

## IMPACT ASSESSMENT PLAN

### **Mexico**

Desarrollo Comunitario Forestal de los  
Estados del Sur

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## Introduction

The present document describes the Impact Assessment (IA) plan for the Desarrollo Comunitario Forestal en los Estados del Sur (DECOFOS) project in Mexico.

The DECOFOS project was approved September 15th, 2009 and became effective March 23rd, 2011. The implementation of the project lasted 5 years and it was completed March the 31st, 2016 (closing date was September 30th, 2016). The total cost of the project was US\$18.5 million with a contribution from IFAD of about US\$5 million and a donation from the Global Environment Facility (GEF) of US\$5 million. The rest was financed by the Government of Mexico (US\$7 million) and by contributions of beneficiaries (US\$1.5 million). The Comisión Nacional Forestal (CONAFOR) was the lead implementing agency for DECOFOS through its state delegations and the Project Management Unit (PMU).

The project, which resulted in a concerted efforts between IFAD, the Government of Mexico and the Global Environment Facility, was implemented in three States: Oaxaca, Chiapas and Campeche and covered a total of 79 municipalities. It had the dual goal of improving the livelihood of people living in poverty and extreme poverty in degraded or marginalized areas and of contributing to climate change adaptation and mitigation through the restoration and revitalization of degraded lands and deforested areas as well as by supporting, both technically and financially, the implementation of sustainable productive activities. This dual goal is in line with policies and programs for poverty reduction that have been promoted in the country during the last 30 years and, most recently, with the "*Cruzada Nacional Contra el Hambre*" which is the main social policy strategy of the Government to eradicate hunger in Mexico. Moreover, project's objectives are also aligned with national policies and programs aimed at promoting the reduction of the negative effects of climate change through increased mitigation and adaptation.

The target population of the project comprises members of rural communities and *ejidos*<sup>1</sup> as well as group of individuals without any land rights.<sup>2</sup> The inclusion of this latter category of beneficiaries represents an important novelty introduced by the DECOFOS project compared to other projects implemented in the area which are generally directed towards land owners/tenants only. The project has also a specific focus on gender and youth, as it was aimed at empowering women by increasing their participation and leading role within the economic life of the communities/*ejidos* as well as by augmenting employment opportunities for young people so to reduce migration.

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<sup>1</sup> The Mexican Constitution of 1917 introduced the concept of *núcleos agrarios* putting much more emphasis on social rather than individual interests in managing agricultural land. The 1992 reform and the corresponding Agricultural Law recognized three forms of property for land and water: public, private and social. This last one corresponds to the *núcleos agrarios* namely, *ejidos* and rural communities. In particular, the *ejido* is a traditional land tenure system combining communal ownership with individual use. An *ejido* can consist of cultivated land, pastureland, or other uncultivated lands on which community members individually use designated parcels and collectively maintain the communal holdings. Both *ejidos* and rural communities are registered with the Mexican National Agrarian Registry (*Registro Agrario Nacional*).

<sup>2</sup> These are the so called *avecindados* as defined by the Mexican Agrarian Law: Mexican nationality adult individuals who have lived for one or more years in the *ejido's* land and have been recognized as such either by the *ejido's* assembly or by the competent agrarian court. The *avecindados* were allocated some land (to farm and build their house) but traditionally they do not have rights to benefit from the forest (Corbera et al., 2011).

The project had two main components. The first component consisted in developing the organizational, planning and managerial capacities of beneficiaries in targeted communities and *ejidos* as well as on increasing their awareness of climate change risks and of related adaptation and mitigation options. The second component had a more practical connotation as it consisted in providing technical and financial support to the start-up of micro-entrepreneurial projects and small-businesses enterprises focussed on sustainable production of timber and non-timber forest products, in addition to eco-tourism and other business activities as well as in supporting the adoption of agroforestry and of other good environmental practices aimed at restoring and revitalizing degraded areas.

The key outcome indicators of interest in this impact assessment are at various and different levels: **i) household/community level:** impacts are expected in terms of poverty reduction as well as in enhanced resilience through adaptation strategies and **ii) environmental level:** benefits are expected as off-site public benefits (reduced erosion and degradation) and global benefits (mitigation to climate change). The project outcomes highlighted are also closely related to the strategic objectives (SO's) of IFAD: increased rural people's productive capacity (SO1) and greater environmental sustainability and climate resilience of rural people's economic activities (SO3).

The IA plan presented in this document describes the different elements needed to ensure a rigorous ex-post evaluation of the DECOFOS project. Conducting a proper IA implies determining: a) the net causal effect of the project on the indicators of interest, as implied by the Theory of Change and specified in the Logical Framework, b) the specific mechanisms through which these effects are achieved or not achieved, as well as c) secondary benefits obtained differentiated on the basis of heterogeneity of impacts in different sub-groups of beneficiaries or, for the same type of beneficiaries, under different circumstances.

The effort towards conducting an IA for the DECOFOS project should be seen in light of the reciprocal and shared willingness of all the actors involved to improve the understanding of the project's performance towards the achievement of its objectives satisfying at the same time the efforts being made by IFAD and the wider development community to effectively measure the impact of agricultural development interventions, aiming to build upon a hitherto neglected area of research (World Bank, 2011). Conducting effective impact assessments serves the dual purpose of upholding accountability and informing ongoing improvements to programme implementation (Gertler, 2011), benefits that apply both to IFAD and beyond. With specific regard to IFAD, this assessment constitutes part of a portfolio-wide set of impact assessments that will be used to assess the overall impact of IFAD projects, due to be completed by the end of its current replenishment period in 2018. Moreover, providing evidence of the effectiveness of the project constitutes an invaluable opportunity for local governmental bodies to learn which mechanisms are more effective in benefiting groups of members from communities/*ejidos* located in marginalized forest areas, how the project succeeded in obtaining the benefits, which concrete actions could be taken to obtain even higher benefits, and how much the project contributed to the economic results of its beneficiaries as well as to improving their living conditions.

DECOFOS offers a good opportunity in this regard given the identification of project's beneficiaries and the importance of geographic and agroecological conditions in defining target groups and eligibility criteria, (which offers opportunity for a good identification strategy of treated and control groups) as well as for its logic of intervention for which indicators of impacts can be constructed and measured.

