Alianza MéxicoREDD+
Con la gente por sus bosques

Community-based Climate Change & REDD+ Education in Mexico: Experiences and lessons learned in Oaxaca and Chiapas

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Students from Telebachillerato 37 in Montecristo de Guerrero, Chiapas participate in a workshop on climate change and the role of forests and local communities.

Key Messages

- *Through the Mexico REDD+ Alliance, Rainforest Alliance and partners are implementing community-based climate change education and capacity building activities, using the Forest Conservation and Climate Change Curriculum Toolkit, in order to ensure that indigenous and smallholder communities receive the knowledge needed to make informed decisions about their natural resources and actively participate in REDD+ discussions and actions.*
- *With regards to environmental and climate change education, teachers play a crucial leadership role within indigenous and smallholder rural communities in Mexico and can be stewards of change, helping to promote increased environmental awareness within their communities and translate education into action.*
- *Utilizing climate change education materials that are adapted to local contexts to explain complex issues, like deforestation drivers and climate change impacts in ways that learners can easily understand and readily relate to, can help lay the foundation for sustainable land and forest management, and further support the goals of strategies related to climate change and REDD+.*
- *The importance of collaborating with local educational partners in order to build increased support for climate change education and ensure its continued advancement is a key lesson learned during the M-REDD+ Alliance's educational work in Mexico and should be considered a priority for others wishing to undertake community-based climate education strategies.*

The M-REDD+ Project & a Need for Community Climate Change Education

Mexico is considered one of the world's most diverse countries, and is home to 10 percent of Earth's plant and animal species[1], with over 23,000 vascular plant, 500 mammal and 1000 bird species[2]. Yet many of the country's forests and ecosystems are in jeopardy of being destroyed due to the expansion of agriculture and development projects. Through a project funded by the United States Agency for International Development (USAID), a coalition of NGOs—including the Rainforest Alliance, The Nature Conservancy, Woods Hole Research Center and Espacios Naturales y Desarrollo Sustentable—is supporting the Mexican government and key players in the rural sector to address the drivers of deforestation in Mexico and implement strategies that encourage the protection of forests and ecosystems. This coalition, called Alianza México REDD+ (in English, the Mexico Alliance for Reducing Emissions from Deforestation and Degradation, or the M-REDD+ Alliance), is specifically working at the national, regional and community levels to advance REDD+ and sustainable land management policies and programs. The M-REDD+ Alliance is further supporting the development

DEFINITIONS

- **REDD+:** Reducing Emissions from Deforestation and Degradation plus other strategies, like forest conservation and sustainable forest management which encourage the protection of trees.
- **Education:** With regards to this case study, education is considered the deliberate act of providing instruction and sharing information in order to raise awareness of a particular topic, enhance a community's knowledge-base and provide building blocks towards the practical application of that information.

of regional-level "early action" REDD+ pilot sites that stimulate sustainable low-carbon rural development and provide lessons and impacts that can be applied to the establishment of REDD+ strategies at the national and subnational levels. In these early action areas, the M-REDD+ Alliance provides technical assistance and training to support local communities in the implementation of best management practices in forestry, agriculture, ranching and land-use planning.

Complementing the work carried out in the early action sites are additional efforts to ensure that indigenous and rural community stakeholders have the tools and knowledge needed to engage in REDD+ actions and decisions that affect them and their natural resources. Understanding that education is a key entry point for ensuring communities are engaged and informed of REDD+ actions and policies that may affect them, The Rainforest Alliance, as part of the M-REDD+ Alliance, developed the Forest Conservation and Climate Change Curriculum Toolkit an educational guide that uses a suite of dynamic activities, adjusted for varying learning styles and literacy levels, to explain concepts like deforestation, forest degradation, REDD+, and climate change adaptation and mitigation.

