

Carbon project

Comunidad El Tarahumar Durango, Mexico



CAR 1648

A Cool Effect onsite report

February 2025

Improved Forest Management



As part of our Seller's Pledge, Cool Effect conducts project site visits as part of its due diligence process.

This visit marked our first trip to this community carried out by Elder Mendoza and Elsy Alvarado in February 2025.

The Cool Effect team was accompanied by the AGESA project developer, Alvaro Jaramillo and Cesar Osorio, along with the entire Comisariado of the community and the technical forest team, led by President Jose Guadalupe Pallan.

In August 2013, AGESA was founded to help companies operating in Mexico comply with the country's environmental regulations. In 2018, AGESA registered as a developer with the Climate Action Reserve, becoming one of the first in the Durango region developing over 10+ carbon projects.

Alvaro Jaramillo holds an undergraduate degree in Forestry and a master's in Public Administration from the University of Juarez. He also earned a master's degree in Environmental Impact Evaluation from the International Ibero-American University, a master's in Education from the Latin American Faculty of Social Sciences, and a doctorate in Environmental Sciences from the University of Seville, Spain. With over 30 years of experience as a professor at the University of Juarez in Durango, Mexico, he has dedicated his career to academia and environmental research.

Cesar Osorio earned a degree in engineering from the School of Agricultural Sciences at the Universidad Autónoma de Chihuahua. Like Alvaro, he has built a 30-year career working with forestry companies and INEGI (National Institute of Statistics and Geography). Since 2018, he has been developing carbon projects in Durango under AGESA.



Cesar Osorio,
Project Developer

Alvaro Jaramillo,
Project Developer

Elder Mendoza,
Cool Effect

Elsy Alvarado,
Cool Effect



What is AGESA?

A consulting firm that develops, manages, advises, and supervises projects, especially in renewable energy and climate action. They are involved in Climate Action Reserve (CAR) projects, particularly in Durango, Mexico.

How the revenue is used





This is the first time we have encountered a team or “brigade” specifically designated as “carbon credits” within a project.

For most of the year, brigade members carry out activities essential to the project’s methodology. Their forest maintenance work is highly labor-intensive; weeding, pruning, constructing firebreaks, building rock filter dams, cordoning, and reforestation.

During fire season, they transition into the community’s fire fighting brigade, playing a vital role in wildfire prevention and response. This dual responsibility not only enhances the project’s overall effectiveness but also provides brigade members with stable, full-time employment — ensuring year-round job security in a region with limited work opportunities.





Reforestation

Reforestation is regarded as essential for expanding forest cover. The carbon credit brigade works to restore deforested land through both natural and manual reforestation methods. A key technique used by the brigade is "cordoning," a process designed to enhance the likelihood of tree seed natural germination. By carefully preparing the land, they create optimal conditions for new growth, ensuring the long-term sustainability of the forest. The Cool Effect team witness this "cordoning" all through out the forest.

