

# Cocoa from peasant and indigenous families – A way to fight climate change

Producer organization: Federation of Agro-ecological Producers and Collectors of Cocoa, Cochabamba (FEDPRACAO CBBA)



Bolivia - Climate Resilience Case Study No. 1

Rogers Mendoza Aro, 2020



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Cover photo: Young engineer from the Indigenous University UNIBOL QUECHUA, member of the Squad doing grafting to recover unproductive cocoa plants - Photo: FAO, 2020.

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## EXECUTIVE SUMMARY

Bolivia has more than 50 million hectares of forest, the vast majority of which is in the Amazon region, which covers 43% of Bolivia's territory. Logging and uncontrolled fires are degrading large areas of the remaining forest. Furthermore, more than 80% of deforestation and logging is illegal. Deforestation is responsible for about 90% of national CO<sub>2</sub> emissions, according to the National Fund for Forestry Development (FONABOSQUE), with data from 2017.

Added to this scenario are fires in the Chiquitania of the Bolivian Amazon in 2019, which were among the most devastating disasters recorded in Bolivia. As a result of these fires, the protected areas of San Matías, Otuquis, Ñembi Guasu and Tucabaca suffered terribly reaching peak destruction in August 2019. The fires also devastated a significant amount of wildlife. According to the Chiquitano Forest Conservation Foundation, more than 1,200 species of animals live in this region; the fires destroyed 3.62 million hectares of forest and pastureland between August and October 2019, according to media reports.

The Tropic of Cochabamba is one of the regions most affected by deforestation and land use change, reporting 85% of the disappearance of its forest reserves, according to the Institute of Advanced Development Studies (INESAD) in 2017. In this region, agroforestry systems with cocoa have gained strength in recent years, as coca producers have turned to this crop for its qualities and management characteristics that allow for diversified production in the short, medium and long term, associated with annual, biannual and perennial crops. Cocoa production in this region is promoted since 2004 and led since 2016 by the Departmental Federation of Agro-ecological Producers and Collectors of Cocoa Cochabamba (FEDPRACAO CBBA).

FEDPRACAO CBBA. has developed a Climate Resilience Plan with cocoa for adaptation and mitigation of the effects of climate change. It contains plans to establish 300 hectares (ha) of cocoa in Agroforestry Systems (AFS) and rehabilitate more than 300 ha of unproductive plots until 2024.

A series of trainings and technology transfer activities have been arranged for smallholder producers, indigenous people, women, and young people. They have covered topics such as integrated management of cocoa, ecological management of production and an introduction to climate change. These actions have been strengthened by 'exchanges of experience' between organizations of smallholder and indigenous producers, public and private entities, to reflect innovation in production, research, marketing, industrialization, and organizational strengthening in the cocoa sector.

Additionally, under the Climate Resilience Plan, 25 hectares of unproductive cocoa plots were rehabilitated through grafting techniques, an activity carried out by a team of young people from the Bolivian Indigenous Quechua University "Casimiro Huanca" (UNIBOL Quechua), called Escuadrilla, with the aim of generating technical services from FEDPRACAO CBBA. to its associates. Additionally, there are 30 hectares of forest species in cocoa plots, with the technical and financial support of the United Nations Food and Agriculture Organization (FAO).

For their part, the indigenous communities of the Yuracare TCO have promoted wild cacao from their communities to the national market and in this way improve the economic income of the producing families.

# 1. INTRODUCTION

## 1.1 NAME AND VISION

The name of the Forest and Farm Producer Organization discussed in this case study is the 'Federación Departamental de Productores y Recolectores Agroecológicos de Cacao Cochabamba' (FEDPRACAO CBBA). Its vision is to be a representative organization of cocoa producers at a departmental level, in harmony with the environment, with inclusion and gender equity, focused on different areas of the national and international market, providing support in training, technical assistance, organizational strengthening and ecological production. FEDPRACAO CBBA is one of five Departmental Federations of Agro-ecological Cocoa Producers and Collectors in Bolivia (La Paz, Beni, Santa Cruz, Pando, and Cochabamba). All those five department federations have been federated as members of COPRACAO BOLIVIA.