This curriculum was adapted for local contexts in Oaxaca and Chiapas, and implemented regionally within 90 different communities – as seen in the map below - in order to enhance their understanding of local environmental issues and the ways in which community-based actions, like REDD+, reforestation and forest conservation, can benefit their communities and help combat climate change. Communities engaged in climate change education activities include Tuxtla Gutierrez, Chiapa de Corzo, Pijijiapan and Tapachula, as well as Oaxaca de Juárez and Guelatao.

This document details some of the key lessons learned throughout the process of implementing climate change education approaches in Chiapas and Oaxaca and highlights some of the innovative ways in which teachers and youth are using the knowledge they've gained to implement community action projects that are changing local perceptions about forests and climate change and helping to spark increased awareness of environmental conservation issues.

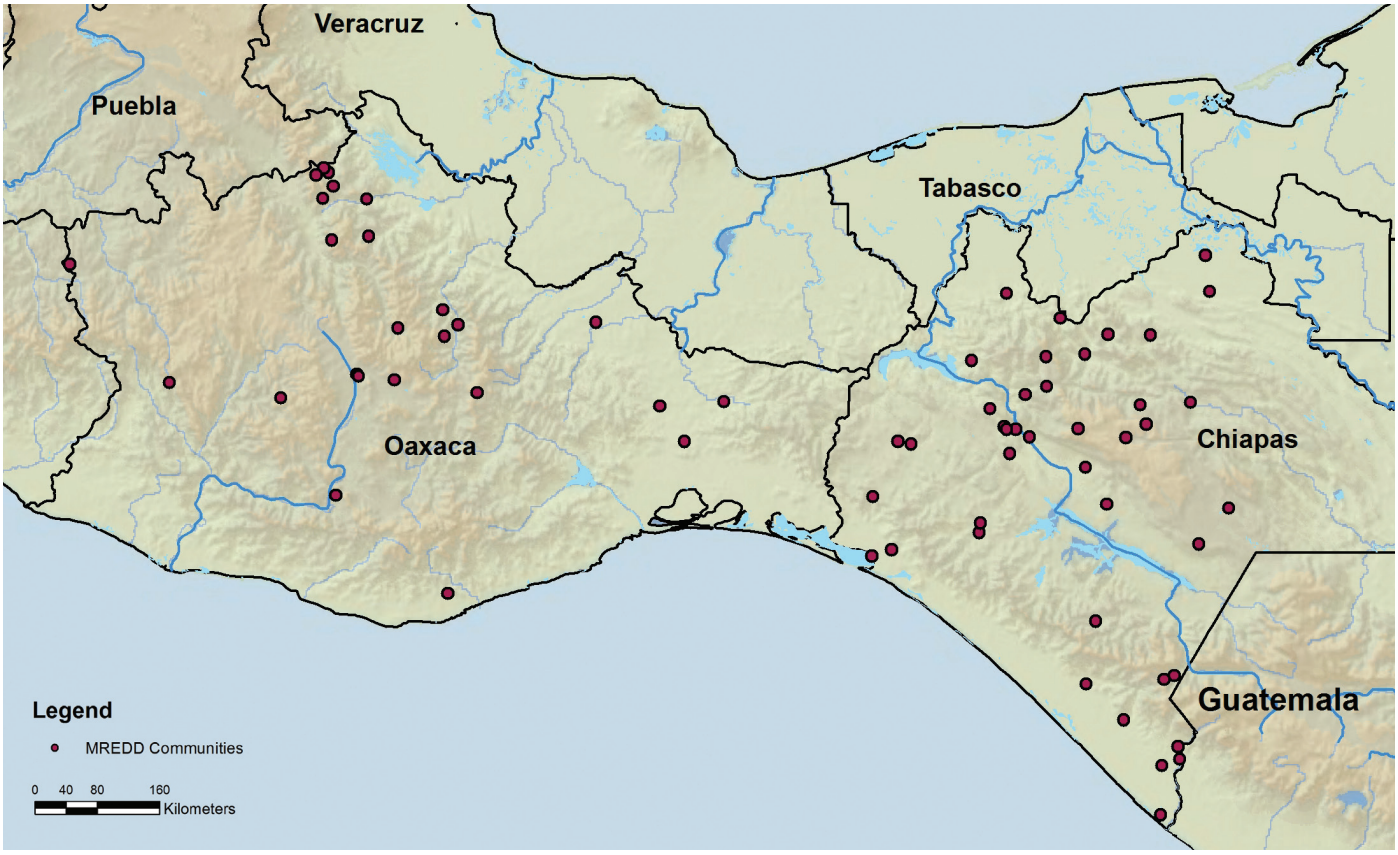
Developing Educational Approaches for Oaxaca & Chiapas & Adapting to Local Contexts