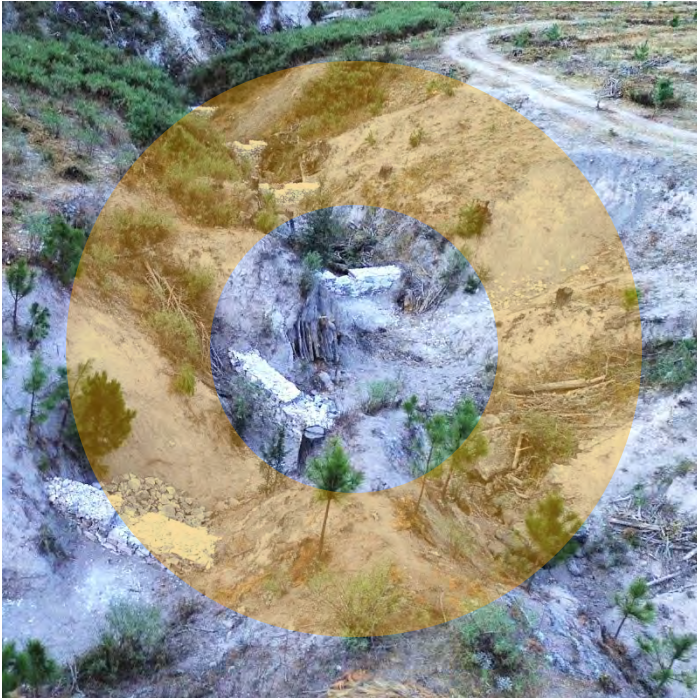


Rock filter dams

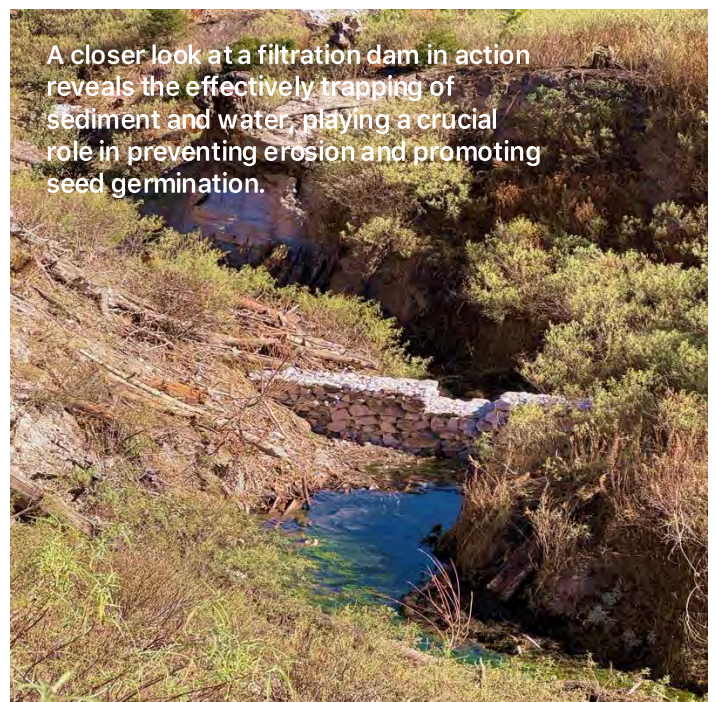
The carbon credit brigades have undertaken the monumental task of constructing rock filter dams.

These structures are designed to trap sediment in eroded areas, helping to restore the land and create suitable conditions for tree growth.

In some regions, rock filter dams are combined with cordoning efforts to enhance the overall recovery of degraded landscapes.



Example of a successful filter dam.



A closer look at a filtration dam in action reveals the effectively trapping of sediment and water, playing a crucial role in preventing erosion and promoting seed germination.

Slope smoothing

Slope smoothing is carried out exclusively using carbon credit funds due to its high cost. This process involves applying solid materials to conserve soil and prevent landslides or water erosion.



Other uses of carbon revenue

The indirect significant benefits to the community

- High-cost items like machinery are now a reality from the carbon credit revenue
- Round-the-clock surveillance with the construction of strategically located fire camera towers alert the forest brigade's fire detection threats.
- Water spring rehabilitation converting former livestock watering holes to natural water features.
- Road maintenance essential for emergency safety and daily transportation.
- Construction of an aerodrome accommodating air taxis, a common and essential means of transportation in these remote regions.



Acquisition of powerful excavating equipment aids the forest brigade's daily workflow.

Signs – Education

Signs like these are displayed throughout the community as an educational tool, addressing topics such as biodiversity, carbon credits, waste management, and social infrastructure development. They also serve to clearly demarcate community land boundaries. This initiative reflects the leadership's strong commitment to involving both the community and visitors at every step of the process.



Carbon Brigade



The Carbon Brigade consists of 17 men between the ages of 19 and 37, tasked with the immense responsibility of maintaining the forest, restoring land through erosion control efforts, and transitioning into the fire brigade during fire season. Their deep understanding of the forest landscape allows them to monitor conditions closely and report any concerns to the leadership.

The brigade's primary goals are fire prevention and carrying out the activities required by the carbon project. This group is typically composed of young men who might otherwise migrate from their communities and ejidos. By providing these job opportunities, the community leadership not only prevents the loss of this vital demographic but also equips them with comprehensive forestry training — preparing them as the future stewards and owners of the project.



Fire brigade machinery



The revenue from carbon credits has been instrumental in helping this community prepare for various emergencies. In this photo, we can clearly see the machinery purchased with these funds, all properly labeled.

This equipment has allowed the community to improve roads for emergency access, acquire a water cistern truck for firefighting, and secure a dedicated vehicle for brigade personnel transportation.

Without carbon credit revenue, these essential purchases and activities would have been out of reach due to their high costs.



Fire cameras



A total of seven fire detection cameras, equipped with long-range solar charging systems, have been installed throughout the community, providing full visibility across the area. One of these cameras is mounted at a height of 15 meters on the watchtower, allowing it to detect fire outbreaks and send real-time alerts to the leadership, fire brigade, and carbon credit brigade.