## 1.2 LOCATION

FEDPRACAO CBBA is in the Tropic of Cochabamba, in the North-East of the Department of Cochabamba. It borders the department of Beni to the north; the areas of Cono Sur and Valle Central to the south; the areas of Valle Central and Valle Andina to the west; and the department of Santa Cruz to the east. Its members live from 200 to 240 meters above sea level, and belong to the municipalities of Villa Tunari, Shinahota, Chimoré, Puerto Villarroel and Entre Ríos. Federation members livelihoods are mainly based on the cultivation of cocoa in agroforestry systems, but they also sell associated forest species such as tejeyeque, almond, crespito and cerebo; and non-timber crops such as rice, yucca, avocado, pacay and banana.

## 1.3 FOUNDATION AND MEMBERS

According to Valerio Cruz Gutiérrez, President of FEDPRACAO CBBA the organization was founded on March 26, 2016. It is formally registered with legal personality and has five member associations who were themselves founded since 2001:

1. Asociación de Productores Agroecológicos del Margen Centro (APAMAC), from the municipality of Villa Tunari.
2. Association of Integral Agroforestry Producers of the Municipality of Shinahota (APAIMS), of the municipality of Shinahota.
3. Association of Jatun Mayu Tacuaral Cocoa Producers (JATUN MAYU), of the municipality of Chimoré.
4. Union of Organizations of Cocoa Producers of the Tropic of Cochabamba - CHOCOLATE TROPICAL; and,
5. Association of Collectors of Wild Cocoa Yuracare (ARCASY) located in the Community Territory of Origin Yuracare, in the municipalities of Chimoré and Villa Tunari.

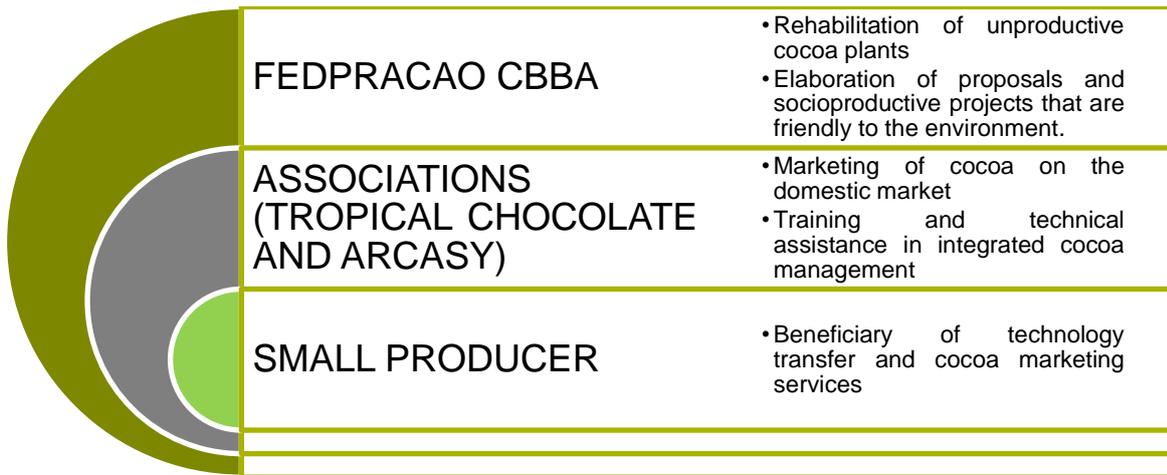
There is a total of 560 families who belong to these associations, made up of smallholders, indigenous people, women, and young people.

## 1.4 BUSINESS PROPOSAL

FEDPRACAO CBBA. develops rehabilitation services of unproductive cocoa plants through grafting to increase productivity volumes. However, in the long term, it is considering offering further services including a nursery to produce quality cocoa plants for the associates.

The Federation also offers support for the Development and management of proposals and projects related to agroforestry systems with cocoa. In general, its services are developed in coordination with its associations using the following modality:

**Figure 1. Relationship between FEDPRACAO CBBA and its members**



Source: FEDPRACAO CBBA 2019.

