

Yucatán Peninsula, Mexico

*A Jurisdictional Approach to
Conserving the Maya Forest*



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Executive Summary

Mexico is one of the world's megadiverse countries, and the Yucatán Peninsula is home to the country's largest remaining swath of tropical forests. Despite its environmental and cultural values, that forest loses 80,000 hectares per year to extensive ranching and agricultural practices.

The three peninsular states (Yucatán, Campeche, and Quintana Roo) have long recognized that they share one ecosystem in the great Mayan forest, as well as a common cultural heritage and similar economic drivers of land-use. In 2010, they signed an agreement to work together on addressing climate change and deforestation. Since then, with The Nature Conservancy's support through the USAID-funded Mexico REDD+ Program, and the collaboration of civil society, the states have designed and put in place a jurisdictional program focused on forest conservation, sustainable rural development, and reducing emissions from deforestation and forest degradation (REDD+) across the full 14 million hectares of the Peninsula. This case study documents the main elements of that program in order to help inform the design and development of similar efforts in other regions of the world.

The Yucatán Peninsula jurisdictional program has strengthened and established key institutions that all employ a participatory approach to cross-sector collaboration. These include an innovative monitoring platform known as the Maya Forest Watch, a Regional Fund for the jurisdictional program that prioritized transparency and efficiency over state control, and multiple levels of governance bodies that are designed to respond to local needs and foster high levels of community participation. Additionally, the program prioritized learning and sharing across community members and civil society which has proven to be a key leverage point – catalyzing replication of best practices far beyond what the program could do on its own.

The jurisdictional program revealed the importance of aligning a critical mass of actors around a common vision, with the support of a backbone organization to help maintain progress, coordinate parallel strategies, and improve resilience to political change. A jurisdictional effort also requires patience and a dedicated funding source over many years.

The Yucatan Peninsula Sustainability Agreement (ASPY 2030) was signed and launched by the three state Governors in December, 2016. ASPY includes multiple ambitious goals including to eliminate deforestation, restore 2 million hectares of degraded lands, and place 50% of the Peninsula under protection or sustainable management. It has created a productive dialogue for sharing and participation among diverse actors: between ranchers and foresters, between environmental and rural development agencies, and between companies, universities, and NGOs. The strength of ASPY 2030 is that it is not a single organization, but rather a framework for collaboration in which the people of the Yucatán Peninsula can see themselves and their potential contributions to help move the region toward this common vision of sustainability.

1. Introduction

Tropical forests harbor some of the world's highest biodiversity and largest carbon stocks, making them essential for conservation and the mitigation of climate change. Additionally, tropical forests are often seen as essential to economic development, with high demand to harvest or convert them to produce crops, livestock, and timber. These same landscapes are often home to diverse cultures and peoples who have inhabited and used the forests for generations. The challenge of how to balance the protection of vast forested ecosystems and cultural heritage with economic development is a global problem that finds greater urgency in the face of rapid climate change and growing populations. To this end, TNC has worked around the world in tropical forest landscapes to find more effective ways to help people and nature thrive together.

The Nature Conservancy (TNC) has worked for thirty years in the Yucatán Peninsula of Mexico, initially focusing on protected areas and gradually shifting to a broader agenda of supporting sustainable landscapes. From 1990 to 2007, TNC led the USAID-funded Parks in Peril program, which spurred the creation of a nationwide protected areas network that includes the Calakmul Biosphere Reserve in southern Campeche and the Sian Ka'an Biosphere Reserve in Quintana Roo. In the 1990s, TNC also supported the development of a jaguar conservation corridor to increase biological connectivity throughout the region.

While the protected areas have been successful at staving off habitat conversion in the Peninsula, deforestation has continued rapidly outside them. TNC's strategy has thus evolved over the last ten years to address the underlying causes of deforestation and conserve lands around and between the protected areas. With rural communities living throughout the agricultural and forest mosaic of the Yucatán Peninsula, effective conservation depends on their active engagement. Local communities have been key conservation partners in developing and implementing strategies to address their social and economic needs while maintaining standing forests.

Since 2010, TNC has supported a jurisdictional approach to forest conservation, sustainable rural development, and reduced emissions from deforestation and forest degradation (REDD+) across the three states of the peninsula. This approach was largely supported through the Mexico REDD+ Program (M-REDD+) funded by USAID and implemented by TNC.¹ The jurisdictional program has progressed in phases, from design and institutional strengthening, to piloting and prototyping of specific initiatives, to a large-scale commitment to end deforestation across the whole of the peninsula through lines of action aimed at scaling successful practices. The program has been developed and implemented in partnership with the state governments and a diverse array of NGOs, communities, universities, and private sector partners, through a process that has led to a steady increase in ambition and participation.

This paper is one in a series of three case studies—alongside São Félix do Xingu, Brazil and East Kalimantan, Indonesia—that represent a decade's worth of TNC's experience in supporting conservation and sustainable rural development in tropical forest landscapes at the jurisdictional scale. Although approaches have varied from place to place, TNC has supported program development, coordination, facilitation of processes, technical assistance, funding, and testing innovations to ensure sustained momentum and progress toward sustainable landscape goals. While REDD+ program development has formed a core component in each landscape, the programs have also embraced a broader sustainable development agenda over time that goes beyond one specific mechanism.

This document aims to systematically describe the Yucatán Peninsula's jurisdictional approach from 2010 to the present, including its development, major results, and lessons learned. By sharing key insights from this multi-year effort, we hope to inform other experts and jurisdictions facing similar challenges in reducing tropical deforestation and achieving landscape-scale sustainability.

Lessons from this jurisdictional program have contributed to the development of TNC’s common framework for Collective System Leadership (CSL) at the landscape scale. CSL represents a promising approach to enable diverse stakeholders and sectors to work together effectively in a complex environment to achieve a wide range of sustainability goals at a large scale. The key components of CSL—including a real understanding of the landscape dynamics at play, a defined process for empowering innovation, network-based leadership, and the development of shared vision and accountability—are demonstrated in diverse ways through these programs.

We invite you to consider this case study as one part of a package of inter-related products that contribute to conceptual evolution and advancement of jurisdictional programs throughout tropical forest areas. In addition to the CSL document and other case studies, we have also completed a deep-dive paper on cross-sector collaboration, a systems analysis of key challenges faced by jurisdictional programs, and a survey of existing jurisdictional programs around the world.

2. Context

Ranked among the top 12 megadiverse countries in the world and fifth in global species richness, Mexico is home to a wide array of flora and fauna not found anywhere else on Earth. Especially notable for its forest biodiversity, Mexico has over 1,000 native tree species and more than 66 million hectares of forests, representing one-third of the country’s land area.²

The largest extent of forests remaining in Mexico is the Maya Forest of the Yucatán Peninsula, stretching across the states of Yucatán, Campeche, and Quintana Roo, as well as into Belize and northern Guatemala. These 13 million hectares of forest provide refuge for countless rare and endangered species like the white-lipped peccary, tapir, scarlet macaw, harpy eagle and howler monkey.³ As of 2014, the Yucatán Peninsula forests are estimated to store 347 million tons of aboveground carbon.^{4,5}

This rich natural resource base has supported, and been supported by, human populations for thousands of years, and it continues to provide a range of needs to its rural communities. Around 40% of Yucatán Peninsula’s population is of indigenous descent (1.8 million people), and over half of land and forests are managed under Mexico’s unique *ejido* system of land tenure. (See [Box 1: Ejidos and agrarian communities in Mexico](#)). The livelihoods of the Yucatán Peninsula’s ejidos and indigenous communities are interwoven with the forest that provides food, firewood, medicinal herbs, building materials, and spiritual resources.

Ejidos and agrarian communities in Mexico

In the Mexican Yucatán Peninsula, 56% of land and two-thirds of forests are managed as *ejidos* or *comunidades agrarias* under Mexico's unique system of communal land tenure.⁶ This figure is 51% in Mexico as a whole. In the three Yucatán Peninsula states there are 1405 registered ejidos and 1 comunidad covering 7.9 million ha.⁷ Ejidos emerged from the redistribution and granting of large landholdings following the Mexican revolution and were enshrined in the 1917 constitution. Ejido lands are legally owned by their members (*ejidatarios*), who hold shared rights for management and decision making. *Comunidades agrarias* are distinct from ejidos in that they represent the formal restitution of ancestral land claims to native peoples, whereas ejido claims did not require prior historical occupation. Many native communities chose to register their lands as ejidos because of the difficulty of documenting ancestral ties to the land and because the size of ejido land grants were based on the needs of the applicants (i.e. their number and the quality of land being granted) rather than historical claims.⁸

Ejidos are organized into individual parcels for farming and common-use areas (typically forests) that are managed collectively for timber, conservation, resins, or other products. Following 1992 reforms, ejido land that does not contain forest can be leased and sold to other ejido members or can be privatized and sold to outsiders if agreed to by the ejido council.⁹ Although this raised concerns that ejidos would rapidly sell off their lands and lead to an erosion of this institution, to date fewer than 10% of ejidos nationwide have converted to private property. Evidence indicates that maintaining the ejidos responds to a range of considerations about livelihoods, migration, and resources that are more influential than the 1992 legal reform.¹⁰ Recent reforms in 2017 also allow for the creation of unions in ejidos to promote improved entrepreneurship and setting aside of lands for women-operated enterprises.¹¹



Figure 1. Man picking corn in San Agustín, Yucatán, Mexico
(Photo credit: Erich Schlegel, 2017)

Throughout the region, many ejidos and indigenous communities continue to practice diversified agricultural systems that evolved over thousands of years. The traditional *milpa* system is a multiple-use strategy that includes farming of several varieties of maize, beans, squash, and other vegetables, integration of fruit trees into fallow forest, bee-keeping, and maintenance of forest corridors for hunting, wood, and conservation of native species. An estimated 300 to 500 species of animals and plants are traditionally used by Yucatec Maya communities.¹² This agroforestry model provides both subsistence and market products, mitigates climate risks, and maintains biodiversity. The system offers an ecologically sound model particularly suited to the region's ecology that balances conservation and rural livelihoods.^{13,14}

However, traditional indigenous agriculture in the Yucatán Peninsula often generates low income, and rural poverty is widespread. As a result, youth are increasingly seeking opportunities in nearby cities as well as in the United States. Rural abandonment increases pressure on communities to sell or rent their land for commercial agriculture, road construction, and tourist development.¹⁵ Agricultural subsidies that promote forest conversion make resisting these pressures even more difficult. Clearing forests is seen as the main path to economic well-being, and this dynamic has made the Yucatán Peninsula one of the country's primary hotspots for deforestation.

Across the peninsula, large-scale plantations and pastures are replacing traditional agriculture and natural ecosystems. Although one-third of the Yucatán Peninsula's land and coasts are protected, the region loses more than 80,000 hectares of forests per year (equal to 40% of the total annual deforestation in Mexico and releasing 5.7 million tons of carbon dioxide emissions). Forest loss is driven primarily by cattle pasture expansion (50% of loss since 2000), commercial and small-scale agriculture (30% of loss), and forest fires (10% of loss).¹⁶

Forest loss in the Yucatán Peninsula states has remained steady since 2001

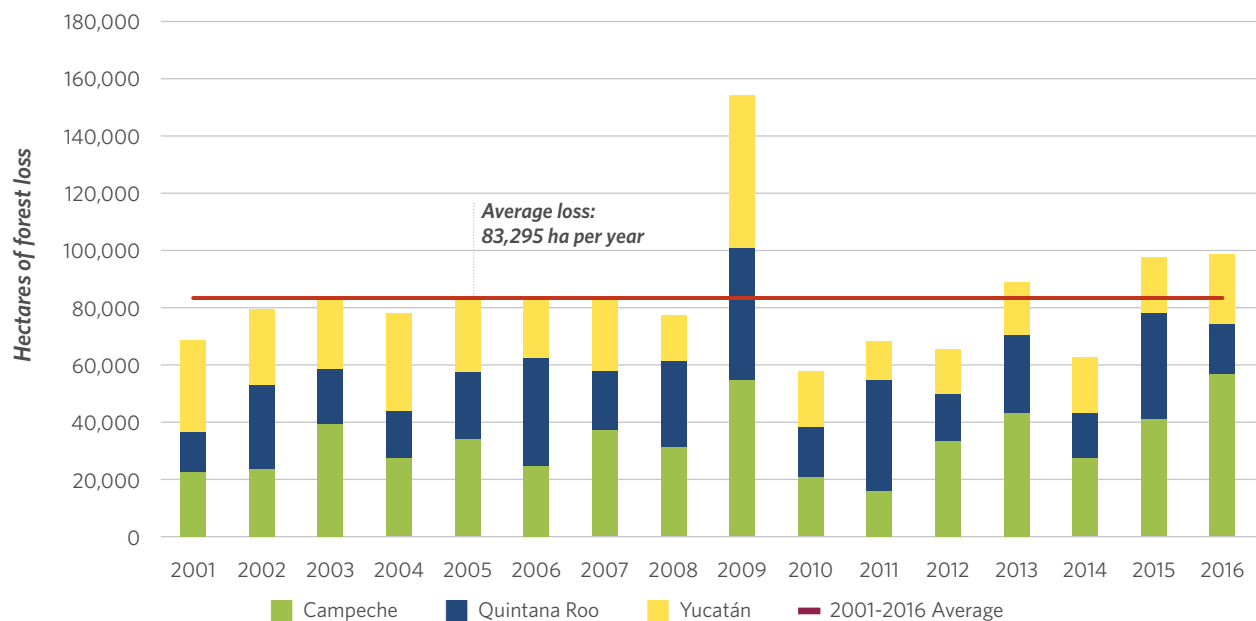


Figure 2. Rates of forest loss in the Yucatán Peninsula states from 2001 to 2016 using satellite data.¹⁷