Additionally, during fire season, a watchman is stationed atop the tower with a hand radio, ensuring constant surveillance. His salary, funded by carbon credit revenue, covers fuel due to the tower's remote location, food, and health insurance.

This extensive visibility not only enhances the community's ability to respond swiftly to fire emergencies but also enables them to alert neighboring communities, strengthening regional wildfire prevention efforts.



Water



Work is being done to restore the 7 springs, like the one shown here, within the community. These springs were previously used as watering holes for cattle, which caused soil compaction and water contamination, eventually leading to the springs drying out. Additionally, with the ongoing drought in Durango, water has become even more scarce.

Thanks to the revenue from carbon credits, the leadership has prioritized water conservation and is using these funds to rehabilitate the springs. The springs have been fenced off to keep cattle and other large animals away, and efforts are underway to reforest the area with pine and fruit trees that also provide food for the birds.

It's important to highlight that without water or food, the birds will leave, and if there are no birds, pests will begin to appear. The leadership is optimistic that in two years, they will have restored clean water for the community.



Roads



Due to a lack of funds, the community's crucial roads were in severe disrepair, to the point that people had to travel on horseback, and some children had to hike long distances to get to school. With the revenue from carbon credits, the community was able to repair the roads, making transportation in and out of the area possible. Good roads are essential for medical emergencies and fire response. As the doctor in the community told the Cool Effect team: "I can say that in an emergency, every minute counts here".

Additionally, by repurposing a metal box, a bridge box, as seen in the picture, was installed. This allowed the road to be completed and also ensured that water could flow down the hill during the wet season. Now, children in the area can travel to school by motorcycle.

During our visit to the community of Ciénega de Caballos, we drove over the newly constructed bridge box, which has significantly improved the road conditions.



Aerodrome



The community is investing in the construction of an aerodrome, a vital project given its remote location and the surrounding natural canyons. Currently, the nearest hospital is a grueling seven-hour journey, which has tragically resulted in many preventable deaths. However, with a small airplane, that same hospital would be only 25 minutes away, underscoring the urgency of this investment.

Due to the high costs involved, the community has chosen to develop the aerodrome in stages, allocating a portion of each current and future carbon credit issuance to fund the project. The current issuance has covered the entrance construction and leveling of the landing area, while future issuances will finance the planned pavement of the runway and the acquisition of a small air ambulance. This air ambulance will serve a dual purpose—not only for medical emergencies but also for transporting essential supplies during crises.

Once completed, the aerodrome will accommodate air taxis, a common and essential means of transportation in these remote regions.



Biodiversity studies



Carbon revenue has enabled the community to fund its own biodiversity research project. This investment supports two individuals who travel on horseback for four to six hours daily along biological corridors, identifying species to aid in the protection, conservation, and restoration of the ecosystem. In addition to its ecological benefits, this initiative has created two jobs in a region where employment opportunities are scarce.

Furthermore, the community of Tarahumar has been selected by a group of Mexican universities as the pilot area for the reintroduction of the Mexican wolf, a species long extinct in the region. This selection highlights the area's rich ecosystem and its potential to support wildlife conservation efforts.



Solar panels – decarbonization



The community applied for funding from the World Bank to install solar panels for their mill — an opportunity that would otherwise be financially out of reach. However, the funding required the community to contribute a portion of the total cost. They were able to meet this obligation using revenue generated from carbon credits.

The social and environmental benefits have been significant. The mill no longer blankets the community in smoke from diesel generators, greatly improving air quality. Additionally, the workers are no longer exposed to the constant noise, reducing the risk of hearing damage. The mill has also significantly reduced its carbon footprint, contributing to broader climate goals.