This specific impact assessment will involve collecting both quantitative and qualitative data from programme and control participants, with the quantitative data being analysed using statistical matching in order to produce robust estimates of the programme's impact. The rest of the document is divided into four main sections. The first section develops the Theory of Change (ToC) of the project, which is built upon the ToC presented in the Project Design Report but adequately modified to respond to the specific requirements of the IA design, and formulates the main IA questions to be answered. The second section presents the IA design, describing the methodology and including the timing of the activities to be performed. Details of the sampling and data collection strategies are discussed in the third section, whereas the fourth and last section provides information on the workplan, the budget and deliverables.

## Theory of change and main impact assessment questions

### The DECOFOS project and its logic of intervention

According to the Project Design Report (July 2009) 73% of Mexico's territory is covered by forests and wildlands, which corresponds to about 140 million hectares. Forests serve important ecological and environmental functions: Mexican forest ecosystems bear 10% of the world's biological diversity and play a stabilizing function in soil and water regimes as well as an important role in the global carbon balance. From an economic perspective, sustainable forest management can provide a reliable source of income and subsistence products to indigenous and non-indigenous communities through the supply of direct economic goods such as timber and other wooden forest products and a whole set of non-timber forest products (Cavatassi, 2004).

The linkage between livelihoods, forests and conservation has been largely studied in recent economic literature. The evidence of a converging geography of poverty and natural forests (World Bank, 2003) has produced a plethora of studies which tried to identify the causes and effects of this two way link. However, if the downside of this relationship that is, the link between poverty and deforestation/forest degradation, has been widely investigated – with arguments against and in favour of both causal directions– less attention has been paid to the actual and potential role of forests in cushioning and reducing poverty (Angelsen and Wunder, 2003). It was not until more than a decade ago that the seminal studies by Campbell et al. (2002) and Cavendish (2000) introduced the concept of environmental income documenting the important contribution of the so called "hidden harvest"<sup>3</sup> (Scoones et al., 1992; Campbell and Luckert, 2002) to total household's income in many developing contexts. This finding was simultaneous to the mounting evidence in the economic literature and policy thinking showing that rural households were increasingly becoming economic agents rather than just plain farmers. In many smallholder settings, off-farm income was gaining a lot of importance and even sometimes outweighing farm income. In such sense, income diversification was a commonly pursued livelihood strategy to increase both the level and stability of household income (Holden, et al., 2004; de Janvry & Sadoulet, 2001; Ellis, 2000; Reardon et al., 2000). Angelsen et al. (2014) provide a thorough survey of the growing forest and environmental income literature from which it emerges that environmental and, in particular, forest income can positively contribute to rural livelihoods in three main ways: (i) by supporting current consumption and avoiding falling into deeper poverty, (ii) by providing safety nets in response to negative shocks in the various household domains (e.g. agriculture production, health of family members, etc.) and filling gaps during seasonal shortfalls (Angelsen et al., 2014; Wunder, Börner et al., 2014; McSweeney, 2004; Pattanayak and Sills, 2001; Angelsen & Wunder, 2003; de Beer and McDermott, 1996 among others), (iii) finally, by helping the household in moving out of poverty through enabling accumulation of assets (Angelsen and Wunder, 2003).

Despite all of that, starting from the '80s, Mexico has experienced one of the largest deforestation rates in Latin America due to a number of complex socio-economic and political reasons which have reduced incentives to the sustainable use of forests with negative consequences for their long term conservation (Segura, 2000). Most of the total forest land in Mexico (about 80%) is owned by communities and *ejidos*, however forestry activities represent the main source of income only for a very small proportion of these communities (about 5%). This might be due, among others, to limited

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<sup>3</sup> The "hidden harvest" refers to the diversity of goods provided freely from the environment that is, from noncultivated ecosystems such as natural forests, woodlands, wetlands, lakes, rivers, and grasslands.

technical, productive, managerial and marketing capacities combined with little resources and low organizational skills. According to Segura (2000), the efficiency of the forest community enterprise is a function of the degree of the internal organization of the community, and is related to the importance the community assigns to the forest resource.

According to the Project Design Report (July 2009) 73% of Mexico's territory is covered by forests and shrubs. This corresponds to about 140 million hectares, 80% of which are owned by communities and *ejidos*. The DECOFOS project was designed based on the analysis of the problems affecting the forestry sector in the country and, particularly, in the states of Oaxaca, Chiapas and Campeche which are mainly driven by deforestation and lack of resources, investments and technical capacity. More in details these problems can be summarized in what follows:

- Deforestation, overexploitation of forest land and ecosystems degradation;
- Limited technical, productive, managerial and marketing capacities combined with little resources and low organizational skills;
- Lack of investment and market opportunities;
- Lack of institutional support for community initiatives.

The list of issues highlighted above have clearly led to a vicious circle driven by deforestation and degradation of natural resources which has, in turn, caused progressive marginalization of forest communities' population (especially young people) and which has led to increased migration towards big urban centres and the US. In such context, forestry and related activities and resources have constituted mainly a subsistence strategy for marginalized forest communities' members. By restoring and re-foresting degraded areas combined with the provision of technical and financial support to the development of micro-enterprises and sustainable production initiatives, the project tried to pursue a boost in the productive sector of these areas and enlarge the set of income generating opportunities for groups of small-scale producers while, at the same time, containing ecosystems degradation and reducing the negative effects of climate change.

To achieve these objectives the project was structured around two main components:

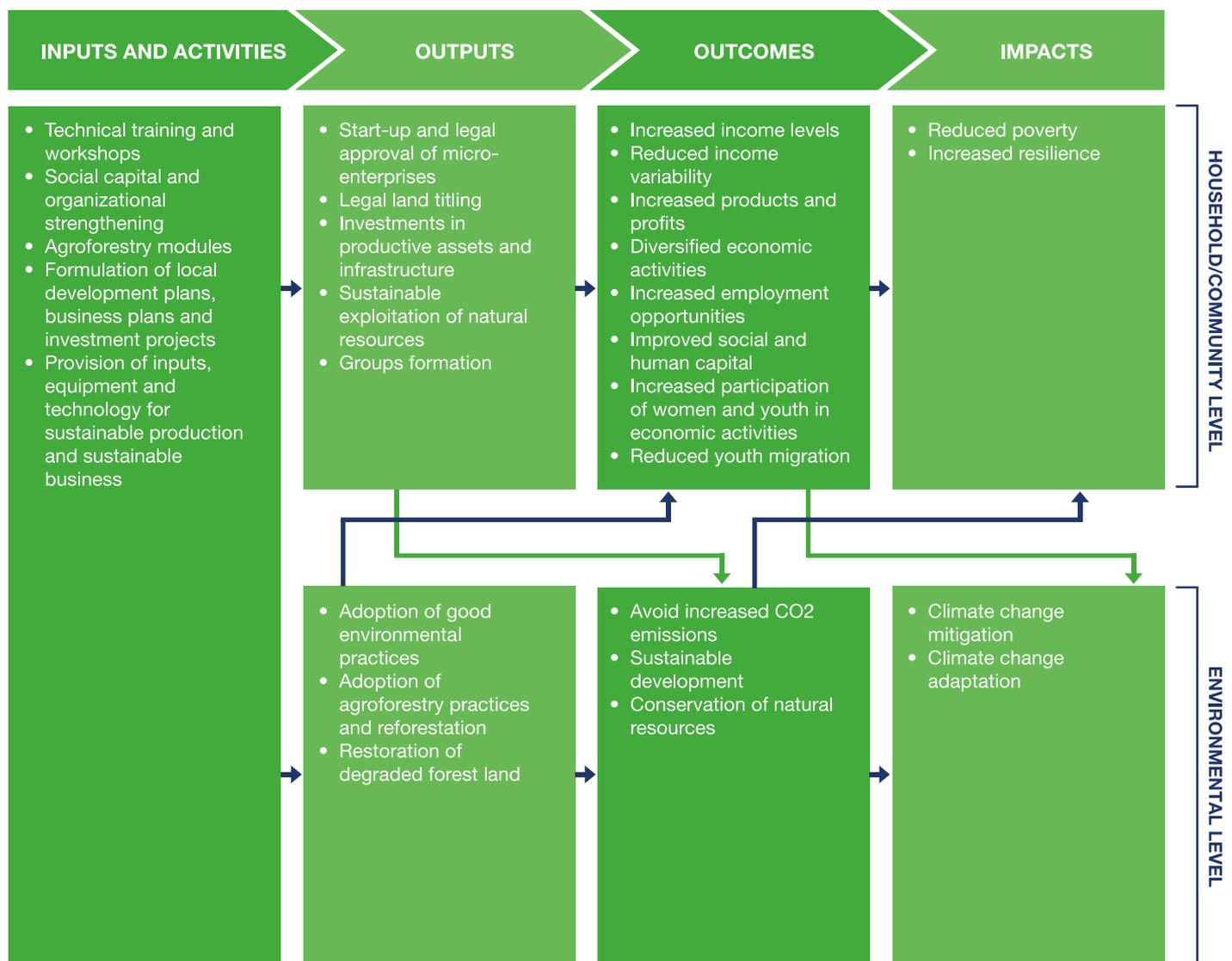
- **Component 1: Improve organizational, planning, and managerial capacities of local communities/*ejidos* including climate change mitigation and adaptation.** This component was implemented through the delivery of 294 training courses and workshops mainly related to (i) climate change effects and the adoption of good agricultural/environmental practices to adapt and mitigate these effects; (ii) the formulation of local development plans, participative environmental assessments, and business plans.
- **Component 2: Forest projects and businesses.** This component had a more practical connotation as it consisted in providing technical and financial support to start-up micro-entrepreneurial projects or strengthening already existing small-businesses related to sustainable production of timber and non-timber forest products and eco-tourism (including legal approval of the newly formed or already established business entities) as well as in supporting the adoption of agroforestry and good environmental practices for climate change mitigation and adaptation (e.g. agroforestry modules, plant nurseries, firewood saving stoves).

Based on the above, the logic of the project is such that it is expected to have impacts at two different levels:

- At the **household/community level**: the project aims at reducing households' poverty mainly through increased income and greater diversification of economic activities (i.e. new income sources and employment opportunities) related to sustainable production of timber and non-timber forest products as well as social capital formation/strengthening;
- At the **environmental level**: the project aims at contributing to climate change mitigation and adaptation mainly through the adoption of agroforestry and good environmental practices as well as through the conservation and valorisation of forest natural resources that can help avoiding deforestation and the consequent CO2 emissions.

As such, once project beneficiaries and control households are identified, impacts can be assessed on indicators of the above. It is also important, however, to identify and measure the mechanisms through which these results are expected to be achieved. The project's result chain is summarized in Figure 1. It shows how the inputs provided and activities implemented through the project are associated to particular outputs. The expected outcomes implied by project's outputs, and which will lead to the expected final impacts, are distinguished by the two levels DECOFOS is supposed to have had influence on: household/community and the environment.

**Figure 1. DECOFOS logic of intervention**



The project is therefore expected to have a positive impact on the livelihood of beneficiaries by reducing poverty as well as on environmental conditions of the targeted areas through climate change adaptation and mitigation initiatives. The first impact is supposed to be achieved thanks to the fact that beneficiary households are expected to increase their income and reduce income variability by diversifying their economic activities (and therefore income sources), increase their products and profits and benefit from more employment opportunities created for their members, especially women and youth. This logic is seen in a more dynamic local economy context where economic actors have better technical and managerial capacities, women are empowered, youth migration is reduced, and social relationships as well as organizational networks and formal associativity are stronger. All of the above is meant to happen through the delivery and implementation of specific inputs and activities such as technical training and workshops, distribution of production inputs, equipment and technologies, business mentoring and assistance; these, in turn will allow for the creation and formalization of new businesses and investment plans. Similarly, the impact at the environmental level is expected to be achieved thanks to the sustainable development and natural resource conservation of forest areas and avoided deforestation which lead to reduced CO<sub>2</sub> emissions; in addition land titling and land protection system combined with capacity development and climate change awareness will lead to the adoption of good agricultural and environmental practices, agroforestry, reforestation and restoration of degraded forest land.

The following are the key evaluation questions that will help assess the project's impact:

- Did the project translate into higher and more stable income and more diversified income sources for beneficiaries through the creation of new micro-enterprises and small business opportunities?
- Did the project translate into higher employment rates both at the beneficiary household and community level through the creation of new micro-enterprises and small business opportunities?
- Did the project translate into higher and stronger social capital through more participation in associations/organizations/groups (both in terms of participants as well as frequency of events)?
- Did the project confer a leading or participative role to female and young beneficiary household members within the household economy?
- Did youth migration decrease thanks to higher employment rates and new business opportunities?
- Did degradation decrease and CO<sub>2</sub> emission volumes remain stable (compared to the baseline) or even reduce thanks to increase in reforestation and adoption of natural resource management practices in project's communities/*ejidos*?
- Did the negative effects of climatic events decrease thanks to the adoption of natural resource management practices?