Education was identified as an important activity for the M-REDD+ project due to its ability to help communities understand the science behind climate change, and how to engage in actions and policy dialogue to better mitigate and adapt to its impacts. The regions of Oaxaca and Chiapas were selected because they maintain significant and unique forests which are sadly under threat. They are also home to many indigenous and forest-dependent communities – stakeholders who are frequently called upon to undertake carbon conservation activities, yet often do not receive access to education needed to make informed decisions about their land. Many communities within these regions are already engaging in REDD+ preparedness and are involved in the early-action sites, and climate change education should thus help add to their understanding of conservation and sustainable forest management.

In both regions, significant attention was allocated to recruiting educational partners and working with school systems that would help us reach rural and indigenous communities and ensure they obtain the climate change and environmental education they deserve. The Bachillerato Integral Comunitario (BIC) school system in Oaxaca, as well as the Telebachilleratos school system of Chiapas were prioritized because they both serve underrepresented indigenous and smallholder communities and within these communities, teachers are often regarded as leaders and can help initiate community action projects that lead to sustainable changes. See see section on partnerships for more information.

The process of designing curriculum materials that are adapted to local contexts then began. Modifying educational approaches and accompanying materials to ensure they resonate with community members and maintain relevancy within their lives is one of the most important tasks in implementing climate change education programming for communities. Examples of modifications undertaken to complete the *Forest Conservation* and *Climate Change Curriculum Toolkit* for both Chiapas and Oaxaca include:

- Utilizing information about local trends, such as deforestation rates and climate change impacts, to ensure that materials resonate with each community.
- Using varied types of activities, like visual, hands-on, individualized learning and group activities to address differences in learning styles.
- Ensuring that materials include images, maps, and graphs, for those with limited literacy skills, as well as clear, non-technical language with accompanying background information to help explain scientific processes.



Map of communities participating in climate change education activities through the work of the Mexico REDD+ Alliance. © 2014 Esri

The curriculum walks learners through topics like deforestation, the carbon cycle, and climate change using localized information on deforestation rates, types of vegetation, and forest degradation, as well as hands-on activities that teach participants about carbon stored in trees, the elements of the carbon cycle and the role that communities can play in protecting forests. Examples of interactive activities used within the curriculum can be found in chart 1.

For both Oaxaca and Chiapas, materials were adapted to include locally relevant information about climate change trends and projected impacts, rates of loss in forest cover, and the local drivers of deforestation. In this manner, the materials provide a basis upon which community members can discuss and analyze trends in deforestation, and changes in forest cover over time within the different regions. Through this analysis, students and teachers become aware of the alarming trend of deforestation and forest degradation that is occurring within Oaxaca and Chiapas.

In Oaxaca, deforestation is fueled in large part by the expansion of agriculture and cattle ranching. One study analyzing loss in forest cover during the time period of 1979 – 2001 estimated that a total of 750, 000 ha of natural vegetation was lost statewide and warned that if deforestation persists at this rate, by 2020, only 1/5 of Oaxaca's current natural vegetation will remain[3]. In Chiapas, the expansion of the agricultural frontier, as well as the extraction of forest resources such as harvesting for timber, has resulted in severe deforestation within the region. Across the state, an estimated 120,000 hectares of forest lost occurred during the period of 1990-2009 and 670,000 ha of forests degraded. Deforestation rates vary within the region—for example, the areas of Los Altos, Fronteriza, and Selva suffered the greatest loss of vegetation (21%) compared with an average of 11% in the rest of the state. If these trends continue, an additional 216,000 hectares of forest is expected to be destroyed in 2016[4].