Cocoa marketing (in the national market) is another service offered, in this case by the association CHOCOLATE TROPICAL, the operational arm of FEDPRACAO CBBA. CHOCOLATE TROPICAL is responsible for collecting cocoa raw material under strict quality controls from a Collection Centre. In addition, ARCASY oversees collecting wild cocoa from the indigenous communities of the Yuracare TCO for national marketing.

In addition to the marketing activities of these associations, training and technical assistance are provided in the integrated management of cocoa (hybrid and wild) and in the agronomic management and post-harvest storage of cocoa, to increase productivity volumes with quality. These activities fall under the broader Bolivian principles of respect for Mother Earth and resilience to climate change.

According to Rogers Mendoza, Coordinator of FEDPRACAO CBBA, each one of the aforementioned services is facilitated and offered to the member associations, composed of small producers (peasants, indigenous people, women and young people) of cocoa from the Cochabamba Tropics region.

### 1.5 MARKET CONTEXT

The association CHOCOLATE TROPICAL has consolidated itself as the hybrid cocoa marketing arm of the Federation. It has a regional collection centre and its aggregated product from Cochabamba has been recognized as ‘fine and aromatic cocoa’ in the 1st Bolivian Cocoa and Chocolate Salon 2019. That event was organized by the National Coordination Committee of Bolivian Cocoa, with samples sent for evaluation to the Paris Chocolate Salon, France, 2019. The product also has a national market. The company Chocolates La Paz, acquires about 25 MT of cocoa per year, which generates approximately USD \$60,000 of gross profit. The company INCONA SRL. of Cochabamba is another market option.

According to information from Edward Quiroz, ARCASY’s support technician, the associations have been developing the quality of the beans since 2016 to meet export regulations and standards of the chocolate industry. In 2019, ARCASY managed to collect approximately 15 MT of cocoa from the indigenous communities of the Yuracare TCO, generating a gross profit of USD \$79,650. This image of bean quality, built and recognized by the companies, has generated economic interest. For example, the Breick chocolate industry has negotiated a deal directly benefiting 130 cocoa picking families. But in addition, there are wild cocoa traders who offer their products to other companies or chocolate industries. Both hybrid and wild cocoa have been positioned on the national market, with national prices for hybrid cocoa around USD \$3,500 per MT and wild cocoa around USD \$5,000 per MT, which is above the New York Stock Exchange price of USD \$2,337 per MT, according to data from the International Cocoa Organization (ICCO) for 2020.

One of FEDPRACAO CBBA’s main competitors is the Central de Cooperativas El Ceibo, which belongs to the Federacion Departamental de Productores y Recolectores Agroecologicos de Cacao de La Paz

(FEDPRACAO LA PAZ). The El Ceibo cooperative is one of the largest cocoa agro-industries in Bolivia, collecting about 1,420 MT/year of dry cocoa, which represents 70% of the country's production, according to data from the Ministry of Rural Development and Lands (MDRyT) in 2019.

Through careful negotiation, it has been possible to develop with El Ceibo an inter-institutional agreement involving a political partnership since 2009, to the benefit of the small producers and collectors of cocoa. The purpose of the agreement was to establish a national: Confederation of Agro-ecological Producers and Collectors of Cocoa of Bolivia - COPRACAO BOLIVIA. In addition, as a Federation, FEDPRACAO CBBA have been able to get closer to El Ceibo to generate strategies through exchanges of experiences that have helped to consolidate their own long-term commercialization plans.

## 2. THE NATURE OF THE THREAT OF CLIMATE CHANGE

### 2.1 PERCEIVED CLIMATE CHANGE THREATS

One of the more obvious climate change effects and one of the main concerns of Federation partners is the increase in rainfall in the region, between January and March. This has caused flooding affecting all production, plants, and part of the agricultural land, reducing the productive size of the plots. According to the Government of Cochabamba, with data up to 2014, in the last 30 years one of the areas with the highest rainfall in the country is the Cochabamba valley, where the average value is 4,250 mm per year. In the Yuracare TCO, where wild cocoa is produced, annual flooding has begun to affect their homes for days and weeks, bringing disease and cutting off communication roads, according to cocoa collector Marcial Martínez.