## Target population and selection of beneficiaries

DECOFOS target population is represented by members of rural communities and *ejidos* as well as group of individuals without any land rights (the so called *avecindados*) residing in marginalized forest areas in Oaxaca, Chiapas and Campeche. As already mentioned, the project covered a total of 79 municipalities: 47 (out of a total of 570) in Oaxaca, 21 (out of a total of 118) in Chiapas, and 11 (all) in Campeche. Figure 2 illustrates the geographic coverage of the project.<sup>4</sup>

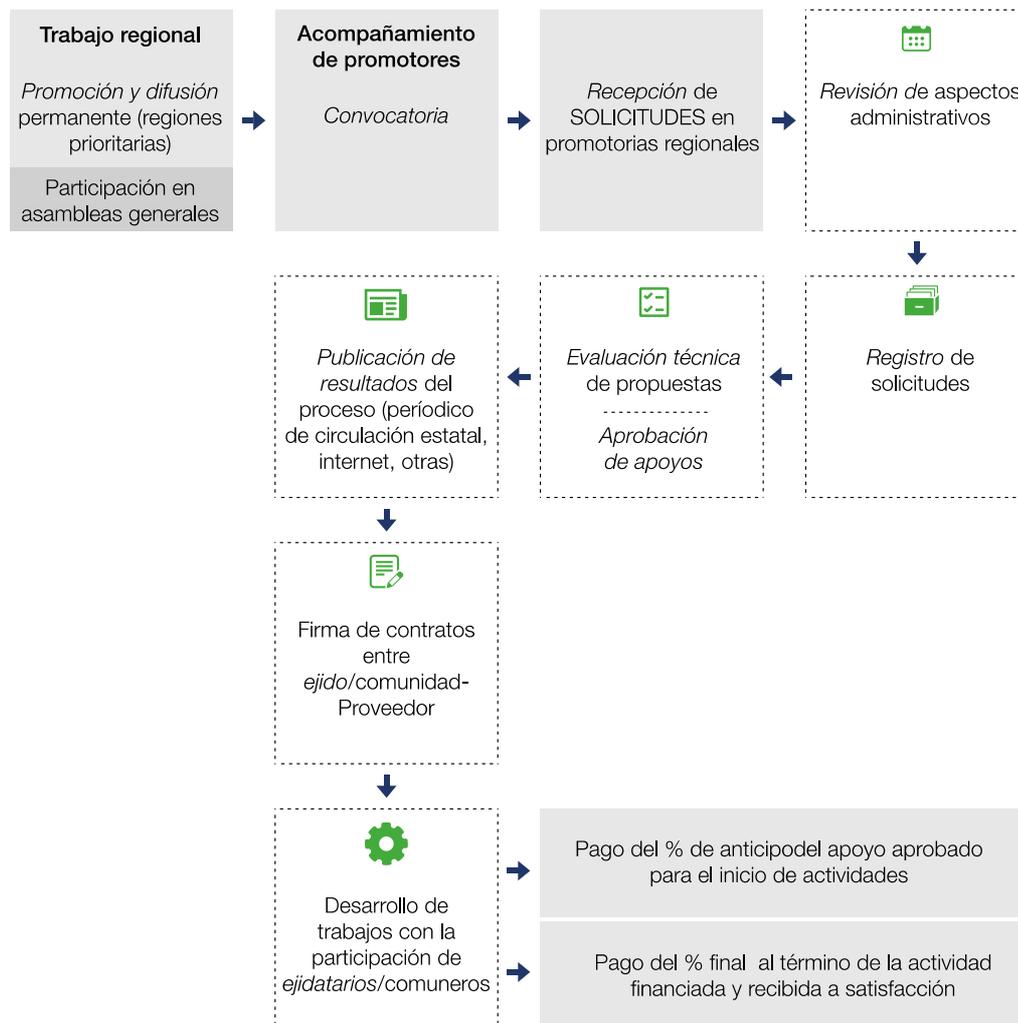
**Figure 2. Target areas of DECOFOS project**



Source: DECOFOS Project Completion Report, August 2016.

<sup>4</sup> The complete list of eligible municipalities is available in Annex 1.

**Figure 3. Diagram of DECOFOS implementation**



Source: DECOFOS Workshop Report, June 2008.

Both Component 1 and 2 were implemented through a demand-driven process which is better described in the diagram in Figure 3.

As a first step, project awareness campaigns were promoted in eligible areas followed by an advertisement campaign of project's call for proposals via different communication medias (radio, newspapers, leaflets, etc.). At this point, interested community/*ejido* members (including those without land rights) from eligible areas constituted themselves into groups and, with the assistance of a technical advisor,<sup>5</sup> prepared the legal and technical documentation needed to submit a formal request to obtain project's support for one or more specific type of activity. Table 1 summarizes the type of supports that have been requested and granted throughout the duration of the project by project's component.

<sup>5</sup> It has to be noted that in order for a technical proposal to be valid and considered for application this had to be developed with the assistance of (and signed by) a technical advisor to be chosen from an official list of accredited professionals provided by CONAFOR.

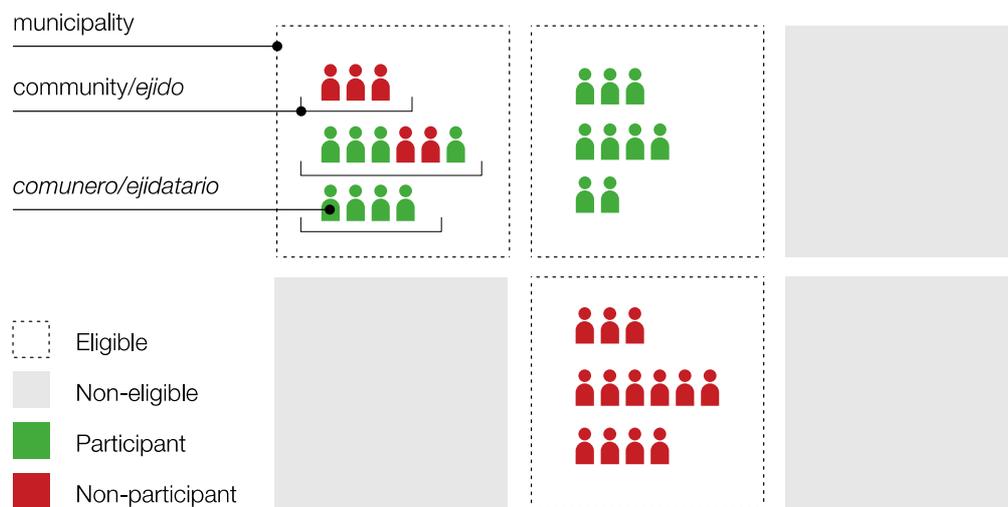
**Table 1. Type and amount of supports requested and granted.**