Through evaluating forest cover data and drivers of deforestation, learners begin to understand the roles that these forests play as carbon sinks, and thus begin to recognize why forests are important and why the advancement of strategies to protect them —like REDD+—are vital.

As of September 2014, more than 150 teachers and students have been directly trained using the Forest Conservation and Climate Change Curriculum and have not only learned about issues that impact their communities, but are also starting to undertake community action projects that are having significant, positive impacts on local forest ecosystems.

Teachers Prove to be Crucial Climate Change Leaders

The *Forest Conservation* and *Climate Change Curriculum Toolkit* is helping youth better understand complex community issues

THE DIVERSE FORESTS OF OAXACA AND CHIAPAS

Oaxaca is one of the most ecologically diverse regions in the world, with a complex mosaic landscape of mountains, valleys and plains, and an altitude gradient ranging from 0 to 3700 meters above sea level. The resulting physiographic regions are home to a vast array of vegetation and species biodiversity and 11 different types of vegetation, including tropical forests, temperate forests, and moist deciduous/semi-deciduous forests.

Similarly to Oaxaca, the forests of Chiapas are also highly diverse. Chiapas is the second most ecologically diverse region in Mexico and it is home to over 1,400 tree species, spanning across 7 physiographic regions and a diverse range of topography with an altitude gradient ranging from 0 to 4100 meters.

Information retrieved from: Conservación de los bosques y cambio climático: El papel de las comunidades locales, Guía para el Educador, Oaxaca (July 2013).

and is encouraging them to become more involved in issues that affect them and their communities. And teachers are not only promoting use of the curriculum, but they are also taking what they've learned and are finding innovative ways to involve their students and the broader community in actions to promote the conservation of forests and combat climate change. In both Chiapas and Oaxaca, teachers have proven themselves to be leaders within their communities, often taking it upon themselves to host their own climate change education workshops for community leaders, municipal authorities, farmers, foresters, and others, and initiating community action projects around environmental issues like deforestation and forest conservation, recycling and waste reduction, water conservation, and composting.

The knowledge and excitement generated from participating in the climate change education workshops has transformed into lasting educational and sustainable land management impacts. In Chiapas, for example, teachers from the community of Montecristo de Guerrero helped embed the curriculum within her school, and also utilized the curriculum to inspire her students to care about the environment and forests within their community. Her students created gardens with traditional medicinal plants, a tree nursery, and took steps to make every classroom more environmentally friendly. The school is now planning to reforest an abandoned plot of land within the community, and will continue to undertake community conservation and restoration projects.

Othón Torres Osorio and Matea Solis Morales from the community of San Andrés Solaga in Oaxaca, also demonstrated leadership in advocating for the ongoing inclusion of the climate change curriculum within their school. They trained every teacher in their school in the subject matter and the use of the curriculum. They also assessed local forest issues within their community and got involved in community efforts to combat the proliferation of bark beetles (Dendroctonus spp), which are destroying local forests. Alongside local municipal authorities and community members, the students and teachers implemented a community action project focused on integrated pest management activities and reducing the presence of the beetles – some forest areas were burned and cut down in order to promote forest regeneration and in other areas approximately 3,000 trees were planted.

These are just some of the examples that demonstrate how teachers are building on the interest generated from use of the Forest Conservation and Climate Change Curriculum Toolkit and applying it to legitimate challenges within the community. Tens of thousands of trees have been planted as a result of these educational efforts. Additionally, the teachers, community members and students all have an increased interest in environmental and forestry issues and many are undertaking their own projects, often in partnership with local universities, on topics like greenhouse gas accounting, propagation, composting, and monitoring trends in major weather and climate events.

