for gender equity. Rather, we have adopted a participatory approach of gender, due to the fact that there is a limited participation of women".

The results of the evaluation show that the achievements were significant to women beneficiaries of the project in opportunities to improve their farms with the cultivation of certified seed, access to financing, negotiating power to know the quality of their coffee, deciding who to negotiate their coffee with, aspects that are highlighted in this paragraph. However, there is still much to do, especially in assessing the impact on gender equity and the generational change within each of the organizations of producers, since there are still cultural barriers that prevent the recognition of the productive work of women in rural areas.

In the implementation of the program, the technical team of the project was trained and they worked under the "family team work" slogan, an integration approach to family production. Small messages on gender were designed in each of the training modules, on the importance of the contribution of women, how their work is valued, and the role of the sons and daughters. Posters addressing the subject were distributed, for example: "Men and women who walk side by side get very far, because they are both equal, this is where change begins," and were placed in key locations, such as grocery stores, mini-markets, among others. Figure No. 3 summarizes the gender strategy in the project.

Figure No. 3 Gender strategy Approach in the MAS Project



This strategy facilitated the opening of spaces for women's participation as beneficiaries of the project and as community trainers. The implementation of these actions aimed at facilitating the access to resources and benefits for men and women of the MAS project, which has had to face severe cultural barriers that still prevail in the rural area. Despite efforts to involve more women in project activities the masculine character persists in many agricultural activities. There are still many activities related to the cultivation of beans and coffee that continue to be primarily attributed to men.

Source: Formation on Improved Farming Practices, April 2017.

Illustration No. 1 Poster socialized in communities

7.4.1 Contribution of the MAS Project to equal participation from men and women

In case of the coffee chain, the participation of women was 19%. In the mid-term evaluation this figure was 16%, not overcoming the planned target of 20%. In the production of coffee, the collection activities have traditionally enabled incorporating family work. Women have been incorporated as cuppers, but it has been difficult to incorporate them in greater proportion as community trainers due to the personal risks associated to moving in a motorcycle in solitary places. In the rural savings and credit groups associated with the MAS project, there is more presence of women in productive activities than in the other groups of producers in rural areas that are part of its social base, since by August of 2016 it reached 32% of participating women, promoting the participation of women and youth in decision-making, in productive work and in the management of salaries and profit. There is an upward trend in some positions where women are doing quite well, in positions such as: secretariat with a high participation (53%), Treasury (38%) and chair of the supervisory board (35%) which are the mechanisms of governance and accountability of the rural savings groups[4].

Table No. 9 Participation of women in the coffee value chain

Final Evaluation		MTE		
Women	Men	Women	Men	
19%	81%	16%	84%	

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

The results of the project's evaluation show that the foreseen target on the incorporation of women was achieved. In case of the bean chain, as a result of project actions participation of women who received technical assistance or were trained was 23%, surpassing the results of the mid-term evaluation, which was 14% and the proposed target was 20%.

Table No. 10 Participation of women in the bean value chain

MASP		MTE	
Women	Men	Women	Men
23%	77%	14%	86%

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

[4] FUNDER. Fourth and Last Report on Project Expansion (From June 1st to August 31st, 2016).

It is important to note that, in the case of the bean chain, many of the spaces in the post-harvest activities like the selection and classification of seeds are performed by women. A female producer of the focus group said: "We cannot speak of the existence of a gender balance since a substantial part of the groups served are savings groups where women represent the majority of members. It is recognized that women have fine skills for the classification of seeds. The project has involved women and youth, and this seems to be an innovative and interesting thing".

7.4.1.1 Land Ownership

Land ownership[5] is a key element in the access to and control of resources that allows the participation of women in both chains, being a key factor for their empowerment. In the case of the bean chain, 61% of women are owners of their land and 25% of the production units belongs to their partner and 6% to both. In the case of men, 83% are owners of their land and 3% of the plots are owned by their partner and 5% belongs to both. In the control group, 60% of women own the land compared with 86% of men and 3% that belongs to both.

Table No. 11 Land Ownership - bean

Description	MASP		Control Group	
	N=64 Women	N=213 Men	N=81 Women	N=357 Men
It belongs to me	61%	83%	60%	86%
It belongs to my partner	25%	3%	25%	2%
Both	6%	5%	9%	3%
My children	5%	0%	2%	1%
Other	2%	7%	2%	9%
Not responsive	3%	3%	4%	1%

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

In coffee production 81% of the women coffee producers are owners of their land and 10% is owned by both, compared with 91% of men and 7% belongs to both. In the control group 80% of the women are owners of their land and 91% of men.

We confirm that 81% of owners refer to managing of the land. In the final evaluation survey, the producers declared if they rented or owned the land but the survey did not ask whether the farmers had property titles.

In Honduras, several valid ways of land ownership are established by law, including freehold (credited by authorities with a public deed), beneficial ownership (in possession of the land, with documents from municipal authorities), community deed (under special legal safeguard, on indigenous communities), and other forms of ownership acknowledged by law. The evaluation study did not include the forms of property distributed according to gender.

There is also land rental, which would be the closest to simple land management, without property rights. Finally, there is simple land settlement, which is occasional and does not grant rights over the land

[5] The sum is not greater than 100% since in some cases a farm could have two or more kinds of land ownership.

Table No. 12 Land ownership - coffee

Description	MASP		Control Group	
	N=71 Women	N=347 Men	N=63 Women	N=312 Men
It belongs to me	81%	91%	80%	91%
It belongs to my partner	7%	1%	10%	1%
Both	10%	7%	9%	7%
My children	5%	1%	5%	1%
Other	0%	2%	1%	2%
Not responsive	0%	0%	0%	0%

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

7.4.2 Participation of women in access to services in the coffee PO

7.4.2.1 Technical Assistance

Technical assistance is one of the main supporting axes provided to coffee producers by the MAS Project. Of a sample of 90 coffee producing women interviewed, the technical assistance of MAS per year of harvest increased since the start of the project in 2013-2014 from 23% to 92% in the 2016- 2017 harvest. In case of men of a universe of 383, 15% to 91%, respectively, as shown in the following table:

Table No. 13 Coffee harvest seasons in which producers received training and technical assistance from the MAS Project

Harvests	N=90 Women	N=383 Men
2013-2014	23%	15%
2014-2015	43%	46%
2015-2016	73%	81%
2016-2017	92%	91%

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

Last table shows the coffee harvest seasons where women received training or technical assistance from a community trainer of the MAS project, reaching the highest proportion in the 2016-2017 harvest, a similar behavior is found for men.

Table No. 14 Training in Coffee Quality

	MASP		Control Group	
	N=90 Women	N=383 Men	N=81 Women	N=347 Men
Total	**100%**	**100%**	**100%**	**100%**
Yes	**80%**	**87%**	**10%**	**15%**
No	**20%**	**13%**	**90%**	**85%**

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

From the total universe of the evaluation, 80% of women and 87% of men received training on the quality of coffee, reflecting equal access for both. It is worth noting that the quality aspects were not only receiving the training, it is reflected that 7 of every 10 women trained know about the quality of coffee they produce, a situation that is of little relevance in the control by showing that the number of women who received training in coffee cupping was a minimum (1 person).

Table No. 15 Farmers that know the quality of their coffee

	MASP		Control Group	
	N=37 Women	N=182 Men	N=1 Women	N=17 Men
Total	100%	100%	100%	100%
Yes	70%	67%	100%	53%
No	30%	33%	0%	47%

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

About future sale relations for the 2017-2018 harvest, 80% would sell their coffee to the exporter. Of these, 67% of producers negotiate directly with the exporter, 16% through their organization that has an agreement with the exporter; while 25% of women sell through the exporter. In regards to the control group, it is noted that 67% of the women sell their coffee directly to the exporter and 66% of men, in the search for better prices.

Table No. 16 Coffee producers selling to exporters in the 2017-2018 harvest

	MASP		Control Group	
	N=90 Women	N=383 Men	N=81 Women	N=347 Men
Yes	80%	88%	63%	56%
No	20%	12%	37%	44%
Total	100%	100%	100%	100%

Source: Prepared by ANED Consultores – Sigil Consulting consortium, 2017 – MAS Project Final Evaluation

7.4.3 Participation of women in access to services in the bean POs

7.4.3.1 Technical Assistance Services

One of the main services that the bean producers had access to through the MAS project was to technical assistance, which women producers of grain otherwise would not have access to, which is evident in the control group, who reported that they did not have access to that service. Of a universe of 113 women producers of beans, the technical assistance of MAS per cycle of harvest was increasing since the start of the project in the second cycle of 2013 from 22% to 82% in the second cycle of 2016. In case of men from 19% to 75%, respectively, as shown in Table No. 21.

Table No. 17 Coffee harvest seasons in which producers received training or technical assistance from the MAS Project MAS

Harvest	N=90 Women	N=383 Men
2013-2014	23%	15%
2014-2015	43%	46%
2015-2016	73%	81%
2016-2017	92%	91%

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

7.4.3.2 Certified Seed

One of MAS's strategic lines is to facilitate access to high quality seed and inputs, and this is an opportunity for women beneficiaries. In this sense, 83% of the women interviewed reported that they acquired the certified seed at the MAS Community Banks. To a lesser extent, they were acquired in an Association of producers, trading houses and other centers of seed supply, but not in the control groups.

Table No. 18 Places where certified seed was purchased

Description	MASP		Control Group	
	N= 78 Women	N=226 Men	N=3 Women	N=32 Men
Total	100%	100%	100%	100%
Community Bank/MAS	83%	87%	0.0%	0.0%
Association of producers that supplies certified seed (AFS)	4%	2%	0.0%	3.1%
Technological Bonus	0%	0%	0.0%	6.3%
Trading House	4%	4%	0.0%	12.5%
Other	9%	7%	66.7%	68.8%

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

The technological bonus is a contribution as supplies, made by the Government through the Ministry of Agriculture and Livestock, for smallholder producers. The amounts have changed throughout the years, but usually it includes 1 quintal of urea, 1 quintal of formula (N, P, K) and 25 or 30 lb of seed. The bonus is only for staple grains (corn, beans, rice, sorghum).

7.4.3.3 Sales to New Markets

An opportunity in the bean chain as a result of the intervention of the project was the sale of the production to IHMA. In the year 2015, the sale in formal markets is marketed on a larger scale through the signing of an agreement with IHMA under quality standards. These business opportunities with new actors were growing, considering that 42% of women indicate that the quantities sold in the first cycle of 2016 were higher than sales in the first cycle of 2015, as well as for the second cycle of 2016, 21% of women consider that they were greater than the second cycle of 2015. On the other hand, the control group did not report any sales to IHMA.

Table No. 19 Percentage of bean sales in the first and second cycles to IHMA, 2016

Description	First		Second	
	N=19 Women	N=69 Men	N=19 Women	N=69 Men
Greater	42%	57%	21%	36%
Equal	21%	12%	26%	10%
Less	11%	14%	16%	16%
Did not sell	21%	10%	37%	38%

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

It is important to note that both female producers (95%), and male producers (88%) who sold to IHMA are satisfied with the sales conditions; 63% of women and 71% of men stressed that in the next harvest either first or second season of 2017 they would sell their bean production to IHMA.

Table No. 20 Percentage of producers satisfied by selling to IHMA

Description	N=19 Women	N=69 Men
Total	100%	100%
Yes	95%	88%
No	5%	12%

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

7.4.3.4 Access to Financing

A key aspect that affects access to opportunities for improvement of their plots is the financing. In this regard, access to financing during 2016, presented no great differences between men (43%) and women (41%), but it

can be highlighted that in the control group the percentage of women and men without access to financing is greater.

Table No. 21 Access to financing by sex

	MASP		Control Group	
	N=114 Women	N=370 Men	N=81 Women	N=357 Men
YES	41%	43%	10%	15%
NO	59%	57%	90%	85%
Total	100%	100%	100%	100%

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

7.4.4 Participation of women in remunerated agricultural activities

It is important to highlight that the participation of women in agricultural activities, especially in the implementation of the MAS project, involved two key aspects: on the one hand, employment opportunities in the various activities of coffee production, incorporating them as cuppers and in beans in post-harvest activities.

In the case of beans, the results of the evaluation indicate that women had an increase in productivity of 3.4 quintals per hectare, which was reflected in an increase in income.

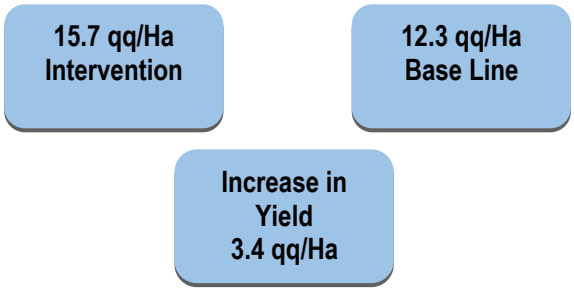


Figure No. 2 Increase in bean yield for women

VIII. PROJECT EFFICIENCY ANALYSIS

8.1 Alliances as a response to producers' needs

A strategy to respond to the needs of coffee and bean chains responds to the knowledge of the real possibilities to find solutions to the problems producers face, through strategic allies. Therefore, the creation of Strategic Alliances made it possible to expand the intervention and the response of MAS, achieving a greater competitiveness and development of the families served. To this end, 16 public/private alliances were agreed during the life of the project (Table No. 22).

Table No. 22 Number of Public/ Private Alliances.

	MASP	Target	Differences
Public/ private alliances	16	6	10

Source: Final Evaluation of MASP August 2012 to March 2017

These alliances responded to five basic aspects of the 2 productive chains: 1) technical assistance for the dissemination and adoption of improved agricultural practices, 2) the research for the validation and production

of bean seed, 3) the establishment of community seed banks to preserve the vegetative material adapted to local environments, 4) the organization and strengthening of the local financial capital through rural savings groups and 5) the improvement of market insertion through proper storage and packaging of products. Table 27 describes some of the alliances established and their financial contribution to the activities in the field that were promoted by the MAS project.

Table No. 23 Private/Public Alliances

	Strategic Partners	Investment	Value chain	Strengthened Component
1	Neumann Foundation	2,500,000	Coffee	Strengthening the capacity of the PO. Technical assistance to 2,000 smallholder producers affected by rust in three departments.
2	USAID-Feed the Future	50,000	Bean	Establishing community seed banks. Validation of bean varieties resistant to climate change and bio-fortified.
3	World Food Program (WFP)	60,000	Bean	Establishing community seed banks. Bean Research and Development and installation of the laboratory for soil fertility of SAG-DICTA.
4	Honduran Coffee Institute (IHCOFFEE)	270,000	Coffee	Training on Improved Agricultural Practices and strengthening the capacity of organizations of producers. Joint program to support farmers affected by rust.
5	*Research and Technology Directorate (D*ICTA)	290,000	Bean	Establishing community seed banks. Research and production of improved varieties of bean seed
6	FAO-Honduras	200,000	Bean	Establishing community seed banks. Strengthening of community seed banks and the PASH network
7	Beneficio Santa Rosa	2,150,000	Coffee	Strengthening the capacity of the PO and expand access to credit
8	Molinos de Honduras (MdH)	2,200,000	Coffee	Training in improved agricultural practices and expand access to credit
9	Foundation for Rural Development (FUNDER)	389,500	Coffee/Bean	Strengthening the capacity of the PO and expand access to credit. Training of 160 savings groups of smallholder producers and financing to smallholder coffee growers
10	Beneficio S.R y M DE H, IHCAFE and Michigan State University.	5,000	Coffee/Bean	Assessing the storage infrastructure of the PO. Research to improve the packing and storage of beans and coffee
11	TechnoServe -KRAFT	50,000	Coffee/ Bean	Training on Improved Agricultural Practices
12	COVELO Foundation	400,000	Coffee/ Bean	Expand Access to credit
Total		**8,564,500**		

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017. Final Evaluation MASP

The establishment of these alliances allowed the project to mobilize financial resources of over US$8.5 million, and set the stage for opportunities for producers of coffee and bean chains to undertake improvement processes in their production systems, to give added value and guarantee achieving agreements and contracts for the marketing of products. Likewise, they were inserted into local financial markets; they appropriated technological innovations and agreed to new markets with differentiated pricing of their traditional markets.

The strategy of change in the organizational and institutional capacities through public private partnerships, had three major impacts: 1) technologically, which has to do with the improvement and the balance of the production systems with their local and national environment, 2) socially, through impact on the increase of employment and income to improve their competitiveness and 3) strategically, to ensure their food security and preserve the family assets.

8.1.1 Creation of funds to expand access to credit

Producers of the bean chain reported that one of the main strengths of the MAS Project was its approach strategy to the producers for their productive organization, based on the organizations that were already developed by the communities themselves and by other institutions. These include rural savings groups, established rural businesses, and other associations promoted by government projects. It also meant a significant saving of resources, the use of Field Schools as a method of supplementary technical training to farmers. This method proved attractive to participants.

In some cases, the invitation to participate as a strategic ally of TechnoServe's MAS project was accompanied by a solidarity contribution for the financing of producers.

- **UNDER-COMSA-TECHNOSERVE Alliance**

COMSA's manager addresses the topic by expressing the following:

"A financing fund was formed, which provides some input to the producer, especially fertilizer. *Each one of us, TECHNOSERVE, FUNDER and COMSA, contributed $100 thousand to have a fund of $300 thousand for financing. In reality, producers need more, but they can start going forward with this fund.*

At the conclusion of the time of the project, half of TECHNOSERVE's fund will capitalize our finance unit that is called BANCOMSA, which is supporting with education and credits to producers. When recovering the total amount of $ 300 thousand, 50 thousand of funds contributed by TECHNOSERVE will be passed on to FUNDER and $50 thousand to BANCOMSA, which in reality is a savings and credit group that has that name. With this fund, we will continue funding to producers. This fund will become a revolving fund."

- **Molinos de Honduras-COVELO Foundation-TECHNOSERVE Alliance**

Due to the intervention, Molinos de Honduras and the Covelo Foundation created a joint fund for the financing of coffee producers. In this regard Molinos de Honduras's manager said the following:

"We were helped to make an alliance with COVELO. With them, we established a fund for producers. We share the risks of the financing. In practice, we have always formed a 'pool' with TECHNOSERVE and COVELO".

- ***OLAM-TECHNOSERVE Alliance***

When asking the sales rep from OLAM on the matter, he said the following:

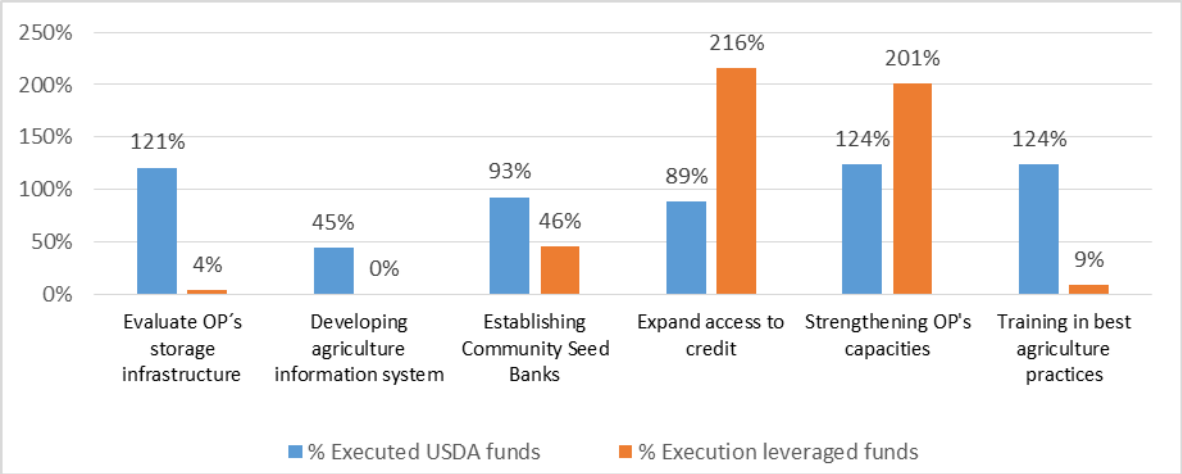
"The financing that we give here comes directly from Olam, from the company. OLAM's credit policy has as a frame of reference to do business. There is financing if we achieve to do business with producers.

The funding is separate. TECHNOSERVE has its area and we have ours. However, TECHNOSERVE has spoken to us about the subject of the Tripartite funds. At the time, we exposed it to headquarters. Up until now, nothing has been materialized on the matter".

8.1.1.1 Leverage Funding

Leveraged funds contributed to the improvement of the financial efficiency in the MAS project, noting that the major contribution of the strategic partners focused on strengthening the components of Expanding Access to Credit with 216% and strengthening the Capacities of Organizations of producers 201%, surpassing even the funds allocated by USDA. On a smaller scale, the establishment of Community Seed Banks was supported with 46%, Training in Best Practices 9% and evaluate the Storage Infrastructure with 4%, according to what is shown in Chart N° 36.

Chart No. 1 Leveraged Funds by Component



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

Strategic alliances have been a fundamental bastion in the implementation of the MAS project because it wouldn't have been possible to achieve similar results with fewer resources considering that:

a) The signing of technical cooperation agreements with strategic partners, has contributed to complement the actions undertaken by the MAS project.

b) Its effects can transcend, because in addition to open access from the PO to markets, the training of community trainers, the organization of community groups, training and technical assistance to improve productivity and access to improved seed, contribute to the stabilization of the marketing chain and financial services model.

c) The coffee chain will be able to continue without difficulty because producers are protected with the contracts signed for five years with MDH;

d) There is a real commitment from producers to offer a competitive product in the international market in terms of quality and cup. The PO will be able to meet the payments and it has been proven that the POs are good payers.

e) Late payments or non-payment constitute less than 3%;

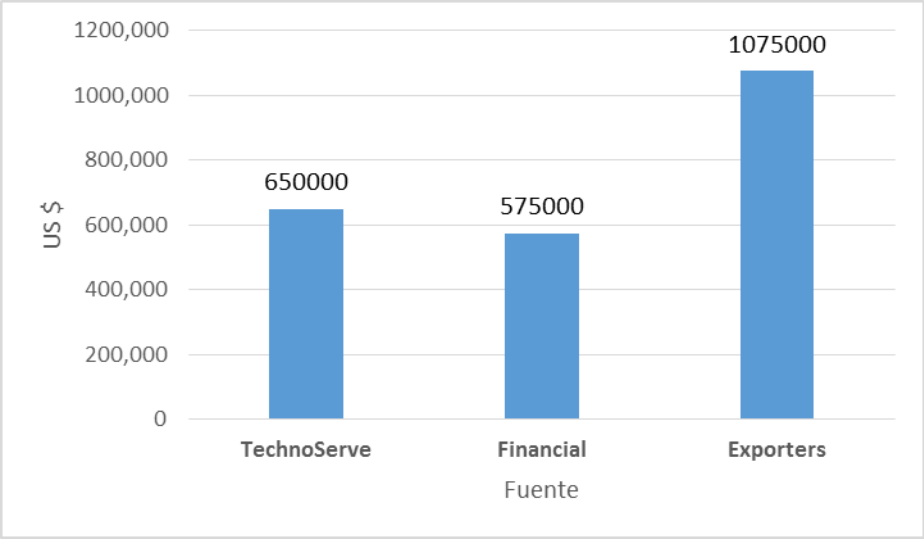
f) The financial assistance provided by Covelo and FUNDER, ensures that they will continue to provide assistance in this matter.

In the opinion of the Country Manager "*having managed with the exporters the direct relationship with the producers through agreements, the PO feel that if they can perform their actions as small entrepreneurs, they can directly negotiate prices and this forces them to maintain the quality in order to remain competitive; in addition, the agreements signed with the partners have helped to give a sense of security and trust to the funders, because there is a real commitment from producers to offer competitive product and quality. For example, Molinos de Honduras is signing agreements with a validity of up to five years, an aspect that contributes to the sustainability of the project even when TechnoServe leaves. The participation of strategic partners to leverage the project exceeded initial expectations, considering that not only the investments have been increasing each year, but, in addition, new partners have been incorporated to see the results obtained in supporting Organizations of producers financially and with technical assistance, can offer quality products*".

8.1.1.2 Mechanisms of Access to Credit

Access to credit in the coffee chain is relevant and to assess the allocation and mobilization of counterpart funds to the credit portfolio, the project's Financial Specialist was interviewed, who said that in order to increase the use of financial services and specialized technical assistance to strengthen the coffee chain funds Matching Grant Fund (MGF) are available. Currently, four exporters are working with their own funds, Beneficio Santa Rosa, Coffee Orgánico Marcala SA DE CV (COMSA), Molinos de Honduras (MDH) and the Coffee Cooperative Olancho Limited (COCAOL). The model can be sustainable provided that parties fulfill the responsibilities set out in the agreements, keep the delinquency rate below 3% and that the guarantors for the PO to comply with the payments will be financial institutions (COVELO AND FUNDER). Below is a Chart with the behavior of the funds that are currently leveraging the coffee chain.

Chart No. 2 MGF Funds awarded and leveraged in the Coffee Chain



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017. MAS Project Final Evaluation.

The total leverage through MGF is US $1,650,000 provided by the partners and US $ 650.000 by the MAS project, creating a revolving fund to be administered by the financial institutions to continue providing support to producers even if TechnoServe would leave. However, the MAS project has not developed yet a regulation for the use of the funds allocated by TechnoServe, a non-refundable deposit which will be administered by the financial institutions (COVELO Foundation, FUNDER and NEUMANN Foundation)

8.1.2 Business contracts with competitive markets.

MAS Project officials actively mobilized to establish strategic alliances between organized producers and exporters of coffee and buyers and processors of beans, creating a mutual beneficial exchange relationship of quality products and better prices, effectively removing traditional intermediaries from the commercialization chain.

In the coffee chain, the exporting company with higher rating demonstrated in the international market was selected in the first place, and on their ensured cooperation they expanded the participation of the export sector. With regard to the consultation on how the strategic alliance started with TechnoServe's MAS project, managers from exporting companies expressed the following:

- **The Manager from Coffee Orgánico Marcala, Sociedad Anónima (COMSA)**, responded as follows: *"We were approached by some people who work with the project. Among them we found Mr. Tomas Membreño, Maryorie Plats and Hugo Paz. They were very active, very inspired by the goals of the project and by the desire of making a direct relationship between smallholder producers and the exporter. They were very motivated to modify the traditional models of the smallholder producer who was almost inevitably led to the intermediary.*

  From the start, we developed a capitalization strategy for the company, but also the sustainable development of the producers."