Ecotourism



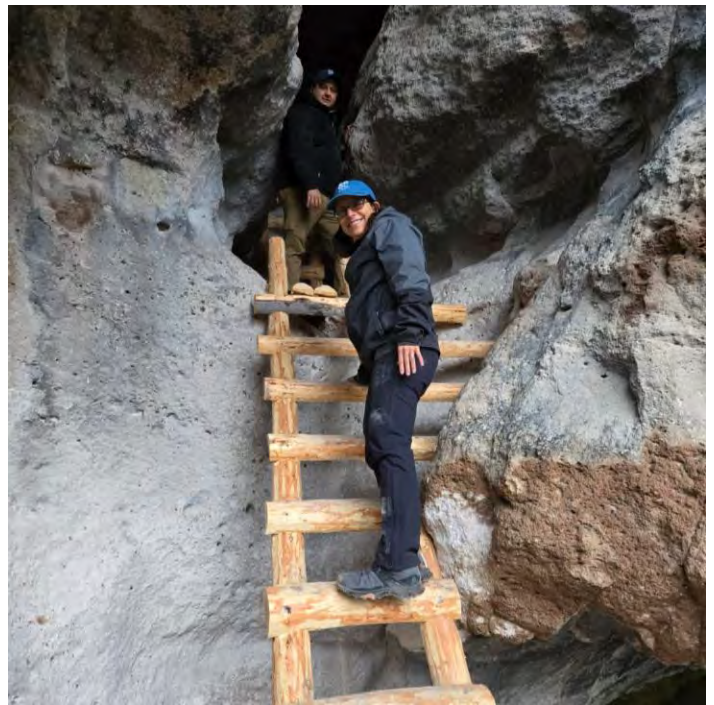
The community of Tarahumar places a high value on biodiversity, and this commitment is evident throughout the community. Their goal is to educate both locals and visitors about the rich biodiversity found within the community. To support this, they have created educational trails, installed informative panels describing local vegetation, and placed posters at key locations. Local schools regularly organize field trips to these trails, helping to further educate children about their natural environment. All of these initiatives have been made possible through the revenue generated from carbon credits.



Ecotourism biodiversity



In the communities ecotourism areas, bird migration is actively studied — an effort that plays a vital role in preventing forest plagues. As shown in the images, small blue and red jars of water are placed strategically to attract birds, allowing scientists to monitor their presence and identify species throughout the year. This ongoing research is made possible thanks to the revenue generated from carbon credits.





This community is proudly FSC certified — a rigorous and costly certification that reflects its commitment to the highest standards of environmental stewardship, social responsibility and economical sustainable forest management .



What is FSC?

Forest Stewardship Council (FSC) certification is a system that ensures forest products come from responsibly managed forests. It involves both forest management certification and chain-of-custody certification. FSC-certified products are traceable from the forest to the consumer, ensuring they meet specific environmental, social, and economic standards.

Still more to do...

"We [the community] have a lot of needs, therefore we do not have a share of the proceeds like other carbon projects. Here the carbon revenue is invested: 50% to the project and 50% to social and biodiversity safeguards."

—Mr. Jose Guadalupe Pallau, President of the ejido

Full time physician and medicines



The remoteness of this community poses serious challenges to healthcare access—the nearest hospital can be a grueling seven-hour journey.

In emergencies, having a doctor on-site can mean the difference between life and death. Regular access to medical care also helps prevent illness and addresses health issues before they become critical. Attracting and retaining a doctor in such an isolated area is both difficult and costly.

Thanks to revenue from carbon credits, the community has been able to hire Dr. Oscar Rodríguez, a dedicated physician from Durango. He lives in the community for 21 consecutive days, then returns home to the city of Durango for a 7-day break and remains on call 24 hours a day while in the community.

Speaking with Dr. Rodríguez, he expressed deep gratitude for the support made possible by carbon credits. Not only does it allow him to make a meaningful impact in an extremely rural area, but it has also inspired him to continue advancing his medical education



Water heater



Access to basic services is always a challenge in this rural area — and access to hot water is no exception. Traditionally, families relied on wood-burning fires to heat water, a method that is both labor-intensive and environmentally taxing.

Thanks to revenue from carbon credits, the community has begun installing solar water heaters in homes, significantly reducing the demand for firewood and improving families' quality of life. As, Ms. Columba, an Indigenous woman shared with a smile: "My kids never wanted to take a shower — it was usually just once a week. Now, I can't get them out of the shower, and they take one every day."



Women involvement



The community is making a concerted effort to include women wherever possible. While there is strong female representation in the administrative offices of the sawmill, achieving the same level of inclusion within the IFM project remains a challenge—one the community is actively working to overcome.

In these images, the community has entrusted drone operation duties to Ms. Yasel Guzman and assigned a female cook to support the otherwise all-male carbon credit brigade. Ms. Lupita serves as the Secretary of the Comisariado.



Elders



There is a deep respect for elders in this community. Our first stop was to meet with the founders of the community and listen to their stories—many of which were later shared in a video during the “extraordinary assembly.” These individuals are the original, and still active, comuneros. They generously shared with Elder and me the experiences and efforts that made the current community possible.