Another threat is unusually intense dry seasons causing forest fires. This is linked to fluctuations in temperature between high and low and in times when they are not expected. High temperatures have increased over the past 25 years, especially in August, September, and October, causing streams and rivers to dry up temporarily. The average environmental temperature over the Cochabamba Tropics region is between 24°C and 43°C from August to October, according to data from the 2014 Cochabamba Governor's Office. During that hot dry period, there is no fresh water in many communities where cocoa is produced. In 2014, a voracious forest fire caused by uncontrolled land clearing swept away more than 500 hectares of forest and productive areas in the municipality of Chimoré, in the 8th and 10th districts. It affected coca, citrus, cocoa, pineapple, grassland, and bush plots.

### 2.2 IMPACT ON FOREST AND AGRICULTURAL RESOURCES

"Flooding affects the cocoa, avocado and forest plants. The leaves turn yellow and fall off, then the whole trunk dries out, sometimes the bushes are even carried away by the flooding. In some places the water is up to a meter high and affects the small cocoa pods, it blackens them and all the flowers spill, in addition there is a proliferation of diseases," says one cocoa producer, Ramos.

High rainfall has also led to floral abortion of cocoa, i.e. the floral cushions have fallen away, and flooding has led to a higher incidence of fungal diseases affecting cocoa and other crops. If this is high, above 85% during the rainy and cold periods, it favours the incidence of fungal diseases, such as black pod (*Phytophthora sp.*) and moniliasis (*Moniliophthora roreri*) (Procacaho, 2015).

According to data from the Colombian Agricultural Research Corporation (CORPOICA), rainfall suitable for cocoa cultivation should be between 1,173 and 3,000 mm/year. But in recent years in dry areas there has been a water deficit, and this has caused physiological problems with flowering and fruit development. The high temperatures have affected the different agricultural crops that are associated, in the case of cocoa has generated loss of leaves, which directly affects the physiological metabolism of the plant and the yield, due to water stress or lack of water availability. It also causes blackening of the fruits and the entry of fungal diseases.

The temperature for cocoa cultivation can range from 20 to 30°C, with 25°C being the optimum and 15°C the minimum average annual temperature. Temperature also influences the vegetative development, flowering, and fruiting of the cocoa crop, as well as the ripening process. In the hot months, the fruits mature between 140 and 175 days, while in low temperatures they take between 165 and 205 days, according to FAO (2010).

Unusually low temperatures have also been a problem. These paralyze the vegetative development of cocoa and other crops such as cassava, bananas, pineapples and pacay, because tropical crops cannot develop their physiological activity below 15 ° C. Under these conditions, the physiological ripening time lasts for more than five months, when the usual time is between 4 and 5 months. In 2010 for example, low temperatures caused a loss of 80% of cocoa production, outside that even the plant in 60% of the main branches were burned or necrotic, affecting the production of the next year.

## 2.3 IMPACT ON BUSINESS AND FINANCE

Climate change affects the association and the producers in every way. If climate change affects production, there is less harvesting, and the producers will have less income. The association is also affected, as its production projections are not going to be realized - it is a chain of events. For example, a daily newspaper in Cochabamba reported on January 13, 2019 that the municipalities of Puerto Villarroel, Villa Tunari, Chimoré, Shinahota and Entre Ríos, all in the Tropic of Cochabamba, were declared disaster areas. The Climate Change, Risks and Natural Disasters Unit reported then that there were 7,538 families affected and at least 5,438 hectares of crops lost (banana, plantain, papaya, pineapple, rice, citrus, cassava, passion fruit, coca, and cocoa). There were also reports of 356 homes flooded by the rains and overflowing rivers.