- **The Procurement Officer from OLAM, in Villanueva, Cortés**, responded along the same lines: *"We met with the engineer Ricardo, with Hugo Paz and with Mr. Tomas Membreño. We met with them, they presented the project and how we could fit into it. Due to our interest in working directly with producers, we found common grounds and we started the relationship with them. We wanted to work directly with the producer and benefit them and TechnoServe offered us this opportunity through the project*".

  COCAOL Co-op's Manager, in Santa María del Real, Olancho, said the following: "We began our approach with what they call a junior officer and not with a senior officer. They have their categories to work. I think it was with Julio Guerrero. He visited us to offer some kind of support for the members they were going to work with in a coffee and wine area to see if it was possible for us to support them in the marketing process with producers that they had organized directly. Following the visit, we began the relationship with them mainly based on the topic of marketing with the producers that they had. That is how it all started".

  COCAOL Co-op's Manager emphasized on the fact that without the intervention of the MAS Project is would have been very likely that this relationship had never happened.

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- **The female in charge of MARVISA plant, a bean buying and processing Company in San Pedro Sula,** *about how the MAS project had been involved with strategic allies, she highlighted the visit they had received from TechnoServe officials, who arrived with producers associated to the project: "Yes, Mr. René came with 2 or 3 more people, an engineer and 2 farmers who were in the project".*

Both in the case of MARVISA as well as in the coffee exporting companies, it is worth highlighting, the interest they had in working directly with smallholder producers.

In this regard, one of the strategic partners of the MAS project, has been the Molinos de Honduras coffee exporter. On this matter, the manager of Molinos de Honduras said the following:

"I have been working with the company for four years. We took the company to create new opportunities, introduce improvements and new approaches".

"From the beginning we wanted to buy coffee directly from producers. We had no idea on how to do so, but I got to know about the MAS project and came into contact with them. Look, the thing is that traditional commercialization was a bit complicated and it was done through intermediaries. We were looking for quality and we were convinced that, with the intermediaries meddling, we wouldn't be able to find quality. Therefore, it was a logic decision to look for the producer directly, and the MAS project, gave us that valuable opportunity."

"We learned, *very soon, that working directly with producers would give us advantages that traditional commercialization through intermediaries wouldn't give us. We see this relationship from a business perspective. It is not just about having a kind heart.*

The thing is that the producer receives benefits and that I, as an exporter, can also receive benefits. It is about having both sides happy doing business together.

I trusted in the potential of the smallholder producer. We have been able to confirm this potential in the 4 years we have been making business with smallholder producers under the guidance of the MAS Project".

"The MAS Project has given us access to a volume of good quality coffee that has been increasing sustainably over the last 4 years and now they are an important offeror for us. For instance, when I started in the company 90% of the coffee we exported was purchased from intermediaries. Currently, web buy one third from intermediaries, one third from co-ops and one third from producers associated with the MAS project, whom which we have fluent communication. I like to sign agreements every year with producers".

8.1.3 Attitude to reach maximum performance levels in solidarity work

The main agents carrying agronomic and technological innovations have been the MAS technicians and community trainers. The commitment from technicians has stood out as well as the horizontal treatment they give to the producers they work with.

On this matter, a member from the board of the MAS Project said the following:

- *"It seems to me that one of the key factors for the achievements we have had in the Project lies here, in our work team. It is a team that has no sense of entry or exit time. It is a team that does not know the difference between a work day and weekend.*

Technical assistance's quality offered to producers is important. But it is also important to mention the empathy with which the team arrives to each household from producers and a horizontal relationship between the technician and the producer. The attitude of the technician is different: *"I am your friend and I come to give you a hand for you to improve what you are doing".* The fact of not approaching the producer with an attitude of imposition, with an authoritarian voice, telling them what they have to do, but giving them technical advice in the form of recommendations and that recommendation is supported by tests, facts, results and it has been key to understand the project's achievements.

8.1.3.1 Satisfaction from the producers in regards to the support received by the MAS Project

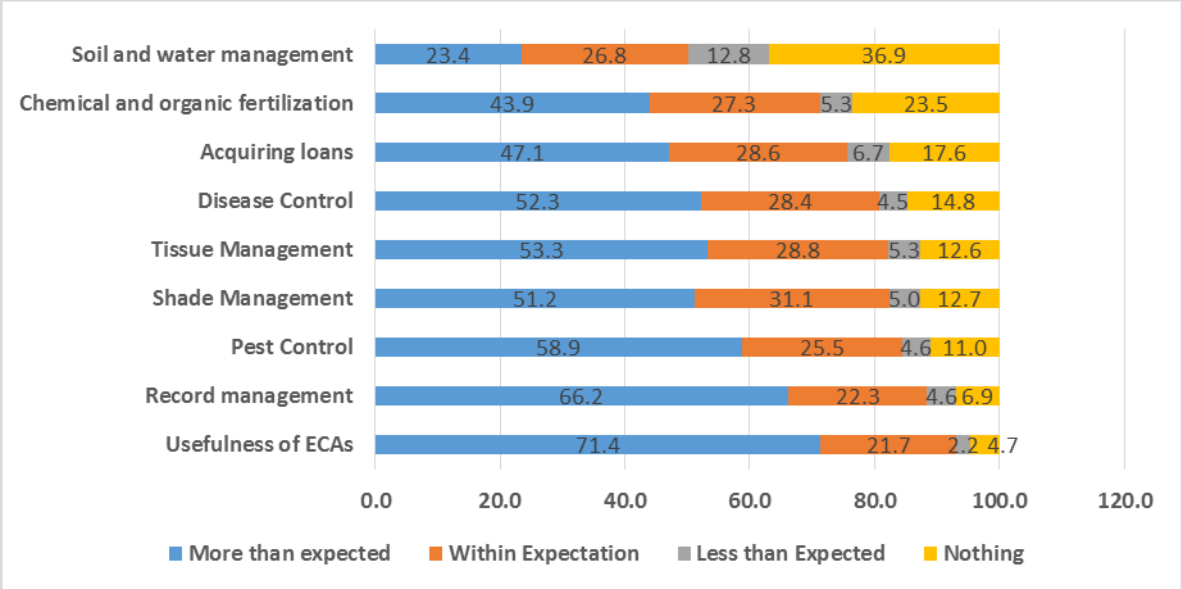
The most important appraisal from this evaluation is the satisfactory opinion from coffee and bean producers that were part of the Project as beneficiaries. Therefore, each the members of the investigation was asked about the level of satisfaction they felt on the support they received from the MAS Project during the implementation period. The consultation was based on the following satisfaction scale: 1) more than what was expected, 2) within expectations, 3) less than the expectations and 4) nothing. Likewise, there was a consultation on the possibility to continue in the future with practices and technologies that were given by the Project. The results of these consultations were the following:

8.1.3.1.1 Satisfaction from producers in the coffee chain

Producers manifested their greater satisfaction, in the "more than expected" and "within expectations" categories, with percentages between 81% and 93% in the following activities: usefulness of the Field Schools, tissue management, shade management, disease control, pest control and record management. Chemical and organic fertilization and soil and water management with an acceptance level of 71 to 76% and access to loans had a lower acceptance level (50%). The latter could be associated to the costs of investment in labor and financial resources to build some kind of physical infrastructure. In this regard, it is recommendable to promote low cost BP in soil and water.

This result of greater satisfaction was linked to the transference of innovative techniques and technologies, like the case of field schools and the records of inventory and accounting controls, but also of innovations and practices that they has already performed but that in this case the new knowledge and skills acquired produced important changes in production and productivity, the least satisfaction was with those new technologies that they knew less about and that demanded greater financial resources and labor (See Chart 27).

Chart No. 3 Level of Satisfaction from coffee producers of the support they received from the MAS Project in techniques and technologies.



8.1.3.1.2Continuity in applying techniques and technologies in coffee growing

For producers in the coffee chain that were consulted and that gave answers to questions related to the continuity of implementation of techniques and technologies, without the support of the MAS project, it was noticeable that more than 92% of the producers expressed that they would continue this process of technological innovation. This reply comes to show that in producers' minds, they want to make these activities part of a stable, profitable, productive and environment-friendly assets. (See Table 24).

Table No. 24 Percentage of coffee producers that will continue using techniques and technologies promoted by MAS

Techniques and technologies	N	Continue	Will not continue
Tissue management	314	100	0
Shade management	331	98.8	1.2
Disease Control	365	97.5	2.5
Pest control	379	99.2	0.8
Soil and water management	303	93.4	6.6
Record management	187	92.5	7.5
Using Field Schools	367	97.3	2.7
Receiving information through SMS	205	97.1	2.9

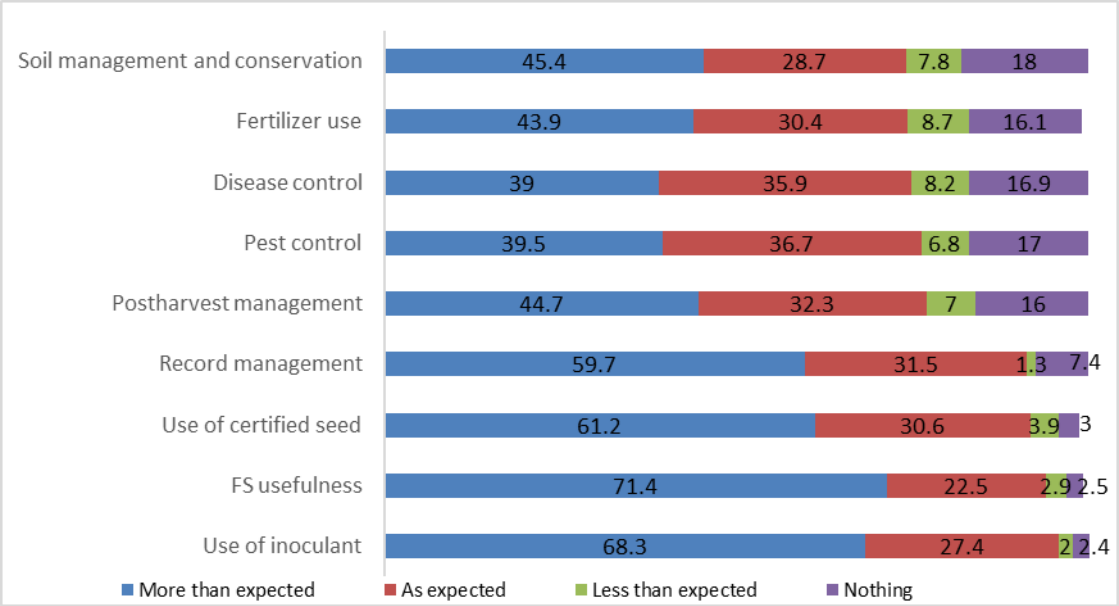
Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017. Final Evaluation MASP

8.1.3.1.3Satisfaction from producers in the bean chain

In regards to the support from the MAS Project in techniques and technologies, producers in the Bean chain, showed they were greatly satisfied, in the "more than expected" and "within expectation" categories with acceptance percentages over 90%. Techniques within these levels of acceptance are: inoculant for seed (96%), the field school (94%), certified seed (92%) and record management (91%). The rest of technologies were found within an acceptance from 74 to 77%, these technologies are related to post-harvest management, plague control, disease control, use of fertilizers and soil and water conservation.

This result with a greater level satisfaction was linked to the transfer of new technologies that made an impact in their level of knowledge and generated significant changes in production and productivity, the least level of satisfaction is associated to techniques and technologies they made prior to the project or some prior knowledge they had. In case of soil and water management, their least level of satisfaction could be associated to the costs this practice requires for its implementation (See Chart 4).

Chart No. 4 Level of satisfaction from bean producers of the support they received from the MAS Project in techniques and technologies



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017. Final Evaluation MASP

8.1.3.1.4Continuity in applying techniques and technologies in bean growing

For bean producers who were consulted and gave answers to questions related to whether or not they would continue implementing these techniques and technologies, it was noticeable that more than 93% were ready to continue this technological innovation process. Between 4 and 7% of producers expressed not being able to continue using certified seed and the inoculant. This could be related to the price, either because they cannot afford it or because input is not available locally.

Table No. 25 Percentage of bean producers who will continue applying techniques and technologies promoted by MAS

Techniques and Technologies	N	Continue	Not continue	NS / NR
Certified seed	304	95.1	4.9	0
Inoculant	252	93.3	6.7	0
Fertilizer	355	95.5	2.3	2.3
Disease control	294	96.3	0.3	3.4
Pest control	328	95.1	0.3	4.6
Harvest practices	398	94.2	1.5	4.3
Use of farm records	138	98.6	1.4	0
Receiving messages	149	98.7	1.3	0

Source: MAS Project Final Evaluation, August 2012 - March 2017

The results of the opinion measurement from producers on the level of satisfaction with the support received from the MAS project and the conviction to continue with the development of activities in the future, are evidence that help ensure that the project was successful in its field activities. Probably the testimony of the producers is the most valid of all testimonies since it is an honest assessment and it is closer to the truth.

IX. EFFECTIVENESS AND IMPACT BASED ON THE STRATEGIC LINES OF THE PROJECT

9.1 STRATEGIC LINE 1*:* Facilitating Access to high quality seed and input

9.1.1 Effectiveness in the achievement of expected results

To improve production and productivity of bean crops, certified seed becomes an important input. Smallholder bean producers are characterized by the low use of certified seed. Institutional efforts have been made to improve the use of quality seed among producers; however, coverage of field programs has been limited. Furthermore, the high costs of seed produced conventionally and the low profitability of the crop, become factors that discourage the use of this input in bean production. With the implementation of the MAS project and other field projects, the quality certified seed production strategy was promoted by establishing and strengthening the Community Seed banks. In order to achieve the target, the MAS Project was inserted into the operational structure of bean seed production that had already been established in the country, finding necessary to strengthen institutional coordination mechanisms and the subscription of operational agreements, in order to achieve efficiency in the development of field activities. DICTA/SAG; El Zamorano University, SERTISEM/SENASA/SAG, Michigan State University (Hired by TechnoServe); IHMA; the Seed Program from FAO and the PASH Network, were important allies in this process. The results are shown below:

9.1.1.1 Registered and basic seed production

For the implementation and strengthening of quality seed production, the reproduction of improved varieties with known productive potential was promoted, and its improvement must have gone through the four conventional stages of a genetic enhancement process (genetic seed, from foundation, registered and certified). A total of 788.19 quintals of registered seed was produced from the varieties of bean promoted by the Project, these were: Amadeus – 77, Deorho and Carrizalito. Furthermore, 17.3 quintals of basic seed from the PM2 variety. It is important to mention that a total of 225 people (22 women among them) were trained in certified seed production and bean post-harvest technologies.

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Table No. 26 Basic and registered seed production, by sowing cycle

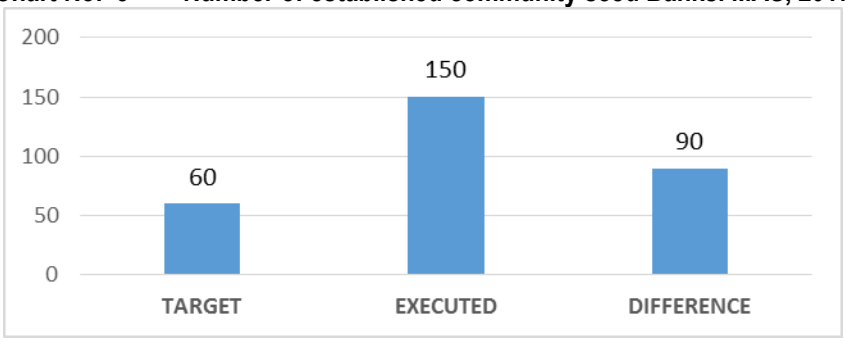
Farming cycle	Variety				Total (qq)
	Amadeus-77 Registered	Deorho Registered	Carrizalito Registered	PM2 Basic	
Late *postrera*/ second cycle 2012-2013	36.89	49.0	42.35	0	128.24
Postrera/ second cycle 2013	57.50	285.0	183.20	0	525.70
Late *postrera*/ second cycle 2014-2015	84.25	0	0	0	84.25
Postrera/ second cycle 2015	1/	1/	1/	1/	1/
Late *postrera*/ second cycle 2015-2016	50.0	0	0	17.83	67.83
Primera/ first harvest 2016	1/	1/	1/	1/	1/
Total…	**228.64**	**334**	**225.55**	**17.83**	**806.02**

Source: Report of activities and results of the MSU-DICTA 2013-2016 sub-contract (august).
1/ No sowing

9.1.1.2 Community Seed Banks

The MAS Project proposed as a Global Target establishing and strengthening 60 Community Seed Banks (CSB), by the end of the period 150 banks were accounted for, exceeding the target in 90 units or in 150 percentage points. It is important to highlight that during the life of the project 133 community banks were certified by SERTISEM/SENASA/SAG, which becomes a successful sign of the activity promoted by the project.

Chart No. 5 Number of established community seed Banks. MAS, 2017

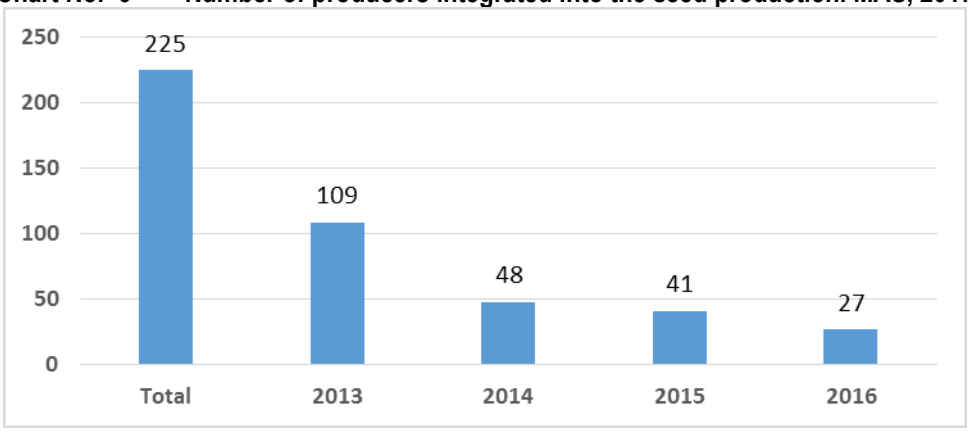


Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 MAS Project Final Evaluation

9.1.1.3 Producers integrated into the seed production process

As part of the formation and consolidation of the CSB, 225 individual seed producers were incorporated in the years of the project, disseminated in the municipalities of the 5 assisted departments. The strategy to incorporate producers into seed production consisted in conducting a major integration (of producers) in the first years of the Project and diminishing the incorporation of new members in the subsequent years, a time that would be dedicated to the consolidation of the activity. In addition, the MAS project started a formation and strengthening process of groups of producers in bean seed. Forty-two (42) groups were accounted for to have an important farming activity in the seed production. The strategy to incorporate groups into the seed production process was valid and consequent with the development of the activity, since this will allow the continuity in the exchange of good quality seed and the CSB would become the disseminators of technologies for the validation of new materials that the producers themselves rescue or ones introduced by programs, projects or government institutions.

Chart No. 6 Number of producers integrated into the seed production. MAS, 2017



Source: Prepared by the ANED Consultores – Sigil Consulting Consortium, 2017, Mas Project Final Evaluation

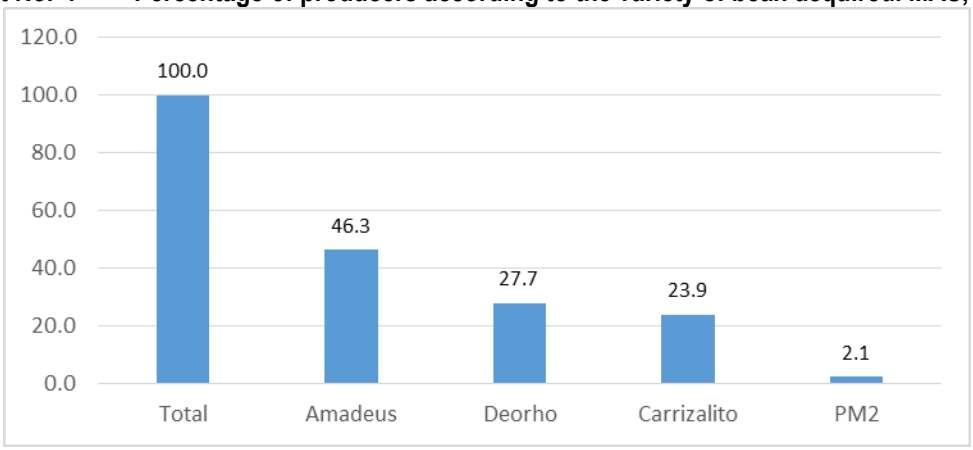
9.1.1.4 Certified Seed Production

The fundamental work of the CSB was to supply quality certified seed to its partner producers and buyers in general. With the contribution from MAS and other field projects, 8, 787.83 quintals of certified bean seed were produced in 4 years. With this amount of seed, it is estimated that there is capacity to grow approximately 10, 250 hectares of bean and reach slightly over 205,000 quintals of bean yield.

The support action from MAS to the CSB and access to seed through activities promoted in the field, are successes in improving bean production in the assisted areas and in the country overall. The target related with the number of seed banks was greatly surpassed. The sustainability of the CSB is based on the soundness reached with the assistance of MAS and from other programs and projects.

When producers (N=484) were consulted in the final evaluation about the planted certified bean varieties in the first and second harvest of 2016, the response was the following: 46% said that they had sown the Amadeus variety; in second place, the Deorho variety with 28% and in third place the Carrizalito variety with 24% and lastly, PM2 with 2% of the producers.

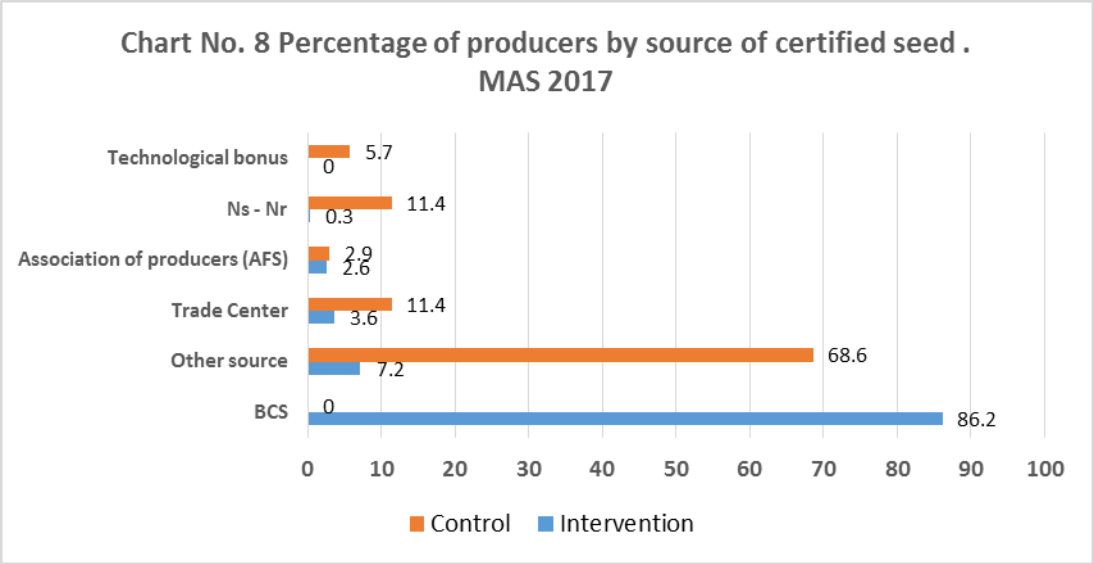
Chart No. 7 Percentage of producers according to the variety of bean acquired. MAS, 2017



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017, MAS Project Final Evaluation

Likewise, producers were consulted about the place they got certified seed from. The CSB was their main supply source for certified seed (86.2%) for producers assisted by the MAS Project, followed by other sources (7.2%), AFS (2.6%). On the other hand, the control group had other sources (68.6%) as the main source for certified seed, followed by the trading houses (11.4%), another important source was the Technological Bonus distributed by the Government of Honduras through SAG. However, it is worth observing that producers in the control group also get their supply from the AFS in a similar proportion, which suggests that this service is reaching neighbor communities that are not assisted by the MAS Project.

Chart No. 8 Percentage of producers by source of certified seed according to intervention and control. MAS, 2017



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017, MAS Project Final Evaluation.

There are other aspects that could be concluded from these results, if the AFS work in a network with the CSB, they could become an important stakeholder in the dissemination of certified seed in the surrounding areas; likewise, the CSB could supply the Honduran Government's Technological Bonus to reach producers from the regions where the CSB is not present.

Data is conclusive, in the sense that the CSB are the ones guaranteeing certified seed availability in the field and putting it within reach of producers in the areas.

Promoting quality bean seed production by establishing and strengthening the CSB constitutes one of the greatest acknowledged successes in the four years of field work from the MAS project. This assertion is supported by the criteria set by representatives of allied institutions and agencies, who expressed the following:

Dr. Luis Flores. Director of the Dry Grain Legume Program from MSU, expressed: "The objectives underlying the cooperation of the University of Michigan with the MAS Project were met and exceeded. In terms of numbers of beneficiaries reached we are doing well, in aspects of seed volumes achieved we are doing well; we set our minds to reach a certain number of Community Seed Banks and we are also doing well. We understood in an excellent way with our counterpart in Honduras, which is DICTA and we defined what each one was going to do and I consider that the objectives were achieved, both by DICTA and the MAS Project and for us".

Ing. Ricardo Salgado, DICTA's Head of Technology Transfer Program, said: "The MAS Project came to strengthen the bean area, DICTA worked with the bean investigation team and with the Seed Program from SAG, achieving to release new varieties and generating certified seed through the seed banks in several regions of the country. One of the greatest achievements of MAS is that the bean grain producers at a commercial level bought certified seed from the community seed banks, and the result was increases in yield, uniform and excellent quality grains and according to the demands from buyers like: IHMA, WFP, MARVISA, and others. In the past, producers produced poor quality grain, since they were planting genetically degraded seeds, procuring low yield and they also lacked a safe market. Currently, they even have a guaranteed price.