Many expansive practices suffer from low productivity, but improved production models on cattle, maize and other crops, and forestry have been tested and show promise to increase economic returns without increasing pressure on the land base or natural resources.¹⁸ Cost-benefit studies indicate that investment in best practices is usually economically viable: results range from MXN 0.27 to 0.58 of profit for every MXN 1.00 invested in silvopastoral systems (for cattle) up to MXN 3.00 profit for every MXN 1.00 invested in conservation agriculture (for mechanized techniques). There is a

significant opportunity to address the deforestation problem while also increasing production in agriculture and ranching, helping to sustain the various practices critical to rural livelihoods and to protect biodiversity in the Maya Forest.¹⁹

The Yucatán Peninsula has viable pathways for sustainable development, but improved capacity, planning, and coordination is needed to target activities and mobilize resources where they are most appropriate. Traditional Maya milpa systems are ecologically sound but struggle to provide sufficient income for rural communities when competing with subsidized maize and cattle production. These subsidized models are economically inefficient, extensive, and suffer from low productivity. State and municipal authorities also lack capacity to implement effective land-use planning to guide land use activities to best balance conservation with production. The result is an inefficient process that is unsustainable from both an economic and an environmental perspective. The challenge is how to replicate and scale up proven best practices while also improving the enabling conditions for long-term, sustainable land use.

2.1 Policy Dynamics

Protected areas cover nearly one-third of the Yucatán Peninsula territory and have proven to be effective at reducing deforestation and loss of natural ecosystems within their boundaries. However, deforestation and ecosystem loss continue to occur beyond their boundaries, leaving them at risk of becoming fragmented islands.

Mexico's land-use policies and programs are dominated by positive financial incentives (i.e. "carrots") with very few effective enforcement mechanisms (i.e. "sticks") to deter unsustainable practices. Federal subsidy programs that promote extensive cattle and maize production provide much of the economic incentive for conversion of forests into low-productivity cattle pastures and fields in the Yucatán Peninsula. However, agricultural subsidies are not targeted precisely and go mostly to a small number of large producers that carry out extensive forms of production. Subsidies focus on compensation rather than increasing productivity, and do relatively little to help encourage more labor-intensive, diversified production. There is no evidence that subsidies increase farm employment, and agricultural employment has continued to decline rapidly since the 1990s.²⁰ Small farmers and ranchers wait to see what they can get from the government and make land-use decisions based on what the subsidies will pay for, rather than on any sense of demand and supply or ecological aptitude of their land. This has created a culture of handouts and an inefficient rural sector across Mexico.

The federal government also provides subsidies for environmental protection. In 2003, the National Forestry Commission (CONAFOR) began Payments for Ecosystem Services (PES) programs to pay private and ejido landowners to conserve forests for water, biodiversity, carbon, and agroforestry.²¹ The payments compensate landowners for the opportunity cost of leaving forests intact. In 2018, CONAFOR allocated a total of MXN 50 million (USD 2.5 million) to provide as PES to landowners in the Yucatán Peninsula states, covering a total of 28,257 hectares—with an average payment of USD 88 per hectare for the year.²² However, the program only lasts for five years and does not encourage investments in economically viable forest management, leaving forests in the same vulnerable position as before once the program ends.

The federal subsidies for agriculture are much greater than federal subsidies for conservation and often compete for the same lands. The 2018 national budget for SAGARPA's agricultural subsidies was MXN 58.6 billion (USD 2.9 billion), while all subsidies under the Environmental Ministry (SEMARNAT) and CONAFOR in 2018 were MXN 8.8 billion (USD 445 million), or 15% of SAGARPA's total subsidy budget.²³

Mexico is gradually working toward a more integrated approach to land-use policy and practice. Mexico's National REDD+ Strategy, completed in 2017, focuses on Sustainable Rural Development, which recognizes that to protect, manage, and restore forests and end deforestation it is necessary to support and work with the rural communities who own and manage most of these lands. With many of the causes of deforestation lying outside of forests, the REDD+ Strategy emphasizes working across multiple stakeholders and sectors to develop strategies aligned across the country. Strong influence by environmental NGOs helped develop this vision of REDD+ that links rural livelihoods to stopping deforestation, rather than basing it on direct payments for ecosystem services.

Mexico has also demonstrated leadership on addressing climate change, as the first developing country in the world to pass a comprehensive climate change law. The General Law on Climate Change aims to reduce emissions by 30% by 2020 and 50% by 2050 as well as reach zero net loss of carbon from land-use change by 2020. These commitments constituted Mexico's Nationally Determined Contribution (NDC) presented at the 2015 COP-21 in Paris, which aims to reduce deforestation 80% by 2020 and 100% by 2030.

In May 2018, the Mexican Congress also approved several modifications to the Sustainable Forestry Development Law (*Ley de Desarrollo Forestal Sustentable*), which includes a provision that prohibits SAGARPA from granting subsidies or incentives for agricultural activities in deforested areas or for activities that increase the agricultural frontier.

Although numerous innovations and developments in Mexico have shown promise to contribute to sustainable rural development and conservation, underlying structural factors constrain a more rapid transition. Subsidies continue to drive a low-productivity, expansive form of agriculture, and are part of a long-established political system that is hard to influence. Unpredictable politics and high dependence on oil exports for public finance can leave funding for conservation and rural development at risk of cuts. While local communities and producers across the Yucatán Peninsula continue to utilize a traditional form of farming that is compatible with forest conservation and local food security, their system is not supported by the broader policy, market, and financial conditions, putting it at risk of being replaced with inefficient, extensive land use that does not provide climate mitigation, environmental conservation, or social values to the local populations or the country. The challenge is how to provide adequate support and incentives for best practices in agriculture that not only get farmers over the hump of initial investment and adoption, but also provide the supporting enabling conditions and markets so these best practices are economically viable over the long-term.



Figure 3. Aerial views of corn fields near the Mennonite community of Santa Maria, Campeche (Erich Schlegel, 2016)

3. Yucatán Peninsula Jurisdictional Program

The Yucatán Peninsula Jurisdictional Program followed an iterative process that started with an initial agreement to work together, a systematic process to follow through on the initial commitments, and then a new agreement with greatly increased ambition and a broader set of actors. This process allowed the three states to get early wins, build momentum, earn each other's trust, build a strong case for action, and gradually bring in additional actors.

In December 2010, on the sidelines of the UN climate negotiations held in Cancún (COP-16), the three states of the Yucatán Peninsula officially announced their commitment to work together on climate change. This agreement marked the beginning of the Jurisdictional Program for sustainable rural development in the peninsula. In the agreement, the states pledged to develop a regional strategy for climate change adaptation, develop a regional strategy on REDD+, and create a regional climate change action fund. A regional climate change commission would be established to coordinate these efforts.²⁴ This collaboration sets the Yucatán Peninsula apart from other jurisdictional programs in that it includes multiple states within the program.

The states have long seen themselves as part of a single region with shared environmental resources and ecosystems, similar economic concerns, and a shared Maya cultural heritage. As one environmental official from the state of Yucatán described it, "It was not so hard to create a regional vision" to get the states to work together. "Both state and economic actors have seen it as a single region." An environmental official from Quintana Roo noted that previous work on cross-boundary biological reserves since the 1980s meant the states already understood the need and challenge of working across land use types and administrative boundaries on sustainable development. The Yucatán official also highlighted that "the 2010 climate change agreement created a process for us to attract more resources and investment as a region," and it increased international attention toward their efforts to reduce deforestation, protect biodiversity, and support rural development.

The main role of REDD+ in this context was to help provide a meaningful financial incentive, within a cohesive and coordinated jurisdictional program, to help transform land use in a way that would reduce deforestation and forest degradation while also providing sustainable rural livelihoods throughout the peninsula. While the good will to collaborate among the states was evident, the mechanism by which to achieve this transformation and how sustainable rural development would look on the ground was yet to be determined in detail. This is where the role of TNC and the M-REDD+ program entered in 2010.

Over the next six years, TNC, through the USAID-funded Mexico Reduced Emissions from Deforestation and Degradation (M-REDD+) Program, supported the states to carry out their 2010 agreement. TNC served as the backbone organization to facilitate the process, guiding the leadership coalition and various working groups, coordinating stakeholders on gathering data and information, designing the program, maintaining momentum, and establishing the necessary institutional foundations. Many other actors were critical in developing inputs, analyses, pilots, and guidance for the program. In parallel, at the national level, TNC worked closely with CONAFOR to design the country's national REDD+ system. The result is truly nested, compatible REDD+ system with clearly defined roles and responsibilities for national, state, and municipal levels, and analogous functions established at each jurisdictional level.²⁵

The following sections describe several critical building blocks for the jurisdictional program. Although they are described separately, many of these processes occurred in parallel in an inter-related and mutually supportive process, rather than a step-by-step chronological order. A timeline is provided in [Section 5](#) to display the overall chronology of these events; the linkages between them are described in the following sections.

3.1 Understanding Landscape Dynamics

3.1.1 Drivers of deforestation and biomass maps

To support the 2010 agreement, TNC carried out a systematic process in coordination with its partners to thoroughly understand the landscape dynamics at play. A critical early step was developing a shared understanding of the problem by analyzing the key drivers of landscape change and deforestation in the Yucatán Peninsula. While multiple data sets already existed, these data sources were not linked and drew different conclusions. Many people believed, for example, that small-scale milpa prepared with slash-and-burn farming (which occasionally allowed fires to get out of control) was the main cause of deforestation. Few stakeholders understood the degree to which cattle pasture expansion was the dominant driver throughout the peninsula.

Key spatial analyses were carried out to understand the current state of the Yucatán Peninsula's forests and their major threats. With the expertise of Woods Hole Research Center, a national map of above-ground forest biomass (2013) was developed to strengthen Mexico's REDD+ forest monitoring system and identify priority areas with highest forest biomass;²⁶ this was supported with a map in 2017 that provides biomass change measurements from 2000 to 2014. In parallel, TNC staff proposed creating a spatially-explicit map of the drivers of deforestation. This analysis and map was made in 2014 by researchers at the Institute of Ecology (INECOL) in Veracruz, using spatial data from the University of Maryland. The map identifies the direct cause of deforestation for every 30m x 30m patch of forest lost over the period from 2001 to 2013.

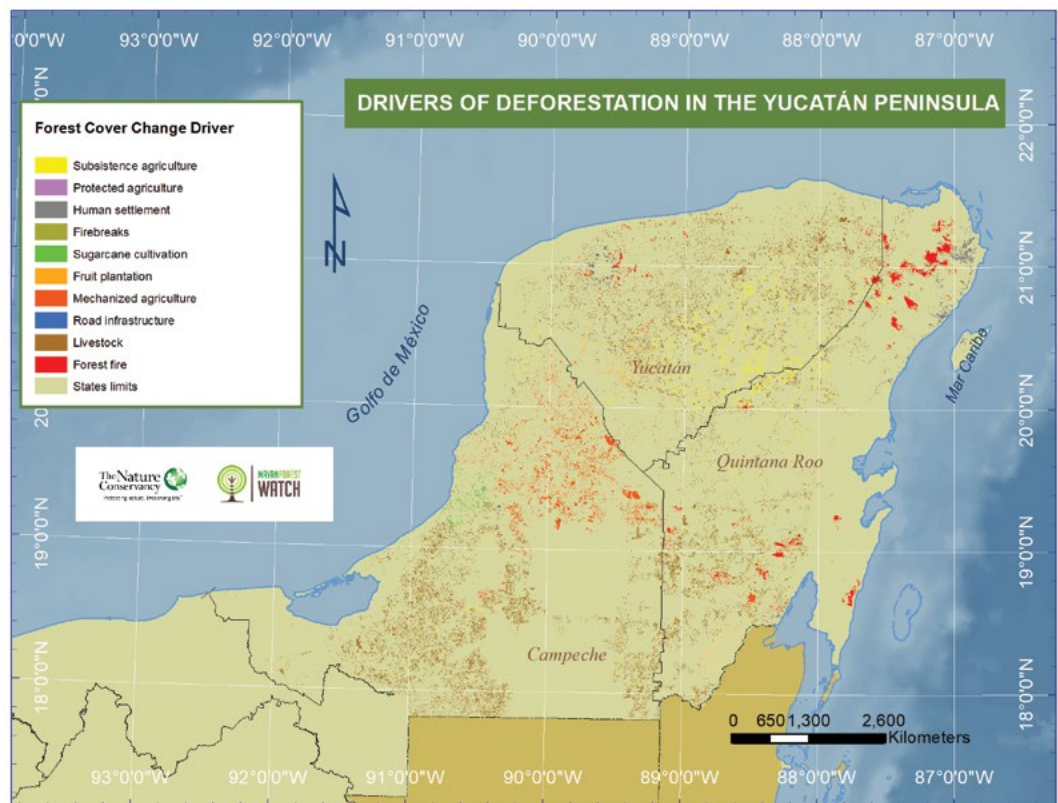


Figure 4. Map of drivers of deforestation in the Yucatán Peninsula (TNC 2018).