There are also knock-on effects to other sources of potential income generation for members of these cocoa federations. For example, Abel Laira G. is the owner of the "QUIGUE" Sawmill Company, which in Yuqui dialect means Honey. It extracts forest wood in the Yuquiciri TCO, from the different communities involved in cocoa production, and is also installed in the municipality of Chimoré. According to the owner, the floods due to the high rainfall in the region do not allow him to operate his machinery normally to extract forest species such as almond and verdolago, nor precious tropical hard wood, nor 'Ocho', soft wood for formwork. Normal activities begin in April, with the opening and graveling of roads to move and transit, but this has been delayed by the high rainfall. In May, the company carries out the felling and extraction of the wood, until October. Because of climate change, the company has to construct the road every year, often waiting for the rains to stop even in June or other months when the harvesting is done, so it has to invest more in the operating costs of machinery and personnel (fuel and food), reducing its usefulness, among other consequences, such as hiring fewer personnel for the operations.

## 2.4 IMPACT ON VULNERABLE GROUPS

The concerns of vulnerable groups regarding climate change have been solicited and then included in two main documents of FEDPRACAO CBBA. The first document is the Climate Resilience Plan 2020-2024 of FEDPRACAO CBBA. The plan was supported by the project "Strengthening the productive, social and cultural capacities of the associations of cocoa farmers, indigenous people, women and youth of FEDPRACAO - Cbba, through the restoration of cocoa agroforestry landscapes with climate resilience", financed by the Food and Agriculture Organization of the United Nations (FAO) and the Forest and Farm Facility (FFF). In order to develop this plan, meetings were coordinated to gather information and concerns of the farmers, indigenous people, women and young leaders of the five associations: APAMAC, APAIMS, JATUN MAYU, ASIPASP and CHOCOLATE TROPICAL, with the participation of 9 women and 22 men leaders.

The Climate Resilience Plan (PRC) deals with cocoa AFS in the Tropic of Cochabamba. It reflects strategies of conservation, mitigation, and prevention the generate resilience to climate change. The plans strategic headings include:

- a. Capacity building towards climate resilience,
- b. Climate risk management with cocoa,
- c. Soil management with cocoa,
- d. Innovation and technology uptake for climate change adaptation with cocoa.

In addition to this specific plan, the Institutional Strategic Plan (PEI) 2020-2024 of the FEDPRACAO CBBA. was agreed upon, where the concerns of cocoa farmers, indigenous people, women, and young people of the Tropic of Cochabamba were considered to work on strategic actions:

- a. Improvement of Productivity
- b. Organizational Strengthening,
- c. Innovation and Technological Development,
- d. Development of Commercialization,
- e. Agro-industrial Transformation.

The two planning tools aim to strengthen cocoa production:

- The Climate Resilience Plan focuses on the restoration of agroforestry systems with cocoa, which will allow the direct participation of the producer.
- The Institutional Strategic Plan focuses on institutional actions that allow the consolidation of FEDPRACAO Cbba.

The execution of these plans is currently taking place. With the PEI, more than 50 Has. of cocoa will be established in agroforestry systems for the component of productivity improvement. In the technological innovation component, the local selection of elite plants will be developed, as well as the formation of a basic agro-productive cooperative in the component of organizational and commercialization strengthening. All these actions include training within the 2020 management.

## 3. THE BUSINESS AND FINANCIAL MODEL RESPONSE TO IMPROVE CLIMATE RESILIENCE

### 3.1 AGRO-ECOLOGICAL DIVERSIFICATION

Agro-ecological diversification is built into the systems as cocoa, bananas, rice, and forest plants are planted at the same time. To optimize the use of the soil, another method is called "chaqueo" which involves Planting without burning, eliminating weeds and bushes by hand, and leaving the woody species. The cocoa fruits develop more quickly in this context and contain microorganisms that favour their growth.

FEDPRACAO CBBA, under the capacity building element of its Climate Resilience Plan has developed the establishment of agroforestry systems with cocoa, to promote a climate-smart agriculture and thus generate resilience to climate change. It has done this by focusing on diversification as an adaptive strategy to climate threats through two main approaches:

#### a. Land habilitation with controlled burns

Initially the land is weeded, and trees are felled to open alleys that Will subsequently prevent the spread of fire. The crop land is then subsequently burned to plant rice and corn crops. Before the harvest, cocoa and forest species are planted, together with yucca so that this annual crop can generate further income for the producer in the following year. This is accompanied by planting of bananas and pacay (Inga sp.) so that income can be generated in the second and third years of production. Finally, pacay, cocoa, and forest species are cultivated in the third year. The objective is that in a period of 30 to 40 years, cocoa will be one of the crops that generates continuous income, while the long-term forest species (semi-hardwood) will be harvested from 15 to 20 years onwards.