	Amount granted	Nb. of supports granted
<b>Componente I. Fortalecimiento de las capacidades para la organización, planeación, gestión local y cambio climático</b>	22,153,071	452
Capacitación para el monitoreo comunitario en adaptación y mitigación al cambio climático (CMCA)	667,118	16
Evaluaciones rurales participativas (ERP)	1,096,200	29
Estudios Técnicos EEAC	450,000	5
Formulación del plan local de desarrollo (FPLD)	1,495,000	33
Intercambios de experiencia (IE)	76,500	1
Promotor forestal comunitario (PFC)	1,074,600	16
Seminarios de comunidad a comunidad (SCC)	5,091,067	69
Talleres y cursos de capacitación técnica (Talleres)	3,030,620	85
Talleres de sensibilización para la mitigación y adaptación al cambio climático (Talleres_C1)	6,692,045	140
Constitución y registro legal de microempresas rurales (CRLM)	2,479,921	58
<b>Componente II. Proyectos y negocios forestales</b>	111,679,330	600
Ejecución de Proyectos de Microempresas Rurales (PMER)	60,161,753	125
Formulación proyectos de inversión (FPI)	4,774,500	80
FPN Formulación del plan de negocios (FPN)	1,290,000	19
Modulos Agroforestales (MA)	17,765,142	174
Proyectos de transferencia de tecnología (PTT)	20,454,831	144
Viveros comunitarios (VC)	7,233,104	58
<b>Total general</b>	<b>133,832,401</b>	<b>1,052</b>

As a final result 1,052 supports have been granted throughout DECOFOS lifetime (that is, between 2011 and 2015) out of which about 96% were successfully delivered. It is very important to note that these supports do not correspond to an equal number of benefiting groups as the same group of *comuneros/ejidatarios* might have requested and been granted more than one type of support (either in the same year or in different years).

The selection process for project participation was done at different levels once the eligible areas had been identified and the project promoted and offered in the various communities and *ejidos* within the eligible areas where degradation and poverty levels were present as per project requirement.<sup>6</sup> As a result of interest shown by the various *ejidos*/communities and of the valuability and validity of the development plans they proposed, participant *ejidos* and communities were selected. Obviously, not in all of the eligible municipalities there existed communities and *ejidos* that asked or obtained to participate to the project. Consequently, it is possible that some of the eligible municipalities did not participate to the project at all; likewise, within participant municipalities, not all *ejidos* or communities participated to the project and in turn it frequently happened that in one specific (eligible) community/*ejido* only part (those willing to) and not all of the *comuneros/ejidatarios* participated to the project, as shown in Figure 4.

**Figure 4. Selection of beneficiaries in DECOFOS**



Source: Authors' elaboration.

<sup>6</sup> In particular, project areas were identified based on the following criteria: (i) high and very high marginalized areas, (ii) presence of communities without ongoing forest management programs, (iii) areas with limited attention from institutions and governmental programs (especially forest programs such as "Procymaf" and "Proárbo"), (iv) areas characterized by the presence of spots with high biodiversity and potential to provide goods and services, (v) areas with scarcity of natural resources but with potential to develop products that can satisfy the demand of local industries (e.g. plantations) and restore the wood mass.

**Table 2. Participant/eligible entities by State**

	Municipalities	Communities/ <i>Ejidos</i>	Comuneros/ Ejidatarios
<b>Oaxaca</b>	37/ 47	72/108	3908
<b>Chiapas</b>	18/21	128/647	7731
<b>Campeche</b>	8/11	109/371	6607
<b>Total</b>	<b>63/79</b>	<b>309/1,126</b>	

Table 2 shows the difference in numbers between participant<sup>7</sup> and eligible entities by project state.

Project's impacts are going to be measured at the household level given that support was granted to groups formed.

### Possible unintended impacts and spillover effects

In addition to the intended impacts, which have been discussed in [section 2.1](#), there are several possible secondary (unintended) effects in the implementation of the project:

- Increased input purchases: in order to sustain the new micro-businesses started-up with the project and agroforestry production;
- Increased associativity and inclusion of people without land rights into community's economic activities: thanks to the project the *avecindados* are recognized with an active role within the economic life of the communities and start to be involved in it;
- Reduction of illegal exploitation of forest areas: thanks to the project awareness is raised with respect to the potential economic and environmental value of forest natural resources, which lead to reduced illegal extraction of timber and non-timber forest products;
- Increased Use and extraction of non-timber forest products;
- Increased access to financial resources thanks to well though business development plans but also to formal land titling.

The main spillover effects are expected to be the following:

- Benefits entailed by the project in terms of new businesses initiated and employment opportunities created as well as higher levels of associativity and inclusion are also transmitted to non-participants, particularly to non-participant community members within participant communities but also to non-participant communities within municipalities where one or more community/*ejido* participated;
- Similarly, off-site public benefits can be generated by the adoption of agroforestry and good environmental practices such as increased CO2 sequestration, reduced waterlogging impacts and dryland salinity, carbon sequestration, flood mitigation.

<sup>7</sup> In this document the terms beneficiary (non-beneficiary) and participant (non-participant) will be used interchangeably as they describe the same status of a given entity (community/*ejido*, group member, household, etc.) with respect to the project intervention.

## Impact assessment design

Given the ex-post nature of this impact assessment, the project will be evaluated using a quasi-experimental approach combining propensity score matching (PSM) with a single difference method (that is, measuring the difference in outcomes between treatment and control after the intervention).

### Household level

Measuring ex-post the impact of the DECOFOS project on households' poverty implies carefully understanding how project's beneficiaries have been selected, which type of activities have been delivered and the way in which they have been rolled out during project implementation. As shown in detail in [section 2.2](#), selection of beneficiaries for the DECOFOS project was on a demand-driven basis.