Teachers also serve as vital sources of information and knowledge in terms of obtaining feedback on the curriculum toolkit, improvements they recommend, and challenges they face when trying to implement the curriculum within their schools. In the community of San Andrés Solaga, for example, the majority of students travel from other communities to attend school, so one challenge that teachers experience is helping students realize the importance of protecting forests in San Andrés Solaga and contributing to reforestation activities around the school, even though these forests are outside of their hometowns. Using the climate change curriculum, the teachers were able to help students better understand the value of forests globally and locally.

The Importance of Partnerships

In both Chiapas and Oaxaca, establishing meaningful partnerships with educational stakeholders has proven to be an important component of ensuring long-term support for climate change education and embedding it within school programs.

In Oaxaca, we are working with the Colegio Superior para la Educación Integral Intercultural de Oaxaca (CSEIIO), a public state entity which oversees the subsystem of schools in Oaxaca known as Bachillerato Integral Comunitario, or BICs. A strategic partnership with CSEIIO has been instrumental in ensuring that we reach communities who may be lacking access to climate change education. BIC schools are located in rural and indigenous communities throughout Oaxaca and teachers focus heavily on ensuring that educational content takes into account

CHART 1. EXAMPLES OF ACTIVITIES THAT STUDENTS AND TEACHERS PARTICIPATE IN THROUGH USE OF THE FOREST CONSERVATION AND CLIMATE CHANGE CURRICULUM TOOLKIT

Activity	Details
The differences between weather and climate	Participants create maps detailing different climatic events in their communities. The aim of this activity is to help participants understand the difference between weather and that "climate" can be measured at varying levels—e.g. regional, national, and global—each of which has its own varying characteristics. Students graph changes in atmospheric CO2 over a 50-year period, and interview family members, neighbors, or elders in the community to learn about local climate trends.
The carbon cycle	Through an interactive game, participants pretend to be carbon atoms moving through the carbon cycle—through trees, the atmosphere, animals, wood products—in order to better understand how carbon atoms are exchanged between living things and the environment, and the important role forests play within the global carbon cycle.
Responses to climate change impacts	Participants create a 'freeze frame' photo of a major event like a hurricane or flood that happened within their communities. They then evaluate how their community responded to the event and create another freeze frame of what the community could have done differently. The goal of this activity is to help participants understand the important role that strategies like education, disaster preparation, risk management, and forest conservation can play in terms of adapting to climate change impacts.
Deforestation & the importance of forests	Participants learn about their region's forests, differences in forest types and the ecological and social importance forest resources maintain. Using local maps that contain data on deforestation and land use trends, participants evaluate changes over time and begin to understand the rate at which local forests are being destroyed and the factors that are driving this deforestation. Participants also learn how to estimate the amount of carbon stored in trees through simple mathematical calculations and subsequently begin to realize the value forests play as carbon sinks.
Payment for ecosystems services	Participants learn about the ecosystem services that forests provide as well as ways in which communities have obtained payments for protecting these services, for example through the sale of carbon credits. Participants analyze local communities that have benefited from implementing strategies to protect and sustainably manage forests and have capitalized on these activities through payments for ecosystem services. Examples of such communities include the Santiago Comaltepec community in the Sierra Norte of Oaxaca and the Federación Indígena Ecológica de Chiapas (Indigenous Ecological Federation of Chiapas).

These activities are adapted for local contexts to meet the needs of those who are learning, but the key learning objectives and the goals of each activity generally remain the same.

the unique varying cultures and communities located within their BIC schools are also very active within their communities. For example, there are courses specifically focused on teaching students about issues that directly affect their communities and encouraging students to develop, implement and manage community action projects that benefit their school and community[5]. This has allowed teachers to encourage the development of student–led climate change and forestry projects.