#### b. Land habilitation without burning:

In this approach, a secondary forest of 5 to 7 years is cleared and thinned (i.e. some tree species removed), but without burning. The aim is to achieve 50% shade, so that the cocoa plants can be established, accompanied by pacay and medium- and long-term forest species.

**The AFS include: Rice + Corn + Cassava + Banana + Cocoa + Pacay + Crespito + Almond+timber**

The rehabilitation of land without burning is one of the best practices for the establishment of cocoa in agroforestry systems, since it avoids emission of carbon dioxide, reduces soil erosion, and increases natural biodiversity which gives greater resilience to climate change.

According to 2018 data from The Nature Conservancy Colombia, agroforestry systems with cocoa improve soil conditions, increase biodiversity, and capture carbon, thus increasing productivity. In addition, the system generates income at different times of the year, not only from cocoa but also from other accompanying species – which helps farmers with regular cash flow.

### 3.2 ECONOMIC DIVERSIFICATION

FEDPRACAO CBBA. has developed a Project called "Strengthening the productive, social and cultural capacities of the associations of cocoa producers, peasants, indigenous people, women and youth of FEDPRACAO – CBBA.", which was implemented in 2019 with financing from the FFF for Bs. 278,400 (USD \$ 40,400).- and with a counterpart of Bs.146 .980 (USD \$21,320) financed by the Federation. This allowed the establishment of 30 hectares of forest species in agroforestry systems with cocoa and the rehabilitation of 25 hectares of unproductive cocoa plants through grafting.

As part of its work to improve climate risk management (under the Climate Resilience Plan), the Federation, together with its commercial arm CHOCOLATE TROPICAL, extended a credit guarantee certificate to its members so that the bank could grant producer members an individual credit. In this way the producers increased their production area. The credit granted by the financial entities (bank) not only encouraged the increase of cocoa production, but are also investment into other crops to diversify income generation and build climate Resilience - each according to the needs of the producer, with the purpose of generating greater economic income.

### 3.3 SOCIAL DIVERSIFICATION

FEDPRACAO CBBA. has provided a range of social services, as a departmental organization, to its cocoa producers' associations. These have involved a diversification of support networks for those producers under the innovation and technology uptake part of the Climate Resilience Plan through:

#### a. A training and technology transfer 'cocoa squad'

The participation of local youth was a vital element in the formation of the 'Escuadrilla' – a technology transfer cocoa squad. Young people who are integrated into cocoa production, agreed to contribute their knowledge to increase productivity. The idea was that the cocoa squad would play an important role in the process of technology transfer in cocoa crop management, with emphasis on the process of rehabilitating unproductive plots through grafting. A technical training protocol was developed, working with technology packages from the Central de Cooperativas El Ceibo S.R.L., and the experience of CHOCOLATE TROPICAL.

The initial training of trainers' workshops was 50% theoretical and 50% practical, coordinated with the Mancomunidad de Municipios del Trópico de Cochabamba - MMTC and the Universidad Indígena Intercultural Comunitario Quechua "Casimiro Huanca" (UNIBOL Quechua). The initial trainings were attended by 17 young people (71% men and 29% women), of peasant and indigenous origin from the departments of La Paz, Cochabamba, Oruro, Santa Cruz, and Potosi. At the end of the training, the Cocoa Experts' Squad was formed of 6 youth after a theoretical and practical evaluation.

#### b. Technical services provided by the cocoa squad

The technical services provided by the cocoa squad had the purpose of rehabilitating the unproductive plots through grafting in the field. They were provided as a service for the benefit of the producers of the member associations of the Federation. This is the first time that a cocoa squad has been created, whose achievement is the rehabilitation of cocoa farms that for years did not produce anything. The process has proved highly successful since unproductive plantations yielded 3 qq/Ha, but with the rehabilitation the production level rose to 15 qq/Ha minimum.