Indigenous community



The community has actively worked to ensure that the Tarahumara people living within its territory are formally recognized as an Indigenous group. This recognition aligns with Mexico's broader national strategy to acknowledge, preserve, and support Indigenous communities and their rights. Importantly, any benefits the community receives from carbon credits are also shared with the Tarahumara.



Giving back



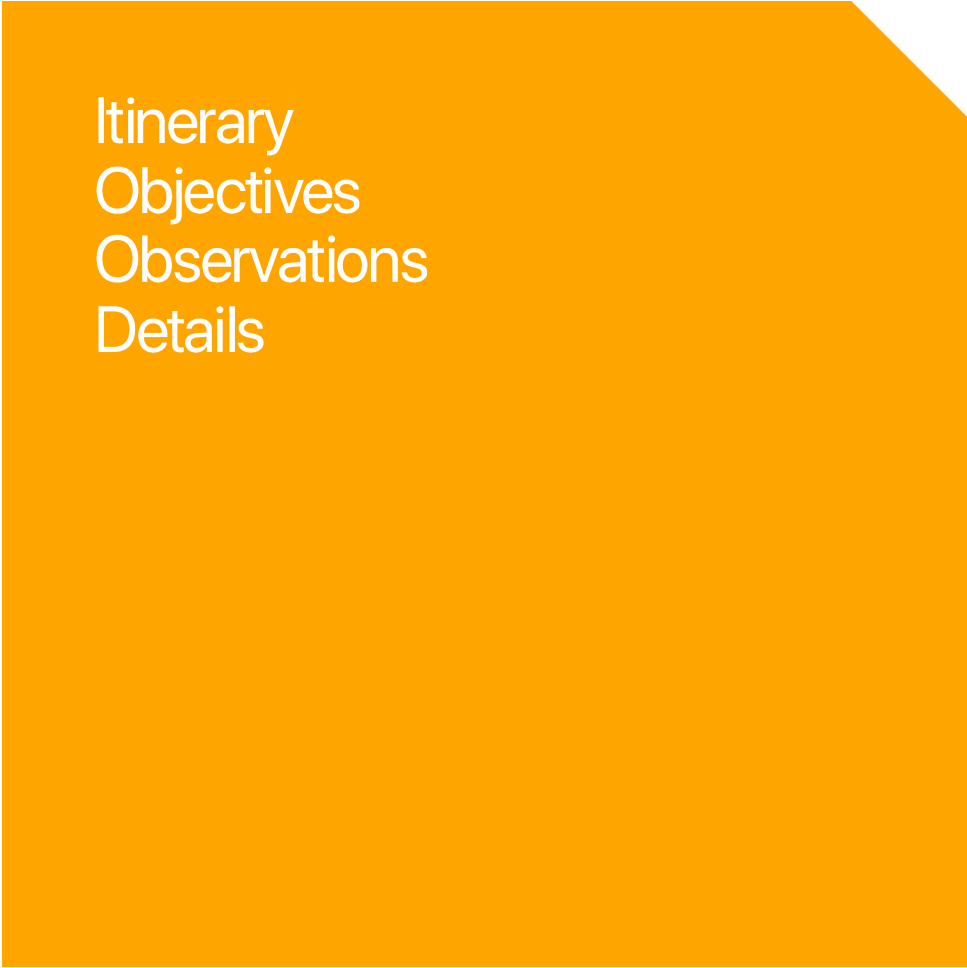
The Comisariado places great importance on ensuring that a portion of the revenue from carbon credits is reinvested into society. As part of this commitment, scholarships were awarded to seven students—five female and two male—based on academic performance. These scholarships support both high school and university students of the community.

In the image to the left, we see the five female recipients, who are pursuing degrees in Environmental Engineering, Orthodontics, Business Administration, and Medicine—all fields that are greatly needed by the community.

The community also extends its support beyond its boundaries. In the nearby town of Tepehuanaes, it contributes to a youth soccer program by providing uniforms and covering travel expenses for tournaments. This team, Santos Tarahumar, is part of a project led by a local medical doctor aimed at helping young people recover from drug and alcohol addiction through sports.



Appendix

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Itinerary
Objectives
Observations
Details

The objectives of this site visit were to:

- Visit the project site for the first time.
- Meet with the leadership and the technical forest team.
- Engage with the community.
- How does the carbon project benefits the community at large

Itinerary and observations:

Arrival The Cool Effect team was welcomed at the Tarahumar commercial forestry offices in the main town of Santiago de Papasquiaro, Durango, for initial introductions, as the Tarahumar community itself is very remote. There, the team was introduced to the personnel—160 in total, including 20 women. The workforce is a mix of people from Santiago de Papasquiaro and the Tarahumar community.