In Chiapas, the Rainforest Alliance has a Memorandum of Understanding (MOU) with the Secretary of Education which lays out strategies for collaborating effectively together and supporting a shared, long-term objective of scaling up environmental and climate change education in Chiapas. In partnership with the Secretary, we have rolled out the climate change curriculum across a subsection of the Chiapas school system, called Telebachilleratos, which includes many rural schools that serve underrepresented populations and often lack the financial resources for teacher trainings or implementing new, creative curriculum approaches. The Secretary has provided financial support to teachers who would otherwise be unable to travel to workshop locations and obtain the training they need to implement the climate change curriculum within their schools. The Secretary has also begun embedding the climate change curriculum toolkit within a larger program they have called Educating with Environmental Responsibility, which is being rolled out through all of school sub-systems within Chiapas. This support from the Secretary not only helps assure teachers of the credibility of this curriculum, but has helped us reach a much larger audience than we otherwise would have been able to.

After learning about the carbon cycle, teachers from communities throughout Oaxaca take measurements and confirm that when wood is burned, it releases carbon dioxide into the atmosphere.

Challenges

The process of implementing community-based climate change education in Chiapas and Oaxaca has been largely successful, but there have also been challenges along the way. One of the biggest hurdles has been encouraging teachers to participate in the workshops and gaining their support for the curriculum. Ongoing teacher strikes due to opposition against new public education reform policies has threatened our ability to ensure a high level of teacher participation in the education workshops. Another challenge that has hindered the ability of teachers to join workshops is distance. Since teachers come from different communities throughout the region, we try to find a location that is central and easy to get to but we cannot always accommodate everyone's needs. Despite the strikes and the challenge of distance, however, we have been able to engage a core group of enthusiastic teachers and have been pleasantly surprised by the number of teachers who attend the workshops, many of whom must travel hours to attend.

Ensuring that we can provide adequate support to teachers on an on-going basis in order to encourage the continued use of the curriculum has also been a challenge. We typically received highly positive feedback from teachers about the curriculum and its usefulness overall, but some have encountered difficulties in interpreting and implementing the curriculum within their classrooms. Ensuring that we are continually communicating with teachers to help them address challenges implementing the curriculum is critical to the long-term success of this education effort. Last year, we piloted a workshop model in Chiapas where the participants met 4 times throughout the year in order to share additional resources and discuss discussed shared challenges. This was very effective and we are now using this model in Oaxaca as well so that teachers can rely on one another for support.

A Look Ahead

The *Forest Conservation* and *Climate Change Curriculum Toolkit* is already helping communities better understand the importance of the environment and ways in which a community's actions can positively or negatively affect the ecosystems around them. The curriculum is inspiring youth to engage in actions to support their communities - as evidenced by the increasing number of school-led community action projects.

Throughout the next year, the MREDD+ Alliance will facilitate follow-up workshops and continue to provide support and guidance to teachers in Oaxaca and Chiapas who are implementing the curriculum and designing accompanying community projects. In this manner, we aim hope to continue to build enthusiasm for climate change and REDD+ education and ensure continuity and continued engagement on the part of students and teachers.

In the future, as REDD+ polices and strategies begin to take shape in Mexico, climate change education will further help lay the foundation for youth and indigenous communities to engage in national REDD+ activities. As the national government of Mexico begins implementing REDD+ and climate change strategies and policies, there will be a process of consulting with indigenous and rural community stakeholders. Without a basic understanding of the scientific concepts and issues inherent within forest conservation, climate change, and REDD+, it would be very difficult for these communities to engage in meaningful political discussions about their natural resources. The Forest Conservation and Climate Change Curriculum Toolkit provides this background and thus helps alleviate the gap in community-based education that is critical to ensuring that the rights and opinions of communities are considered and incorporated into REDD+ policies and programs.

Given the leadership that teachers have already shown within their communities, it is likely that they could maintain a very important role within the consultation process through continuing to promote the climate change curriculum toolkit, and explaining technical concepts related to REDD+ and climate change. This can help ensure that community stakeholders have the knowledge needed to actively engage in conversations and strategies concerning their forests and natural resources well into the future.

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