The implementation of the MAS project awakened the different stakeholders in the bean value chain, who were dormant and neglected, mainly due to the depressed prices and in the hands of intermediaries. Now the Panel was reactivated and the PASH Network is working better".

Dr. Lenin Gradiz, FAO Representative's Assistant /Honduras, said: "The implementation of the MAS Project helped meeting one of FAO's targets, eradicating hunger. The achievement of the MAS Project was making the bean chain, a sustainable productive activity, especially in the targets to provide smallholder producers services and input for their small entrepreneurship. The bean chain was depressed, there were no quality regulations, now there is a political awareness at the highest level, the bean chain is a priority and the food security of the Honduran people partially lies on it".

Abg. Mario Gómez. Honduran Agriculture Marketing Institute (IHMA): "The experience we had with the MAS Project was very positive. IHMA acquires good quality product from the producer due to the technical support given to them through MAS.

Seed Focus Group from Olancho: "The training we have received from TechnoServe has allowed us to have Access to the PASH network and has made us important certified seed producers. TechnoServe has given us an added value as producers and the project we have with them is very important".

Carmen, from the same focus group, affirms: "Well, now we have really received the support, because women have always been marginalized, as if they weren't able. Currently, we have been given participation, for instance, in my case, as a woman I have had the support from the project to come in as a producer to the seed bank. Now, I haven't been excluded, I was in the past".

9.1.1.5 Established bean seed validation plots

The validation plot is a knowledge and skill transfer methodology that has upsurge over the past few years. Its virtues are focused on the fact that the knowledge and skills are given by another producer and/or community leader with broad experience in the production topics, also getting the specialized technical assistance for those cases that require it. Training happens in the producer's field with direct participation from producers in the community throughout the growing period. The MAS project has promoted this methodology, procuring a better adoption of quality seed from it (See Table No. 27). It is considered that a great part of the success achieved by MAS is directly related with this training methodology from technicians and producers, in learning by doing in the environments and plots of the beneficiaries.

Table No. 27 Establishing validation plots in the bean crops

Activity	TARGET	2014	2015 - 2016	Total
Plot	45	105	245	350

Source: MAS Project Monitoring Unit, 2017.

The project goal was establishing 45 validation plots for the production of bean seed. By the end of the project 350 plots were accounted for, exceeding the goal in 677 percentage points. Validation plots is a methodology that has been and is being used by other stakeholders in the development of production and they have the conditions for it to be broadly disseminated in the different areas of bean production and for other crops from national agriculture.

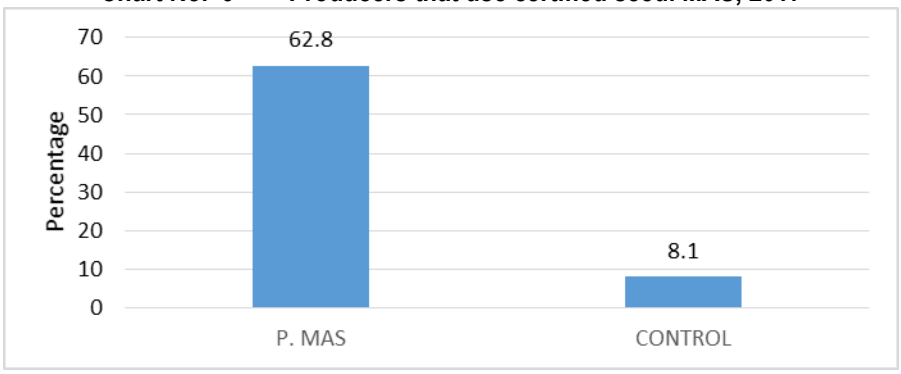
9.1.1.6 Use and Access to certified bean seed

Under the conventional system of certified bean seed supply, its use is relatively limited. The causes of this behavior have to do with the fact that it is a self-pollinating plant, condition, which favors its greater genetic

stability in the field. Therefore, it does not require the producer to acquire it through purchase or by other means, in each crop cycle. On the other hand, the physical availability of the seed at the local level is not always feasible, and its price, is not always affordable for the producer. Under these circumstances, the alternative to use certified bean seed is made possible through quality artisanal seed production.

The MAS project contemplated within its strategy improving bean yield, the promotion of the use of certified seed. The results show that 63% of the MAS project beneficiaries use certified seed in bean growing, which is different from the producers that were not beneficiaries, who quantify that the degree of use of this input is 8%, expressing a difference of 55 percentage points. There is no doubt that the improved seed is a necessity in the smallholder and medium bean producers. The bean production in the country may be substantially increased due to the use of certified seed in their plots.

Chart No. 9 Producers that use certified seed. MAS, 2017



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

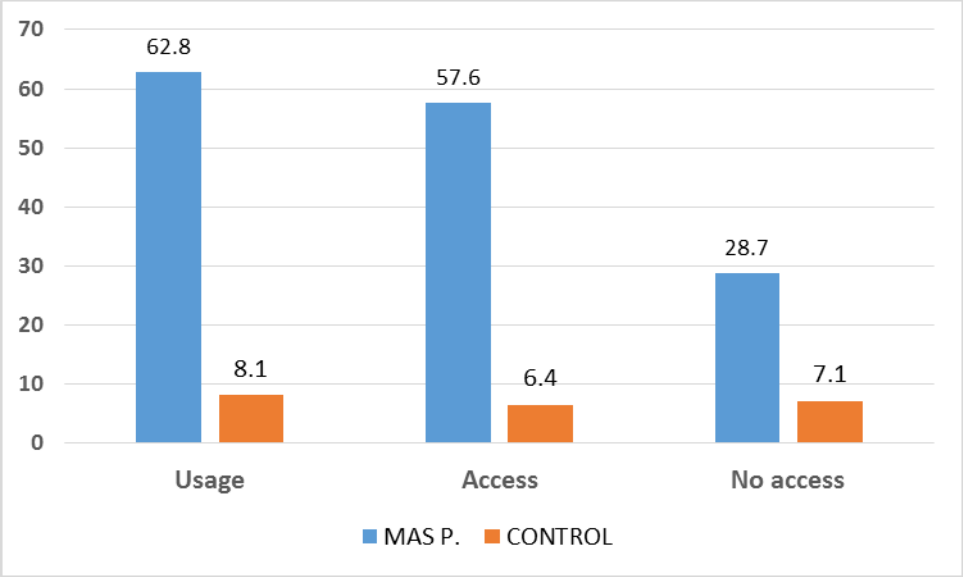
Nonetheless, Jairo Aguilera seed producer considers that it is necessary to "*open up markets because the incentive – for the producer to adopt the improved variety seeds – is for there to be an industry that would buy that product, where there may be a negotiation in prices from the producers with the industries. Because the only buyer respecting a guaranteed price is IHMA and it does not have the capacity to buy the national production.* On the adoption of the improved varieties of seed: *"with more competitive demands and market quality standards it is a need for the producer to grow certified seed, otherwise, it will not be able to keep up with those markets".* In his opinion the PO understand the message *"If we want to enter differentiated markets, it will only happen by growing beans from certified seeds".*

9.1.1.7 Access to improved seed

Access to improved seed is directly related with how easy it is to obtain it, with the Price and quality of the product. The MAS Project promoted access to improved seed as a way to contribute to the improvement of bean crop yield. In order to achieve this, the life of the project set as a goal supporting access to improved bean seed for 5, 000 producers, by the end of the period 7, 462 producers were assisted exceeding the target established in 49 percentage points. When the MAS producers were asked about the access to the improved bean seed, 58% said yes, on the other hand, only 6.4% of producers in the control group reported that they had access to it.

In consultations to the producers, they acknowledge the virtues of the certified bean seed, however, access to it, is conditioned by local availability, price accessibility and financing availability to acquire it. In this access process the methodology used by the Project was determining through demonstrative plots and the CSB.

Chart No. 10 Percentage of producers that use and have access to improved bean seed. MAS, 2017



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

9.2 STRATEGIC LINE 2: Developing and implementing a training program in agriculture techniques and technologies

9.2.1 Effectiveness in achieving the adoption of good agriculture practices

One of the expected results from the MAS Project focused on creating attitude changes in producers to achieve the adoption of good practices that would allow improving their capacities in managing the coffee and bean chains. Thus, the success of the MAS Project lies on the training work made with both local leaders, field technical staff and in the producers. Therefore, the Project proposed assisting 15,000 coffee and beans producers through training on how to learn by doing in field schools to achieve that 60% of them (6,000 in coffee and 3,000 in beans) adopted new techniques and technologies promoted by the Project. Over the five years of the project, 26,902 producers received training in both chains.

For the last harvest year, 67% (5,293) out of 7800 coffee producers have adopted 3 or more techniques in the growing season, , concentrating a greater response in the producers of El Paraíso by 60% and Comayagua with 23%. Regarding the beans category of 3,957 producers for the last year, 76.2% (3,015) have adopted the same number of practices or more. For this item, a response to superior adoption is obtained in El Paraíso and Olancho in a very similar percentage, 26% and 25% respectively, followed by 18% or less for Comayagua, Yoro and Francisco Morazán in their order.

One of the main achievements of the MAS Project in its field action is related to the levels of technology adoption reached by producers. Regarding coffee growing, the results presented in Table 28 show that 67.9% of the producers managed to adopt 3 or more techniques or technologies aimed at improving crop production and productivity. The effort of the project in terms of assistance by gender, indicates that it was very similar, noting that 66.7% of women managed to adopt three or more technologies promoted by the Project, while 68.1% of men achieved the same level of adoption.

On the other hand, in the bean crop the level of adoption of technology was higher, as it was indicated that 76.2% of the producers achieved 3 or more techniques or technologies adopted as a result of the action of the Project. Regarding adoption by gender, it was similar. In this case, 74.6% of women achieved three or more technologies, and in the case of men, it was 76.8%.

The data also show that the highest adoption was reached in the bean crop, surpassing the coffee producers by 8.3 percentage points. This difference may be related to the lower degree of difficulty offered by bean techniques and technologies in relation to coffee.

Table No. 28 Percentage of producers that have applied and adopted 3 or more new techniques and technologies, by gender

Producer by crop and gender	N	3 or more technologies	Percentage
Coffee producters	**473**	**321**	**67.9**
Women	90	60	66.7
Men	383	261	68.1
Bean producers	**484**	**369**	**76.2**
Women	114	85	74.6
Men	370	284	76.8

Field Schools

Technical assistance provided by national institutions in farming production is complemented by development programs and projects, funded by external cooperation. Assistance coverage in farming production is low, therefore producing a technological gap that have effects in natural resources and in the production of crops for food security in the population and for those products destined for export. . that is why to overcome gaps in technologies, the MAS project implemented a short, medium and long term strategy from the farms or plots of the producers, called Field Schools (FS), in order to generate from the endogenous knowledge with the exogenous knowledge, a series of technological innovations of their own or adaptable to the productive areas and the producers themselves, as well as an opportunity for formation of young human talent, where in technological adoption and innovation they would have the opportunity to find incentives in their plots from increase in productivity, improvement of vegetable material available and increase in their income. In order to achieve the expected results, the project programmed establishing 400 FS, distributed in 226 for coffee crops and 174 for bean crops. By the end of the project the total target was surpassed by 52 units of production training, equivalent to an execution of 13 percentage points over the expectancy (Table No. 29).

Table No. 29 Expected and actual participation in field schools

Field schools	MAS	Target	Differences
FS for coffee	255	226	29
F for beans	197	174	23
Total	**452**	**400**	**52**

The benefit of FSs is that they are focused on exchanging knowledge, skills and abilities among producers. Leader producers and agricultural technicians; having an experimental lab in their plots where they test, validate and innovate technological practices adapted to local environments. In these FS, the project introduced new input and agricultural practices, reproducing vegetable materials from new technologies (improved seed, seed inoculation, fertilizer doses, tissue, etc.), disseminating and divulging technologies (good practices in soil and water management, shade management, pruning and lower pruning in coffee farms, others) and achieving diffusion and adoption thereof, which at the end of the process, produced the sought technological change, as a response to the problem that the coffee and bean productive chains faces.

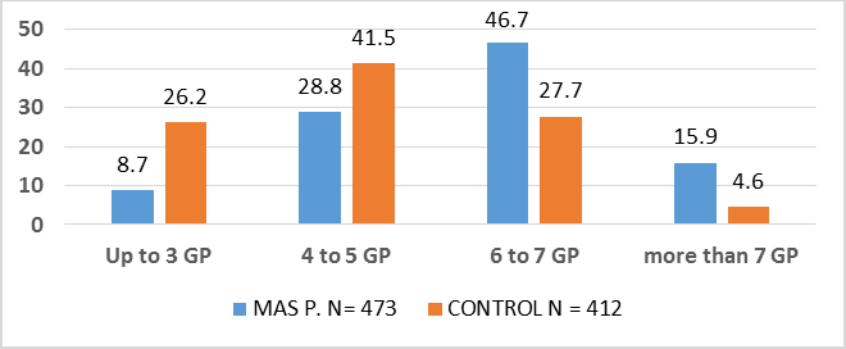
This launched the project to technological innovation through the field school strategy, which facilitated the process of adoption of new technologies and allowed small producers, men and women to improve their income and profitability of their productive activities within the value chain for coffee and beans and at the same time, generate a healthy impact in the environment and natural resources.

9.2.1.1 Adoption of new techniques and technologies by coffee producers

9.2.1.1.1 Adopted techniques and technologies

When comparing the levels of adoption of five selected good practices[6] that are determinant for productivity between producers assisted by the Project and the control group, it was evident that 68% of producers from the control group had 5 or less good practices whilst in assisted producers only 38% was between 3 and 5 good practices. On the other hand, 47% of the producers from the Project adopted 6 to 7 good practices and 16% more than 7 good practices. The opposite happened with the control group, where only 32% of producers adopted 6 or more good practices.

Chart No. 11 Adoption of good practices by coffee chain producers (%)



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017. MAS Project Final Evaluation

The following table describes the techniques and technologies and the percentage of producers by different levels of adoption in the coffee chain. Note that the good practices in **post-harvest, shade regulation and chemical fertilization**, are adopted by all producers including the control group, meaning that they are essential within the coffee chain. In chemical fertilization practice, at all levels the project beneficiaries used less quantities than control group farmers because they were based in soil analysis.

[6] Five specific practices were selected for this analysis, these were: tissue management, shade regulation, disease control, pest control and fertilization.

For producers who adopted between 4 and 5 good practices to **post-harvest, shade regulation and chemical fertilization** they also added **pest and disease control** (rows 1-3 and rows 4-5)**.** These last two became the response to exogenous factors that affect coffee crops like rust and CBB, mainly.

At the level of adoption of 6 to 7 practices there was the greatest quantitative leap of Project producers, by increasing the percentage of producers with a greater capacity of response to the rust and CBB issue in coffee and proper tissue management was added to these (e.g. eliminating axillary buds, topping and middle-pruning) and soil and water management to avoid erosion and achieving water conservation (rows 1-3 plus rows 4-5 plus rows 6-7; last 4 columns). Here is where the Project achieved transforming from the traditional farm to a modern farm.

The level of adoption with more than 7 good practices made a shift in 16% of producers for farm management based on appropriate information related to prices and markets and a greater commitment with the environment and society (all rows, last 2 columns).

Table No. 30 Adopted techniques and technologies in the coffee crops (% producers). MAS 2017

Good Practices (GP)	Up to 3 GP		4 to 5 GP		6 to 7 GP		More than 7 GP		Observation
	MAS	CG	MAS	CG	MAS	CG	MAS	CG	
Post-harvest	**95**	**95**	**99**	**100**	**100**	**99**	**100**	**100**	3 cross-cutting GP in the coffee activity
Shade	**85**	**85**	**87**	**93**	**96**	**99**	**100**	**100**	
Chemical fertilization	**25**	**48**	**57**	**77**	**69**	**90**	**89**	**100**	
Pest control	17	14	**62**	**56**	**90**	**86**	**96**	**95**	Exogenous factors that required a cultural change in agricultural practices
Disease control	5	1	**55**	**49**	**82**	**84**	**96**	**95**	
Tissue	24	6	53	39	**87**	**83**	**96**	**100**	Technologies and investments that transformed the traditional farm into a modern farm
Soil and water management	10	2	21	19	**55**	**43**	**96**	**95**	
Records	8	5	18	12	43	23	**87**	**63**	A change toward informal decision making
Organic fertilization	5	6	10	6	26	28	**63**	**63**	Change in attitude when facing the environment and society

Source: MASP Final Evaluation August 2012 to March 2017 Note: MAS →Project CG → Control Group

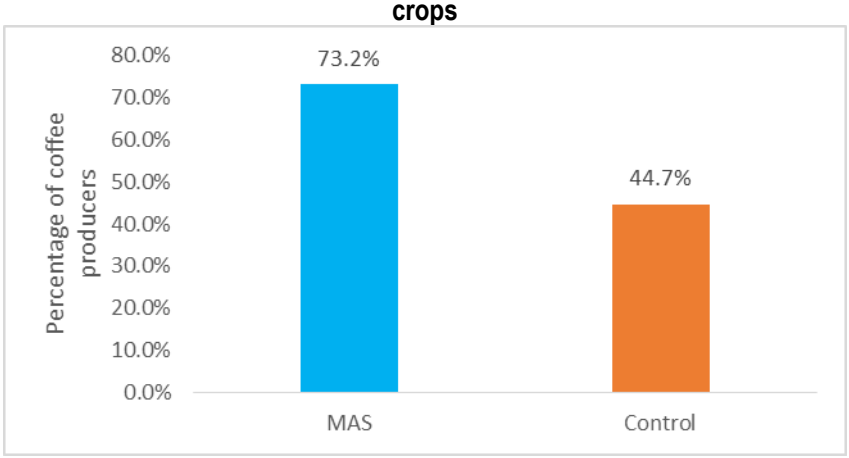
In summary, when the Project achieved for 63% of producers to reach a threshold of 6 GP and exceed them, it transformed the capacities of producers from the coffee chain and set the foundation for an efficient, profitable, sustainable and friendly economic activity with the environment and society. Meaning that it went from individual needs to the responses of collective needs, of more oxygen, more water, more soil, more employment and income and less greenhouse effect gas emissions

9.2.1.1.2 Tissue Management

Tissue management is a widely known practice by coffee producers, which is also called restoration and salvage of the investment in the farm.

The final evaluation, consulted coffee producers if they had applied tissue management or pruning in their crops, 73.2% of MAS producers confirmed they had done it. Almost all of these (98.8%) confirmed they started doing it because of the assistance from the Project. In a less proportion, 44.7%, producers from the control group confirmed they had done it as well. The difference of 28.5% shows that the MAS Project promoted improving techniques related to tissue management in order to achieve a greater production and productivity of the crop.

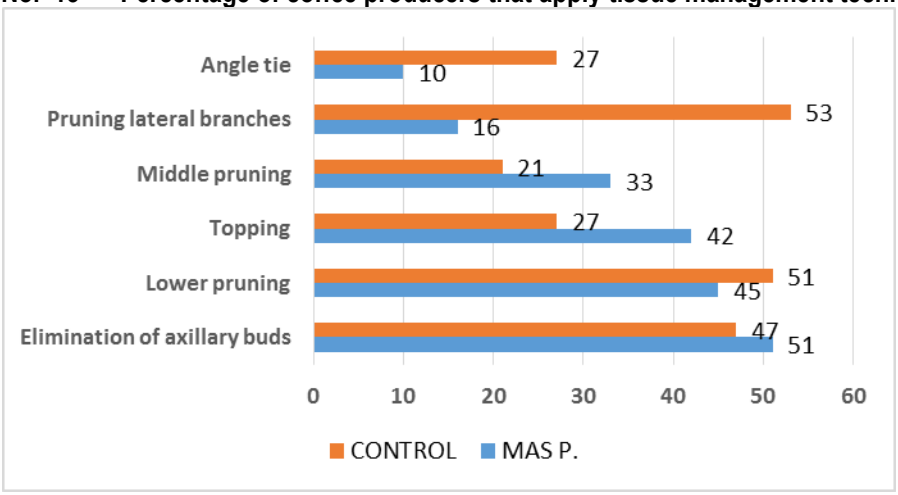
Chart No. 12 Producers who apply one or more tissue management or pruning practices in coffee crops



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

The confirmation on the kind of practices implemented in tissue management indicates that MAS producers adopted eliminating axillary buds (51%), followed by 45% who prefer lower pruning and 42% prefer topping. Data from Chart No. 9 show that MAS producers exceeded control producers in these kinds of practices: eliminating axillary buds, topping and middle-pruning. CG producers perform angle pruning (27%), pruning lateral branches (53%) and lower pruning (51%).

Chart No. 13 Percentage of coffee producers that apply tissue management techniques



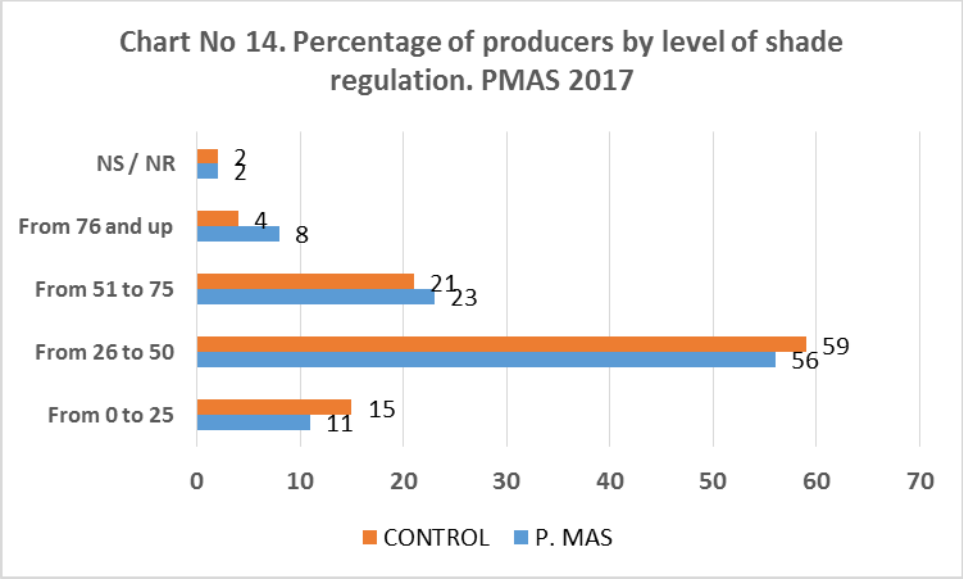
Source: Prepared by ANED Consultores – Sigil Consulting Consortium. MAS Project Final Evaluation, 2017

9.2.1.1.3 Shade Regulation

Just as the prior one, shade regulation is a traditional practice in coffee growing management. Shade is regulated at different levels to allow solar energy in. It was confirmed that most of MAS producers (54%) have their crops under the shade, 7% keep their crops out under the sun and 39% have both under the shade and under the sun. A very similar situation happens in the control producers, 66% keep their crops under the shade, 7% under the sun and 27% under both.

Producers who keep their crops both under shade and under both, which represent 93% (439 cases in MAS and 382 in the CG), were asked if they were used to regulating the shade for their crops, of these universes, 85% of MAS producers (372 cases) confirmed they did and 84% in the CG (321 cases) did. When asking about the level in which they regulated shade in their farm, data from Chart No. 10 shows that in both study groups, the ones who regulate shade predominate at a level between 26 and 50%. Control producers slightly surpassed MAS producers (56%) by three percentage points (Chart No. 14).

Chart No. 14 Percentage of producers by level of shade regulation. MAS, 2017



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

9.2.1.1.4 Fertilization

Fertilization is a very common practice among coffee producers, however, many times the results in terms of productivity and profitability are not the ones expected. Traditionally, the producer expects a greater response in yield by applying more chemical input in their farm. This is a key factor in order to change their mindset and invest in coffee growing. It started with soil analysis, in order to define formulas, amount and the number of applications, the moment for applying it, incorporating organic fertilizer and lime to regulate the pH of the soil. The result of this intervention was to reach a greater efficiency in using the correct amount of this input by making crop fertilizations. Differences are evident, in the use of chemical fertilizers, in average, Project producers are using 392 Kg/Ha against 325 Kg/Ha in the control group; in terms of foliar fertilizer they use 4.3 L/Ha against 5.3 L/Ha in the CG; just as in organic fertilizer, they use 2, 332 Kg/Ha on the other hand the CG use 1,109 Kg/Ha; and, in the use of calcium lime, Project producers used a greater number of kilos in order to balance pH in the spoil and thus, make the amount of other input much more efficient. It is clear that organic fertilizer and calcium lime doubled in the intervention group and it diminished the need to use foliar fertilizer.

According to the Final Survey, 74 per cent of producers from the CG apply chemical fertilizer versus 65 per cent of MAS producers. In soil analysis, only 14% of the CG does it versus 36% of MAS producers. .

Table No. 31 Use of fertilizer in the coffee chain. MAS 2017

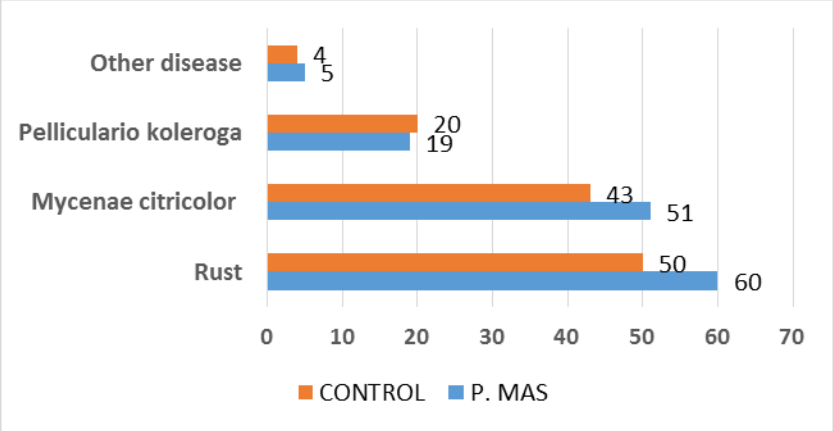
Evaluation	ChemicalF Kg/Ha	OrganicF Kg/Ha	FoliarF L/Ha	Limestone Kg/Ha
Intervention	392	2,332	4.28	72.5
Control	325	1,109	5.28	35.6
Source: Prepared by ANED Consultores – Sigil Consulting Consortium. MAS Project Final Evaluation, 2017				

In summary, producers have achieved changing their attitude in the efficient use of input with the correct dose due to the soil analysis. Thus, they have learned that an excessive application of fertilizer (CG), due to the lack of soil analysis, becomes a "luxury absorption" by the plants which creates a physiological unbalance and limits their productive capacity.