The work of the young women of the cocoa squad proved particularly noteworthy, who in the development of cocoa grafts obtained a high percentage of successful grafting due to the precision with which they worked. The rehabilitation of 25 hectares of unproductive cocoa plots was achieved through grafting in more than 33 producing families.

### **c. Experience exchange workshops**

Five workshops have been held to exchange experiences between cocoa producers in different areas and at the regional level. These have included exchange of experience to strengthen the capacities and individual and associative business ventures to understand the main actors involved in cocoa, through the workshop on Gourmet Chocolate (from the bean to the bar) and professional tasting Events. They have also included workshops with the Central de Cooperativas EL CEIBO R.L. in La Paz, with the Cocoa Experimental Station of the Tropical Agronomy Faculty of the Universidad Mayor de San Andrés (UMSA) and with the International Cocoa Research Centre.

The workshops were all targeted 100% at practical improvements, and across the five workshops covered the following topics:

- a. The importance of soil and genetic variability of clones (under the soil management portion of the Climate Resilience Plan)
- b. The importance of pruning (training, health, and maintenance) and diseases,
- c. The importance of grafting, rehabilitation, and performance of elite plants,
- d. Organizational strengthening,
- e. Marketing,
- f. Values and principles of cooperative business,
- g. Technology transfer in agronomic management,
- h. Effects of climate change and its consequences,
- i. Analysis of the dynamics of cocoa agroforestry,
- j. Chocolate making,
- k. Confectionery.
- l. The chain from cocoa harvesting to the chocolate bar.

A total of 96 producers, technicians and students participated (91% men and 9% women), from the municipalities of Villa Tunari, Shinahota, Chimoré, Puerto Villarroel and Entre Ríos, from UNIBOL Quechua and the associations APAIMS, APAMAC, JATUN MAYU and ASIPASP; in addition to the participation of the departments of La Paz, Cochabamba, Santa Cruz and Beni.

The workshop impacts included practical application by cocoa producers, who have improved management through grafting and pruning. Additionally, the quality of cocoa has increased because of good harvest and post-harvest management.

### **d. Development of cocoa varieties**

FEDPRACAO CBBA. is developing the local selection of 15 elite and/or promising cocoa plants in the Tropico de Cochabamba región. This is considered as an important priority for the sector, since it will allow the increase of the yield per hectare, improve tolerance to pests that might increase with climate change, and improve organoleptic characteristics through 2 thesis students from UNIBOL Quechua. In addition, the Federation intends to consolidate a base agro-productive cooperative, which plans to affiliate to the Central of Cooperatives EL CEIBO R.L., to promote agro-industry, marketing, and organizational strengthening.

## **3.4 OTHER RESILIENCE MEASURES**

FEDPRACAO CBBA. has developed training in response to climate change and the need for management of organic cocoa production within the member associations. To reflect the importance of agroforestry systems and environmental conservation, the initiatives were directed at producers, young students of UNIBOL Quechua, with the aim of promoting the importance of environmental care.

### 3.4.1 PARTNERSHIPS

One of the main links that has allowed FEDPRACAO CBBA's production diversification is the FAO-hosted FFF, through the Letter of Agreement "Strengthening the productive capacities of associations to be more resilient in the Cochabamba Tropics region". Another link is the Forestation, Reforestation, and Integrated Forest Management (FORMIBOSQUE) project of the Cochabamba Government, which has made it possible to provide plant material from forest plants to establish approximately 30 hectares in agroforestry systems with cocoa. Additionally, with the Confederation of Agro-ecological Cocoa Producers and Collectors of Bolivia - COPRACAO BOLIVIA, the production chain has been strengthened through the Technical Roundtable of Cocoa to implement the Program for Strengthening Cocoa Production in Bolivia 2020 to 2024.