This impact assessment will focus on some and not all of the activities implemented with the financial support granted by the project to selected participants. This choice is based on the fact that we can distinguish between activities for which we expect to have a high impact and others for which we expect a low impact on project's outcomes. Table 3 classifies the types of financial support granted according to their expected level of impact based on the feedback received by key project staff during our scoping mission to Mexico.

**Table 3. Expected level of impact of project's activities**

Low-expected-impact	High-expected-impact
<ul style="list-style-type: none"> <li>• Capacitación para el monitoreo comunitario en adaptación y mitigación al cambio climático (CMCA)</li> <li>• Evaluaciones rurales participativas (ERP)</li> <li>• Estudios Técnicos EEAC</li> <li>• Formulación del plan local de desarrollo (FPLD)</li> <li>• Intercambios de experiencia (IE)</li> <li>• Promotor forestal comunitario (PFC)</li> <li>• Seminarios de comunidad a comunidad (SCC)</li> <li>• Talleres y cursos de capacitación técnica (Talleres)</li> <li>• Talleres de sensibilización para la mitigación y adaptación al cambio climático (Talleres_C1)</li> <li>• Formulación proyectos de inversión (FPI)</li> <li>• FPN Formulación del plan de negocios (FPN)</li> </ul>	<ul style="list-style-type: none"> <li>• Constitución y registro legal de microempresas rurales (CRLM)</li> <li>• Ejecución de Proyectos de Microempresas Rurales (EPMER)</li> <li>• Módulos Agroforestales (MA)</li> <li>• Proyectos de transferencia de tecnología (PTT)</li> <li>• Viveros comunitarios (VC)</li> </ul>

Source: Authors' elaboration based on project data.

Moreover, based on the feedback received by key project staff and beneficiaries during our scoping mission in the field, three scenarios with different probability of occurrence naturally emerged:

1. Communities/*ejidos* that benefited only from low-expected-impact activities (21%);
2. Communities/*ejidos* that benefited only from high-expected-impact activities (30%);
3. Communities/*ejidos* that benefited from low-expected-impact activities also received financial support for high-expected-impact activities (50%).

Due to the above, we decided to focus the impact assessment only on communities/*ejidos* receiving high-expected-impact activities. In this way, in case the low-expected-impact activities have a negligible impact, we will be able to provide an exact estimation of impact else the estimated impact will be a lower bound estimate of the real impact of the project.

Considering the way in which the selection process of beneficiaries took place (see Figure 4), it is very likely that some of the activities implemented through the project generated positive effects for both direct beneficiaries, and other non-beneficiaries living in the same community/*ejido*. For example the demand for labour could have increased due new micro-enterprises and small-business entities established by participant *comuneros/ejidatarios*. As a result, community members who did not benefit from DECOFOS financial support directly might have received the benefits indirectly due to this increase in the demand for labour. These households can be considered as indirect project beneficiaries.

The impact assessment will therefore focus on three different groups of households:

1. Direct beneficiaries of high-expected-impact activities (treatment group);
2. Non-beneficiaries of neither low- or high-expected-impact activities (control group);
3. Indirect beneficiaries of high-expected-impact activities.

Due to the ex-post nature of this impact assessment, and the fact that the project took track of all the financial supports provided as well as of their beneficiaries, the identification of the **treatment group** is pretty straightforward and will therefore be based on the list of communities/*ejidos* by type of financial support provided by the PMU. As a first step communities and *ejidos* where high-expected-impact activities were implemented will be identified. Secondly, for these communities the complete list of direct beneficiaries (name, surname and address) will be provided by the PMU<sup>8</sup> and treatment households to be surveyed will be randomly selected among those based on the calculated sample size.

For the identification of the **control group**, on the other hand, several alternatives have been explored during our scoping mission. The idea is to take advantage as much as possible of the process and mechanisms applied for the selection of project's beneficiaries among eligible community groups. This of course depends on how detailed and comprehensive is the information related to both the selection and exclusion of potential beneficiaries that has been collected through the project monitoring system. The monitoring system put in place for DECOFOS can provide the information needed to identify groups that were excluded from the selection process and, in some cases, the reason why they were excluded. Therefore, whenever possible, data from the monitoring system will be used and complemented with secondary data (e.g. *Censos Ejidales, Registro Nacional Agrario*) according to the following steps:

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<sup>8</sup> This information is not currently available but it will be retrieved by the CONAFOR state delegations from the hard copies of the application submitted in the selection process where the applicants were asked to provide the full names of direct beneficiaries for the specific activity for which project's financial support was requested.

1. First, a list and map of eligible but non-participant communities/*ejidos* will be provided by the PMU and CONAFOR state delegations;
2. Within this list two types of communities/*ejidos* will be identified:
  - Communities/*ejidos* that applied for financial support of high-expected-impact activities but were excluded from the selection process<sup>9</sup> → out of these, if data allow, we will identify as potential controls those groups that (i) were excluded for no other reason than unavailability of funds and did not enter the project in subsequent years; (ii) were excluded because an almost identical business proposal was financed in the same area and did not enter the project in subsequent years; (iii) were excluded for mere formal (and not substantial) reasons and did not enter the project in subsequent years;<sup>10</sup>
  - Communities/*ejidos* that did not apply for any financial support → in this case it is important to understand why these communities (even if eligible) did not apply to participate to the project. To do that a meeting with the technical advisors accredited by CONAFOR and the CONAFOR state delegations will be held in each state. It has to be noted that the technical advisors have a crucial role in the whole process since, as already mentioned, in order for a technical proposal to be valid and considered for application this had to be developed with the assistance of (and signed by) a technical advisor to be chosen from an official list of accredited professionals (about 25 per state) provided by CONAFOR. In addition to that part of the advertisement campaign of the DECOFOS project in the eligible municipalities was also their responsibility. However, the technical advisors were allowed to manage a maximum of 8 proposals each which may imply that a number of potential beneficiary communities/*ejidos*<sup>11</sup> have been excluded a priori from the project due to a number of exogenous reasons (i.e. distance and logistics, previous experience of the technical advisor working in some communities and not in others, better relationships with some *Comisariados de Bienes Comunales/Comisariados Ejidales*,<sup>12</sup> etc.) and could be considered as valid potential controls.
3. Once the complete list of potential control communities/*ejidos* is compiled, it will go through validation during ad hoc meetings organized in each project state with the PMU, the CONAFOR state delegations, and the technical advisors. These meetings have the objective to identify among the full list of potential controls those communities/*ejidos* that are as much similar as possible to the treated ones. This implies also some preliminary statistical and geographical matching on treated and control communities using secondary data if available.
4. Finally, once the final validated list of control communities/*ejidos* is put together, the complete list of households residing in those communities (name, surname and address) will be provided by the various *Comisariados de Bienes Comunales/Comisariados Ejidales* (president, secretary and treasurer)<sup>13</sup> and control households to be surveyed will be randomly selected among those based on the calculated sample size.