9.2.1.1.5 Disease identification

Coffee diseases are widely known by producers. The diseases with greatest impact are rust, Mycenae citricolor and Pelliculario koleroga. In line with the Project, producer training achieved improving the identification capacity of the disease by 51 and 60% of producers in regards to the Mycenae citricolor and rust disease, which made a difference in 8 and 10 percentage points in regards to the control group, respectively (Chart No. 15) this way, when improving their capacity to diagnose the coffee diseases, producers improve their control and the kind of treatment to have a healthy and productive farm.

Chart No. 15 Percentage of producers who report diseases in their farm. MAS, 2017

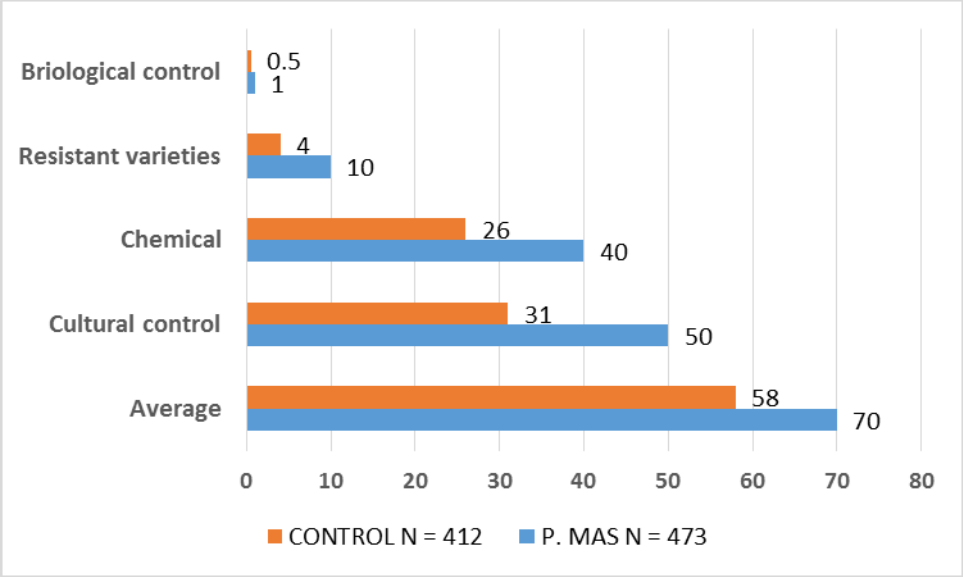


Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 MAS Project Final Evaluation

Disease Control

The Producers' response capacity to diseases has improved with the kind of treatment they conduct; some of them are chemical, biological, cultural and tolerant variety control. Project assistance achieved for 70% of producers in average to adopt improved practices in disease control against 58% of the CG. Among the disease control techniques we find "cultural control" in 50% of assisted producers against 31% from the CG, and "Chemical control" applied by 40% of beneficiaries versus 14% more for the CG. The technique for resistant varieties and biological control were used in a less percentage (Chart No. 16)

Chart No. 16 Coffee producers that apply disease control techniques (%)



Source: Prepared by ANED Consultores - Sigil Consulting Consortium. MAS Project Final Evaluation, 2017

9.2.1.1.6 Pest Control

The main pests attacking coffee are CBB and leaf miner. The producer knows these pests and conducts control according to their knowledge and possibilities. The MAS Project trained producers on Integrated Pest Management (IPM), starting from the knowledge of the economic threshold of pests, using less chemical products and for them to be as environment-friendly as possible and interact with other controls (biological, ethological, etc.).

Most of the coffee farms are affected by pests, 70% of the Project producers acknowledge having these problems against 65% of the CG producers. Among the reported pests, 74% of assisted producers said they have had attacks from CBB against 61% reported by the CG. In terms of the leaf miner, 17% of assisted producers reported it against 10% from the CG.

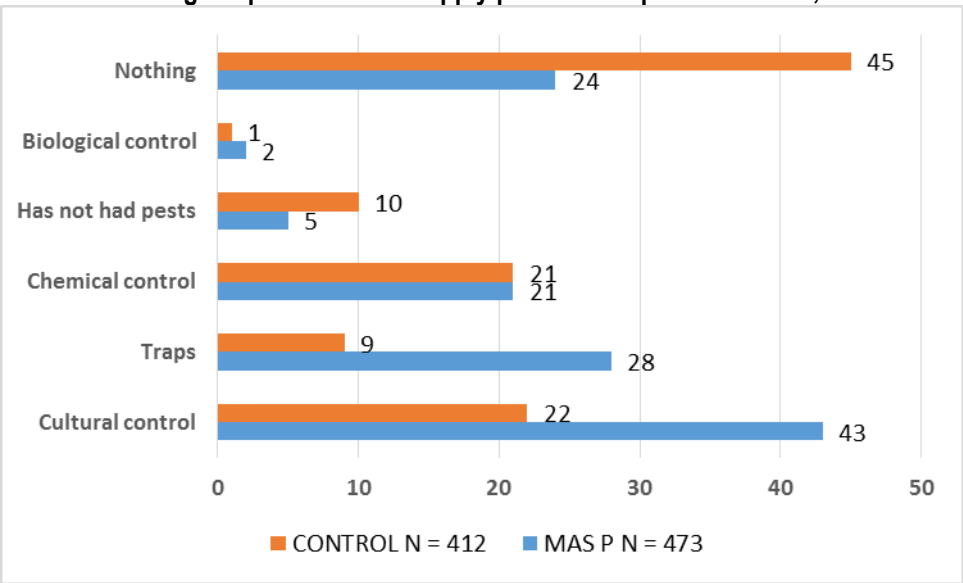
Table No. 32 Producers (%) who report pests in their coffee farms. MAS 2017

Pest	MASP (N= 473)	Control (N= 412)
Coffee Bean Borer	74	61
Leaf miner	17	10
Other pest	3	3
Average	**76**	**65**

Source: Prepared by ANED Consultores - Sigil Consulting Consortium. MAS Project Final Evaluation, 2017

Project actions achieved a response on behalf of the assisted producers. Seventy-six per cent (76%) of assisted producers apply pest control practices against 55% of the CG. Of the total of assisted producers 43% make a cultural control (scavenge beans, repeal, and regulate shade, tissue and weeds) against 22% of the CG, 28% of the beneficiaries place “Alluring traps” against 9% of the CG. In terms of chemical control, 21% of assisted and non-assisted producers applied it (See Chart No. 16).

Chart No. 17 Percentage of producers who apply pest control practices. MAS, 2017

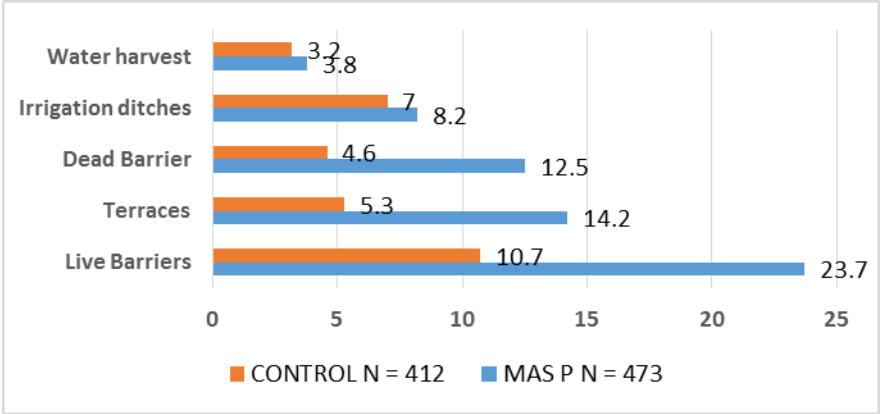


Source: Prepared by ANED Consultores - Sigil Consulting Consortium. MAS Project Final Evaluation, 2017

9.2.1.1.7 Soil and Water Management

A characteristic of coffee is that it is grown on hillsides with steep slopes and high precipitation, which puts it at risk of erosion. Soil and water conservation practices were directed to building channels, barriers and water harvest. In these practices the level of adoption from participants varied between 4 and 24% of participant producers, generating a variance between 1 and 13 percentage points in regards to the control group (Graph No. 14). These are the good practices that support family assets, sine healthy, fertile and deep soil guarantees investment. However, here is where the Project has found some resistance from the producers to adopt. It will require from the Project in a future intervention, to assess the possibility of establishing a policy on incentives and conditions headed toward promoting the adoption of soil and water GP, starting from those requiring less investment of financial resources and time, but ones that would revert the possible loss of soil and humidity that threatens family assets and their environment.

Chart No. 18 Percentage of producers that apply soil and water techniques



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017, MAS Project Final Evaluation

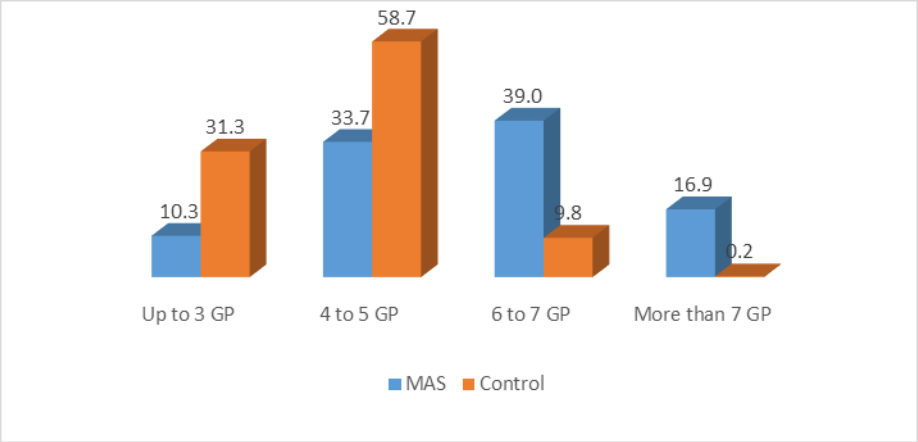
9.2.1.2 Adoption of new techniques and technologies by bean producers

9.2.1.2.1 Applied techniques and technologies

Among the GP addressed and supported by the Project, in the bean chain, are the ones related to crop fertilization, use of improved seed, and inoculant use and management, soil and water management, disease and pest control, post-harvest management and administrative records. The results on the application and adoption of these GP are the following:

When comparing the levels of adoption of selected GP that are determinant to increase productivity[7] it was evident that 56% of producers assisted by the Project had adopted 6 and more GP in comparison with only 10% of the control group.. Regarding the adoption of 4 to 5 GP, the greatest percentage of CG producers were found with 59%, while the assisted producers added 34%; at the lowest level of adoption with less than 3 GP, the CG had 31% and beneficiaries barely 10%.

Chart No. 19 Percentage of bean producers according to their level of adoption of GP. MAS, 2017



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017. MAS Project Final Evaluation

The following table describes techniques and technologies and the percentage of producers in the different levels that have adopted them in the bean chain. Note that the Post-harvest, pest control and disease control GP are adopted by all producers including the control group, meaning that they are essential within the bean chain. Likewise, for assisted producers, soil conservation is much more adopted than disease control, in the adoption level of 3 GP. For producers who adopted between 4 and 5 GP, both assisted producers and the CG had a greater adoption of Post-harvest, pest control, soil conservation, disease control and fertilization GP. It is worth mentioning that disease control and fertilization is prioritized by the assisted group but the good practices of Fertilization and Soil Conservation are accepted by the CG. In the levels of adoption of 6 to 7 practices, there was a greater quantitative leap from Project producers, by increasing the number of GP adopted incorporating certified seeds and inoculant in seeds; on the other hand the CG adopted certified or improved seeds. The level of adoption for more than 7 GP includes data records and improved seed, which assisted producers included.

[7] The specific practices selected for this analysis were: the use of inoculant, disease control, pest control and fertilization.

In summary, when the Project achieved for 56% of producers to reach a threshold of 6 and more GP, it transformed the capacities of producers in the bean chain and set the foundations for "more integral" management of the bean crop system, which seeks for a greater economic efficiency, resilient to diseases and pests, a high yield with quality germplasm, a greater innovation and adoption of technologies and a reaction from producers before the need of soil conservation to continue with the agricultural activity. In other words, the assisted bean chain achieved preserving the crop from external factors and found its assistance profitability efficient for the crop, with new technologies in natural resource management and in producers. It transformed the way in which they interacted with the environment and society.

Table No. 33 Techniques and technologies adopted in the bean chain (% producers). MAS 2017

Good practices	Hasta 3 BP		4 a 5 BP		6 a 7 BP		More than 7 GP	Observation
	MAS	GC	MAS	GC	MAS	GC	MAS	
Post-harvest	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	Good practices like preserving the crop and production
Pest control	36.0%	45.3%	76.1%	94.6%	91.0%	97.7%	98.8%	
Soil Conservation	44.0%	27.0%	69.9%	76.3%	87.8%	83.7%	98.8%	
Disease control	28.0%	38.0%	62.0%	89.1%	83.6%	95.3%	98.8%	
Fertilization	32.0%	21.9%	61.3%	77.0%	83.6%	95.3%	98.8%	Changes in the technological innovation by incorporating technologies to potentiate effectiveness and profitability of the crop
Certified seed	14.0%	.7%	41.1%	3.1%	78.3%	58.1%	100.0%	
Seed inoculants	8.0%	0.0%	31.3%	.4%	66.1%	2.3%	87.8%	
Improved seed	2.0%	.7%	9.8%	3.1%	23.3%	60.5%	64.6%	
Farm records	8.0%	3.6%	8.6%	7.0%	33.3%	44.2%	82.9%	Changes in the incorporation of management for informed decision-making.

Source: Prepared by ANED Consultores - Sigil Consulting Consortium. MAS Project Final Evaluation, 2017

9.2.1.2.2 Cropping system and sowing density

Smallholder producers grow beans under different sowing systems, especially in the hillside with the purpose of making a more efficient use of soil and protect it from erosion. The predominant cropping systems are monoculture, polyculture and crop rotation. Within the staple grains, the frequent systems are corn + bean; corn + sorghum, bean + sorghum, bean + sorghum and corn + sorghum + squash.

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Table No. 34 Bean cropping systems according to farming cycles (% producers). MAS 2017

System	First		Second	
	MASP	Control	MASP	Control
Monoculture	78.9	70.4	61.3	62.4
Polyculture	16.3	26.8	21.8	25.9
Crop rotation	4.8	2.8	16.9	11.6

Source: Prepared by ANED Consultores - Sigil Consulting Consortium. MAS Project Final Evaluation, 2017

According to the results from the final survey, **in the first cycle** the MAS Project promoted monoculture at a greater level in order to achieve better productivity, aside from this, varieties promoted by the Project are systemic, due to the size of the plant (determined growth). In this case, it is shown that 79% of Project producers planted their bean plots in monoculture, surpassing the CG in 8.5 percentage points; on the other hand, the polyculture system was reduced in 10.5 points, going from 26.8 (CG) to 16.3 (MAS beneficiaries); and the crop rotation grew in 2.0 percentage points for Project beneficiaries (4.8) in regards to the control group (2.8%). For the **second cycle** in both cases (MAS beneficiaries and non-beneficiaries), producers in monoculture diminished in around 10 points in regards to the first cycle, due to the short time of precipitation in many bean producing areas during this cropping cycle, condition (short period of rain), which within staple

grains, only beans cover the needs for humidity of the plant (60 to 70 days). Producers in crop rotation for the second cycle are very similar to the ones expressed in the first cycle, the same in Project beneficiaries and non-beneficiaries.

Bean sowing densities as part of the cropping systems has improved for many years, due to the technical assistance given by the institutions, therefore, beneficiary and non-beneficiary producers have achieved having sowing distances (between ditches and plants) that are very similar. Data shows that beneficiaries have 42 centimeters between ditches and 24 between plants in average, on the other hand, non-beneficiaries average between 37 and 22 centimeters respectively. Sowing distances depend on several considerations; however, size (height) of the plant is the most important one.

Table No. 35 Sowing density in bean crops. MAS 2017

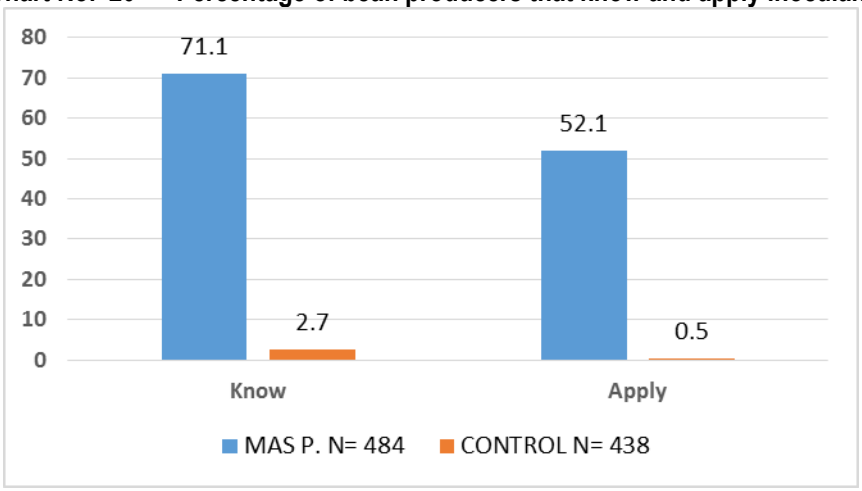
Distance	Recommended	MASP	Control
Between Ditches (cm)	40-45	42	37
Between Plants (cm)	30-40	24	22

Source: Prepared by ANED Consultores – Sigil Consulting Consortium MAS Project Final Evaluation 2017

9.2.1.2.3 The use of inoculant

The use of inoculant in bean production is not very well known among bean producers. The MAS Project after making validations in the field and knowing about the virtues from the point of view of production and its impact in the environment, promoted it among beneficiary producers. Results obtained in the final evaluation, show that 71% (344/484) of beneficiary producers knew about the use of inoculant and 52% (252/484) were applying it. On the other hand, in producers that were not MAS beneficiaries only 3% (12/438) of them knew about it and 0.5% (2/438) of producers were using it.

Chart No. 20 Percentage of bean producers that know and apply inoculant

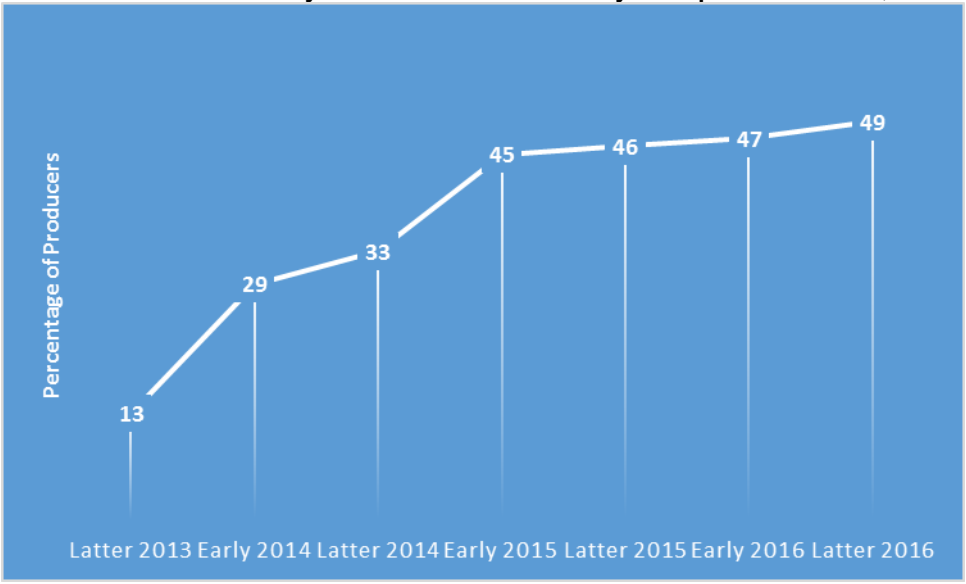


Source: Prepared by ANED Consultores - Sigil Consulting Consortium. MAS Project Final Evaluation, 2017

On the other hand, even though there isn't a record of the base line survey, when observing the results from the midterm survey, there is a trend to increase in the amount of producers assisted by the MAS Project that use this technological innovation, by surpassing the 57.6% of producers that had knowledge about it and 66.8% of them used it. Data shown in Chart No. 17 confirm the growing behavior in the use of inoculant in each harvest cycle from the producers assisted by the MAS Project that confirmed they applied it in the final evaluation. The initial situation of 13 per cent of the producers changed up to 49 per cent of them using

inoculant in the later harvest of 2016. It is relevant to mention that 93.3% confirms they will continue using it even if the Project ends:

Chart No. 21 Tendency in the use of inoculants by bean producers. MAS, 2017



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

Another important element that must be considered, is the fact that since the inoculant is a product generated in a laboratory through efficient bacteria in capturing nitrogen from the air and soil, its practical use could not be within the reach of bean producers, however, MAS, with scientific and technical support from El Zamorano University achieved to produce it, isolating efficient native strains and reproducing the product at a commercial level. With this, MAS, in seeking for sustainability in technology has gone beyond that, by training staff from DICTA in the preparation of inoculant with the required quality. In order to guarantee the availability of the inoculant in the communities, a distribution strategy was defined through trading centers of agricultural input and the institution providing technical assistance to bean producers.

Another important achievement from the MAS Project is leaving out in the open and promoting the viability of the use of inoculant in bean crops, as well as its production and commercialization and having shown the level of productivity that can be reached with this technology. It will be up to DICTA, the projects supporting bean production and the agricultural input trading centers to continue promoting the technology in other areas of bean production, making it sustainable and keep up the quality of the product.

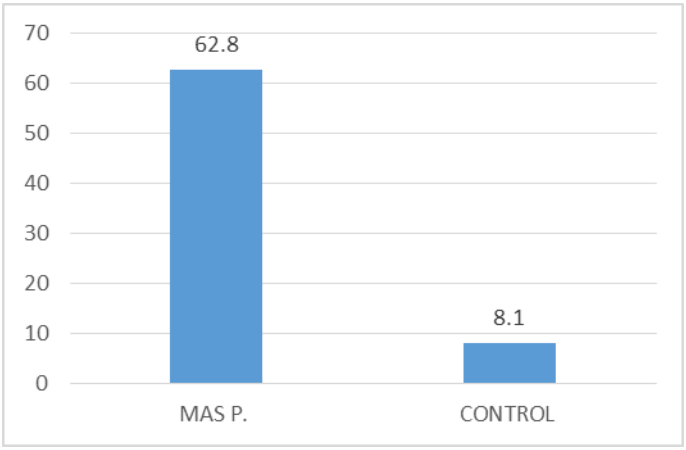
9.2.1.2.4 The use of certified seed

Promotion of the use of improved bean seed has been limited nationally, since it is a self-pollination plant that does not oblige the producer to acquire it in each cropping cycle, which means that from the specialized commerce point of view it is not as attractive as a commercial economic activity, however, under the artisanal seed production category, the use of this input is standing since it is viable for production with accessible Price and it significantly contributes to the improvement of productivity. Project producers, have put into practice and have adopted the use of certified bean seed in their crops. The results form the final evaluation evidences that 63% (N=484) of MAS producers have incorporated into their system, the use of certified seed, against 8% (N=438) of the CG producers, with a difference of 55 percentage points.

Project support to strengthen or establish certified bean seed banks, ensures input availability for commercial grain producers and at the same time it stimulates a specialized production line like seed production. In terms of production, the MAS Project allowed going from the use of commercial grain as seed to seed from certified varieties to aligned sowing and less seedlings per position to improve crop productivity.

MAS Project producers have recognized implemented and adopted the use of certified bean seed in its cultivation. The results of the final evaluation evidence that 62.8% (304/484) of the producers of the universe of study assisted by MAS confirmed the use of certified seed of improved varieties of beans. These results significantly exceed the universe of control producers with a difference of 54.8 percentage since only 8% (35/438) of the producers interviewed used it. It is important to note that 95.1% of the 304 producers who confirmed using certified seed will continue sowing once the MAS project is completed, the control producers that represent approximately 10% (35 cases) compared to the universe that uses certified seed from the ones assisted by MAS, 85.7% confirm they will continue to use it in the future.

Chart No. 22 Producers that use certified seed. MAS, 2017

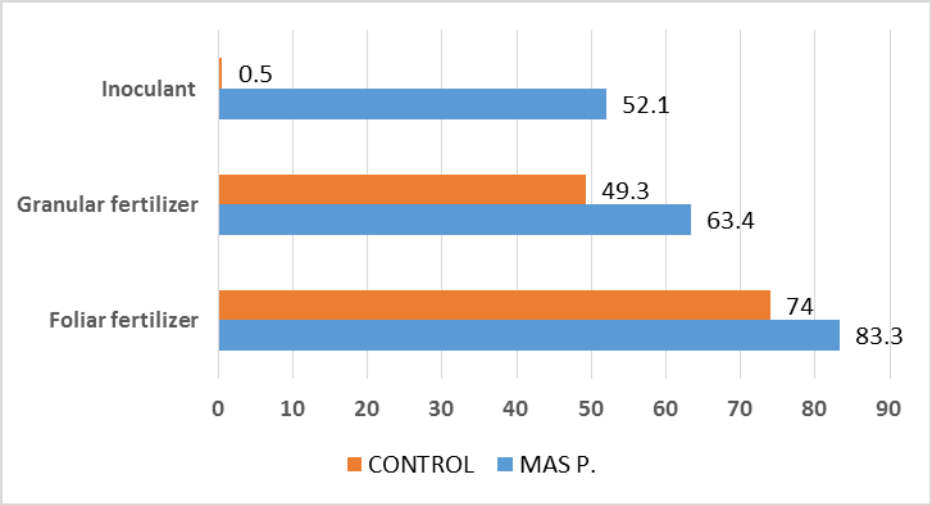


Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

9.2.1.2.5Use of fertilizer

After many years of continuous use, soils have decreased their level of fertility, a condition that is recognized and attended by a large part of the producers. In the cultivation of beans chemical fertilization is quite widespread. In the case of foliar fertilization, 83% (n=484) of the producers assisted by MAS applied this practice, surpassing by 9.3 percentage points non-beneficiary producers, which was 74% (n= 438). In regard to the granular chemical fertilizer the use is lower. 63% (n= 484) of the producers with the assistance of the MAS Project carried out this practice, on the other hand, in the 49% (n=438) of the non-beneficiary producers put it into practice, making a difference of 24 percentage points.