### 3.4.2 CLIENTS

One of the companies that has been engaged as a client is Industria Chocolatera La Paz (El Alto, La Paz), to which the dry cocoa bean is marketed as a conventional product. The hybrid cocoa is put into the industry in 46kg (1qq) sacks at a cost of Bs.1,100 /qq (USD \$160), under strict quality controls. The wild cocoa is sold to the Breick industry (La Paz), in 46 kg. sacks at a price of Bs. 1,500. -/qq (USD \$217), for its transformation into a finished product for national and international commercialization.

### 3.4.3 COMMERCIAL STRATEGY

The FEDPRACAO Cbba. and associations dedicated to cocoa, such as CHOCOLATE TROPICAL and ARCASY, are responsible for the marketing of cocoa raw material (hybrid and wild). This is how the product is marketed as raw material (dry beans).

The cocoa of the Tropic of Cochabamba is recognized as fine and aromatic cocoa at a national level and contains a high percentage of butter (45%). The price of the product is negotiated with the industry, which is set in relation to domestic market demand and reference prices maintained by El Ceibo R.L., The promotion of cocoa is carried out through social networks (Facebook and Instagram) to obtain other customers. In addition, the federation has participated in business conferences and national and local fairs, but the only point of sale are the offices of Chimoré, where the Federation is located.

After having participated in the 'ALADI's Macro Business Roundtable' in Colombia in 2019, there appear to be no limits in terms of quality or reputation to foreign trade. If the entire Cochabamba region were dedicated to producing this product, the country could compete in the international market, but since production is small, producers must focus on the domestic market. The cocoa market is large globally, for example, there are ready orders of 50 MT every two months – so the federation realises it Will have to work hard to raise the volume of cocoa at the regional level.

## 4. CONCLUSIONS

### 4.1 MAIN CONCLUSIONS

One of the success factors in building Resilience to climate change has been the establishment of cocoa agroforestry systems, which allows the generation of diverse short, medium- and long-term economic income for cocoa producing and harvesting families in the Cochabamba Tropics region. One of the advantages of cocoa agroforestry systems is the recovery and conservation of soils, the development of nutrient cycling, carbon dioxide (CO<sub>2</sub>) fixation and crop diversification, which in turn makes them more resilient to climate change. Improved methods of establishing the agroforestry systems have consolidated agro-ecological Resilience in the face of climate change.

Another advance by FEDPRACAO CBBA. has been the organizational innovation of developing technology transfer services led by a team of young technicians called 'Escuadrilla' – the cocoa squad - to carry out the rehabilitation of unproductive cocoa plots through grafting, thus increasing yields from 3 qq to 15 qq/ha. FEDPRACAO, has included women and young people in the Cocoa Grafters team within the Squad. They know that this is not enough, so in the long term we are going to include more

young people in the cocoa activities, so that they can lead and continue. But the work done to date has strengthened the economic position of the producers faced by some climate changes production losses.

In addition, through its institutional linkage it has been possible to develop a series of exchanges of experiences with different cocoa producing organizations, public and private entities, such as CEIBO R.L., Sauce TIPNIS, UMSA Experimental Station, Sara Ana Experimental Centre of FIBL-ECOTOP, dedicated to the production, research, industrialization and commercialization of organic cocoa. This diversification of social connectivity to improve climate resilience capabilities is already yield practical impacts.

### 4.2 INVESTMENT CHALLENGES

One of the elements of challenge has been the technology transfer of the cocoa squad to the different communities where the cocoa plots are located, with the aim of rehabilitating unproductive cocoa plants. As a result of these challenges, a budget modification has been made to the FFF/FAO project to make efficient logistics possible, since the young experts in rainy periods have had to stop their activities. The development of regular meetings has also been implemented to better link member associations of FEDPRACAO Cbba. to coordinate activities related to the rehabilitation of unproductive plots, establishment of forest species, training, and exchange of experiences.

### 4.3 BENEFITS AND THEIR DISTRIBUTION

The cocoa bean has generated greater income for peasant and indigenous families, since those producers have worked together under the general assembly of FEDPRACAO CBBA (see Figure 2 for organizational diagram). And the climate resilience work has ensured these benefits Will continue in the near term. Financial benefits have been distributed from increasing the price of cocoa by 10% so that families have a fair price for their cocoa.

**Figure 2. Organizational structure**