Figure 5. Aerial views of corn fields near the Mennonite community of Santa María, Campeche (Erich Schlegel, 2016)

The map of drivers of deforestation helped create a shared understanding among decision-makers in the state governments, local NGOs, research organizations, producers, and private sector actors around what the problem was and where to target specific interventions. It showed the largest drivers to be cattle pasture (50%; in all three states); subsistence agriculture (16%; mostly in Yucatán); mechanized agriculture (13%; mostly in Campeche); and forest fires (10%; mostly in Quintana Roo). Smaller localized drivers included urban expansion and development, sugar cane and fruit tree cultivation, and tourism development.²⁷

3.1.2 Value chain and situation analyses

The program also developed detailed analyses of the key value chains implicated in the drivers of deforestation map—beef, maize, and soy—and carried out a situation analysis of traditional milpa agriculture in the peninsula. The value chain mapping identified the main restrictions to improving sustainability among the different actors in each value chain and proposed strategies for how they could contribute to zero deforestation. The analyses used a methodology developed by the Economic Commission for Latin America and the Caribbean (CEPAL) for strengthening value chains and created dialogue among all the actors involved which built deeper understanding of opportunities and challenges and more buy-in around the strategies within each node of the chain.²⁸

The cattle value chain analysis found that, despite ranching’s outsized impact on forests, not many cows are actually produced in the region, economic benefits and productivity for the ranchers are low, the market prices are unstable, and the benefits are concentrated in the hands of a few buyers.

The milpa study was critical to understand the current situation of traditional Maya milpa in the peninsula and the relationship between culture, prevailing practices, and the high levels of secondary forest vegetation found within these agricultural systems. The study found high conservation and use of traditional seeds, incorporation of long fallow periods, and low uses of pesticides and fertilizer. The study identified numerous practices that could improve food security, productivity, and environmental outcomes, and which could be supported under the REDD+ program.²⁹

3.1.3 Shared data platform: Maya Forest Watch

Another key element to sharing data and knowledge is the Maya Forest Watch (Observatorio de la Selva Maya, or OSM).³⁰ Designed by TNC and Pronatura and launched in 2015, OSM is a collaborative online forest monitoring platform and network for the Yucatán Peninsula. Its aim is to provide for the generation, coordination, and analysis of forest cover data and forest change data to communicate to governments, landowners, and NGOs and improve decision making. Collaborators include the College of the Southern Frontier (Ecosur), the Center for Scientific Research of the Yucatán (CICY), local NGOs like Kaxil Kiuic and Bioasesores, and the three state governments. TNC's Maya Forest Program Coordinator Sébastien Proust notes, "The idea is to have multiple sectors working together to promote information sharing in consensus to provide it to key users. [OSM] is a network focused on providing solutions and responses to the questions received from decision makers." As a common platform, OSM can help increase consistency and harmonization between disparate data sets and provide up-to-date information to key decisionmakers in a user-friendly fashion.



Figure 6. Neyra Solis of Pronatura watches as a park ranger checks his position using GPS during a patrol of Mexico's Calakmul Biosphere Reserve (Mark Godfrey, 2006)

3.1.4 The Learning Community links a shared understanding with innovation

Building a shared understanding of the landscapes dynamics is not a purely technical exercise. The “shared” element of the understanding is critical; you can’t begin to address complex problems until the actors involved recognize their contribution to those problems. The Yucatán Peninsula’s REDD+ Learning Community was a key strategy to make this happen. The learning community includes civil society actors working on sustainable development across the peninsula who have met regularly since 2012. Its goal is to build capacity of members to manage their projects, enable self-learning, create replicable REDD+ actions (i.e. increasing capacity to implement best production and conservation practices with local communities), and indirectly influence the public policy processes and enabling environments in the region. The learning community helped NGOs develop an integrated landscapes perspective by understanding the drivers of deforestation and forest degradation where they work. Moreover, it allowed the NGOs to speak with a common voice, which helped them integrate their vision into the high-level commitments and plans of the state governments.

Creating a shared understanding of landscape dynamics among the key stakeholders was a critical starting point for the program. Holistic understanding of complex landscape dynamics is a pre-requisite to effective action to influence landscapes, but cannot be achieved through isolated analysis. A critical element of the program aimed at building productive dialogue among the diverse, autonomous actors who drive those landscape dynamics. The shared understanding will hopefully be strengthened over time by integrating insights through the Learning Community and by increasing transparency and the flow of information among actors through the Maya Forest Watch.

3.2 Building an Innovation Ecosystem

3.2.1 Piloting improved practices

Based on the results of the analysis of drivers of deforestation, and other insights from various dialogues with key stakeholders, TNC and ENDESU (*Espacios Naturales y Desarrollo Sostenible*) launched a small grants program to introduce, test, and measure the effectiveness of best management practices for farmers, ranchers, foresters, and community conservationists.

The objective of the pilot projects was to determine which practices could provide the greatest social, environmental, and economic benefits at the least cost to guide and influence the types of interventions prioritized in national and state REDD+ programs. The pilot projects financed through the program were subject to local measurement and monitoring processes as well as an external analysis of interventions to measure their economic and environmental costs and benefits. A key element was the focus on using the pilots to generate data and developing a systematic approach to scale up the practices that proved successful.



Figure 7. Ráncer Jose Palomo stands under the shade trees in his silvopastoral pasture at his ranch Los Potrillos in Becanthen, Yucatán (Erich Schlegel, 2016).

The pilot projects were selected through an open call for proposals where local NGOs and community associations submitted proposed activities. This self-selection process allowed TNC to identify a greater range of partners than in the past and also ensured the program was working with a coalition of willing participants. A total of 15 projects, managed by 10 local organizations, were implemented with 47 communities in the peninsula, reaching 1500 farmers in initial pilots. This led to farmers implementing sustainable best practices on 6000 hectares, conserving an additional 13,000 hectares, and placing 74,000 hectares of forest under improved management. The practices tested included silvopastoral systems (mixed use of trees and pastures) for intensifying cattle ranching, conservation agriculture for improving maize and soy production, agroforestry and improved milpa practices to support Maya communities, and improved forest management for community forest enterprises.

Data on the costs of implementation per hectare as well as the changes in productivity were measured locally by the producers themselves, with support from the local NGO. Additionally, TNC supported an external economic analysis of the five productive models to determine the costs of benefits of adoption.

Using these results, TNC designed financial packets or interventions for each model that include a mix of self-contributions, credits, and subsidies, which consider the qualitative and quantitative risk of implementation of each system. While the analyses indicate that long-term returns on improved practices are positive, farmers are assumed to contribute 40-70% of upfront costs, with the rest covered by public subsidies and credit. Credit and market support must be sufficient and affordable so farmers are willing to begin and continue these practices, and so farmers who are not involved in pilot activities can to shift to sustainable practices on their own.



Figure 8. 79-year-old Dionisio Yam Moo checks on his corn in his milpa agricultural field (Erich Schlegel, 2016).

3.2.2 Communities of Practice and Territorial Innovation Networks

To support the pilots to learn and share from each other, the NGOs participating within the learning community developed and implemented four Communities of Practice on ranching, sustainable agriculture (including practices for commercial agriculture and small-scale agriculture such as milpa), forestry, and community governance. These Communities of Practice were critical for creating buy-in among participants, helping producers learn from each other, promoting adoption by a larger group, and fostering the beginnings of a network of sustainable producers throughout the peninsula. As these Communities of Practice progressed, the demand for participation quickly outpaced TNC's ability to deliver exchanges. To better meet demand, TNC began to work with partners to design a system that would support large-scale replication and adoption of the practices throughout the peninsula. Using the map of drivers of deforestation to target "hotspots" for particular practices, TNC designed a system of "Networks for Landscape Innovation" (or RITERS, for their Spanish acronym) for each practice.

RITERS consist of a dedicated physical space designed for hands-on learning as well as a network of local leaders who steward model farms, ranches, forests, or conservation sites that serve as satellite training centers. Each RITER center will have sufficient infrastructure and technical capacity to facilitate exchange of knowledge, best practices, and sustainable technologies, while training large numbers of producers and extension agents, who can field-test new and innovative practices in their own productive spaces. The process focuses on farmer-to-farmer or peer-to-peer methodologies to ensure RITERS will not only develop technical capacities, but also "soft" or "functional" innovation capacities to help lead farmers become promoters of these technologies and practices.

In addition to technical capacity to implement improved practices and improved business skills to financially and administratively manage their production systems, producers need to be networked into a broader development system that includes all the other actors in their supply chains, specifically to access financial opportunities, research, input provision, and potential buyers, among others. These innovation networks seek to create positive feedback loops that will accelerate and improve market opportunities for sustainable products.

The RITERS use Social Network Analysis (SNA) to identify and incorporate key actors within the network who will increase probability of innovation adoption, replication, and influence. SNA is the process of investigating social structures using networks and graph theory. This methodology identifies producers who have high innovation, diffusion, and communication capacity and facilitates the design of a network strategy with higher replication potential.

3.2.3 Local Ecological Land Use Planning

A final step in the innovation process for identifying, testing, and scaling improved practices included spatially identifying where these practices could be applied at a larger scale in order to meet multiple goals of eliminating deforestation and increasing productivity of key crops. To that end, TNC worked with partners in the critical landscapes across the peninsula to create legally binding local ecological land use plans (POELs) at the municipal scale. POELs regulate where commercial activities are permitted and designate areas for protection and sustainable use. The plans are created through a participatory process that includes consultation with all communities in the municipality to designate areas for sustainable production (in ranching, agriculture, and forestry) or for conservation. Once completed, the plans are legally binding, and permits for development must be issued in accordance with the plan. They have become a critical tool for helping municipalities make better decisions on where to support agriculture, infrastructure development, forestry, and conservation in the face of existing subsidy and market factors.

In addition to inclusion in the POELs, the sustainable practices piloted through the small grants program were included in Inter-municipal Investment Programs that describe which activities will be implemented where, by whom, and at what costs across the main remaining swaths of forest in each of the states of the Yucatán Peninsula. The Investment Programs were included in Mexico's national REDD+ Emissions Reduction Initiative and the Emission Reductions Program Document (ERPD) submitted to the World Bank's Carbon Fund for results-based payments from REDD+.

In sum, the process undertaken in the Yucatán Peninsula to test solutions, share learning, foster replication, and define the spatial extent for scaling demonstrates a systematic approach to innovation and scale. While in practice the implementation of the project was complex—activating strategies in parallel at several scales and adapting in real time to context, opportunity and leadership capacity—the overall arc of activities has lent itself to progressively increasing levels of buy-in and adoption. Challenges remain on building out the enabling conditions in policies and markets to make these activities self-supporting, but a solid foundation has been laid.

3.3 Networked Leadership and Governance

Governance of the Yucatán Peninsula jurisdictional program is a loose network of governance entities at different scales and with different degrees of power. These entities have been facilitated and supported by TNC as the backbone organization together with other NGOs and the state governments. Some key challenges to maintaining these bodies as active and thriving spaces for cross-sector collaboration include a lack of funding to support them and a lack of interest among the non-environmental sectors, though that is gradually improving.

3.3.1 The Yucatán Peninsula Regional Commission on Climate Change (CRCC)

The Yucatán Peninsula Regional Commission on Climate Change (CRCC) was established to serve as the primary forum for coordination and dialogue for the jurisdictional program. The 2010 agreement described the establishment of the Commission, though the Commission did not officially meet for the first time until March 2015.³¹ It is chaired by the heads of the Environmental Ministries of each state and coordinated by the Yucatán Secretary of Urban Development and the Environment (SEDUMA).³² The CRCC is not a governing institution with formal power (as Mexican law does not define inter-state governing authorities), but serves primarily as a forum for dialogue, transparency, and collaborative decision-making to maintain progress. As one official from the state of Yucatán described it, even though “each state has its own climate goals and slightly different visions, the Commission helps to construct a common vision and helps each state see how it can contribute to this vision.”