Chart No. 23 Percentage of producers that adopt good nutritional practices in coffee crops with the assisted producers and the control group. MAS, 2017



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

9.2.1.2.6 Disease Prevention and Control

If there is a crop susceptible to environmental changes (Excess humidity), to varieties and infected seeds, is the bean, which frequently exposes producers to loss due to diseases. The results from the final evaluation show that for the first cycle 74% (N=484) of beneficiary producers report attacks from diseases. Among the producers form the CG, this percentage was greater, 83% (N=438), making a difference of 9 percentage points. The second cycle, showed a similar behavior.

Regardless if the bean producer is beneficiary or not of the project, producers always take prevention actions to the attack of diseases in the bean crop. In this case, the response from producers was very similar, by indicating that about 73% of producers try to prevent the damage caused by these diseases.

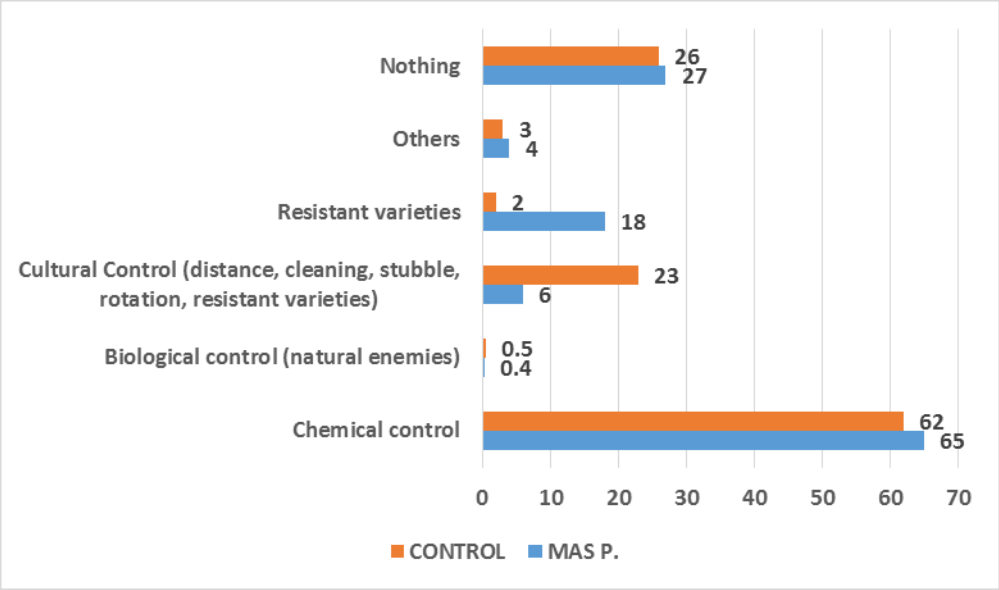
Table No. 36 Producers that report and control diseases in the bean crops. MAS 2017

	MASP N= 484	Control N= 438
Disease Report	74.2%	83.1%
Disease control	73.1%	73.7%

Source: Prepared by ANED Consultores - Sigil Consulting Consortium. MAS Project Final Evaluation, 2017

In order to prevent and control bean disease, producers conduct several practices, some with greater level of acceptance than others. Among the control practices, chemical control is the one applied the most, due to its effectiveness in regards to combating the pathogen and vector (insect) that spreads the disease. Data show that 65% of MAS Project beneficiaries use chemical products for disease control in bean crops; on the other hand 62% of the non-beneficiary producers did it. The difference is minimal (3.0 percentage points) since it is the preferred control method by producers. Cultural control is practiced at a relatively low level. Non-beneficiaries report a greater level (23%) and MAS beneficiaries report 6.0% of producers. Finally, for the resistant varieties of bean, 18% of MAS Project producers expressed that their varieties have a certain level of resistance or tolerance to the attack of diseases. On the other hand, only 2.0% of non-beneficiaries of the project observe resistance or tolerance to the attack of diseases. In this case, it is acknowledged that the local varieties are susceptible to the attack of diseases.

Chart No. 24 Disease Prevention and control per producer in bean crops (%)



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017, MAS Project Final Evaluation

As shown previously, control and prevention of disease attack in the bean crop from beneficiary and non-beneficiary producers has been permanent, however, the Project promoted greater effectiveness in this practice, with important differences in the four years of Project implementation.

Producing big changes in disease control for beans requires a lot of time, since there are different ways to fight it; in some cases through seed, in other cases through vectors (insects) that spread it, due to the favorable environmental conditions for diseases and because chemical control (preferred by producers) is costly. In many cases, it is out of the economic possibilities of the producer. However, the effort of the Project is evident by achieving a greater incorporation of producers to bean crop disease control.

Table No. 37 Producers (%) according to the years of conducting disease control and prevention practices in bean crops. MAS 2017

Years of practice	MASP N= 346	Control N= 317
< 1 year	1.2	0.6
1 year	4.3	1.3
2 years	18.2	4.7
3 years	24.6	9.5
4 years	13.6	6.0
5 years and up	38.2	77.9

Source: ANED Consultores, MAS Project Final Evaluation, 2017

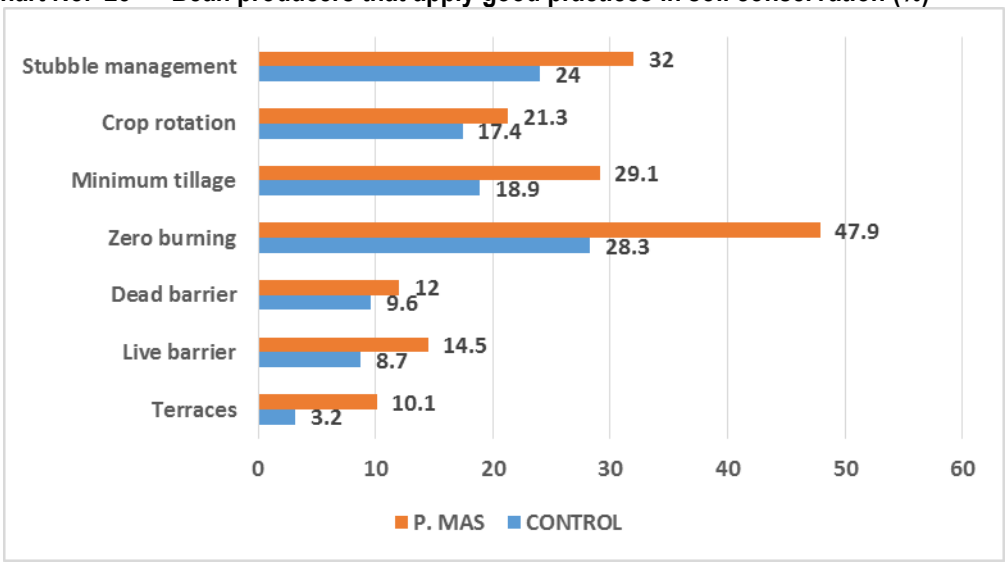
Changes in bean disease control and prevention were observed since the beginning of the project by reporting in the first year that 4.3% of MAS producers were preventing and controlling diseases from bean crops. 1.3% of the control group developed these kinds of activities. In the following years, disease control for the crop was much higher, for instance, in the third year 24.6% of producers from the project controlled and prevented diseases in the crop and 9.5% of producers from the control group conducted the same activity.

9.2.1.2.7 Soil and water management

In soil management and conservation, 79% of beneficiaries against 62% of the CG have adopted these GP. With the target population, the MAS Project promoted a series of technologies that make an important difference in regards to soil and water management in terms of the cropping system. Technologies are not something new for producers, but their adoption has been slow, despite training and assistance actions from the MAS staff.

Of the GP shown in the Chart, MAS project actions make a difference in regards to what the non-beneficiary producers performed. Therefore, an important effect of the Project was no-burning for 48% of the MAS producers, which has a difference of 20 percentage points in regards to the CG; in the minimal tilling, the difference was 10 points; in stubble handling the difference was 8 points and in live barriers the difference was 6 percentage points.

Chart No. 25 Bean producers that apply good practices in soil conservation (%)



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

9.2.1.2.8 Post-harvest management

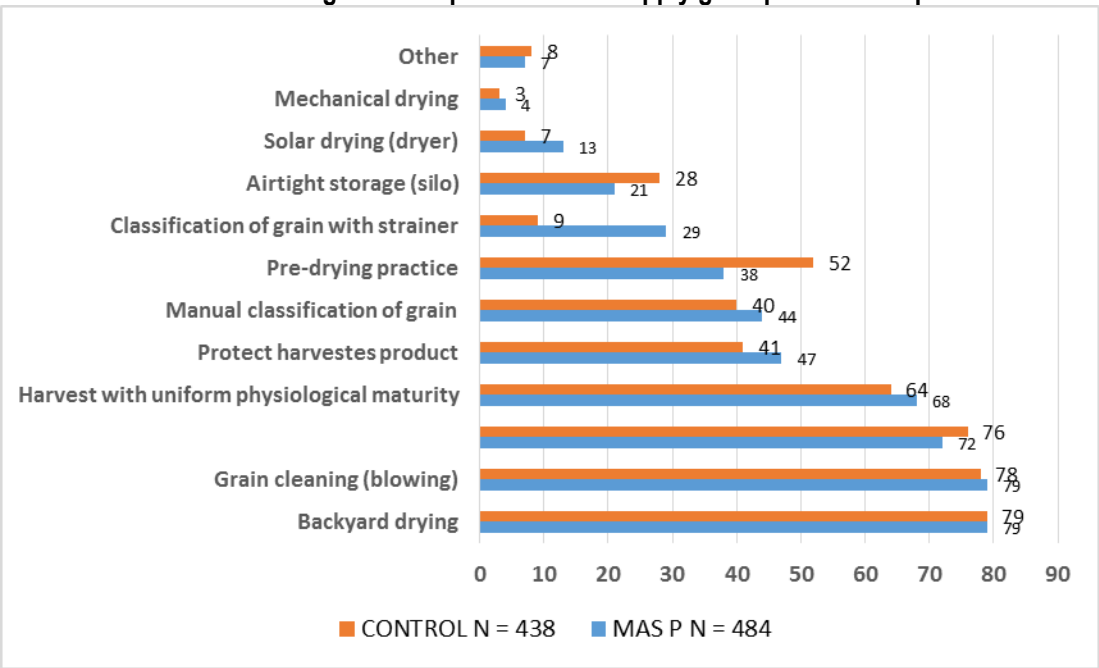
In the past, post-harvest management technologies were promoted by technical assistance institutions and projects, to the extent that they are considered conventional technologies. Among these old conventional technologies we can still find drying in the backyard and grain cleaning. This does not allow establishing a difference between beneficiaries and non-beneficiaries of the project.

On the other hand, grain classification technology with strainer is applied by 29% (N=484) of MAS producers, against 9% (N=438) of the CG, the difference here is 19 percentage points. Likewise, there is a difference in solar drying of grain. It is reported that 13% (N=484) of assisted producers said they had solar drying, while only 7% (N=438) of non-beneficiaries put this technology into practice.

What is being affirmed, is that these technologies have been presented in producers for many years. Drying and cleaning the grain has been made taking advantage of the sun and the wind. Both are rudimentary but economic (minimal investment), which is something the producer values a lot. It is important to highlight that the conventional technologies are rooted within the producers and changing them from one year to the other is not easily achieved, especially when the producer has an advanced age. Youth are more open to changes.

Changes happen, but it is a process that advances as the producer is completely convinced of the value of the technologies, especially related to their investment, functionality and maintenance. Not everything in the past is deficient or bad; there are things from the past that are better than the current ones.

Chart No. 26 Percentage of bean producers who apply good post-harvest practices



Source: Prepared by ANED Consultores - Sigil Consulting Consortium. MAS Project Final Evaluation, 2017

9.2.2 Impact in adopting good agriculture practices

9.2.2.1 Coffee Chain

9.2.2.1.1 Adoption of techniques and technologies

In regards to the adoption of techniques and technologies, results from the final evaluation gave significant evidences between the assisted producers and the control group. The average adoption of techniques and technologies was 0.70 for assisted producers and 0.57 for the control group. This means that the adoption levels of assisted producers are between medium and high, on the other hand, the control group does it from medium to low (See details in Table 41). Among the techniques and technologies considered in the impact measurement model were: tissue and pruning management, shade regulation, disease control, pest control and fertilization.

Table No. 38 Impact of the MAS Project in adopting coffee growing practices

Indicator	MTE	Control	MAS	Significant Differences (p<0.5)		
				MTE - Control	MTE - MAS	Control – MAS
Adoption of Practices	**-**	**0.57**	**0.70**	**-**	**-**	**Yes**

Source: Prepared by ANED Consultores – Sigil Consulting Consortium MAS Final Evaluation 2017.
Note: 95% level of confidence.

9.2.2.1.2Relation between techniques and technologies with yield and income in coffee

The project's impact analysis measured its relation of techniques and technologies in regard to yield and income. It considered 5 cropping practices, like: Tissue management, shade regulation, disease control, pest control and fertilization. Each practice received a weight due to its effects in productivity (See Annex No. 4). With the weight a practice adoption scale was established in regards to its valuation, which was the following: very low adoption (0 - 0.2), low adoption (0.21 - 0.4), medium adoption (0.41 - 0.6), high adoption (0.61 - 0.8) y very high adoption (0.81 – 1.0).

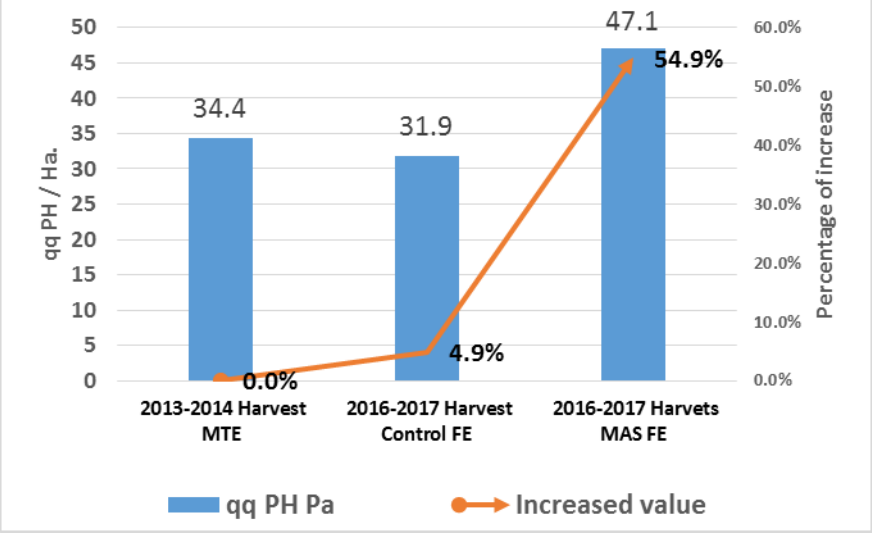
9.2.2.1.3Yield in terms of practice adoption levels

The impact of the project on yield is analyzed in terms of the MAS farmers' adoption of the promoted good practices. Data was compared to the control group's adoption rate. Using the variance analysis (Two-way ANOVA), it showed significant levels between the intervention and control. Under mean separation, we can conclude that there is significance between assisted and control producers with a "Very High Adoption" (5) of practices in regards to the producers from the control group with an adoption between 'High' (4), 'Medium' (3), 'Low' (2) and 'Very Low' (1) adoption. On the other hand, those assisted producers that had a 'Medium' (3) and 'Low' (2) adoption showed significant differences only with the control producers that had a 'Very Low' (1) level of adoption. (See Table 41).

9.2.2.1.4Coffee commercial production yield

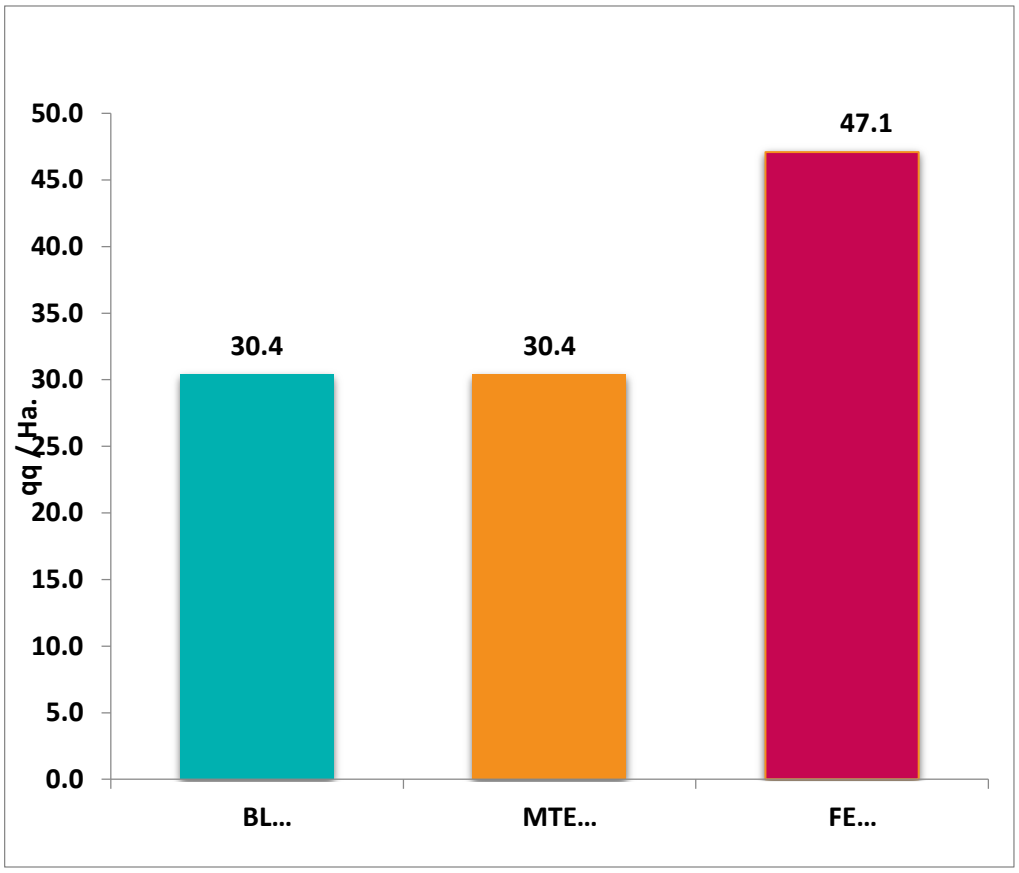
According to the results from the MAS Final Evaluation, MAS producers who harvested coffee in the commercial production area (plantation with 3 or more years old) obtained an estimated average yield of 47.1 quintals of wet parchment per hectare (qq/Ph Ha) for the 2016-2017, harvest, which is superior by 16.7 quintals to the yield from the MTE for the 2013-2014 harvest. This difference represents 54.9% increase, i.e. 29.8 percentage points more than the established target (25%). On the other hand, the final evaluation found that control producers obtained less yield than MAS producers, estimated in 31.9 qq/PH Ha for the 2016-2017 harvest, which is 15.2 quintals less and only 4.9% increase in regards to the MTE.

Chart No. 27 Impact in commercial coffee production yield, MAS versus control



Source: MAS Information System

Chart No. 28 MAS productivity behavior in commercial coffee production



Source: MAS Information System

Table No. 39 Incremental value in coffee productivity, FE and MTE versus BL.[8]

Base line 2012-2013 harvest (qq/Ha)	MTE 2013-2014 harvest (qq/Ha)	Final evaluation 2016-2017 harvest (qq/Ha)	Incremental value MTE/BL (%)	Incremental value FE/BL (%)
30.4	30.4	47.1	0.0	54.9

Note in Table No. 40, that in the five departments, MAS producers increased their yield with respect to the MTE. It is worth highlighting Francisco Morazán, which presented the lowest yield in the MTE, but in the final evaluation it is the highest, results show that it went from producing 20.7 to 63.8 qq/Ha PH,. This situation represents a 208.0% increase in productivity. Yoro is observed in a lesser proportion, since it went from 25.7 to 55.2 qq/Ha PH, which reveals an increase of 114.8%. MAS producers from the department of Comayagua reveal the lowest increase in productivity (11.8%); however, the yield of 56.9 qq/Ha PH exceeds the final average of the MAS Project.

[8] Note: in the final evaluation of MAS the MTE was considered the baseline

Table No. 40 Increase in coffee crop yield
(Yield in quintals of wet parchment coffee per hectare)

Indicator	MTE	Final Evaluation		Increase Value (%)	Target (%)
		MAS	Control		
	2013/2014	2016/2017	2016/2017		
Total	**30.4**	**47.1**	**31.9**	**54.8 1/**	**25**
Comayagua	50.9	56.9	56.7	11.8 2/	
El Paraíso	24.6	39.5	22.3	60.7 2/	
Fco. Morazán	20.7	63.8	32.7	208.0 2/	
Olancho	22.7	30.9	16.1	36.1 2/	
Yoro	25.7	55.2	41.1	114.8 2/	

Source: MASP Final Evaluation August 2012 to March 2017
1/ Percentage in regards to the base line
2/ Percentage in regards to the MTE

9.2.2.1.5Impact in coffee productivity

The impact in coffee yield was evident when comparing the results obtained in the 2013-2014 harvest referred to in the midterm evaluation (MTE) with the 2016-2017 harvest in the final evaluation (FE). Both MAS and control groups are compared against the average yield of the MTE (30.4 qq/Ha PH). Data in the final evaluation revealed that yield was 31.9 qq/Ha PH for the control producers, while MAS producers obtained 47.0 qq/PH Ha. These differences as shown by data from Table No. 41 are statistically significant at a level of confidence of 95%.

In conclusion, the significance test shows that the difference in yields between MAS producers and the control group from the Mid-term to the Final Evaluation is due to the assistance of the MAS Project.

Table No. 41 Impact of the MAS Project in commercial coffee production yield

Indicator	MTE	Final Evaluation		Significant Differences (p<0.5)		
		Control	MAS	MTE - Control	MTE - MAS	Control – MAS
Yield (qq / Ha)	**30.4**	**31.9**	**47.1**	**No**	**Yes**	**Yes**

Source: Prepared by ANED Consultores - Sigil Consulting Consortium. MAS Project Final Evaluation 2017.
Note: 95% level of confidence.

Table No. 42 Significant difference in yield according to good practices between the intervention and control group

Level of adoption		Adoption of Practice in Control				
		5 Very High	4 High	3 Medium	2 Low	1 Very Low
Adoption of practice in the intervention	**5 Very High**	no	**yes**	**yes**	**Yes**	**Yes**
	4 High	no	no	no	**yes**	**Yes**
	3 Medium	no	no	no	no	**Yes**
	2 Low	no	no	no	no	**Yes**
	1 Very Low	no	no	no	no	No

Source: Prepared by ANED Consultores – Sigil Consulting Consortium MAS Final Evaluation 2017.
Note: 95% level of confidence.

9.2.2.2 Bean Chain

9.2.2.2.1 Adoption of techniques and technologies

In regards to the adoption of techniques and technologies, the results from the final evaluation showed significant evidence between the assisted producers and the control group. The average adoption of selected techniques and technologies was 0.78 for the assisted producers and 0.73 in the control group. Among the techniques and technologies considered in the impact measurement model were: the use of inoculant, disease control, pest control and fertilization.

Table No. 43 Impact of the MAS Project in the adoption of practices for bean crops

Indicator	MTE	Control	MAS	Significant differences (p<0.5)		
				MTE - Control	MTE - MAS	Control – MAS
Adoption of Practices	-	0.73	0.78	-	-	Si

Source: Prepared by ANED Consultores – Sigil Consulting Consortium MAS Final Evaluation 2017.
Note: 95% level of confidence.

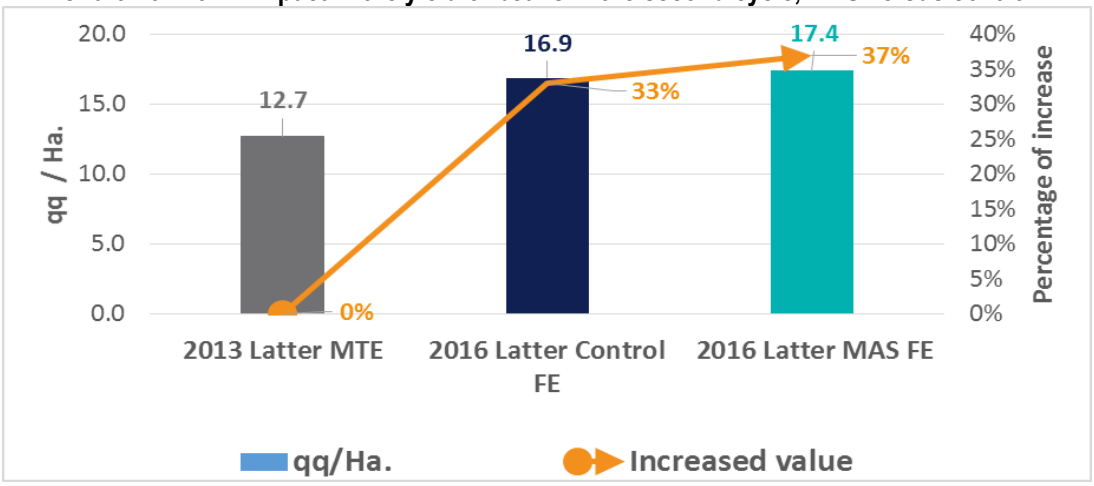
9.2.2.2.2 Yield in harvested area in the postrera cycle (second harvest)

The second harvest season in 2016 presented changes in bean yields because the rains have become erratic, both in intensity and frequency.

Due to climate change effect, the gap between rain to rain has increased.