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<sup>9</sup> However this type of information is not available for all the states in each year of the project.

<sup>10</sup> It has to be noted that the selection and evaluation process consisted of two main phases. In the first phase a pre-selection was made based on the legal documentation to be presented. Applications missing one or more of the required legal documents were excluded and only those complying with all of the legal requirements passed to the second phase. In the second phase the technical proposal was evaluated mainly in terms of its feasibility, viability, and technical suitability.

<sup>11</sup> Those who, having been informed about the project or having had the support of the technical advisor, could have applied for and be granted financial support to implement high-expected-impact activities.

<sup>12</sup> The *Comisariado de Bienes Comunales/Comisariado Ejidal* is the authority in charge of executing and enforcing the decisions taken by the *Asamblea* as well as representing and managing the administration of the community/*ejido*. It also legally represents the *núcleo agrario* in front of third parties based on the agreements taken by the legally constituted *Asamblea*. It is composed by the president, the secretary and the treasurer.

<sup>13</sup> This strategy is pursued since there is no updated information available on the exact households composition of each communities/*ejidos* as the last *Censo Ejidal* was carried out by INEGI in 2007.

As for the **indirect beneficiaries** of high-expected-impact activities, we considered the possibility of identifying this group of households at a later stage through meetings with key informants at the community/*ejido* level. However (i) given that, in order to correctly measure the indirect impact of the project on this type of beneficiaries, a control group for comparison will have to be identified for them as well, and (ii) provided the difficulties in carrying out to this exercise, we have decided not to go along this way. Nevertheless we expect to capture the main indirect effects produced by the project by introducing specific questions in the household and community questionnaire to investigate whether the new activities/businesses implemented thanks to the project had favoured employment as well as higher levels of associativity and inclusion within and outside participant communities.

### Environmental level

Project impact at the environmental level will be measured matching GIS data of treatment and control communities with satellite images and using dedicated tools such as the Ex-Ante Carbon balance Tool (EX-ACT) developed by FAO. This tool aims at providing ex-ante estimations of the impact of agriculture and forestry development projects on GHG emissions and Carbon (C) sequestration, indicating the effects on the C balance.<sup>14</sup>

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<sup>14</sup> C balance = reduced GHG emissions + C sequestered above and below ground.

## Sample design

### Key indicators

Indicator	Formula/Definition	Means of verification
<b>Household level</b>		
<b>Output</b>		
Start-up and legal recognition of micro-enterprises	# micro-enterprises started; # micro-enterprises legally recognized; net annual income from household micro-enterprises, small-businesses and self-employment	Household survey
Investments in productive assets and infrastructure	# productive assets; value of expenditure in productive assets; value of expenditure in infrastructure	Household survey
Sustainable exploitation of natural resources	Ha under agro-forestry modules; # plant nurseries per Ha; # firewood saving stoves in use; # eco-tourism micro-enterprises started	Household survey
Access to financial resources	# and amount of loans obtained	Household survey
Groups formation	# of groups, organizations, associations formed; # members (disaggregated by men, women, youth, <i>avecindados</i> ); frequency and participation to meetings (disaggregated by men, women, youth, <i>avecindados</i> )	Household survey
<b>Outcome</b>		
Increase in income	net annual income per capita	Household survey
Diversification of economic activities	# income sources; income and labour diversification indices	Household survey
Dinamization of the local economy (increase employment opportunities)	# employees in household micro-enterprises and small-businesses; location of origin of the employees; type of employment contract; average wage per day	Household survey
Improve social and human capital	# of trainings and workshops attended per year; frequency and participation to trainings and workshops (disaggregated by men, women, youth, <i>avecindados</i> )	Household survey

Increase participation of women and youth in economic activities	# household micro-enterprises and small-businesses headed by women and youth; # women and youth employed in micro-enterprises and small-businesses	Household survey
Reduce youth migration	# young household members having migrated to urban areas or abroad	Household survey
Increase market access	value of income from sales of timber and non-timber forest product; frequency and location of sales; value, frequency and location of input purchase	Household survey
<b>Impact</b>		
Reduce poverty	value of food and non-food expenditure per capita; # and value of household assets; # meals per day	Household survey
Increase resilience	exposure to negative shocks; adoption of agro-forestry modules and good environmental practices	Household survey
<b>Environmental level</b>		
<b>Impact</b>		
Climate change mitigation	GHG emissions; carbon sequestration	Community GIS
Climate change adaptation	Ha under agro-forestry modules; # plant nurseries per Ha; # firewood saving stoves in use; Ha of natural resources conserved (e.g. under eco-tourism businesses)	Community survey

### Power calculation

As described above, households in treatment and control communities/*ejidos* will be used as units of analysis in order to understand the project impact through quantitative data analysis at the household level. Statistical power calculations is performed to establish the number of households (HH) to be surveyed in treatment and control group. These calculations are based on the expected increase in a number of key outcome indicators such as the value of food and non-food expenditure per capita and the number and value of assets at the household level taken from two data sources: (i) the *Mexican Family Life Survey 2009-2012* (MXFLS3), and (ii) the *Encuesta Nacional de Ingresos y Gastos de los Hogares 2010* (ENIGH 2010). With this purpose the following equations are used (Winters 2010, et al.):

$$N = \frac{4\sigma^2(Z_\alpha + Z_\beta)^2}{D^2} \dots (1) ; N_{Corrected} = N[1 + \rho(m - 1)] \dots (2)$$

Where  $D$  is the impact on the outcome indicator measured as the difference in its means,  $\sigma$  is the standard deviation of the outcome indicator,  $Z_\alpha$  is the critical value of a confidence interval,  $Z_\beta$  is the critical value of the statistical power,  $\rho$  is the intracluster correlation and  $m$  is the number of household units to be surveyed in each cluster.