3.3.2 Inter-municipal Associations in Yucatán and Quintana Roo

The jurisdictional REDD+ program uses inter-municipal Investment Programs as the mechanism to target the regions of each state that are priorities for the REDD+ action and that share similar environmental and social characteristics. The three areas most vulnerable to deforestation targeted for the REDD+ program are central Campeche, south Yucatán, and south Quintana Roo. To develop and manage the Investment Programs and improve local management capacity, the program helped establish and train two inter-municipal associations—JIBIOPUUC and AMUSUR—to implement the REDD+ program at the inter-municipal level. These associations coordinate with public authorities and work to effectively govern their share of the jurisdictional program toward improving productive activities and land use planning, while offering a model that can be replicated in other parts of the country. The inter-municipal bodies are built on existing institutional experiences in Mexico where local authorities manage shared natural resources across a territory. These associations can also improve alignment of public subsidies by developing territory-wide projects among groups of farmers and ejidos that would be unable to access projects on their own.

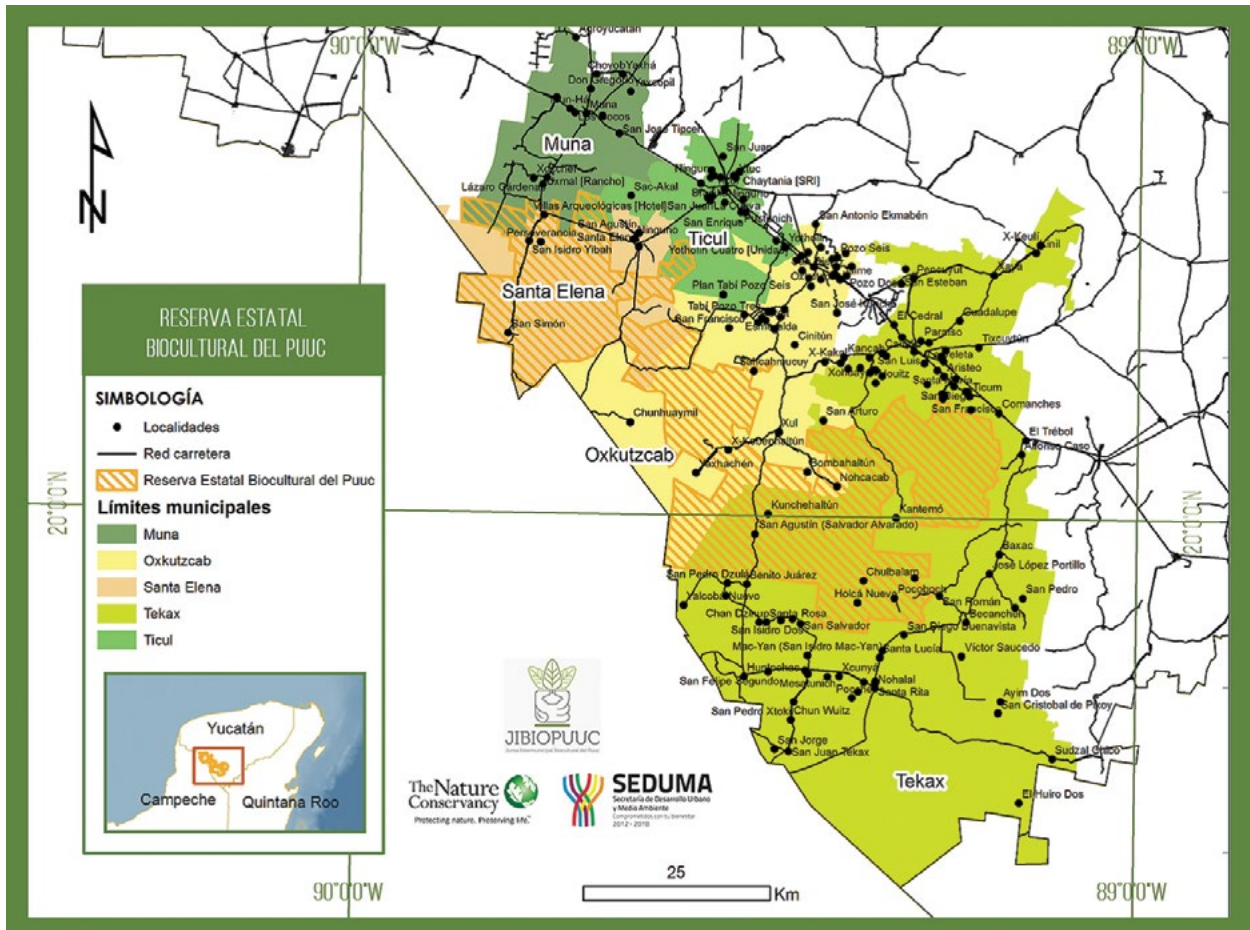


Figure 9. Intervention area of JIBIOPUUC.

In southern Yucatán, the Intermunicipal Association for the Puuc Biocultural Region (JIBIOPUUC) was established in 2014 with the support of TNC. JIBIOPUUC manages the emissions reduction and sustainable rural development program in five municipalities and helps coordinate field programs to support models for improved cattle ranching and traditional milpa.³³ Based on their Investment Plan, JIBIOPUUC has received an allocation of USD 5 million for five years of administrative operation from the Yucatán state government.

In southern Quintana Roo, the Municipal Association of the Environment of Southern Quintana Roo (AMUSUR) was established in 2017 with the leaders from four municipalities to manage the state’s REDD+ investment plan, land use planning, and coordinate the implementation of improved practices.³⁴ A state government official from Quintana Roo described AMUSUR as “an example of social organizations as the base for local land use planning, which approximates the idea of biocultural corridors for sustainable production.”

3.3.3 Regional Climate Action Fund

The Yucatán Peninsula Climate Action Fund (FCPY) was developed as a regional financial mechanism to support the 2010 Agreement and mobilize resources for the jurisdictional REDD+ program. TNC worked with the three state governments to create an independent fund that could support the full range of strategies developed through the jurisdictional REDD+ program. One initial goal was for the fund to channel results-based finance received from the FCPF Carbon Fund into the state and peninsular REDD+ programs. Over time, this role was broadened as the ambition of the jurisdictional program grew.

A critical innovation was that the state governments themselves recommended that the fund be independent from state government budgets to make it easier to track, manage, and receive finance from donors with specific requirements. Therefore, the fund was set up as a public-private partnership with a steering committee comprising the three largest public universities—the Autonomous University of Yucatán (UADY), the University of Quintana Roo (UQRoo), and the Autonomous University of Campeche (UAC)—and TNC. The Fund was legally established as a public-private association in October 2016 and is administered by a professional secretariat.³⁵

3.4 Shared Vision and Accountability

The building blocks described above created sufficient understanding of the landscape dynamics at play, improved confidence in the potential solutions, developed stronger relationships between many of the key players, established the primary institutions, and increased motivation to begin scaling up. At the same time, one of the program's major goals was to take many of the separate components and goals and build them into a coherent and collective vision shared by the key stakeholders. The process to create this shared vision took several years, drawing upon several related but distinct strategy development processes at different scales, until they successfully coalesced into the Yucatán Peninsula Sustainability Agreement (ASPY 2030) signed in 2016.

3.4.1 Yucatán Peninsula and State-level REDD+ strategies

Shortly after the 2010 agreement, the first efforts to develop the jurisdictional vision came through the Yucatán Peninsula REDD+ strategy, which was developed through a series of workshops in 2011 and 2012 and completed in 2012. The Peninsular REDD+ strategy served both as an assessment of the region and enabled a participatory process with institutions and communities in priority action areas (i.e. those facing the highest threats of deforestation) to help develop a common framework and guiding vision for the region. The vision that resulted from the 2012 strategy aimed *“to reduce natural resource degradation and deforestation, and promote sustainable rural development, through the implementation of best practices in the integral management of the territory, which contribute to the mitigation of greenhouse gases and as a consequence an improved quality of life.”*³⁶

Based on this outcome, each state needed to develop its own detailed REDD+ strategy to align with the Mexican legal framework and international requirements for REDD+, in which the national government is represented by CONAFOR and must make any arrangements for collaboration or transfer of resources through the state governments. The state-level REDD+ strategies were developed to provide detailed roadmaps for addressing the main drivers in each state as well as describing the major activities, actors, and sources of finance required. Technical working groups on REDD+ were set up to lead the development of each state's REDD+ strategy.

TNC provided detailed guidance through the M-REDD+ program to ensure these plans were aligned and met all REDD+ requirements. Each state was able to complete their REDD+ strategy by 2016. Each strategy defines the relevant legal framework, describes relevant stakeholders and lines of action, defines the measurements systems and how they align with the national framework, develops a strategy to protect social and environmental safeguards, and defines the financial arrangements in each state to support the REDD+ strategy.

3.4.2 State-level biodiversity strategies

Since 1996, the states had also each been developing their own Biodiversity Studies and Strategies with support from the National Biodiversity Commission (CONABIO). These strategies are created through a multi-stakeholder process to guide states on implementing policies for both conservation and sustainable use of biodiversity.³⁷ Campeche published its completed strategy in 2016, while the

strategies for Quintana Roo and Yucatán are expected to be finalized and published in 2018. A key CONABIO representative in the Yucatán noted that while she was working on the REDD+ strategy development and on the biodiversity strategies, she began to see major overlaps, particularly in the promotion of sustainable production methods and the conservation of biocultural resources.

3.4.3 Yucatán Peninsula Sustainability Agreement

By the middle of 2016, the major goals of the 2010 Climate Change Agreement were on target to be completed: the Peninsular REDD+ strategy had been developed, the Regional Climate Change Commission had been installed, and the Yucatán Peninsula Climate Change Fund was soon to be established. These efforts enabled key decision-makers to see other agendas within their states as part of a greater whole, laying the groundwork for the states to develop a more ambitious jurisdictional plan for sustainable development.

While these strategic plans all contributed elements of a jurisdictional vision for sustainability, the goal of creating an integrated plan that could align strategies around improving rural productivity, addressing climate change, and conserving biodiversity and water resources would require the higher level political support and buy-in of the three state Governors. Getting Governor-level support and approval would be critical to implementing effective cross-sector collaboration.

Fortunately, the upcoming thirteenth Conference of the Parties (COP-13) to the Convention on Biological Diversity (CBD) was to be hosted in Cancún in December of 2016 and motivated the states to build on their previous progress with the world's eyes focused on the Yucatán Peninsula.

The Regional Climate Change Commission (CRCC) decided, during its ordinary meeting in August, 2016, to design a Yucatán Peninsula Sustainability Agreement (ASPY) to consolidate several similar state-level strategies into a Peninsula-wide initiative. They then carried out an in-depth analysis of eight existing state-level strategic plans on REDD+, biodiversity, and watershed management, as well as a strategic plan on sustainable tourism from Quintana Roo. Building off existing strategies meant that the main content of the agreement had already been discussed and agreed to - including through several workshops and an in-depth public consultation process. The overarching strategy focused on providing coordination, alignment, and buy-in to accelerate and amplify results.

The states held numerous discussions and workshops to align the strategies. Once the final version was drafted, each state carried out a full legal verification process to ensure the Governors could legally commit to such an agreement.

Finally, on December 10, 2016, at the COP-13 in Cancún, the three state governors announced and signed the Yucatán Peninsula Sustainability Agreement (Acuerdo para la Sustentabilidad de la Península de Yucatán, or ASPY 2030). ASPY 2030 commits the three states to work together on a regional approach to sustainable development and builds upon the 2010 climate change agreement by expanding the coalition of actors and more clearly defining the environmental outcomes the states wish to achieve.^{38,39} The Agreement contains six goals and several concrete lines of action that align multiple sectors to achieve low emissions growth at the landscape scale ([see Table 1](#)).



Table 1. The 2030 goals and implementation components of the Yucatán Peninsula Sustainability Agreement (ASPY 2030)

| The 2030 Goals of ASPY | Eight implementation themes |
|---|--|
| <ol style="list-style-type: none"> 1. Achieve net-zero deforestation by 2030 (and an 80% decrease by 2020) 2. Restore 2 million hectares of degraded land,⁴⁰ including: <ul style="list-style-type: none"> • Sustainable intensification of cattle ranching on 250,000 hectares • Sustainable intensification of agriculture on 250,000 hectares • Reforestation and forest restoration on 420,000 hectares 3. Place 50% of the terrestrial and coastal territory of the Peninsula under conservation and/or sustainable forest management. 4. Promote Maya biocultural landscapes across 5,484,000 hectares of culturally and ecologically significant landscapes. 5. Attract private and international financing to match the domestic public funding currently allocated to promote the green economy. 6. Restore 20% of coastal reefs (54 km) and 30% of coastal dune systems (80 km) altered by human settlements to help protect human communities, beaches, and infrastructure. | <ol style="list-style-type: none"> 1. Sustainable agricultural development 2. Effective forest management 3. Ecosystem conservation 4. Water and ecosystems 5. Sustainable coastal zone management 6. Sustainable fishing 7. Support of green and responsible markets 8. Sustainable tourism |

ASPY 2030 is supported through four additional agreements:

- Two linked agreements were signed by the Ministry of Agriculture (SAGARPA) with representatives from the environmental sector. First SAGARPA signed an agreement with the Ministry of Environment (SEMARNAT) to coordinate public policies, subsidies, and programs to stop deforestation while still promoting improved food security and rural livelihoods.⁴¹ SAGARPA also signed an agreement with the National Forestry Commission (CONAFOR), which committed them to work together on improving forest and land management while reducing deforestation and degradation.⁴² While subtly worded, these agreements are significant in committing SAGARPA to face the role of agricultural subsidies in deforestation and provide a pathway forward to address issues of poor land use that result from agricultural and environmental incentives competing for the same land.
- The third complementary agreement was a declaration of support signed on November 29, 2016 by 70 private businesses in the agricultural commodities, food, tourism, infrastructure, and natural resource extraction sectors. This statement committed companies to work to align

their practices, investments, and operations in line with ASPY 2030 vision and spatial land use plans. Specific strategies and actions for companies to take have been in the process of development since this signing.