When natural events occur, as droughts in El Niño phenomenon, whose effect is high or severe, its impact is similar in project's assisted production and not assisted production. As a result, both yields are similar, those of local varieties and improved varieties. There are occasions when bean local varieties have better responses than improved varieties to environmental changes (diseases, pests, drought, frost, heat waves and others), since the level of adaptation and response of local varieties is higher than the improved varieties (by its recent introduction).

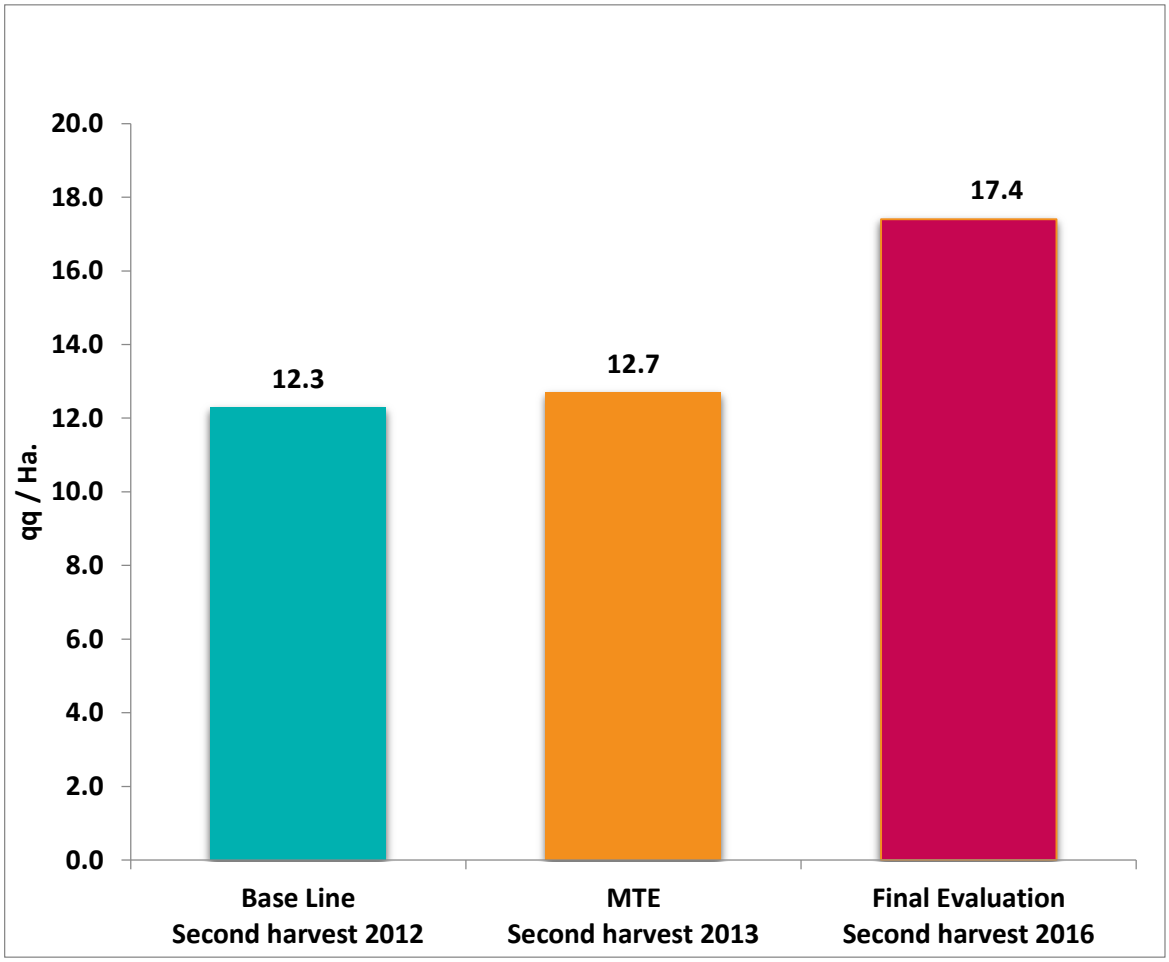
Chart No. 29 Impact in the yield of beans in the second cycle, MAS versus control



Source: MAS Information System

The target established by the Project consisted of reaching 16.0 quintals per hectare in the second cycle, i.e., 20% growth form base line (12.3 qq /Ha.). Final data shows that producers assisted by the MAS Project increased yields by 41.6%, exceeding significantly the established target.

Chart No. 30 MAS Productivity behavior and second cycle bean yield



Source: MAS Information System

Table No. 44 Incremental value in bean productivity, FE and MTE versus BL.

Base line second harvest 2012 (qq/Ha)	MTE second harvest 2013 (qq/Ha)	Final evaluation second harvest 2016 (qq/Ha)	Incremental value MTE/BL (%)	Incremental value FE/BL (%)
12.3	12.7	17.4	3.4	41.6

9.2.2.2.3Yield per harvested area in the first cycle

Bean yield in the first cycle of 2016 in the harvested area was 20.7 quintals per hectare (qq/Ha). Since there wasn't a baseline indicator available, the reference was yield of beans in the first cycle of 2014 contemplated in the midterm evaluation (11.4 qq/Ha). On the other hand, the target established by the project for the first cycle considered a 30% growth from baseline. Comparing data from MTE in 2014 (11.4qq/ha) with the Final Evaluation (20.7 qq/ha), it is observed 81.6% growth in yields. .

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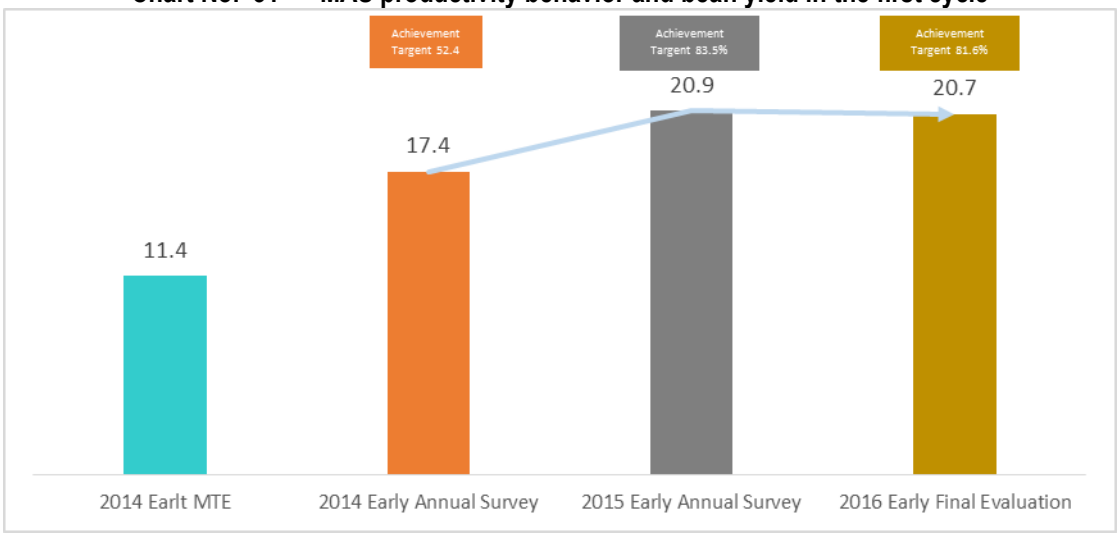
Chart No. 31 MAS productivity behavior and bean yield in the first cycle



Source: MAS Information System

The combination of high yield with a trend of increasing bean prices due to shortage in the last 4 months prior to the second harvest, motivated producers to increase sown areas in regions of the country where there is a favorable climate for first cycle production.

9.2.2.2.4Impact in bean productivity

According to the result obtained through the significance test (Table No. 45). It can be concluded that the difference in yields between the FE (second harvest 2016) estimated at 17.4 qq/Ha and the 12.7 qq/HA from the MTE (second harvest 2013) is due to the MAS Project assistance. However, the difference obtained in the final evaluation between producers from the CG (estimated at 16.9 qq/Ha) and the MAS Producers (17.4 qq/Ha) was not significant.

In table 45, it can also be observed in the first cycle of the 2014 harvest (collected during the MTE) an average yield of 11.4 quintals per hectare was registered. In the final evaluation, MAS producers obtained yield of 20.7 quintals, producing a difference of 9.3 quintals against MTE. With a lesser yield, control producers quantified 17.9 qq/Ha, which makes a difference of 6.5 quintals. On the other hand, second cycle results and first cycle results of 2016 between MAS Producers and control producers reveal a difference that is statistically significant to a level of confidence of 95%. The result obtained through the significant test confirmed that the differential is due to the assistance from MAS project.

Table No. 45 Impact of the MAS Project in bean yield

Indicator	MTE	Final Evaluation		Significant Differences (p<0.5)		
		Control	MAS	MTE - Control	MTE – MAS	Control – MAS
***Primera*/ first harvest yield (qq / Ha)**	11.4	17.9	20.7	Yes	Yes	Yes
***Postrera*/ second harvest yield (qq / Ha)**	12.7	16.9	17.4	Yes	Yes	No

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, MAS Final Evaluation 2017. Note: 95% level of confidence.

9.2.2.2.5Yield in first cycle in regards to the practice adoption scale

When analyzing yield in the first cycle in regards to the practice adoption scale through a variance analysis (Two-way ANOVA), it was found that the adoption of practices between treatment and control **did not result in a significant difference** between the yield measurements for this cycle. Not having a big difference in yield between groups of producers could be related to climate change (drought or excess precipitation) in beans producing areas, reducing the production potential that could be obtained under suitable environmental conditions. Usually, environmental changes go hand in hand with severe attacks from pests and diseases, whose prevention or control goes beyond the possibilities of producers. In addition, since bean is a staple grain in the population's diet, it gets attention from institutions and field programs. This support is reflected in the yield achieved by the control group.

9.2.2.2.6Yield in second cycle in regards to the practice adoption scale

When analyzing the yield in the second cycle in regards to the practice adoption scale through a variance analysis (Two-way ANOVA), it was found that the adoption of practices between control and treatment **did not result in a significant difference** between the yield measurements. The causes for not having a significant difference in the second cycle among producers from the intervention and control groups are the same exposed for the first cycle.

9.3 STRATEGIC LINE 3: Strengthening POs to provide services that add value and comply with market standards

9.3.1 Effectiveness in achieving expected results

9.3.1.1 Administrative and accounting practices of the PO

One of the greatest weaknesses of many producer organizations is related to management and accounting capacities. Weak legal and administrative processes are often found, due to the lack of control and accountability mechanisms. The project promoted the improvement of the administrative capacity by applying practices to ensure the POs strengthen their administrative and accounting capacity, considering the available resources they have.

For the life of the project, the target established was to strengthen 120 POs. 135 POs were assisted surpassing the goal by 13 percentage points. This training and strengthening of social capital in rural areas is generating business opportunities, competitiveness and levels of trust that allow for a more dynamic local and rural economy.

Table No. 46 Producer Organizations that have applied administrative and accounting practices

	MAS	Target	Differences
Organizations	135	120	15

Source: MAS Final Evaluation August 2012 to March 2017

An example of this is the number of POs that received technical assistance from FUNDER, which includes 117 savings and credit groups (CRAC for its acronym in Spanish) in order to strengthen commercialization and credit committees, during the September 2016 to May 2017 period.

Concrete actions were performed in this area: training was delivered to promote a better understanding of the paperwork required to acquire a National Tax Number (RTN for its acronym in Spanish), follow up was provided in obtaining Legal Status which supports the legal constitution of POs, and, lastly, the MAS project

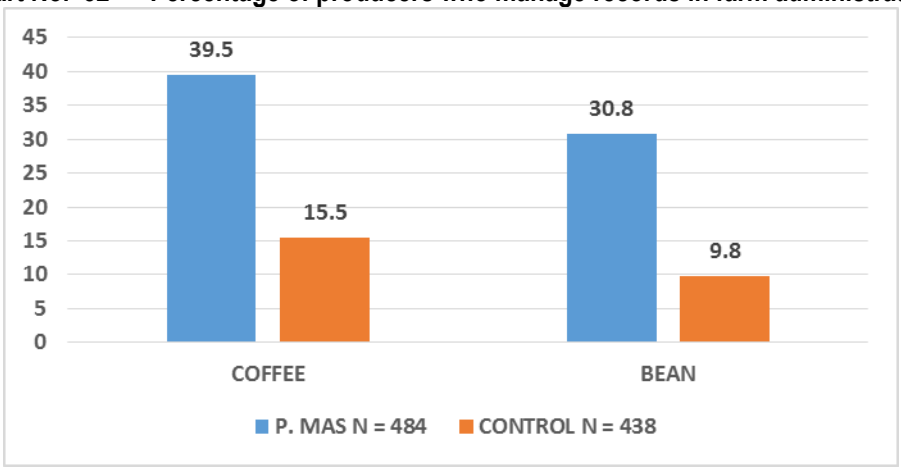
strengthened the entrepreneurial and administrative management capacity of the assisted CRACs directly or through others.

9.3.1.1.1 Administration of producers' farms

Administrating economic activities leads to better analysis of cash flow and the financial results of each period and programmed activity. The MAS project created the conditions for better administration of the coffee and bean chains, from raw material management to payroll recording, cost analysis, purchased and sold production, prices and the value of production as well as the financial analysis of each chain.

During the final evaluation, producers valued the relevance of this knowledge, which has allowed them a more efficient and rational use of the resources they invest, the costs they incur and the profit or loss margin they have by the end of their activities. According to the results, 39.5% of MAS producers assisted in the coffee chain recorded at least one record related to farm management, while in the CG 15.5% did the same. In the bean chain, 30.8% of MAS producers recorded at least one record, while in the CG, 9.8% did the same.

Chart No. 32 Percentage of producers who manage records in farm administration



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

Getting producers to implement the elemental principles of financial and accounting administration in the coffee and bean chains has been important for them to know the profitability of their investments. Even more important has been the involvement of women and youth in the administration, which has allowed them to know the situation of their family assets and to think about administrative strategies to consolidate it.

9.3.1.2 Access to credit and market services

9.3.1.2.1 Expansion of Access to credit

Credit is one of the most important needs that coffee and bean producers have, as well as producers of any other crop in the country. In part, the lack of farming development is related to the credit limitations for production. With the financial support provided by MAS, credit demand from bean and coffee producers was satisfied and surpassed the target. The target was facilitating 5,400 coffee loans, which in the end became 20,319 loans facilitated. Likewise, for beans, 1,406 loans were programmed, which became 5,822 loans achieved by producers. Financing of coffee activities surpassed the project target by 400 percentage points, and in beans it was surpassed by 30 percentage points.

Table No. 47 Number of loans facilitated and MAS producers who benefited from financial services

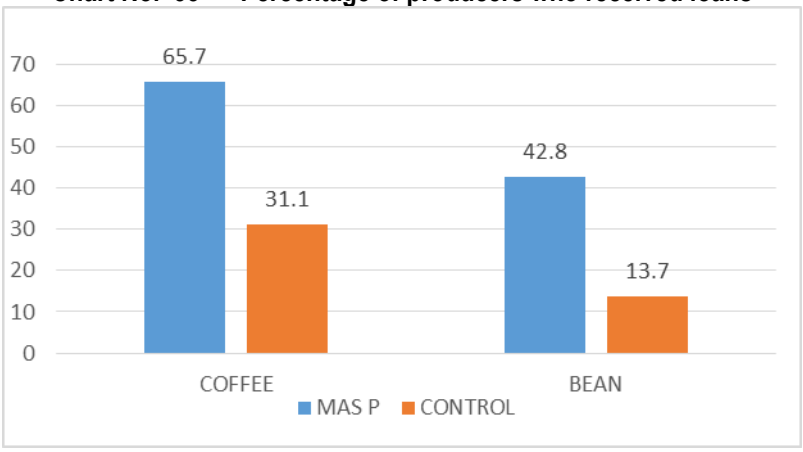
Sex	MAS Project		Target		Difference	
	Coffee	Bean	Coffee	Bean	Coffee	Bean
Total	20,319	5,822	3,994	1406	16,325	4,416
Men	16,111	4,657	2,959	1,041	13,152	3,616
Women	4,208	1,165	1,035	365	3,173	800

Source: MAS Project Monitoring Unit March 2017

It is important to point out that 8,787 producers (25% women) received at least three cycles of loans with the project assistance. This fact shows the support and impact of the MAS Project in providing financial assistance to coffee and bean producers.

During the field research, coffee producers were consulted if they had received loans. The FE found that 65.7% of MAS producers received loans. On the other hand, 31.1% of control producers said they received credit assistance for the coffee growing activities, with a difference of 34.6 percentage points. With regard to bean crops, 42.8% of MAS producers affirmed that they received loans. On the other hand, 13.7% of control producers received financial assistance for the production of this crop.

Chart No. 33 Percentage of producers who received loans



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

9.3.1.2.2 Linkages with infrastructure investors

The MAS Project included in its interventions, conducting entrepreneurial assessments on the post-harvest infrastructure of producer organizations. The purpose was to understand the needs of the producer organizations in regards to the facility of use and management of silos, warehouses, drying equipment and transportation. Then, the project will assist them to apply for financial resources to Government institutions and agencies. With this intervention, institutions participated in their condition of strategic allies to know, for instance, the percentage of producers who had access to solar dryers and drying services.

Table No. 48 Post-harvest infrastructure assessment to organizations of producers, MAS 2017

Assessments	MASP	Target	Differences
	126	80	46

Source: Final Evaluation of the MASP August 2012 to March 2017

With this purpose, the MAS project established as a global target conducting 80 assessments. By the end of the project, 126 assessments were conducted, surpassing the target by 58 percentage points.

In the four years of the project, 233 producer organizations were assisted (210 as target), which demanded financial resources to acquire or improve their productive infrastructure, both in the coffee and bean chains. Investments were addressed to the construction or improvement of warehouses, drying patios, grain dryers, coffee mills, water harvests and irrigation systems. Financial resources available to the PO came from a matching grant fund created by the project valued in US $ 381,000.00, whose contribution came from the MAS Project ($ 177,000), Molinos de Honduras ($ 102,000) and José María Covelo Foundation ($ 102,000). To date, 42 infrastructure projects were funded, which included 39 static dryers and 3 coffee cupping labs.

Table No. 49 Number of organizations of producers linked to investors in infrastructure. MAS 2017

	MASP	Target	Differences
PO linked to investors	233	210	23

Source: MASP Final Evaluation August 2012 to March 2017

Regarding coffee drying, technological changes led to selling 24% of MAS farmers' production in dry parchment. On the other hand, only 7% of producers in the control group sold dry parchment coffee. The effects were reflected in the price that MAS producers received, on average L. 2,145.57 per qq/PH against L. 1,552.75 per qq/PH received by the control producers, opening a favorable gap among these in the total amount of sales.

9.3.1.2.3 Access to agriculture information

Within the intervention strategy of the MAS Project, setting in motion an information system was considered. This system allowed the producer organizations to send electronic messages (via mobile phone) to producers. Likewise, among organizations, institutions and companies allied to the producers and head offices. The system was improved over the years and has remained standing. The project linked different information systems available in the national market with the coffee and bean chains, among these, the ones developed by DICTA, FUNDER, producer organizations.

Information became an effective strategy between information-generating institutions, producer organizations and producers. Its effectiveness is based on being appropriate and relevant for evidence-based decision-making. Data collected with field research show that the Project established as a target in this activity, setting in motion a system in 10 producer organizations. By the end of the project 14 organizations were accounted for, surpassing the target with 4 organizations or in 40 percentage points.

Table No. 50 Number of producer organizations with a working messaging system

	MASP	Target	Differences
Organizations of producers with SMS	14	10	4

Source: MASP Final Evaluation August 2012 to March 2017

It is important to note the fact that organizations of producers incorporated into the system are located in rural areas and specifically in communities with limited access to service internet. Additionally, it is equally important to note the scarce budget they have to invest in equipment and electronic communication technology. In order to reduce the aforementioned restrictions, the project established an alliance with the Federation of Buyer Organizations from the private sector; input and equipment suppliers, NGOs, government and other stakeholders that can act as a technical and entrepreneurial information center.

In global terms, the project proposed 15,000 people with at least one updated source of information from the market. By the end of the project, 16,068 people were incorporated, surpassing the target by 7.1 percentage points. These people receive market information by using SMS and Frontline.

Table No. 51 Number of producers that have frequent access to at least one updated source of market information through SMS

Number of MAS producers with at least one updated source of information from the market	MASP	Target	Differences
	16,068	15,000	1,068

Source: MASP Final Evaluation August 2012 to March 2017

According to the investigation, it was found that 86.7% of coffee producers and 80.2% of bean producers had a mobile phone. They confirmed that the messages they received were related to cropping practices, meteorological information, market prices and convening to training. According to what the producers – who had mobile phones – said, in the coffee chain 41.7% confirmed that they mainly received information about market prices, and in second place about cropping practices. In the bean chain, messages on cropping practices was predominant, confirmed by 33% of them, followed by 19.1% who confirmed receiving meteorological information, and 18% received information on market prices. It is worth noticing that community trainers used messages to convene producers to the trainings they held.

Table No. 52 Percentage of messages received by MAS Project producers

Topic of messages	Coffee (N = 473)	Bean (N= 388)
	Percentage	Percentage
Cropping practices	38.0	33.0
Meteorological information	17.0	19.1
Market Price information	41.7	18.0
Convene to training	26.0	18.0

Source: MAS Project Final Evaluation August 2012 to March 2017

There were three predominant frequencies in the transmission of messages, the most frequent ones were 2 to 3 times a month (38% and 38.3% of coffee and bean producers, respectively); seldom once in a while (36.6% and 42.3% for coffee and bean producers, respectively) and 2 to 3 times a week reported by 20.5% and 13.4% of coffee and bean producers, respectively.

Table No. 53 Percentage of producers that received messages, per frequency. MAS 2017

Frequency of messages	Coffee (N = 205)	Bean (N= 149)
	Percentage	Percentage
Every day	0.5	3.4
2 to 3 times a week	20.5	13.4
2 a 3 times a month	38.0	38.3
Once in a while	36.6	42.3
I just received one	3.4	0.7
I have never received one	0.0	0.0
Other	1.0	2.0
Source: MAS Project Final Evaluation August 2012 to March 2017.		

According to consultations made to producers on the message sender institution or organization, data emphasizes that the information system was implemented almost exclusively by the MAS Project; in consequence, supporting institutions and organizations had low participation in the information system. This situation could limit the sustainability of the system.

Table No. 54 Institutions and organizations that send messages. MAS 2017

Message sender	Coffee (N = 205)	Bean (N= 149)
	Percentage	Percentage
MAS Project	94.0	93.3
FUNDER	0.0	2.0
DICTA	0.0	2.0
Organizations of producers	1.5	3.4
Other	4.4	0.7

Source: MAS Final Evaluation August 2012 - March 2017

In spite of this, this communication strategy implemented by the project is very important and convenient for producers and the institutions that provide assistance for production – since it facilitates communication between institutions, organizations, and producers through mobile phones and Apps. For future interventions, it is important that the education gap of rural producers is taken into consideration in the meteorological information and market information analyses. Similarly, it is important to take into consideration the additional costs the system support incurs as well as establishing alliances with innovative communication methods and techniques through the app.

9.3.1.2.4Direct access to competitive market

9.3.1.2.4.1 Commercialization services through PO

In the commercialization process, the Project defined a long-term validity strategy through co-ops and producer organizations in order to ensure competitive advantages in the coffee and bean value chains. In general, most of the producers from these two chains commercialized their production through other individuals, intermediaries, and in local and national markets. The target of 40% of producers who sold to co-ops and other organizations was reached and surpassed in the commercialization of coffee, by reaching 62% -- surpassing the target by 22 percentage points. In the case of bean, the target was not achieved since only 29.7% of producers made this transaction through co-ops or national programs, leaving 10.3 percentage points below what was established (Table No. 55).

Table No. 55 Percentage of producers selling to cooperatives or other organizations

Chain	MASP	Target	Differences
Coffee producers (%)	62.0	40.0	22.0
Bean producers (%)	29.7	40.0	- 10.3

Source: MASP Final Evaluation August 2012 to March 2017

Producers were asked by the agent buying their products, and their response in regards to coffee and bean production was the following:

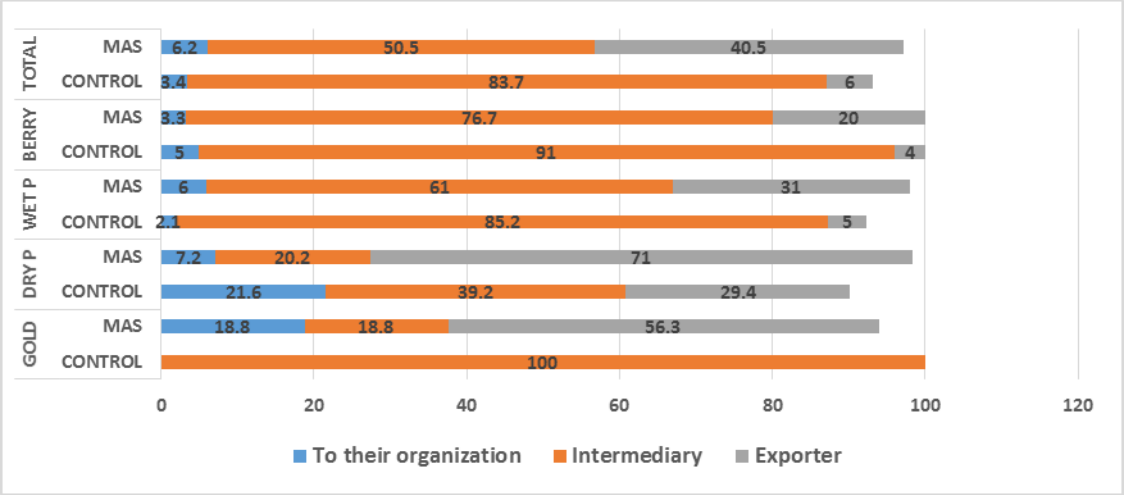
Coffee buying agents. Among the producers assisted by the Project, commercialization with intermediaries predominates (50.5%), in second place, followed by exporters (40.5%), while 6.2% commercialize with producer organizations. Control producers mostly commercialize with intermediaries (83.7%), followed in a low percentage by exporters (6%), and barely 3.4% with producer organizations. (Chart No. 34).