In accordance with the logical framework of the project a minimum detectable effect of 20% is assumed for household expenditure indicator and 10% for household assets indicator. Conventional values of 0.8 and 0.05 for the power and significance level have been chosen, respectively. An intraclass correlation coefficient of 0.05 is assumed. Plugging in the relevant values in equation 1 and 2 we obtain that a sample size of about 2,200 households is needed to detect at least an effect of 20% and 10% in the outcome indicators. Table 4 illustrates household sample by treatment group. It has to be noted that sample size in Campeche is lower compared to the other two states as the number of project beneficiary in this area was also lower.<sup>15</sup>

**Table 4. Quantitative sample sizes by project state**

	Community/Ejido	Households
Oaxaca	20 T + 20 C = 40	400 T + 400 C = 800
Chiapas	20 T + 20 C = 40	400 T + 400 C = 800
Campeche	15 T + 15 C = 30	300 T + 300 C = 600
<b>Total</b>	<b>55 T + 55 C = 110</b>	<b>1100 T + 1100 C = 2200</b>

Source: Authors' computation.

A community level survey will also be conducted in the 110 communities/*ejidos* to which the sample households belong to. This will help to complement the household data and pick up additional information on variables of importance for understanding and evaluating DECOFOS impact. The community survey will collect information applicable to all households residing in the community/*ejido*.

### Data Collection

The impact assessment will include both quantitative (household and community questionnaires) and qualitative analysis. With regard to qualitative analysis it is envisaged to:

- Interview key project informants in each project state including officers of DECOFOS state delegations, technical advisors, members of the *Comisariado de Bienes Comunales/Comisariado Ejidal* (president, secretary and treasurer) and of the *Consejo de Vigilancia*;
- Conduct 2 focus group discussions in each state (each composed by about 15 members ensuring gender and youth representativeness) including officers of DECOFOS state delegations, technical advisors, members of the *Comisariado de Bienes Comunales/Comisariado Ejidal* (president, secretary and treasurer) and of the *Consejo de Vigilancia*, non-participant households.

<sup>15</sup> In particular, if we consider project beneficiaries of only high-expected-income activities, we have about 6,600 households in Oaxaca, 7,700 households in Chiapas and 3,900 households in Campeche.

## Questionnaire

The main data collection instrument for this evaluation will be a household questionnaire with detailed information on household demographic and characteristics, assets ownership, economic activities and income, employment, consumption and expenditure, access to markets, credit and social capital, participation to groups and organizations. As already mentioned, a community questionnaires will also be administered to key community informants. The structure of the household questionnaire is presented in Table 5 and a detailed description of the questionnaires can be found in Annex 2.

**Table 5. Structure of household questionnaire**

<b>Section 1</b>	Socio-demographic characteristics (HH composition, age, education, dwelling conditions)
<b>Section 2</b>	Forest land operated and ownership: inventory, type, land title, etc.
<b>Section 3</b>	Agricultural production (including main products and by products)
<b>Section 4</b>	Household enterprise and business
<b>Section 4</b>	Labour requirements
<b>Section 5</b>	Access to market
<b>Section 6</b>	Other income sources, self-employment, wages
<b>Section 7</b>	Access to credit and utilization

Source: Authors' elaboration.

## Workplan

Activities	IA Calendar November 2016 - June 2017									
	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sept 2017	Oct 2017
Finalize IA design and sampling strategy	█									
Prepare survey instruments for qualitative analysis		█								
Validate sample and conduct KII and FGD			█	█						
Develop quant survey instruments				█						
Recruitment of enumerators			█							
Enumerator training				█	█					
Pilot survey					█					
Data collection					█	█				
Data cleaning							█			
Data analysis								█	█	█
Draft report								█	█	█
Validation of results								█	█	█

## Annex 1.

### List of DECOFOS eligible municipalities by State

Campeche	Chiapas	Oaxaca
1. Calakmul	1. Altamirano	1. Asunción Cacalotepec
2. Calkiní	2. Amatenango Del Valle	2. Mixistlán de la Reforma
3. Campeche	3. Ángel Albino Corzo	3. San Andrés Solaga
4. Carmen	4. Benemérito de las Américas	4. San Andrés Yaá
5. Candelaria	5. Bochil	5. San Baltazar Yatzachi el Bajo
6. Champotón	6. Coapilla	6. San Bartolomé Zoogocho
7. Escárcega	7. El Porvenir	7. San Cristóbal Lachirioag
8. Hechelchakán	8. Ixtapa	8. San Francisco Cajonos
9. Hopelchén	9. Jitotol	9. San Idefonso Villa Alta
10. Palizada	10. La Concordia	10. San Juan Comaltepec
11. Tenabo	11. Las Margaritas	11. San Juan Cotzocón
	12. Maravilla Tenejapa	12. San Juan Juquila Vijanos
	13. Marqués de Comilla	13. San Juan Lalana
	14. Montecristo De Guerrero	14. San Juan Mazatlán
	15. Motozintla	15. San Juan Petlapa
	16. Ocosingo	16. San Juan Tabaá
	17. Ocotepéc	17. San Juan Yaeé
	18. Siltepec	18. San Juan Yatzaona
	19. Soyaló	19. San Lucas Camotlán
	20. Teopisca	20. San Mateo Cajonos
	21. Villacorzo	21. San Melchor Betaza
		22. San Miguel Quetzaltepec
		23. San Pablo Yaganiza
		24. San Pedro Cajonos
		25. San Pedro Ocotepéc
		26. San Pedro y San Pablo Ayutla
		27. Santa María Alotepec
		28. Santa María Temascalapa
		29. Santa María Tepantlali
		30. Santa María Tlahuilotepéc
		31. Santa María Yalina
		32. Santiago Atitlán
		33. Santiago Camotlán
		34. Santiago Choápam
		35. Santiago Ixcuintepéc
		36. Santiago Lalopa
		37. Santiago Yaveo
		38. Santiago Zacatepec
		39. Santiago Zochila
		40. Santo Domingo Roayaga
		41. Santo Domingo Tepuxtepec
		42. Santo Domingo Xagacía
		43. Tamazulapam del Espíritu Santo
		44. Tanetze de Zaragoza
		45. Totontepec Villa de Morelos
		46. Villa Hidalgo Yalalag
		47. Villa Talea de Castro

## References

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