- One year later, in December 2017, six universities (3 public and 3 private) in the Yucatán Peninsula also signed a collaboration agreement to support implementation of ASPY.⁴³ This agreement recognizes their role in training professionals and commits them to integrate environmental sustainability across their curriculums, while also supporting increased research and technical support to ASPY partners.

The governance structure of ASPY 2030 has been developed to improve coordination and decision making, mobilize resources, and carry out the necessary workplans to meet the agreement's goals. Other thematic aspects are led by relevant partners with the right profile or expertise. The private sector declaration is led by Yucatán Foundation of Business Associations (FEYAC) and University Marista leads the implementation of the Universities Declaration. The monitoring is led by the Mexican environmental organization Pronatura, which will use the Maya Forest Watch as the platform for public reporting and transparency.

A Promotion Council (*Consejo Promotor*) is currently being established to serve as a diverse, multi-stakeholder body with broad geographical and sectoral representation, and to play a flexible role in promoting dialogue, implementation, and maintaining progress; in general, to help ASPY run with greater fluidity and transparency. The *Consejo Promotor* will help assume many of the backbone functions by convening and helping guide individual organizations in their contributions. Using the Promotion Council as a base, eight thematic working groups will be formed, with relevant experts from government, civil society, and private sector coordinated to create, fund, implement, and monitor the specific plans.

ASPY 2030 represents a logical evolution from the original 2010 climate change agreement. It is an agreement built upon multiple workstreams and strategies developed in parallel over many years, adopting some of the strongest characteristics of these different initiatives. From the 2010 Agreement, ASPY 2030 took the strong public commitment as a vehicle to create the enabling conditions for jurisdictional-scale progress. From the decades of experience with biodiversity strategies and protected areas, ASPY 2030 took the philosophy of working across administrative boundaries and stakeholders to balance conservation with development. And from the several years of experience testing best practices on the ground with farmers and communities, ASPY 2030 benefited from institutional capacity and relationships that helped validate techniques to improve landscape management.

3.5 Results

This section describes the most prominent results observed to date in the Yucatán Peninsula jurisdictional program. As they are intermediate, they demonstrate that jurisdictional-scale solutions take time and patience to achieve long-term impacts.

3.5.1 Intermediate Results

The primary intermediate results of the program were the design and establishment of the main institutions that will drive the jurisdictional program forward effectively. These institutions were established at the appropriate level of authority – across the whole jurisdiction, at the landscape level, or within key sectors. These institutions have largely become independent entities and are consistently adapting to meet the evolving needs of the program. A key insight from the implementation of this jurisdictional program is the necessity of addressing issues at different scales and with diverse levels of integration. The jurisdictional program cannot expect to centrally manage everything; governance needs to be shared among the key actors.

3.5.1.1 Jurisdictional-scale Governance and Institutions:

- **Monitoring platform:** The Observatorio de la Selva Maya (OSM), or Maya Forest Watch, was officially launched in 2015. OSM is being used by public, private, and civil society actors to share data and analysis to improve decision making. Management of the platform will be gradually assumed by Pronatura. OSM will serve as the monitoring and transparency platform for tracking progress on ASPY 2030.
- **Financial Mechanism:** The Yucatán Peninsula Climate Action Fund (Fondo Climático de la Península de Yucatán) was officially established in late 2016 shortly before the launch of ASPY 2030. In early 2017, its manager and professional staff were installed, and it is currently in an “incubation period” until 2019, working to fundraise from public and private. Its four priority funding areas include REDD+, coastal adaptation, rural development, and capacity building. For its first initiatives, the Fund has prioritized activities on silvopastoral systems in key cattle ranching areas.
- **Governance Body:** The Regional Climate Change Commission (CRCC) was established and has met a total of four times and aims to meet every six months. A key challenge for the Commission going forward is to more fully integrate representatives from the agricultural sector.
- **Learning and Knowledge Management:** The Yucatán Peninsula Learning Community of NGOs has met 14 times since it began start in 2012 with TNC funding. The topics ranged from the conceptual underpinnings of REDD+ to a greater focus on implementing best practices in the field. The Learning Community is now its own independent entity, funded and led by its members under the name “*Paisajes en movimiento*” or landscapes in movement.

3.5.1.2 Landscape-scale Governance and Institutions:

- Since 2014, the **inter-municipal association** of the Puuc (JIBIOPUUC) has been a legally functioning institution and has rapidly been building capacity and personnel. While a major portion of its work portfolio includes the investment plan under the Emissions Reduction Initiative, its work is truly much broader and relevant with or without REDD+. Working in a biocultural landscape, with the financial support of the state government, JIBIOPUUC works on a variety of projects in the region to improve governance, capacity building, connecting communities to markets and improved opportunities, and biological and cultural conservation.
- Five **Networks for Landscape Innovation** (RITERS) have been selected and are in the process of building up their capacity to be active institutions to promote broad replication of improved practices. The RITERS are strategically located in regions where their productive model directly addresses the predominant driver of deforestation. Critically, the RITER model will focus on training the trainers: identifying the practitioners who are most effective at communicating their practices, and training them to bring improved practices back to their communities.

3.5.1.3 Sector-Specific Governance and Institutions:

- The agreements signed between SAGARPA, SEMARNAT, and CONAFOR in 2016 represent increased **collaboration at the national level** to help ensure forests are not converted to agriculture and continue to improve productivity and food security.⁴⁴ This was an unprecedented and welcome step, and a recent update to the Forestry Law builds on this progress. The revision explicitly mandates that SAGARPA “will not provide

support or economic incentives to agricultural activities in deforested zones or those that promote land use change from forestry lands or increase the agricultural frontier.”⁴⁵ This is the first explicit law that forbids agricultural subsidies that lead to deforestation.

- One year after the private sector declaration signed in 2016, the list of **companies** signing has grown from 70 to 80. The companies have focused on developing concrete actions they can understand and undertake within their own operations. They have defined 18 lines of action—including responsible sourcing, reducing carbon footprints, and funding sustainable projects—and have reported more detailed results in a one-year progress report.⁴⁶

3.5.2 Impacts

Impacts, in terms of reduced emissions or hectares conserved, take several years to perceive and measure. This section presents initial, smaller-scale impacts achieved during the development phase of the program.

Pilot practices initiated with communities and farmers have already demonstrated improved results on a farm to farm basis. For instance, projects in the Yucatán Peninsula have shown that moving from conventional livestock farming to silvopastoral systems can turn a loss of MXN 0.69 for every peso invested into a profit of MXN 0.54 cents for every peso invested. This has resulted from improved foraging options from trees, rotational grazing, and more comfortable cattle conditions. These practices have raised productivity from 1 to 3 animals per hectare, nearly doubled milk production per cow (and increased it more than five-fold per hectare), and increased meat production per hectare by sevenfold, while reducing carbon emissions by 50 kg per cow per year.

Among farmers dedicated to mechanized maize and soy farming, those who piloted conservation agriculture methods—including no-till, crop rotation, and organic pest control to reduce their use of pesticides—reduced their costs by 40% and increased production by 72% after two years compared to conventional methods.

4. Mexico’s National REDD+ System

As the Yucatán Peninsula worked to develop its jurisdictional program, CONAFOR was leading a parallel process to develop the National REDD+ System for Mexico. The National REDD+ System follows the Cancún Agreement requirements and includes a National REDD+ Strategy, a safeguards information system, a national reference level, and a national monitoring and reporting system.

Mexico presented its Emission Reduction Initiative (the document describing the National REDD+ System) to the World Bank’s Carbon Fund in December 2016, and the Carbon Fund accepted it, making Mexico one of the first countries to be eligible to receive payments-for-performance from the Fund. As this case study was being written, Mexico was in the process of negotiating its Emissions Reductions Purchase Agreement with the Bank.

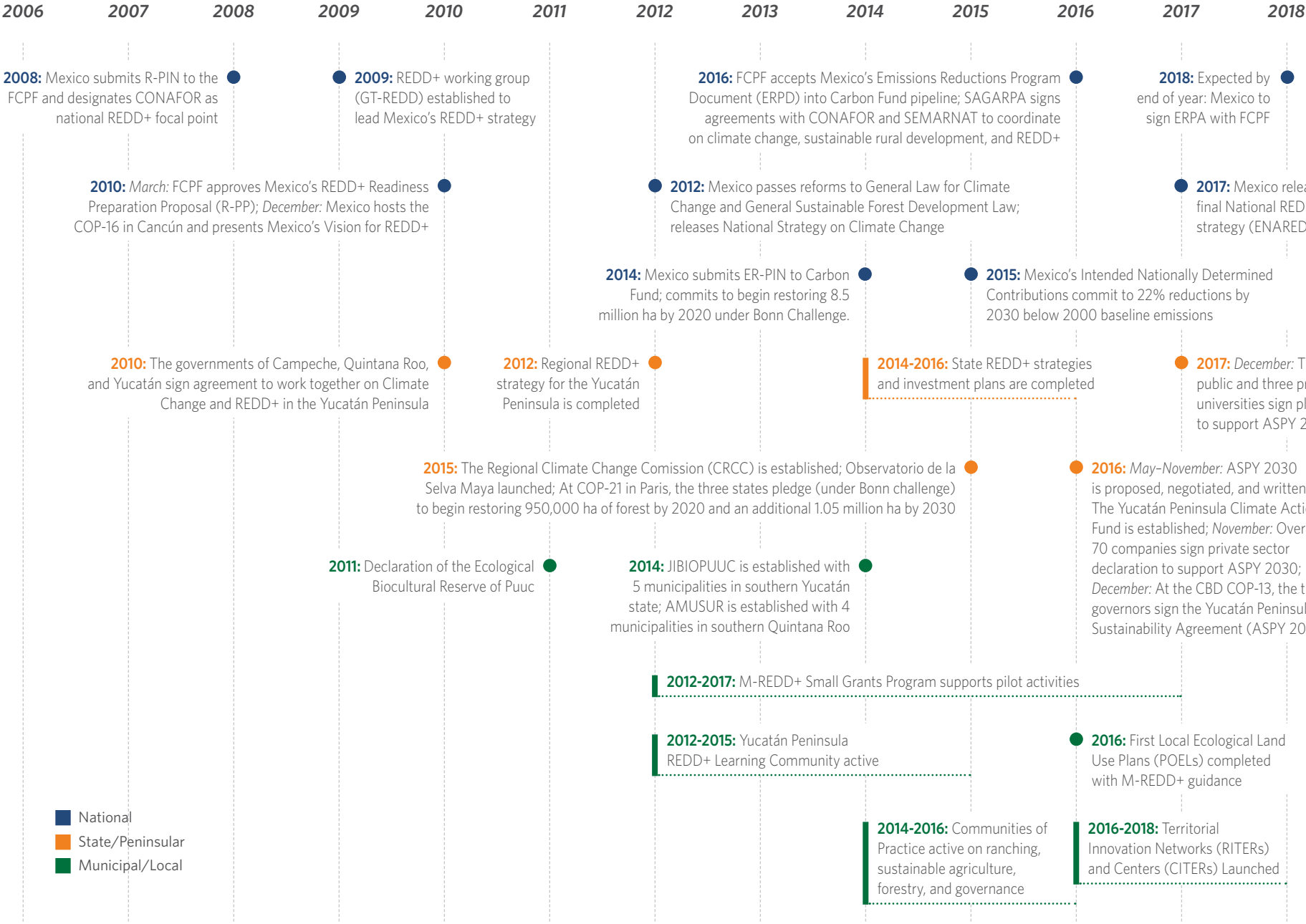
Mexico's National REDD+ System is a true nested approach that defines clear roles, responsibilities, and benefits for the state and local levels. State governments were tasked with developing their own state-level REDD+ strategies and state-level funds for managing payments-for-performance. Additionally, the states participated in a working group with CONAFOR to jointly develop and define the national reference level. Municipalities in critical forested areas within each state were responsible for forming inter-municipal associations (e.g. JIBIOPUUC) and creating inter-municipal Investment Programs which define the activities that will be implemented to reduce emissions.