MAS producers prefer selling to exporters, since they can get better prices in the sale according to quality and awards, which also derive from the quality of coffee produced.

Bean buying agents. Bean producers commercialize their production with several buying agents; however, the most important ones are the intermediaries, IHMA, and particular buyers. The MAS Project strategy was addressed to promote bean commercialization with IHMA, since this has the highest reference price

(US$43.02 and US$40.30 a quintal in the first and second harvests, respectively). On the other hand, control producers' prices vary from US$41.40 and US$40.5 a quintal respectively.

Chart No. 34 Percentage of producers per kind of coffee according to buyer, MAS and control. MASP, 2017



Source: Prepared by ANED Consultores – Sigil Consulting Consortium MAS Project Final Evaluation, 2017

The project strategy had an effect in the commercialization of beans in the year 2016, by achieving 28.8% of assisted producers to commercialize 55.4% of the production obtained in the first cycle. And, 22.6% of producers achieved 26.9% commercialization of the second cycle, respectively. On the other hand, the level of commercialization from the control producers with IHMA was under 3% of producers, and under 5.1% of production obtained in any of the production cycles.

Table No. 56 Percentage of producers and bean production commercialized per cropping cycle, according to buying agents. MAS 2017

Buyer	INTERVENTION (%)				CONTROL (%)			
	First N= 240		Second N= 288		First N= 186		Second N= 249	
	Producers	Production	Producers	Production	Producers	Production	Producers	Production
IHMA	28.8	55.4	22.6	26.9	2.7	5.0	0.4	0.5
Intermediary	42.5	31.2	49.3	54.4	54.3	59.4	56.2	61.5
Organization	4.6	3.9	4.9	3.9	2.2	2.9	1.6	2.7
Particular	14.6	5.5	9.7	3.3	9.7	6.2	10.0	6.0
Other	9.6	4.0	13.5	11.4	31.2	26.6	31.7	29.2
Source: MASP Final Evaluation August 2012 to March 2017								

Data also evidence that participation from intermediaries in bean commercialization within the assisted group diminished substantially. It is reported that for both cropping cycles at least 50% of MAS producers commercialized at least 55% of the production. On the other hand, in the control group, over 54% of producers commercialized little over 59% of the production in any of the production cycles.

Commercialization of the production with producer organizations shows certain level of importance, where it is marked that about 5.0% of MAS producers commercialize about 4.0% of production in both cropping cycles. Control producers presented a similar behavior; i.e., around 2.0% of producers commercialized with organizations a little less than 3.0% of the bean production.

In spite of the commercialization data for bean, do not have a strong difference between MAS producers and control producers. The efforts and achievements reached by the project are acknowledged in the commercialization of this value chain. If IHMA achieves the improvement of the payment system to producers and the Early Payment mechanism is institutionalized and strengthened administrative and financially; the level of production commercialization for bean which be much more important.

9.3.1.2.4.2 Business Agreements between PO's and buyers

Coffee commercialization for producers assisted by the MAS project was done in compliance with sales contracts between other organizations and exporter companies such as: Molinos de Honduras, COMSA, OLAM, LDC, COCAOL, Louis Dreyfus Company, Beneficio Santa Rosa, Coffee Planet Corporation y Co. Honducoffee. As an example, the commitments established for the 2017-2018 harvest are signaled, where 153 coffee POs have signed at least one commercialization contract. In this case, it is estimated that the total signed agreements would be 227 contracts with the PO. Contracts need to be signed with Beneficio Santa Rosa, Coffee Planet Corporation, and Co. Honducoffee. The POs attended by MDH were assisted by the MAS Project.

Table No. 57 Number of signed agreements between buyers and sellers. MAS 2017

Signed agreements	MASP	Target	Differences
Agreements with coffee	648	139	509
Agreements with bean	190	41	149
Total	**838**	**180**	**658**

Source: MASP Final Evaluation August 2012 to March 2017

Targets established by the project were highly surpassed. In terms of coffee, the general program for the project established a target of 139 signed agreements. These agreements reached 648, producing a difference of 509 signed agreements, which are equivalent to an over execution of 366.2 percentage points. In terms of bean, the situation is similar, the programmed target was 41 signed agreements. And, 190 were conducted, exceeding the target in 149 which represents a difference of 363.4 percentage points.

This action becomes another success achieved by the MAS Project in strengthening the coffee and bean chains. Formalizing agreements among buyers and sellers has a great importance by allowing buyers and sellers to start a negotiation process and formalizing commitments for coffee or bean sale and buying. On the other hand, intermediation is attack up front, and it is characterized by fostering the informal market – which only favors the buyer.

9.3.1.2.4.3 Results of commercial relation between POs and coffee Exporters

A. Increase in volume of coffee commercialized by producer organizations.

In coffee production, specifically, we can highlight that in the past, commercialization was defined almost exclusively between the producer and intermediary as a buying agent. The MAS Project promoted producers to open commercialization relations with the organizations, companies, and exporters directly. Under this statement, the proposed target was taking 180 coffee producers to commercialize directly with exporters. When closing operations in the field, the project counted 325 producer organizations selling directly to exporters, which threw a difference of 145 organizations of producers exceeding the target. In terms of percentage this means an over execution of 80.6 percentage points.

Table No. 58 Number of PO selling directly to exporters. MAS 2017

Indicator	MASP	Target	Differences
Organizations of coffee producers	325	180	145

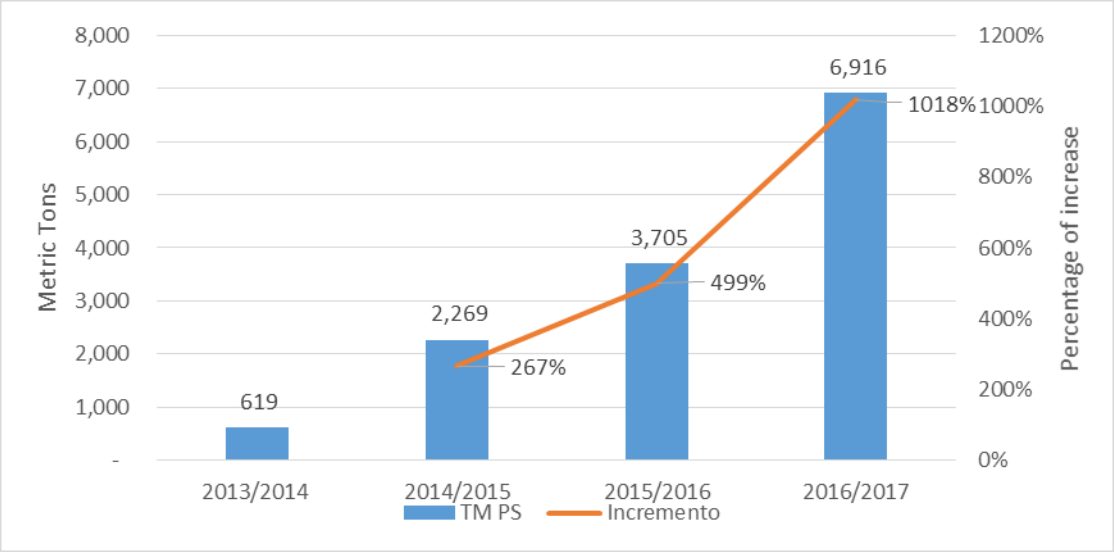
Source: MASP Final Evaluation August 2012 to March 2017

Project progress is very significant and opens the doors for the producer to advance in an organized fashion along the links of the chain, and as consequence, achieve a greater organization and management capacity to reach agreements with buyers. This action, will translate in the end in better levels of profitability of the productive activity.

According to focus groups, support from the MAS Project has allowed the producer-buyer-exporter relationship to create an increase in: the volume of coffee sales, and the quality of coffee to the extent of becoming important suppliers.

As shown in the data below, among the four harvests (from 2013-2014 to 2016-2017) within the validity of the project, approximately a total of 13,508 MT of dry parchment were commercialized.

Chart No. 35 Coffee sales behavior of producer organizations with exporter companies per harvest year (MT x Harvest)

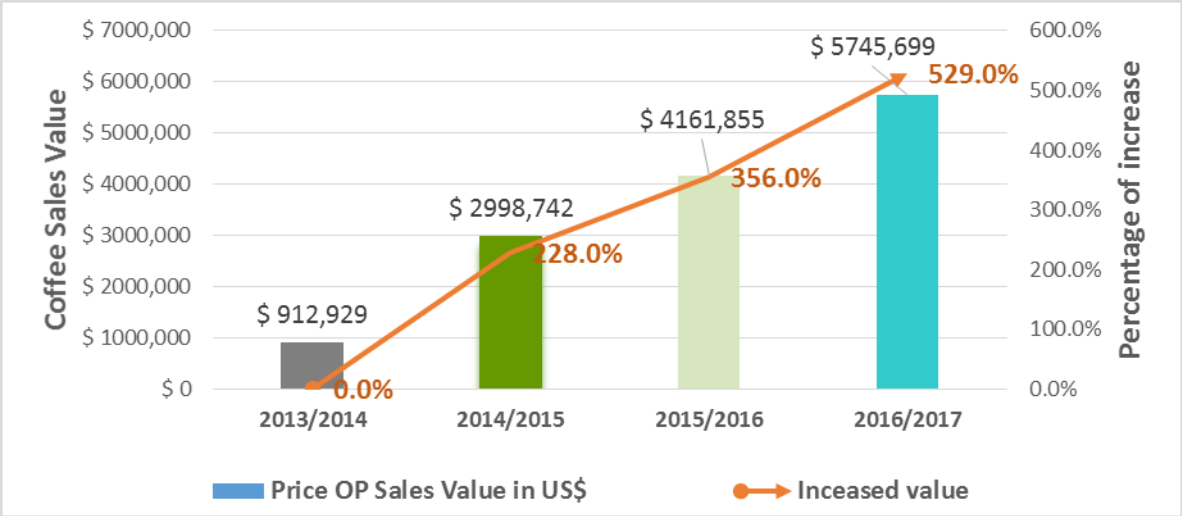


Source: MAS Information System

B. Increase in sales of producer organizations

Coffee producer organizations increased their sales in a significant way. As a global goal the sum of 6.0 million dollars were established for coffee. By the end of the project's standing period it increased to $13.8 million, generating a difference of $7.8 million.

Chart No. 36 Increasing value of sales from the PO's attributed to USDA assistance



Source: MAS Information System

C. Price of coffee reached by exporters in regard to the Stock in New York.

In regards to the price increase obtained by exporters with prices from the stock market in New York, results show that the highest difference, US$ 0.67/lb. of coffee was obtained in the period 2013 – 2014, which diminished starting from 2014-2015 until reaching US$0.38 in 2016-2017. According to this behavior, the proposed target by the project of US$ 0.25/lb. of coffee was surpassed in the four harvests showing a difference between US$ 0.13 and 0.42/lb.

Table No. 59 Average price reached by exporters in regards to New York's stock market. MAS 2017

Harvest	Price US$ per pound		
	Target	MASP	Difference
Harvest 2013-2014	0.25	0.67	0.42
Harvest 2014-2015	0.25	0.60	0.35
Harvest 2015-2016	0.25	0.51	0.26
Harvest 2016-2017	0.25	0.38	0.13

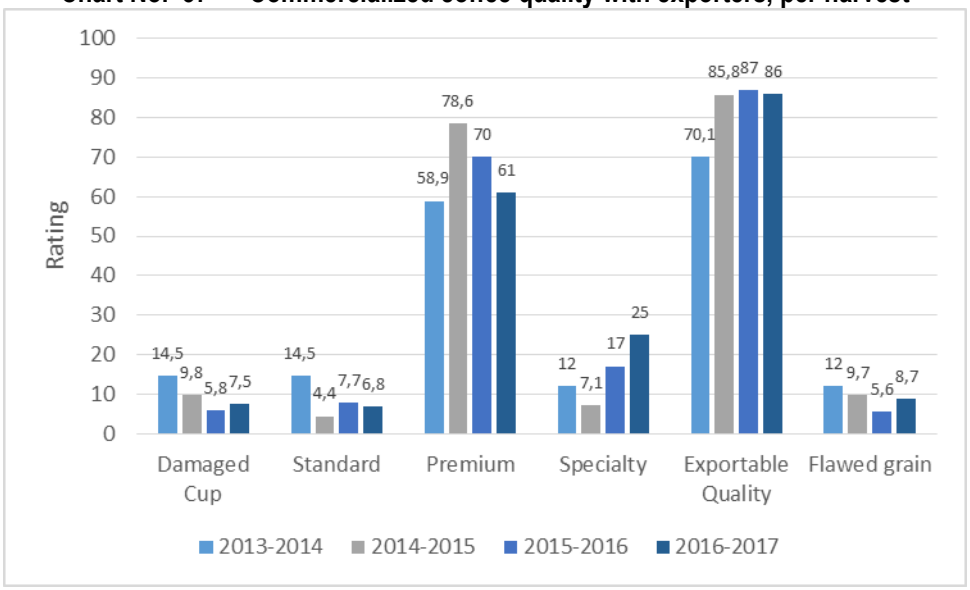
Source: MASP Final Evaluation August 2012 to March 2017

D. Sustained increase in the offer of quality coffee

Prior to the MAS Project, all the coffee harvested by producers participating in the PO reached the market as conventional coffee. Thanks to the technical team and cuppers of the MAS Project, who discovered cup profiles up to 89 cupping points in SCAA formats; the response from the Project emerges to promote the differentiation of coffee due to its quality. And, motivates the producer to improve and be perseverant in managing good practices as well as their farm, harvest, wet milling, and drying.

The incentive system convened with exporter companies, is for them to consider adjusting the price or an award from 84 points and up in the cup profile – which had an impact in the volume of quality coffee by increasing them sustainably throughout the project. Data from Chart No. 33 show that the cup damage had a 14.5 rating in the 2013-2014 harvest, and it was reduced to 5.8 in the 2015-2016 harvest. Increase in the exportable quality stands out – since it has been maintained in a rating between 85.8 and 87.0 points – as well as specialty coffee which from 12.0 in the 2013.2014 harvest doubled to 25.0 in the 2016-2017 harvest.

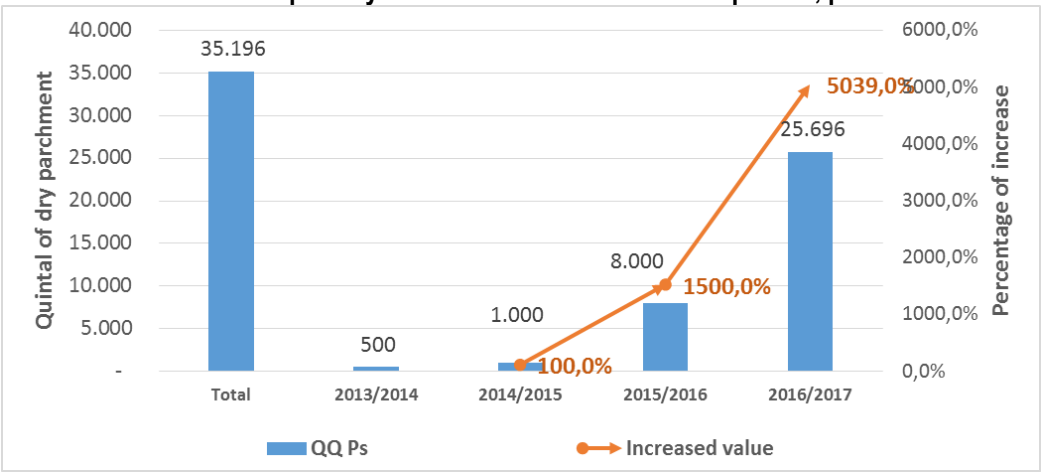
Chart No. 37 Commercialized coffee quality with exporters, per harvest



Source: MAS Information System

Data from Chart No. 38 support the increase in quintals of specialty coffee dry parchment shown by exporters linked to the MAS Project in each harvest. Specialty or differentiated coffee – due to the cup quality in case of the project – are coffees with exceptional attributes that are achieved due to the agro-climatic conditions that nature provides, variety in cropping, the management that the producer gives to it, in the field, in the harvest, and in the wet mill. It is worth observing that in the 2013-2014 harvest, only 500 quintals of dry parchment of specialty coffee were commercialized. This volume increased significantly in the 2016-2017 harvest by counting 25,696 quintals, making a total of 35,196 quintals of specialty coffee dry parchment in all four harvests by exporter companies. As a result, it benefited more than 322 producers who were awarded for having cupping ratings of 84 points and up, with prices and awards that go from HND 200.00 or US$ 8.43 to HND 1,600 or US$67.50 per quintal.

Chart No. 38 Specialty coffee commercialized with exporters, per harvest



Source: MAS Information System

E. Coffee quality becomes an incentive

In order to achieve stand out and award coffee quality – as a factor of sustainability for the smallholder coffee producer – the MAS Project developed along with its team of cuppers a training program on the quality of coffee achieving the participation of 8,286 producers during its implementation. Simultaneously, it developed an innovative experience, the Basic Cupping Knowledge School "ECOBCAFE", from which 84 youth were graduated between the ages of 18 and 30, associated to the producer organizations. Of those, at least 5 young women were hired by formal companies working in coffee buying.

Table No. 60 Producers trained in coffee quality control and youth graduated in tasting

	2014	2015	2016	Total
Producers trained in quality control	1,547	1,950	4,789	8,286
Cuppers graduated from ESCOBCAFE	26	16	42	84

Source: MAS Information System.

Knowledge of the coffee quality produced.

The subjects of the study were consulted in the final evaluation on whether they had received training on coffee quality; 86% of MAS producers confirmed having participated, while only 15% of the control producers participated.

Coffee quality measurement involves a tasting process made by staff trained by the Project. When producers were asked if their coffee had been cupped, 46% of MAS producers answered yes. On the other hand, from control producers only 4.0% of them did.

Out of the producers who tasted their coffee, the ones that knew the quality of coffee they produced, from a total of 219 MAS producers, 68% said they knew, but 32% said they did not know. On the other hand, of the 18 control producers, 56% said they knew about their coffee quality.

Of the total of MAS producers who said they cupped their coffee (219), 3.0% of them said that their score fell in the category of Central Standard, 22.0% expressed their rating was High Grown. On the third level, we find 26% of producers who knew their coffee rating. This category includes the greatest amount of producers. In the rating for gourmet coffee or specialty coffee, 13% of project beneficiary producers confirmed.

In regards to control producers, from a total of 18 producers who cupped their coffee, 6.0% had a rating for Central Standard coffee, 17.0% said their rating was High Grown, and the same percentage for Strictly High Grown. The rating for gourmet or specialty coffee was only found in 6.0% (N=18) of the producers.

Table No. 61 Percentage of producers and coffee sale price for cupping rating

Cupping rating	P. MAS (N = 219)		CONTROL (N = 18)	
	Percentage	Price ($/Qq)	Percentage	Price ($/Qq)
Central Standard	3.0	55.1	6.0	49.6
High Grown (HG)	22.0	61.7	17.0	55.5
Strictly High Grown (SHG)	26.0	68.5	17.0	73.0
Gourmet / Specialty	13.0	65.6	6.0	95.9
NS/NR	37.0	73.3	56	55.7

Source: MASP Final Evaluation August 2012 to March 2017

There are great differences between both groups of producers who know: the quality of produced coffee, which coffee makes an important difference, which coffee is consequence of technical assistance that the project gave to the assisted population through their own cuppers as well the ones from the export companies. Coffee quality ratings fall within the High Grown and Strictly High Grown categories and then the Gourmet or specialty coffee. This behavior tells us that there is progress in terms of quality coffee production.

9.3.2 Impact in Coffee Chain

9.3.2.1 Market condition

One strategy from the MAS Project was strengthening the negotiation capacity of coffee chain producers with the different buying agents. Usually, producers see their incomes affected depending on the agent with which they make their sales transactions. In global terms, producers obtained different income for their commercialized coffee. By linking to intermediaries they obtained less income (US$1,986.4) per sale volume (US$ / TM dry parchment coffee). Instead, their income was greater when the producer commercialized through the Exporter (US$2,702.4), and PO (US$ 2,996.0). Data suggests that 53% of MAS farmers sold to exporters. From these, 57% stated that they sold more coffee to exporters compared to the previous harvest.

Table No. 62 Average sale value per buying agent

Market Agent	Average sale value in US$ / TM
Intermediary	1,986.4
Exporter	2,702.4
PO	2,996.0

Source: Prepared by ANED Consultores – Sigil Consulting Consortium MAS Project Final Evaluation, 2017.

Variance Analysis shows significant differences between “Exporter vs. Intermediary” and “Organization vs. Intermediary”, but not significant difference between “Organization vs. Exporter”. The strategy of linking the coffee producer with higher links in the chain, allows having greater income than when it is done with an intermediary.

Table No. 63 Significance of the value of sales according to coffee buying agents

Market agent	Significant Difference
Exporter vs. Intermediary	**Yes**
PO vs. Intermediary	**Yes**
PO vs. Exporter	No

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, MAS Project Final Evaluation, 2017.

The variance analysis made between buying agents from MAS producers with buying agents from the control group show significant differences. The PO strengthened by the Project established significant differences with the “Exporter” and “Intermediary” from the control group. Likewise, the “Exporter “linked to MAS shows significant differences with the “Intermediary” of the control group. This result shows that as buying agents are strengthened in the coffee chain, the value of income improves for producers.

Table No. 64 Significance between coffee buyers from the MAS and control groups. MAS 2017

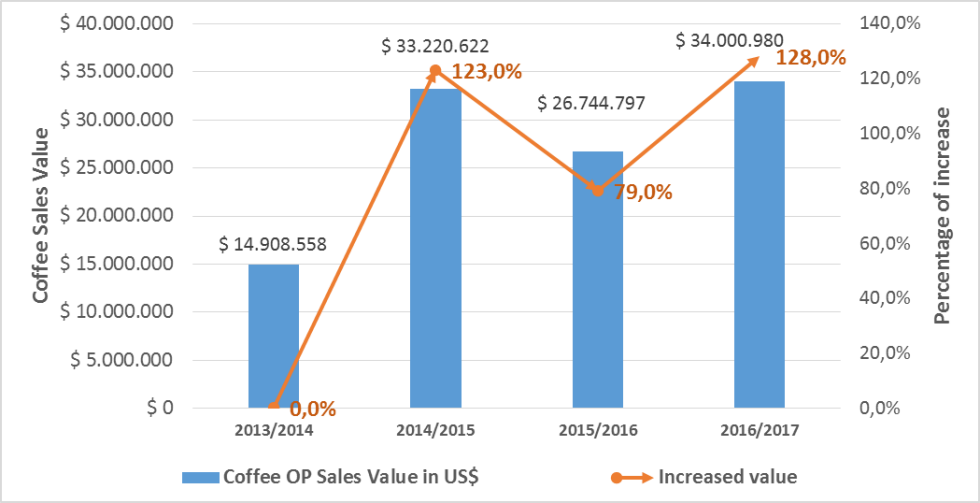
Market agent		Control		
		Exporter	Intermediary	PO
MAS Producers	PO	**Yes**	**Yes**	No
	Intermediary	**Yes**	No	No
	Exporter	No	**Yes**	No

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, MAS Project Final Evaluation, 2017.

9.3.2.2 Increase in sales from MAS Producers

MAS Producers increased their sales significantly. The global target was established at US$13.3 million for coffee, by the end of the period of the Project it increased to US$49.2 million, generating a difference of US$ 35.9 million.

Chart No. 39 Increased value of sales from producers attributed to USDA assistance



Source: MAS Information System.

9.3.2.3 Increase in income of MAS Producers

9.3.2.3.1 Sales income from coffee in producer families

The MAS Project aimed for participant families to increase their average income to US$4,359.10 in coffee production in the 2016-2017 harvest, surpassing efforts from the control group with coffee ($2,191.1), in 98.9%. In regards to income by gender, women expressed an important progress, even if differences persist (in income) between both sexes (Table No. 65). This income increase in favor of producers assisted by the Project is related with the yield improvement and producers' linkage with competitive market – where commercial transactions are made –, whose price determinations were based on product quality. Regarding coffee, they even receive awards, which are real incentives for producers. All of this reached improvement is product of technical assistance provided by MAS, which improved production systems and developed an appropriate strategy for producer insertion into better markets as well as adding crop value. It is considered that this impact will have positive effects in time since income from the two products (coffee and bean) bear severe variations in price and productivity.

Table No. 65 Average income in coffee sale (US$)

Indicator	COFFEE		
	P. MAS(N=470)	CONTROL(N=470)	Difference
Average	**4,359.10**	**2,191.10**	**2,167.90**
Men	4,763.00	2,421.20	2,341.90
Women	2,703.60	1,190.00	1,513.60

Source: MASP Final Evaluation August 2012 to March 2017

9.3.2.3.2Income in coffee sales from producer families according to the department

If the MAS Project achieved important changes in average income of coffee producers in the 2016-2017 harvest, these were more important to the producers from Olancho, Yoro, and El Paraiso. On the other hand, producers from Francisco Morazán (29.6%) and Comayagua (14.9%) were distanced from the control group (Table No. 66). This behavior was originated in the commercialization of the product with exporters, and the market dynamic in producing areas. In addition, those are logical changes as a consequence of the technical assistance introduced through new technologies provided by the Project, and adopted by producers – which by the end of the project, 68% of them used. Activities contributed to transform the way to process coffee for selling. Assisted producers in 24.4% (N=473) sell their coffee in dry parchment, in contrast to the control group from which only 6.5% (N=484) did.

Table No. 66 Average income of MAS families and control families, coffee harvest sale 2016-2017

Total	Average income (US $ / family)		Di. (%)
	MAS	Control	
Comayagua	4,103.60	3,491.70	14.9
El Paraíso	4,174.30	2,046.70	51.0
Francisco Morazán	4,209.50	2,965.50	29.6
Olancho	4,914.20	945.8	80.8
Yoro	4,455.80	1,742.60	60.9
Total	**4,359.10**	**2,128.30**	**51.2**

Source: MASP Final Evaluation August 2012 to March 2017

Note in the following charts, the change made by coffee producers from Francisco Morazán with support from the Project, where 50% sell coffee in dry parchment, while in the control group only 24% did. This change was also made by producers assisted by the department of El Paraiso (23%) versus the control group (3%).