We were given a tour of the administrative offices and the mill. The organization can be considered a medium-sized company, and we were impressed by its structure, cleanliness, and professionalism—qualities that would prove to be a recurring theme throughout the community and the carbon project itself. Transparency is a core value of the Tarahumar community. We also observed that all employees wore protective gear, and we were asked to do the same, reinforcing the leadership's strong emphasis on safety.

After our visit and introductions, we set out for the project site in the communities of Tarahumar and Bajíos de Tarahumar, located about four hours away. We traveled in pickup trucks, each marked with the Tarahumar community logo. Along the way, we made a brief stop in the town of Tepehuanes to visit a charity organization founded by a local doctor. This initiative helps street children struggling with drug and alcohol addiction by engaging them in soccer, with remarkable success in rehabilitating them and reintegrating them into society. The Tarahumar community actively supports the program, funding soccer uniforms and competition trips using revenue from carbon credits.

During the visit of the project site From the moment we entered the community, it was clear how vital the carbon project is to its people. A large sign at the entrance highlights the initiative, and every activity funded by carbon credit revenue is distinctly labeled with "Créditos de Carbono." The project is meticulously managed, with dedicated brigades responsible for tracking and monitoring its progress. These brigades, fully funded by carbon revenue, provide employment opportunities for men and women of all ages, who are trained and hired from within the community. The greatest threat to the carbon project is fire, making fire prevention the community's top priority. To reinforce this, anyone responsible for starting a fire is subject to a fine of 5,000 Mexican Pesos per hectare.

During the visit to the community One of our stops during the community visit was attending an “extraordinary” assembly in the local auditorium. The venue was completely full, with people standing along the sides and many more listening from outside. Such high attendance is uncommon for carbon project meetings, but it was an encouraging sign of the community’s deep involvement and commitment to the initiative. We were seated at the front of the auditorium, and after Elder and I finished our presentations, the audience engaged us with numerous questions. The meeting lasted several hours and did not conclude until every question had been addressed.

Following the assembly, a barbecue — funded by carbon revenue — was held, and the community proudly showcased the large machinery purchased through carbon credits. Unlike many carbon projects that allocate a percentage of revenue directly to landowners, this project does not redistribute any carbon revenue to individuals. Instead, the entire revenue is evenly split between forest conservation efforts and social safeguards. The leadership views social safeguard projects funded by carbon credits as a financial relief for community members — covering costs they would have otherwise borne themselves. Many of these forest and social initiatives would have been financially out of reach for the community without this funding. By investing in these collective benefits, the community sees the revenue as an indirect form of income, removing the need for individual redistribution. As a result, carbon credit revenue is allocated equally, with 50% dedicated to forest conservation and 50% to social and biodiversity safeguards.

While engaging with community members The leadership is highly proactive and deeply invested in the carbon project, taking great pride in its success. Many leaders spoke of their ancestors who fought for the right to reclaim and manage their lands, seeing this initiative as their opportunity to build upon that legacy. For them, the project represents not only a source of pride but also a profound sense of accomplishment and honor.

To uphold this legacy, the leadership ensures that all personnel involved in the carbon project receive proper training in forestry and environmental sciences, equipping them with the knowledge and skills necessary to sustain and enhance their efforts.

Due to the remoteness of this community, job opportunities are scarce. This carbon project provides a rare chance for residents to work, live, learn, and raise their families without having to leave their homeland.

When we asked several members of the carbon brigades about their biggest fear, their response was unanimous: that the carbon project ends, and I have to emigrate. This sentiment underscores just how vital the project is — not just as a source of income but as a means of preserving the community’s way of life.

Final Observation The Cool Effect team concluded that, based on our extensive visits to carbon projects in Mexico, Tarahumar stands out as one of the best we have encountered. This marks their first issuance of carbon credits, and they have done an outstanding job in utilizing the revenue effectively. I must commend the leadership for their proactive approach and clear vision in reinvesting the carbon project’s revenue to further strengthen its impact. The project developer team is highly knowledgeable in forestry, demonstrating a willingness to tackle challenges by thinking innovatively and embracing new technologies. Additionally, the exceptional level of community engagement makes this project a true gem among carbon initiatives.