Payments-for-performance for emissions reductions will flow into a national fund, based on performance against the national reference level (which was defined as a 10-year historic average). The national government will transfer funding to the states based on their performance against their portion of the reference level. States will then finance activities identified in the inter-municipal Investment Programs; payments from state to municipal scale will be de-linked from carbon.

Because the state and national REDD+ systems were developed in parallel and with a fair amount of communication between levels, they are aligned and compatible systems that allow for national measurement and monitoring (to avoid leakage and ensure policy alignment) as well as locally-defined strategies and implementation (to ensure targeted approaches and local level participation and buy-in).

If carbon payments from the World Bank or elsewhere materialize, Mexico and the Yucatán Peninsula are well-positioned to receive them and allocate them toward proven practices that are ready to be scaled up. A critical point in ensuring success of the program will be the degree to which Mexico is able to utilize the REDD+ finance to catalyze changes in their subsidy system, leverage other forms of external investment, and coordinate diverse finance streams.

Project Timeline



5. Lessons Learned

1. Jurisdictional programs should not try to do everything and be everything. There are key interventions that are more operationally feasible at a smaller, landscape scale. There are interventions that need to be driven within sectors. The jurisdictional program should play a key role in developing a shared understanding of the problem and the opportunity among the main actors and facilitate a truly shared vision amongst those actors so that they each feel materially bought into making the vision a reality. They should help identify and drive jurisdictional policy changes and strengthen jurisdictional institutions. But implementation will then often be driven independently, at the appropriate levels and within the appropriate sectors. As implementation unfolds, the jurisdictional program can help ensure solutions are working together to reinforce each other, can help empower innovation through measurement and monitoring frameworks, can increase transparency, and can improve chances for effective collaboration. Jurisdictional programs need to do a better job of focusing on where they can add value, rather than trying to lead everything.
2. Jurisdictional programs, if well-developed, take a long time to bring together. Long-term, predictable, funding sources are critical to success. Large-scale institutional change takes incredible patience and requires a backbone organization that can see the big picture, link actors, and maintain progress, especially when outside factors can create unexpected roadblocks. The USAID-funded M-REDD+ Program provided US\$ 30 million over seven years to help develop and establish the Yucatán Peninsula Jurisdictional Program and Mexico's National REDD+ System. Smaller-scale, shorter-term, or fragmented funding would not have brought together a program with the same level of coherence or collaboration. Donors interested in supporting jurisdictional programs need to have realistic expectations of the time and level of funding necessary. Concentration of resources in high-priority jurisdictions may lead to better results.
3. The contribution of TNC as a backbone institution provided key momentum, funding, and continuity to the Yucatán Peninsula Jurisdictional Program, but leaves a capacity gap in terms of local organizations that can fulfill this role at different levels. The state governments have noted that TNC's contribution as a convener helped improve transparency and legitimacy for the jurisdictional program. However, the program has over-relied on TNC as a convening organization, which leaves uncertainty on the part of other capable partners on where they should step in. While a strong backbone organization is recommended at the start, the process needs to foster a networked leadership approach in which multiple actors share governance responsibility and mutual accountability. Capacity-building is needed to help local institutions assume this role at the whole systems level, or at the sectoral and community levels.
4. Long-term permanence is improved when the program is built as a coalition, rather than relying on one focal point. As government administrations change in Mexico, so do priorities and programs. This can put a jurisdictional program at risk of being abandoned when a new administration comes in and sees the effort as a vestige of another political party. By bringing together three state governments in a high-profile agreement, the Yucatán Peninsula Jurisdictional Program was able to avoid this pitfall. As one administration in one state switched out, the other two were there to provide continuity and make sure the incoming state government was brought into the fold. The same process was successful at the municipal scale with the inter-municipal associations.
5. Programs can't shy away from key leverage points. A major challenge, at all scales, in Mexico has been gaining true buy-in and participation of the agricultural sector, both in the public and private spheres. While the Ministry of Agriculture participated in multiple components and has signed high-level agreements indicating desire to collaborate, real change in their programs and policies has been slow to materialize. Making changes to these has often been deemed too difficult, or too politically-fraught, to be worthwhile. But if the true leverage point for change is shifting domestic subsidies, the program needs to design an approach, which may be long-term, that eventually catalyzes a shift.

6. Create gravity. The creation of a coalition of actors with shared interests and goals in the Yucatán Peninsula is making it much easier for others—whether donors, investors, federal institutions, universities, or companies—to contribute to a common effort. The “gravitational force” of the growing ASPY 2030 coalition can counter the tendency of organizations to pursue solutions in isolation.
7. Creating a shared understand of landscape dynamics among key stakeholders was critical for the program. Holistic understanding of complex landscape dynamics is necessary for effective action to influence landscapes but cannot be achieved through isolated analysis. The program aimed at building productive dialogue among the diverse, autonomous actors who drive those landscape dynamics. The shared understanding will hopefully be strengthened over time by integrating insights through the Learning Community and by increasing transparency and the flow of information among actors through the Maya Forest Watch.
8. Workshop fatigue is real. Building a shared vision and creating a networked leadership system requires a lot of meetings. Getting buy-in and ensuring adequate participation requires unending workshops. This can make actors lose motivation and start to drop out of the process. Concrete, tangible, results, such as those created by the pilot projects, are necessary to maintain faith that the process is worthwhile. Programs need to plan for short-term results while keeping their eye on the long-term outcomes.
9. Don't underestimate the power of sharing. The Learning Community and the Communities of Practice have been real leverage points in the Yucatán Peninsula process. Bringing people together who don't know each other, but have a real reason to collaborate and learn, and helping them build relationships, has created a ripple effect that has greatly amplified the results of the program. Ranchers and farmers who participated in the Community of Practice learning exchanges more readily adopted, implemented, and even invested in sustainable innovations. Likewise, participants in the network of NGOs now reach out to each other to exchange information, expertise and resources. There are more examples in the region of model ranches and farms with different levels of innovation and a variety of practices that can engage producers and technicians in a learning conversation and experience about sustainable landscape management.

6. Conclusion

The jurisdictional program of the Yucatán Peninsula has demonstrated a structured model for collective system leadership that is greatly reflective of a unique Mexican vision for sustainability where conservation and sustainable rural development go hand in hand. Initial conditions presented both challenges (high deforestation and rural poverty) and opportunities (a recognition of the need to work together). Numerous processes were initiated to build a shared understanding through up-to-date analyses on the drivers of landscape change. Pilot projects were created to ensure there were viable pathways to achieve goals on the ground. And prominent, high-level commitments to work together among the states created the momentum for action and accountability and provided an anchor for bringing in the necessary resources to achieve these landscape goals. Significant progress also came through local capacity-building, in developing the inter-municipal management councils and learning communities (which spun off to additional innovations), and development of comprehensive strategies for investment. Although the global REDD+ movement provided a motivating anchor for potential funding, it was a local vision of sustainable rural development that underlay the strategies. Additional successes have been seen in how local land use plans can provide legally-binding frameworks to balance conservation and production, in line with communities' aspirations, while countering to some degree the effect of agricultural subsidies in promoting deforestation. In short, committed local-level innovations and work can create significant progress and potential for more transformative results given enough time.

While ASPY 2030 has provided a prominent banner for jurisdictional-level sustainability and has developed quickly by building on existing goals and experiences, its success is by no means certain. There remains much work to do in implementing the strategies and monitoring progress to meet its ambitious goals, and many organizations still do not understand their roles and contributions clearly. It also may be several years before impacts on deforestation and sustainability can be measured with certainty. Political changes can still derail or delay progress. Regardless, ASPY 2030 has laid an impressive foundation with a collaborative and optimistic spirit that inspires and creates the enabling conditions for more rapid, tangible progress on the ground. Much of its power is in its collective aspect: ASPY 2030 is not a single organization, but rather a framework and an idea in which the people of the Yucatán Peninsula, regardless of their position, can see themselves and their potential contributions to move toward this vision of sustainability.

7. Annex: Annotated Bibliography

Relevant websites and online databases

1. Centro de Excelencia Virtual en Monitoreo Forestal en Mesoamerica: Repositorio Digital (Virtual Center of Excellence in Forest Monitoring in Mesoamerica: Digital Repository). Available at: <http://monitoreoforestal.gob.mx/repositoriodigital/>.
A multi-agency collaboration in Mexico that compiles a diverse range of resources, studies, independent, and academic literature on REDD+ and forest monitoring in Mexico, including many of the studies and resources produced under the M-REDD+ program. Several of the resources listed below can be found in this online repository.
2. Alianza M-REDD+. 2018. Enfoque Innovador: Abordando la deforestación y el desarrollo sostenible. (Innovative Focus: Addressing deforestation and sustainable development). Available at: <https://www.tncmx.org/territorios/>.
The official website of TNC Mexico website on the M-REDD+ project and work in the Yucatán Peninsula, currently being updated with additional news and resources.
3. USAID. Development Experience Clearinghouse (DEC). Available at: <https://dec.usaid.gov/dec/home/Default.aspx>.
More than 200 official publicly-available materials and reports produced under the M-REDD+ program and submitted to USAID, including many of the documents listed below, are available on USAID's online Development Experience Clearinghouse (DEC). Suggested search terms include: Mexico REDD+, "M-REDD+" or "Alianza M-REDD+."
4. Observatorio de la Selva Maya (Maya Forest Watch). Available at: <http://observatorioselvamaya.org.mx/>.
The official Maya Forest Watch website provides access to maps and analytical layers covering the Yucatán Peninsula, which were developed under the M-REDD+ program and incorporating additional data submitted by other collaborators.

5. eREDD+ Platform available at: Available at: <http://ereddplus.com:7776/LIDAR/>.
The eREDD+ Platform includes the full suite of maps developed with support of M-REDD+ at the national level and at the Yucatán Peninsula scale, allowing for REDD+-relevant monitoring of land use, tenure boundaries, deforestation, and activities at the national level. This site includes a high-resolution (0.5 to 1 hectare) land cover map of the Yucatán Peninsula developed by TNC and currently being validated by the federal government for improved spatial planning and decision making.

6. Fondo Climático de la Península de Yucatán (Yucatán Peninsula Climate Fund). 2018. Available at: <http://www.fondoclimaticopy.mx>.
The official website for the Yucatán Peninsula Climate Action Fund, providing an overview of the governance of the fund, news, and current fundraising priorities.

TNC programmatic documents and reports

7. Alianza M-REDD+. 2015. Construcción institucional para promover el desarrollo sustentable: Región Puuc. (Institutional Construction to Promote Sustainable Development: the Puuc Region). The Nature Conservancy, Mexico. (available on request)
This document details the process of development of the Biocultural Puuc region in the south of Yucatán state, from initial efforts to create a corridor for biological and cultural conservation (as part of a network of protected areas throughout the peninsula), to modern institution building and coordination for management across the different municipal boundaries, to the role of the intermunicipal council (JIBIOPUUC) in both leading on sustainable development in the region and also playing a key coordination role in the state's REDD+ strategy.
8. Alianza M-REDD. 2014. Conceptual Model of Mexico's National REDD+ System. Available at: https://pdf.usaid.gov/pdf_docs/PA00MW15.pdf.
This document provides a concise diagram of the design, components, and governance of Mexico's REDD+ program, particularly its nested characteristic and the development of analogous functions and processes at the municipal/local level, state level, and at the national level. While this is a simplified model, it helps the reader understand the logic of how M-REDD+ supported REDD+ institutional development in the Yucatán Peninsula, and why both a state and peninsular/territorial approach were necessary.
9. Alianza M-REDD+. 2017. REDD+ in Yucatán Peninsula: Joining Forces to Produce and Preserve. Accessed 30 June 2017. 5 pp. Available at: https://pdf.usaid.gov/pdf_docs/PA00N6KN.pdf.
This is a concise brochure of the REDD+ approach in the Yucatán Peninsula, including the "five pillars," or critical institutional components and strategies, that were created to underpin the program. This document also helps explain how the jurisdictional REDD+ is nested within the ASPY 2030 framework.
10. Alianza M-REDD+. 2017. The Mexico REDD+ Alliance Small Grants Program. 12 pp. Available at: https://pdf.usaid.gov/pdf_docs/PA00KS7K.pdf.
This short document gives an overview of the M-REDD+ Small Grants Program, main geographical areas of its work, and the major activities carried out as pilot projects for REDD+. This program helped establish knowledge on best practices that could be included in the REDD+ program for capacity building and scaling up.

11. Alianza M-REDD+. 2017. Península de Yucatán: Centros de Innovación Territorial (CITER). (Yucatán Peninsula: Territorial Innovation Centers). Available at: <https://tnc.app.box.com/s/byus3775ervrgk9p125hdlcyp9t9uet9x>.

This fact sheet describes the development of Territorial Innovation Centers as regional schools for training and diffusion of best practices for the jurisdictional REDD+ and sustainability program. The CITERs are focused on specific productive themes—silvopastoral systems, traditional maize, community forestry, etc.—and help train individuals to become trainers in their own communities.