9.3.2.3.3Impact analysis in coffee sales income

In terms of income, results from the final, mid-term, and control surveys are compared. The result from the Final Evaluation was an average income per producer of US$ 4,359.00, which, is 2 times greater than the control group income (See Table No. 68). This result is due to an increase in yield that was able to endure international price drops (they dropped by 70% between the period of 2013 and 2016). Additionally, it is also due to the quality that produced greater added value and strengthening of the PO. And, the relationship between these as well as producers with exporters through a greater capacity of negotiation in terms of commercialized volumes, and product prices.

Table No. 67 Impact of the MAS Project in income from the coffee chain

Indicator	MTE	Final Evaluation		Significant differences (p<0.5)		
				MTE – Control	MTE – MAS	Control - MAS
		Control	MAS			
Income (US$)	**4,825.6**	**2,191.1**	**4,359.0**	**No**	**Yes**	**Yes**

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, MAS Final Evaluation 2017.
Note: 95% level of confidence.

The impact of the Project was analyzed from the income during the 2016-2017 harvest; in terms of their response to the levels of good practices adoption which were promoted. They also received a response from the control group. Using a variance analysis (two-way ANOVA), significant levels were shown between MAS producers and control producers.

Under mean separation, we can conclude that there is significance between assisted and control producers with a "Very High Adoption" (5) of practices in regards to the producers from the control group with an adoption between 'High' (4), 'Medium' (3), 'Low' (2) and 'Very Low' (1) adoption. On the other hand, those assisted producers that had a 'Medium' (3) and 'Low' (2) adoption showed significant differences only with the control producers that had a 'Very Low' (1) level of adoption. (See Table No. 68)

Table No. 68 Significant difference in income in terms of good practices between MAS and control

Level of adoption		Adoption of practices in control producers				
		5 Very High	4 High	3 Medium	2 Low	1 Very Low
Adoption of practice in MAS Producers	5 Very High	No	**Yes**	**Yes**	**Yes**	**Yes**
	4 High	No	No	No	No	**Yes**
	3 Medium	No	No	No	No	**Yes**
	2 Low	No	No	No	No	No
	1 Very Low	No	No	No	No	No

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, MAS Project Final Evaluation, 2017. **Note**: 95% level of confidence.

9.3.3 Impact in the Bean Chain

9.3.3.1 Income in terms of practice adoption scale

Likewise, the income response was analyzed in terms of the study group and the Level of Practice Adoption, finding that the practice adoption between the different groups **did not result in a significant differences** between the mean of income per sale.

9.3.3.2 Yield in the first cycle in terms to access to credit

Financing is an element that promotes production through resource availability to acquire input, equipment, labor, and any other requirement from crops or the production. When requirements from the crop are supplied, results translate in a greater yield. However, this behavior was not that clear for the coffee crop in the first cycle – since there was only a significant difference between the producers assisted by the Project and the producers from the control group who did not receive credit assistance.

Table No. 69 Yield in bean for the first cycle and its relation with access to credit. MAS 2017

Significant difference in first yield		MAS		Control	
		Received	Did not receive	Received	Did not receive
MAS	**Yes**	No	No	No	**Yes**
	No	No	No	No	No
Control	**Yes**	No	No	No	No
	Yes	No	No	No	No

Source: Prepared by ANED Consultores – Sigil Consulting consortium, MAS Project Final Evaluation, 2017.

9.3.3.3 Yield in bean crops in the first cycle in terms of access to credit

For the second cycle, results of the final evaluation show a similar behavior, i.e., when producers from the control group receive financial assistance they establish a significant difference with the producers from the intervention group that did not receive it. The same happened between the producers form the control group who were assisted with loans and those who did not receive it within the intervention group of beneficiaries.

Table No. 70 Yield in bean crops for the second cycle and its relation with access to credit. MAS 2017

Significant difference in second yield		Intervention		Control	
		Received	Did not receive	Received	Did not receive
Intervention	Yes, received	No	No	No	No
	Not received	No	No	No	No
Control	Yes, received	No	Yes	No	Yes
	Not received	No	No	No	No

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, MAS Project Final Evaluation, 2017.

9.3.3.4 Income per sale according to access to credit

As expected, income is directly related with financing of crop activities. Data from the final investigation show that there is a significant difference between producers from the intervention group who received financial assistance and those who did not. There is also significance between producers from the intervention group who received assistance, and the ones who did not within the control group.

Table No. 71 Income in beans, and its relation with access to credit. MAS 2017

Significant difference in income for sale		Intervention		Control	
		Yes, received	No, did not receive	Yes, received	No, did not receive
Intervention	Yes	No	Yes	No	Yes
	No	No	No	No	No
Control	Yes	No	No	No	No
	No	No	No	No	No

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, MAS Project Final Evaluation, 2017.

Conclusion on the impact in the bean chain

In regards to bean crops, results from the final evaluation of the project provide clear evidence that the MAS Project achieved a significant impact in yield, income, and adoption of good practices for the bean chain. This conclusion provides enough evidence of a successful project implementation.

Project impact in terms of crop yield is measured by achieving an average yield of 20.4 quintals per hectare, surpassing in 9.0 quintals for the ones obtained in the mid-term evaluation (11.4 qq/Ha). This difference is statistically significant at a level of confidence of 95%.

In terms of income, the final evaluation expressed an average income per producer of US$1,365.9 making a difference of US$472.8 in regards to what is generated by the control group, US$893.1, which were different statistically.

Likewise, in the adoption of techniques and technologies, the final evaluation shows significant evidence between beneficiaries and non-beneficiaries; achieving an average level of adoption in techniques and technologies of 0.82 for project producers, and 0.78 in producers from the control group.

9.4 Impact on Jobs

9.4.1 Jobs strengthened by the Project

One of the main strategies in income generation for families from the poorest territories of the country is the migration to coffee growing areas. These people get jobs in these places and obtain income that guarantees food security and strengthens their livelihoods. That is the extent of how strategic coffee growing is for the country. More than "120,000 families grow coffee and generate around one million jobs" (MTE 66: 2014). By the end of the Project, it strengthened 25,613 jobs, which surpassed what was recorded in the MTE in 2,404 jobs. With these employments, coffee producers generated US$ 28.9 million, based on 260 days a year and US$8 per labor day.

Bean producers improved their production system with the introduction of new technologies; they also improved job opportunities for rural families. Out of 1,305 strengthened jobs identified in the MTE, the project created conditions to strengthen 2,367 jobs – having innovated with seed inoculation, cultural activities, crop fertilization, and production increase which demanded more labor.

Table No. 72 Number of jobs strengthened with the assistance of MAS in 2016-2017. MAS 2017

Sex	COFFEE			BEAN		
	MTE	P.MAS	Difference	MTE	P.MAS	Difference
Strengthened	23,209	25,613	2, 404	1,305	2,367	1,062
Source: MASP final evaluation August 2012 to March 2017						

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, MAS Project Final Evaluation, 2017.

Demand for labor translated into 27.5 million of labor in coffee crops, and 1.4 million in bean crops, which translates into 220 million dollars and 110 million dollars, respectively (Table No. 73). In total, both chains were strengthened with 111,213 jobs which total value is of 231 million dollars.

Table No. 73 Impact of the MAS Project in strengthening jobs in the coffee and bean chains 2012-2017

Years	Coffee			Bean			US$ Coffee + Bean
	Worked Days	Total Jobs	US$ Total	Worked Days	Total Jobs	US $ Total	
2012/2013	5,498,480	21,148	43,987,840				43,987,840
2013/2014	3,655,080	14,058	29,240,640				29,240,640
2014/2015	4,658,680	17,918	37,269,440	349,440	29,240,640	2,795,520	40,064,960
2015/2016	6,442,540	24,779	51,540,320	272,480	40,064,960	2,179,840	53,720,160
2016/2017	7,284,420	28,017	58,275,360	754,260	53,720,160	6,034,080	64,309,440
Total	**27,539,200**	**105,920**	**220,313,600**	**1,376,180**	**64,309,440**	**11,009,440**	**231,323,040**

Source: MASP Final Evaluation August 2012 to March 2017.

The result of the MAS Project in strengthening employment shows the benefits of technological innovation in the transformation of coffee and bean chains, and highlights its strategic contribution to income generation of rural families. It is a result that offers a view of the valuable contributions that an appropriate intervention has, in looking for responses to the economic and productive needs of the strategic cropping systems of producer families.

9.4.2 Job generation attributed to the Project

The MAS Project proposed having an impact in employment, in order to contribute to the improvement of the rural area population occupations. Based on the target established, coffee crops generated at least 2,404 jobs, with a difference of 1,104 jobs, which surpass the target in 84.9 percentage points.

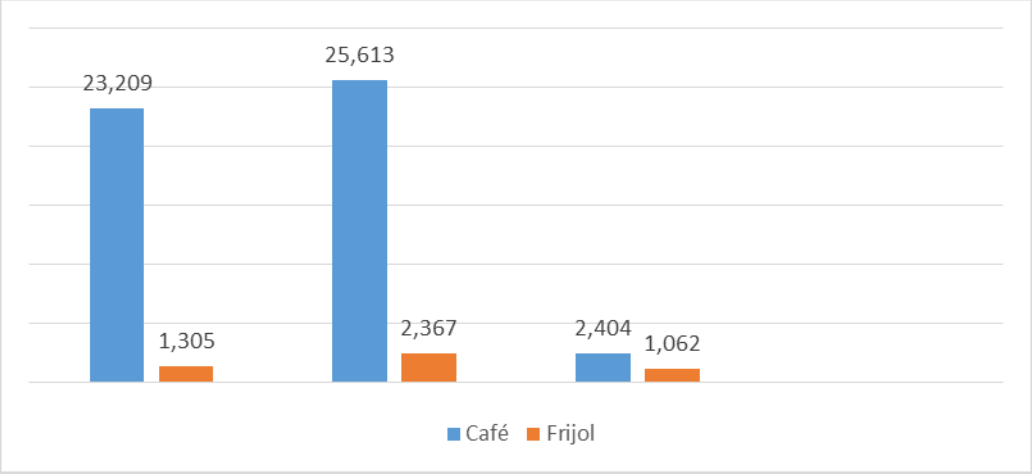
Table No. 74 Number of jobs attributed by the MAS Project, 2017

Crop	MTE	E. FINAL
	2013 – 2014	2016 - 2017
Coffee	1,300	2,404
Bean	313	1062

Source: Prepared by ANED Consultores – Sigil Consulting Consortium, MAS Project Final Evaluation, 2017

In regards to coffee crops, its characteristic is that it creates jobs in a limited way; however, due to the job situation in rural areas, it is always an important activity from an occupational point of view. According to the results, 1062 jobs are attributed to the Project. At the end of the period, the project managed to generate 3,466 (2404 + 1062} attributions, derived from coffee and beans.

Chart No. 40 Jobs created by the MAS Project in the coffee and bean chain



Source: Prepared by ANED Consultores – Sigil Consulting Consortium, 2017 – MAS Project Final Evaluation

Results obtained by the Project in terms of jobs created and strengthened justify the investment made to transform the capacities of producers, and productivity of their cropping system.

X. CONCLUSIONS AND RECOMMENDATIONS

10.1. CONCLUSIONS

10.1.1. Generals

- Project implementation was strongly affected by external factors: i) the coffee leaf rust attack between 2012 and 2013, which reduced the exportable production in 24% (HCB: 2016) and ii) drought from 2012 to 2015. These external factors were not considered in the project design.

- Likewise, MAS Project implementation was affected by security issues, which caused the implementation team to change or abandon communities initially considered as part of the project (MAS Project Director). This factor put technical assistance and results at risk, and created gaps due to adjustments of territories and beneficiaries.

- The project faced a great challenge from the point of view of impact measurement of its intervention since the baseline results were nor consistent with reality. This gap had to be bridged by using data available in the Mid-term Evaluation (MTE).

- Entrepreneurship development of rural youth and women is still at an early stage.

10.1.2. Coverage

- The program covered 31% of the municipalities nationwide and assisted 15.7% of producers. In the department of Comayagua, coverage reached 38% of municipalities. In Francisco Morazán coverage reached only 12% of producers. This means that the project should have made an adjustment in its coverage to assist a greater percentage of producers per department and thus diminish technical assistance dispersion. Each community trainer assisted over 130 producers. In this regard, two strategies could be implemented: 1) increase the number of community trainers to decrease the workload or 2) organize producers in such a way that the population is concentrated in fewer municipalities.

10.1.3. Monitoring and Evaluation

- The selection of bean beneficiaries met 97% of the criteria defined by the donor (USDA) and 76% for coffee producers.

- The Project has a strong monitoring system, which tracked the progress of the interventions. However, during the project planning stage a more in-depth analysis is needed to define the project targets. In the case of MAS, it was observed that the targets were possibly underestimated since they were easily surpassed by the implementation.

- The project conducted a baseline, however, the MAS project staff concluded that the baseline was not as reliable as the data collected during the mid-term evaluation. In collaboration with the Evaluation team, it was decided to use the mid-term data sets in substitution for the baseline.

10.1.4. Project design and strategies

- The Project results in coffee showed that the crop was tended to by 30% of household members while the bean value chain was tended to by 23% of household members. This was consistent with

the low percentages of migration, 15% in coffee and 16% in beans. Data from the final evaluation suggested that 49% of family members of the MAS producers emigrated abroad, while in the CG, it was observed that 63% of household members emigrated.

- The Project developed activities aimed towards the sustainability of interventions. In coffee, MAS organized and strengthened the producer organizations (PO), trained local talent to deliver technical assistance, strengthened POs for commercialization and built partnerships for commercialization and facilitation of credit. In the bean chain, alliances with IHMA and FUNDER in the commercialization of grains promoted processes for sustainability. Local economic capital was strengthened in a cross-cutting way with the formation and strengthening of savings groups and trust funds within credit institutions, like the José Maria Covelo Foundation and FUNDER.

- In response to climate change, 64% of project beneficiaries implement good practices on soil and water management, use of organic fertilizer, shade management, disease and pest control, and tissue management, which contributed to decreasing greenhouse gas effects. In comparison, only 47% of the CG producers contributed to decreasing these effects on the environment.

10.1.5. Commercialization

- The commercialization strategy of early payments for bean producers, through the partnership with FUNDER and IHMA, is an excellent mechanism to encourage production.

- IHMA has low capacity to absorb volumes of over 30,000 quintals of bean. In addition, it operates under a price control system.

- Quality improvement for the production of bean and coffee was achieved through the organization and strengthening of 233 producer organizations that obtained US$ 381,000 from strategic partners like TechnoServe, Covelo Foundation and Molinos de Honduras, for investments in infrastructure. In addition, quality improvement strengthened commercial transactions through agreements, facilitated the creation of sixteen (16) public private alliances, which mobilized US$ 8.6 million for technical assistance, community banks and seed production, training in good agriculture practices, access to credit, commercialization and local financial capital. These achievements allowed access to markets, better prices and commercial agreements for trustworthy relationships in the future that would allow planning production and granting guarantees for loan management.

10.1.6. Techniques and technologies

- In the coffee chain, an average of 65% of MAS producers adopted techniques and technologies, in comparison with 52% of the CG producers. In the bean chain, the adoption was 64% of the beneficiaries against 50% of the CG. This result reflects a transformation in the production systems and management of the chains in a more aware and sustainable way.

- The Final Evaluation found that 63% of MAS producers adopted 6 or more good agricultural practices, in comparison with 32% of the CG. Even though it is common for coffee producers to implement come practices, we can conclude that MAS has achieved transforming the traditional coffee farm to a more modern one, though tissue, soil and water management, the use of organic fertilizer and improved administrative and accounting record-keeping.

- The fact that 56% of MAS producers in bean adopted 6 or more techniques and technologies in contrast with 10% of the CG explains the improvement in producers' profitability arising from the innovation and use of new technologies associated with fertilization, the use of inoculants and improved and certified seed.

- For future interventions, it is recommended that projects continue with innovations and new technologies that may cause important changes in the production systems, the environment and the livelihoods of producers and their families. Transforming a traditional farm into a modern one must include the introduction of three technologies: tissue management, soil and water management and the use of organic fertilizer, which create resilience in response to climate change. In the bean chain, efficiency and profitability depend on the use of three technologies: fertilizers, inoculants and certified or improved seed.

10.1.7. Natural Resource Management

- It was observed that both coffee and bean producers conducted practices for the conservation of flora and fauna (93% of coffee producers conducted shade management, 48% of coffee and 79% of bean implemented soil and water management). Managing natural resources contributes to production quality and climate change adaptation. In the case of production, the natural resource management practices established differences between the people who adopt them and those who do not. In coffee, the average yield was 46.6 Qq/Ha PH for those who adopted, in comparison to the 30.6 Qq/Ha PH for the CG producers that did not adopt any good practices.

- Implementing good practices in management disease (70% coffee and 73% bean) and pests (76% coffee and 82% bean) with organic input and cultural practices contributes to decreasing pollution from water sources and improving coffee and bean quality.

10.1.8. Productivity and profitability

10.1.8.1.Yield

- FE data shows that the MAS Project helped coffee and bean producers to improve their yields. In coffee, assisted producers obtained an average of 47 Qq/Ha PH, in comparison to the 32 Qq/Ha PH from the CG. Productive yields increased by 55% in regards to the baseline (30.4 Qq PH/ha). In beans, in the first harvest cycle, MAS beneficiaries achieved yields of 20.7 Qq/Ha in comparison to the 17.9 Qq/Ha by the CG. This reflects that producers in MAS showed an 80% increase in their yield in regards to the midterm evaluation. In the second harvest cycle, MAS producers increased their yields by 41.5% relative to the baseline. However, yields from the MAS producers obtained in the second harvest cycle (17.4 Qq/Ha) were similar those achieved by the control group (16.9 Qq/Ha).

- The project's impact on yields was analyzed based on the level of adoption of good practices that were promoted by MAS. Producers who adopted 6 GP or more practices in coffee obtained yields between 46 and 55 Qq/Ha per hectare; in the case of bean, yields surpassed 21 Qq/Ha.

- The difference in yields between MAS producers and the control group was significant in statistical terms. This means that changes in yields for MAS beneficiaries both in coffee and beans can be attributed to the MAS Project

10.1.8.2.Income

- Coffee producing families benefited by MAS had an average income of US$ 4,359, which was twice as much as the family income in the CG. In the bean chain, average income of beneficiaries was US$ 1,366 in comparison to US$ 893 for the CG. These differences were significant in the statistical significance tests. This means that the difference in income among beneficiaries and the control group could be attributed to the MAS intervention.

- When desegregating data by sex, it was observed that in the coffee chain, men obtained 1.8 times more income than women. In the bean chain, men had 1.2 more income than women. A similar situation was observed in the income of producers from the control group. Due to these results, it is recommended that new interventions define or revise a gender policy in terms of the investments and technical assistance that could contribute to decreasing income gaps among sexes.

10.1.8.3.Employment

- In the 2016-2017 harvest, the project strengthened 25,613 jobs and created 2,404 new jobs in the coffee value chain. In the bean chain 2,367 jobs were strengthened. On the other hand, the creation of 1,062 jobs in the bean chain was attributed to the project.

- The result of the MAS project in the strengthening and generation of employment exposes the benefits of technological innovation in the transformation of the coffee and bean chains. It also highlights its strategic contribution to the income opportunities of rural families. It is a result that offers a look at the valuable contributions that a timely intervention has in the search for answers to the economic and productive needs of the strategic farming systems of rural families.

10.1.9. Financial systems

- The organization and strengthening of local financial systems represent an option for access to credit where the formal financial system is not present. At the same time, the local economy becomes more dynamic and creates opportunities to diversify economic activities. The Project transferred over US$380,000 to more than 100 first level agencies (savings groups). Likewise, two second-floor instances (Covelo Foundation and FUNDER) facilitated credit to fund productive activities in the coffee and bean chains, in addition to non-agriculture activities.

- By the end of the project, 25,960 loans (20% delivered to women) were accounted for, surpassing a target of 5, 400 granted loans. The loans were valued at more than US$ 15.5 million, which exceeded the programmed target of US$ 5 million.

- With the 16 established alliances, opportunities were generated for investment in the improvement of the coffee and bean chains. These alliances mobilized US$ 8.6 million (target was $5 million), to capitalize family assets with productive infrastructure and capacities to improve competitiveness.

10.1.10. Human Talent Formation

- Intervention from MAS through a transfer of knowledge from producer to producer was materialized by training 100 community trainers (local leaders) with relationships of trust with the target communities. This strategy contributed to strengthening the capacities of producers in the coffee and bean chains. This human talent formation contributes to the continuity of extension within the assisted communities.

- The acquisition of new knowledge and changes in attitude to adopt new transforming technologies was achieved by strengthening the capacities of more than 9,000 coffee producers (19% women) and over 5,000 bean producers (20% women). Mainly, capacities were strengthened in natural resource management, production systems, adoption of technologies for production infrastructure and post-harvest, and administrative and accounting controls.

10.1.11. Strengthening Producer Organizations

- The creation and strengthening of 233 POs (200 target) facilitates access to markets for the producers through economies of scale and by increasing their negotiation capacity.

- Strengthening the capacities of 135 POs allowed coffee producers to obtain more than 47% of their income through sales to exporters, in comparison with 7% of the CG that sold to exporters. Strengthened capacities of the POs included administrative and entrepreneurial management aspects which enabled the signing of 884 agreements (target 180) between buyers and sellers (694 for coffee and 190 for bean) and direct negotiations between 325 producers and 9 exporter companies.

10.1.12. Gender

- The Project made significant efforts to foster the involvement of women in the different activities, thus promoting the acknowledgment of women's work in the rural area through access to knowledge, technical assistance and linkages to market opportunities.

- The gaps between men and women did not show changes in regards to land ownership, income or investment. An example was the income disaggregated by sex in the coffee chain: men earned 1.8 times more income than women. In the bean chain, men registered 1.2 times more income than women. For future interventions, it is suggested to reorient investment and training in order to achieve: a) more participation from women in investments in productive assets and production and b) a greater supervision and monitoring in resource allocation, by diversifying financial support sources for women (savings groups, micro entrepreneurship opportunities, etc.).

10.1.13. Communication

- Leveraging the means of communication (radio, television, others) facilitated the dissemination of actions promoted by the Project throughout the territory. However, it is necessary to have a communication strategy that will give continuity to information exchange of learning and good practices to guarantee sustainable processes.

10.1.14. Information systems

- Establishing an information system with messages related to crop management, climate and prices had a high acceptance, but companies and institutions that transfer those messages do not have the experience yet to prepare content that can be better leveraged by populations with low levels of education and technological gaps.

- The implementation of the SMS messages was an activity that generated interest among the participants due to how useful they were. However, since this activity was managed by the Project, there is uncertainty in terms of its sustainability after project completion.

10.1.15. Budgetary execution

- Fund leveraged through Trust Fund (TF) to strengthen the coffee chain contributed to the sustainability of the Project.

10.2. RECOMENDATIONS

10.2.1. Generals

- In the future, more rigorous quality controls in the baseline collection processes are recommended, in order to have quality data that could be used in project evaluations.

- For future interventions, it is recommended that TechnoServe keep working with women and youth to promote income generation opportunities. This may contribute to decreasing migration flows.

10.2.2. Monitoring and Evaluation

- A recommendation for future interventions is to conduct adjustments to comply with the selection criteria for the beneficiaries, particularly with respect to the coffee value chain.

- For future interventions, faster decision-making is recommended to establish appropriate lines of comparison in the implementation. It is also recommended to strengthen the process of selecting consultants for the baseline survey, in order to have rigorous databases that can be used in subsequent evaluations.

10.2.3. Project design and strategies

- This data suggest that by strengthening the production systems and increasing productivity and income, incentives could be generated to maintain or grow agricultural crops and therefore, family assets.

- However, once the project is completed, all this human, social and economic capital require integration and institutionalization processes, so that mechanisms are established since the beginning to secure changes or impacts in the producers' living conditions.

- In terms of mitigation, institutionalization with municipal governments and national institutions is recommended in order to promote policies and regulations to apply good practices, for instance: no burning, the use of organic fertilizer, among others.

- For future actions, it is recommended that TechnoServe define an incentive policy and conditions for broad compliance in aspects of women and youth participation and the environment. These interventions must be reflected in annual budgets and operational plans.

10.2.4. Commercialization

- It is recommended to look for strategies to expand coverage in terms of purchase volumes and territories, as well as to increase financial capacity to facilitate resources under this mechanism. It is also suggested to explore the possibility of linking this mechanism to the creation of strategic reserves with communal, municipal, and commonwealth grain banks and to develop business/ entrepreneurial opportunities for women.

10.2.5. Human Talent Formation

- To continue with this training system with community trainers, it is recommended to promote agreements with cooperating agencies that support farmers, such as the National Agricultural University, National Autonomous University of Honduras, the Ministry of Agriculture and Livestock, the University of Zamorano, FHIA, IHCAFE and others.

10.2.6. Gender

- For future interventions, it is recommended to define strategies that would integrate a generational replacement incorporating young men and women into technical and financial education linked with their family assets and livelihoods.

10.2.7. Information systems

- The SMS model is still be considered to be in its initial phase. The number and frequency of messages must be reinforced, motivating the participation of farmers and emphasizing greater participation by youth, women and seniors.

10.2.8. Budgetary execution

- Regulations are required for the administration of trust funds to guarantee sustainability over time in the benefit of the producers.

- Committees established by TechnoServe to continue improving the bean and coffee chains could be strengthened with the identification of institutions that will assume the coordination, leadership and monitoring mechanism after the project ends, to achieve sustainability of the chains.

- In order to guarantee the project's economic and technical sustainability, it is recommended to make an additional effort in a second phase of the project in regard to the following:

    - Consolidate the fund leveraging model with the implementation of a permanent mechanism for its regulation. The creation of a trust fund with a financial institution as the trustee of the revolving fund is recommended to develop a control and transparency mechanism in the use and management of funds contributed by the MAS Project, in line with the MGF agreements. This will guarantee for resources to continue growing and reaching producers through time.

    - Another recommendation is to identify and strengthen institutions to coordinate the committees to assume leadership and maintain the funds available for the bean and coffee value chains after TechnoServe closes the project. In addition, such committees must establish a post-project monitoring mechanism for the preparation of follow-up reports.

XI. ANNEXES