12. Alianza M-REDD+. August 2016. Guía Para La Búsqueda De Subsidios Para Proyectos De Conservación y Desarrollo Rural Sustentable. (Guide to Finding Subsidies for Conservation and Sustainable Rural Development Projects). Available at: https://pdf.usaid.gov/pdf_docs/PA00MW4Z.pdf.

This document provides a brief guide to partner organizations involved in the jurisdictional REDD+ program on how to find existing subsidy financing from federal sources to support REDD+ activities, particularly those that are focused on the training and adoption in improved agricultural practices.

13. Alianza México REDD+: USAID/M-REDD+. 2016. 10 Retos de Política Pública para el financiamiento de proyectos REDD+ en México: Síntesis para tomadores de decisiones. (10 Public Policy Challenges for financing REDD+ projects in Mexico: Synthesis for Decision Makers). Repositorio Digital Especializado. Available at: <http://monitoreoforestal.gob.mx/repositoriodigital/items/show/189>.

This document provides a list of major challenges decision makers should consider when working to access public finance to implement REDD+ programs and make them financially sustainable.

14. Bezaury-Creel, J.E., y L. Iglesias-Gutiérrez. 2007. El papel de los servicios ambientales para evitar la deforestación en México (The role of environmental services to avoid deforestation in Mexico), en J. Cavalier (ed.), Servicios de ecosistemas en América Latina. Lecciones aprendidas en agua, bosques y ecoturismo. The Nature Conservancy-USAID-Alex C. Walker Foundation, Cartagena de Indias, Colombia, pp. 17-26. Available at: <http://www.katoombagroup.org/-katoomba/documents/tools/ServiciosdeEcosistemasenLA-TNC.pdf>.

This study gives an excellent background on Mexico's implementation of payments for ecosystem services to reduce and prevent deforestation, their early results, and limitations.

15. Cepeda-González, M.F. July 2015. Clínica de Estrategias Estatales REDD+: Rumbo a su Construcción. (Clinic on State REDD+ Strategies: Path to its construction) México. 58 pp. USAID, Alianza M-REDD+. Available at: https://pdf.usaid.gov/pdf_docs/PA00MW6D.pdf.

This document describes the multi-stakeholder process carried out, facilitated by the M-REDD+ program, to work with states, civil society, and communities to develop the state REDD+ strategies in Campeche, Quintana Roo, and Yucatán as well as in Chihuahua, Oaxaca, Jalisco, Tabasco.

16. Cepeda, C. and A. Amoroso. 2016. Experiences on sustainable rural development and biodiversity conservation in the Yucatán Peninsula. The Nature Conservancy, Mexico. Available at: http://www.biosakbe.com/desarrollo_rural_sustentable/docs/english/experiencias.pdf.

This document provides short case studies on 19 specific local sustainability initiatives carried out by NGOs or communities in the Yucatán peninsula, covering the themes of sustainable agriculture and ranching, sustainable forest management, forest landscape restoration, community enterprise development, and biodiversity monitoring and conservation. The purpose of the book was to highlight existing experiences to create greater regional consciousness on the sustainability contributions that a wide variety of stakeholders could make.

17. Cepeda M.F. and M. Vélez Laris. 2017. Catálogo de mejores prácticas para el campo y el hogar. The Nature Conservancy, Mexico. Available at: <https://www.mundotnc.org/nuestro-trabajo/donde-trabajamos/america/mexico/catalogo-de-mejores-practicas-para-el-campo-y-el-hogar.pdf>.
- An accessible field guide made within the M-REDD+ community of practice in the Yucatán Peninsula, which provides a visual guide to improved productive options for climate mitigation and improvement of livelihoods.
18. Cortez, R. December 2016. New Sustainability Agreement for Yucatán Peninsula Provides Model for Collaboration. Available at: <https://global.nature.org/content/new-sustainability-agreement-for-yucatan-peninsula-provides-model-for-collaboration>.
- A TNC blog news post detailing the signing of ASPY 2030 agreement in December of 2016, an overview of goals, context, and future directions for the program.
19. Ellis, EA, Ward, DA, Romero Montero JA, and Hernández Gómez IU. 2014. Evaluation and Field Survey of Timber Producing Communities for Assessing Improved Forest Management Opportunities for Community Forests in The Peninsula Yucatán and Cutzamala Early Action Site. Final Report. Alianza M-REDD+. Available at: <https://goo.gl/TBPL2K>.
- A detailed analysis of community forest operations in the Yucatán Peninsula, with a focus on assessing potential for improved community forestry in south Yucatán state and north Campeche state, two areas that are not as active in community forestry when compared to Quintana Roo.
20. Ellis, E.A., Romero Montero, A., Hernández Gómez, I.U. 15 August 2015. Evaluación y mapeo de los determinantes de deforestación en la Península Yucatán (Evaluation and mapping of the drivers of deforestation in the Yucatán Peninsula). 160 pp. Repositorio Digital Especializado. Available at: <http://www.monitoreoforestal.gob.mx/repositorioidigital/items/show/234>.
- The objectives of this study, carried out for M-REDD+, were to evaluate the drivers of deforestation in the Yucatán Peninsula between 2000 and 2013; sample and evaluate current deforestation in the field; and analyze and map the drivers of deforestation in the Yucatán Peninsula based on the data from Global Forest Watch/University of Maryland.
21. Fishbein, Greg, and Donna Lee. 2015. "Early Lessons from Jurisdictional REDD+ and Low Emissions Development Programs." Arlington, Virginia: The Nature Conservancy. Available at: https://www.forestcarbonpartnership.org/sites/fcp/files/2015/January/REDD%2B_LED_web_high_res.pdf.
- In recent years there has been increasing support for REDD+ and low emissions development (LED) at a jurisdictional scale. Jurisdictional efforts were designed to overcome the shortcomings of project-based approaches by working across land-use types and with multiple stakeholders to create models for national implementation. This study analyzes eight of the most advanced REDD+/LED initiatives worldwide—including a critical look at the success and challenges to date—to understand what is needed to succeed going forward. Jurisdictions studies include: Acre, Brazil; Berau, Indonesia; Ghana's cocoa ecoregion; Mai Ndombe, Democratic Republic of the Congo (DRC); San Martín, Peru; São Félix do Xingu, Brazil; the Terai Arc, Nepal; and the Yucatán Peninsula, Mexico.

22. Goldstein, A., Erickson, H., Gephart, N., & Stevenson, S. 2016. Evaluation of land use policy and financial mechanism that affect deforestation in Mexico. México: Alianza México REDD+; USAID. Available at: <http://www.monitoreoforestal.gob.mx/repositoriodigital/items/show/168>.

This report helpfully reviews the land use and forest policies in Mexico and related literature, discusses the reach of agricultural subsidies, and its known relationship with deforestation and land use change. It also reviews previous and on-going policy approaches to addressing deforestation in Mexico.

23. Guevara Sanginés, A.I. y Lara Pulido, J. 2014. Mapeo de Fondos Disponibles a Nivel Nacional e Internacional para Financiar Proyectos REDD+ en México. (Mapping Available Funds at the National and International Level to Finance REDD+ Projects in Mexico). USAID. Alianza M-REDD+. México. 29 pp. Available at: https://pdf.usaid.gov/pdf_docs/PA00MW4W.pdf.

This financial analysis was carried out for the M-REDD+ program to identify existing national and international funds available to carry out the REDD+ strategies and activities, in line with the goals of improved practices and sustainable rural development.

24. Ithaca Environmental. 2015. Proceso REDD+ SES (salvaguardas sociales y ambientales) en la Península de Yucatán: Reporte final y lecciones aprendidas. (REDD+ Social and Environmental Safeguards Process in the Yucatán Peninsula: Final Report and Lessons Learned). USAID, Alianza M-REDD+. México. Available at: <http://monitoreoforestal.gob.mx/repositoriodigital/items/show/197>.

This document describes the process carried out to establish the governance structure for REDD+ Social and Environmental Safeguards (SES) in the Yucatán Peninsula. It describes the process of awareness and capacity building on environmental and social safeguards for REDD+ and describes the process of interpretation of indicators to make them adequate to the context of the Yucatán Peninsula.

25. Jenkins, M. 2017. "Maya Gold." The Nature Conservancy Magazine: 28-39. Available at: <https://www.nature.org/magazine/archives/maya-gold.xml>.

This article provides an excellent snapshot and overview of the Yucatán Peninsula program, including interviews with TNC staff, farmers participating in the REDD+ program, and government partners, which provides the cultural and environmental context for the challenges faced by the program.

26. Lara Pulido, J.A., Guevara Sanginés, A., Alba Reyes, R. 2014. Costos y beneficios de diferentes tipos de uso de suelo en México (Costs and Benefits of Different Types of Land Use in Mexico). USAID M-REDD+ Project. 107 pp. Available at: https://pdf.usaid.gov/pdf_docs/PA00MW13.pdf.

This study provides an economic analysis of the costs and benefits of adopting and implementing improved agriculture, forestry, and productive practices in Mexico, which provided essential understanding for proposing and implementing specific practices in the context of the Yucatán Peninsula REDD+ program.

27. Proust, S., Fonseca, S.A., and Cepeda, M.A. 2015. CTC REDD+ de la Península de Yucatán: Análisis de los determinantes de la deforestación y acciones REDD+ en la Península de Yucatán. (CTC REDD+ of the Yucatán Peninsula: Analysis of the drivers of deforestation and REDD+ action in the Yucatán Peninsula). USAID, TNC, Alianza México REDD+, México, Distrito Federal. Available at: <http://www.biodiversidad.gob.mx/corredor/cbmm/pdf/18-analisis-determinantes-deforestacion.pdf>.

This study, carried out of the peninsular Consultative Technical Working group for REDD+, uses the results of the full study of drivers (Ellis et al. 2014) to identify priority regions in the Yucatán Peninsula for different REDD+ strategies where different drivers dominate. This analysis helped to develop sub-regional focal programs on, for example, sustainable cattle intensification, improved traditional milpa, conservation agriculture, and improved forest management.

28. Rodríguez Canto, A.; González Moctezuma, P.; Flores Torres, J.; Nava Montero, R.; Dzib Aguilar, L. A.; Pérez Pérez, J. R.; Thüerbeck, N. y González Iturbe, J. A. Milpas de las comunidades mayas y dinámica de uso del suelo en la Península de Yucatán (Milpas of the Mayan Communities and Dynamics of Land Use in the Yucatán Peninsula). Centro Regional Universitario Península de Yucatán de la Universidad Autónoma Chapingo. Mérida, Yucatán.
- Executive Summary (20 pp): https://pdf.usaid.gov/pdf_docs/PA00MW9H.pdf.
 - Full report (436 pp): https://pdf.usaid.gov/pdf_docs/PA00MW9J.pdf.

This comprehensive report describes the current state of traditional Mayan milpa production and the relationship to land use in the Yucatán Peninsula. It covers sources of income, productive diversity, traditional practices, and categorization of genetic and cultural diversity within these communities.

This study provides a critical base for developing effective interventions to conserve and support traditional Mayan milpa farming in the Yucatán Peninsula.

29. The Nature Conservancy. June 2017. A New Roadmap for Conservation: How mapping technology is helping achieve sustainability in Mexico's forests. Available at: <https://global.nature.org/content/a-new-roadmap-for-conservation>.

This article provides an overview of the objectives, development, and application of the high-resolution land cover map and a map prototype for Sustainable Production Zoning (ZPS) Map prototype.

30. Woods Hole Research Center. Aboveground Forest Carbon Stocks in Mexico. Available at: <http://whrc.org/publications-data/datasets/aboveground-forest-carbon-stocks-in-mexico/>.

31. Cartus, O., Kellndorfer, J., Walker, W., Franco, C., Bishop, J., Santos, L., & Fuentes, J. M. M. (2014). A national, detailed map of forest aboveground carbon stocks in Mexico. *Remote Sensing*, 6(6), 5559-5588. Available at: <http://www.mdpi.com/2072-4292/6/6/5559>.

This analysis of above-ground biomass (i.e. forest carbon stocks) in Mexico was funded within the M-REDD+ program and helped support the case for where to support REDD+ activities, as the Yucatán Peninsula was demonstrated to have the highest forest carbon stocks in the country with high risk of deforestation. The complementary detailed article in the journal *Remote Sensing* is also listed above.

Documents on the 2010 three-state climate change agreement

32. Secretaria de Desarrollo Urbano y Medioambiente (SEDUMA). 7 December 2010. Acuerdo entre Gobernadores de la Península de Yucatán en materia de Cambio Climático Cancún, Quintana Roo (Agreement between the governors of the Yucatán Peninsula on Climate Change – Cancún, Quintana Roo). Available at: <http://www.seduma.yucatan.gob.mx/cambio-climatico/acuerdo-gobernadores.php>.
 - Acuerdo General de Coordinación sobre el Cambio Climático de la Península de Yucatán. Available at: http://www.seduma.yucatan.gob.mx/cambio-climatico/documentos/acuerdo_gobernadores_py_cc.pdf.
 - Declaratoria De Los Estados De Campeche, Quintana Roo y Yucatán Para La Acción Conjunta Ante El Cambio Climático en la Península de Yucatán. Available at: http://www.seduma.yucatan.gob.mx/cambio-climatico/documentos/declaratoria_py_cc.pdf.

The documents above are the two linked agreements that were made by the three state governments of the Yucatán Peninsula in December 2010 to work together on climate change. These include a general coordination agreement as well as a joint declaration of action on climate change.

Documents on the Yucatán Peninsula regional and state REDD+ strategic plans

33. El Colegio de la Frontera Sur: Unidad Campeche. 2012. Estrategia Regional de la Península de Yucatán para la Reducción de Emisiones por Deforestación y Degradación Forestal. Available at: http://www.ccpy.gob.mx/pdf/Regional/documentos-regional/redd/informe_actividades/informe_final.pdf.
34. Gobierno del Estado de Campeche. Estrategia Estatal De Reducción De Emisiones por Deforestación y Degradación (REDD+ CAMPECHE). Available at: <http://www.ccpy.gob.mx/agenda-campeche/redd/>.
35. Gobierno del Estado de Quintana Roo. Estrategia Estatal De Reducción De Emisiones Por Deforestación y Degradación (REDD+). Available at: <http://www.ccpy.gob.mx/agenda-qroo/redd/>.
36. Gobierno del Estado de Yucatán. Estrategia de Reducción de Emisiones por Deforestación y Degradación Forestal (REDD+) del Estado de Yucatán. Draft version available at: <http://www.ccpy.gob.mx/agenda-yucatan/redd+/>.

The above documents include the Yucatán Peninsula regional REDD+ strategy created in 2012, and the three individual state REDD+ strategies which were developed later using the regional REDD+ strategy as a guide. The regional and state REDD+ strategies provide significant background information on biophysical conditions and policies in the states, but the specific strategies to be carried out are detailed in the investment plans

ASPY 2030 Agreements, Announcements, and Plans

37. Acuerdo para la Sustentabilidad de la Península de Yucatán, ASPY 2030. (Yucatán Peninsula Framework Agreement on Sustainability, ASPY 2030). Available at: <http://ccpy.gob.mx/agenda-regional/aspy2030.php>.
 - Text of agreement available at: <http://ccpy.gob.mx/pdf/Regional/aspy/aspy2030.pdf>.

This is the full original text of the ASPY 2030 agreement signed by the three state governors at the CBD COP-13 on 10 December 2016.

38. Declaratoria del sector privado (empresas agropecuarias, forestales y financieras) para la Sustentabilidad de la Península de Yucatán. (Declaration of the private sector – agriculture, forestry, and finance firms—for the Sustainability of the Yucatán Peninsula). December 2016, Cancún, México. Available at: <https://www.mundotnc.org/nuestro-trabajo/donde-trabajamos/america/mexico/declaracion-del-sector-privado-peninsula-de-yucatan.pdf>.
39. TNC. 2017. Declaratoria del sector privado y financiero para la Sustentabilidad de la Península de Yucatán: Empresas Firmantes (Private and financial sector declaration for the Sustainability of the Yucatán Peninsula: Signing businesses). Available at: <https://www.mundotnc.org/nuestro-trabajo/donde-trabajamos/america/mexico/empresas-han-firmado-el-acuerdo.xml>.
40. ASPY 2030. December 2017. Declaratoria del sector privado y financiero para la Sustentabilidad de la Península de Yucatán: REPORTE DE AVANCES 2016-2017. (Private and financial sector declaration for the Sustainability of the Yucatán Peninsula: Progress Report 2016-2017). Available at: <https://www.mundotnc.org/nuestro-trabajo/donde-trabajamos/america/mexico/declaratoria-del-sector-privado-y-financiero-para-la-sustentabilidad-de-la-p.pdf>.
- The first document above includes the private sector declaration as a complement to ASPY 2030, signed in late November 2016. The second document lists all companies who signed. The third document provides a one-year progress report on carrying out the private sector declaration.
41. SAGARPA. 16 December 2016. Firman SAGARPA y SEMARNAT acuerdo de colaboración para preservar bosques y fortalecer la sustentabilidad alimentaria del país. (SAGARPA and SEMARNAT sign collaboration agreement to conserve forests and strengthen food security of the country). Available at: <http://www.sagarpa.gob.mx/Delegaciones/jalisco/boletines/Paginas/2016B12002.aspx>.
- The above link is an announcement that details the agreement signed between SAGARPA and SEMARNAT to improve coordination to protect forests and achieve improved food security across the country, signed in part to support the goals of ASPY 2030.
42. Universidad Marista. 21 December 2017. Instituciones de educación superior se suman al Acuerdo para la Sustentabilidad de la Península de Yucatán. (Higher education institutions join the Yucatán Peninsula Agreement for Sustainability). Available at: <http://www.marista.edu.mx/noticia/1662/instituciones-de-educacion-superior-se-suman-al-acuerdo-para-la-sustentabilidad-de-la-peninsula-de-yucatan>.
- The above agreement was signed one year after ASPY and details the commitment of public and private universities to act to support the goals of ASPY 2030.

National government documents and strategies on REDD+ and climate change

43. National Forestry Commission (CONAFOR). 2010. Mexico's Vision on REDD+. Zapopán, Jalisco, México. Available at: http://www.conafor.gob.mx:8080/documentos/docs/35/2520Visi%F3n%20de%20M%E9xico%20para%20REDD_Ingles.pdf.
44. CONAFOR. August 2017. Estrategia Nacional para REDD+ (National Strategy for REDD+) (ENAREDD+): 2017-2030. Zapopán, Jalisco, México. Available at: <http://www.enaredd.gob.mx/wp-content/uploads/2017/09/Estrategia-Nacional-REDD+-2017-2030.pdf>.
- The above documents include Mexico's Vision on REDD+ and the finalized national strategy on REDD+, which establish REDD+ as being based in Sustainable Rural Development and define the priority regions for action.

45. FCPF. 17 November 2016. Emissions Reduction Initiative (IRE) Document. Emissions Reduction Program Document: Mexico. Anexo 3: Resúmenes de Programas de Inversión (Annex 3: Summaries of Investment Programs)
- Full ERPD available at: https://www.forestcarbonpartnership.org/sites/fcp/files/2016/Nov/Final_ENGLISH_20november_2016.pdf.
 - Annex 3: Summaries of Investment Plans (2016): Available at: <https://www.forestcarbonpartnership.org/sites/fcp/files/2016/Oct/Anexo%203.%20Resumenes%20Programas%20de%20Inversi%C3%B3n.pdf>.

The above documents include the ERPD (synonymous with the Emissions Reduction Initiative) submitted to the FCPF, which also includes the summaries of the investment plans to be carried out in specific regions of the states of Campeche, Chiapas, Jalisco, Quintana Roo, and Yucatán.

Relevant third-party literature and studies

46. Anderson, E N, and Barbara Anderson. 2011. "Development and the Yucatec Maya in Quintana Roo: Some Successes and Failures." *Journal of Political Ecology*, 18: 51–65. Available at: <https://journals.uair.arizona.edu/index.php/JPE/article/view/21706>.
- This article examines the resilience of traditional Mayan agriculture in the face of major changes in markets, an increasing emphasis on large-scale commodity, and climate change, providing insights for how local-scale Mayan agriculture could be better supported.
47. Balderas Torres, A., Skutsch, M., de los Ríos, E. 2015. Pro-poor analysis of REDD+ activities designed to tackle drivers of deforestation and forest degradation in the Yucatán Peninsula. Technical Series: Forest Governance and Economics. San Jose, Costa Rica: IUCN-CIGA. Available at: <http://www.biodiversidad.gob.mx/corredor/cbmm/pdf/5-pro-poor-analysis-redd-activities-designed-tackle-drivers-deforestation-forest-degradation-yp.pdf>.
- This paper gives an excellent overview of the social, historical, biophysical, and development context of the Yucatán Peninsula and examines how REDD+ interventions can be designed to both alleviate poverty while addressing drivers of deforestation.
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- This article examines the resilience of ejido community land tenure in Quintana Roo in the face of 1992 reforms that were predicted to lead to increasing levels of privatization (i.e. parcelling) of ejido land. This paper provides useful insights on how ejidos have responded to changing policy and economic context, helpful for understanding how REDD+ interventions might influence ejido land management decisions.
49. Bastos Lima, M. G., Visseren-Hamakers, I. J., Braña-Varela, J., & Gupta, A. 2017. A reality check on the landscape approach to REDD+: Lessons from Latin America. *Forest Policy and Economics*, 78, 10–20. Available at: <https://doi.org/10.1016/j.forpol.2016.12.013>.
- This article examines multiple large-scale REDD+ initiatives in Latin America that are trying to reconcile multiple landscape functions, sectors, and stakeholders while also achieving large scale reductions in deforestation and measurable emissions reductions. The paper examines REDD+ initiatives in Brazil, Ecuador, and Mexico, particularly the Yucatán Peninsula REDD+ program.

50. Carrillo-Fuentes, J. C. and Velasco-Ramírez, A. 2016. Estudio legal: Facultades y responsabilidades del manejo forestal y del suelo ante REDD+ en México (Legal Study: Capabilities and responsibilities for forest and land management with respect to REDD+ in Mexico). CIFOR Occasional Paper. CIFOR. Available at: <https://doi.org/10.17528/cifor/006024>.

This article describes the powers and responsibilities of government bodies and agencies in Mexico—particularly at the federal level—to provide context and background for how they would need to participate in REDD+ initiatives, by examining existing relevant laws, programs, and policies.

51. CIFOR. 15 April 2010. Forests, Land Use, and Climate Change Assessment for USAID/Mexico. Final report prepared by the CIFOR team. Available at: http://www.ccmss.org.mx/descargas/forests_land_use_and_climate_change_assessment_for_usaidmexico.pdf.

This paper assesses Mexico's climate change challenges, with an emphasis on the vulnerability of ecosystems and biodiversity to climate change in Mexico, summarizes the country's climate change policies, strategies and programs, and the outcomes and lessons learned from past and ongoing climate change programs, including work supported by bilateral and multilateral agencies and donors.

52. Deschamps Ramírez, P., and Larson, A.M. 2017. The politics of REDD+ MRV in Mexico: The interplay of the national and subnational levels. CIFOR Occasional Paper no. 171. Available at: <https://doi.org/10.17528/cifor/006568>.

This paper examines the development of Mexico's approach to REDD+ MRV and its interplay with politics at the national and state levels. It arises from questions aimed at comprehending actors' different interests and understandings of REDD+ MRV, why visions vary, how coordination functions vary across actors and scales, underlying factors affecting coordination, and how these can be addressed to create a functioning multilevel REDD+ MRV system.

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This study conducts a comprehensive literature review of land use and land cover change in the Yucatán Peninsula over the last 50 years to identify the direct and indirect causes of forest cover change. The publications reviewed reveal regional differences in forest cover and land use change within the three states. Cattle ranching is identified as the most immediate cause of deforestation, following by agriculture, and mostly within the states of Campeche and Yucatán.

54. Madrid, L., J.M. Núñez, G. Quiroz, and Y. Rodríguez. 2009. La Propiedad Social Forestal En México (Social Forest Property in Mexico). *Investigaciones Ambientales* 1(2): 179-96. Available at: <http://www.revista.inecc.gob.mx/article/view/75#.WutLo4gvxJw>.

This article provides a helpful review of social forestry land tenure in Mexico, which includes all forest land that is under ownership and management of ejidos or communities. The article finds that 55% of all forests in Mexico are under social property.

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This document provides the methodology that TNC used to analyze the value chains for cattle, maize, and soy in the Yucatán Peninsula.

56. Porter-Bolland, L., Bonilla-Moheno, M., Garcia-Frapolli, E., & Morteo-Montiel, S. 2015. Forest Ecosystems and Conservation. In G. A. Islebe, S. Calmé, J. L. León-Cortés, & B. Schmook (Eds.), *Biodiversity and Conservation of the Yucatán Peninsula* (pp. 377-398). Cham: Springer International Publishing.
- Chapter on Forest Ecosystem and Conservation: https://doi.org/10.1007/978-3-319-06529-8_15.
 - Link to full book: <https://link.springer.com/book/10.1007/978-3-319-06529-8>.

This chapter provides a helpful overview and analysis of the principal processes and factors that affect land use and forest conservation in the Yucatán Peninsula, using the latest data to also analyze economic, social, and development trends in the peninsula.

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This article examines the impacts of the national ejido certification program, PROCEDE, which arose out of the 1992 land reforms. It finds that PROCEDE helped to replace old, inaccurate property maps with a more modern cadastral framework with the participation of local people and helped to resolve numerous land conflicts. It also discusses the concerns of modernizing certification schemes on the potential to weaken community institutions and accelerate deforestation; important considerations given that development of more accurate land use maps with communities plays a prominent role in the Yucatán Peninsula REDD+ program.

Endnotes

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