



CARBON, AN ASSET FOR CONSERVATION

Similar to other protected areas of the country, the small land owners, ejidatarios (people who own lands-in-common), and those living and working in local communities in the mountains, forests, scrublands, and rainforests of the Sierra Gorda Biosphere Reserve (SGBR) have for generations developed a number of activities and traditional practices that have had a significant negative impact on the region's biodiversity without having extracted any sustained improvement in their impoverished conditions and stagnant economic development. Their current situation is not a viable option.

A photograph of a lush, moss-covered forest. Sunlight filters through the dense canopy, creating a misty, ethereal atmosphere. The trees are heavily covered in green moss, and the ground is also covered in vegetation. The overall scene is a vibrant, natural landscape.

Carbon, an asset
for conservation in the

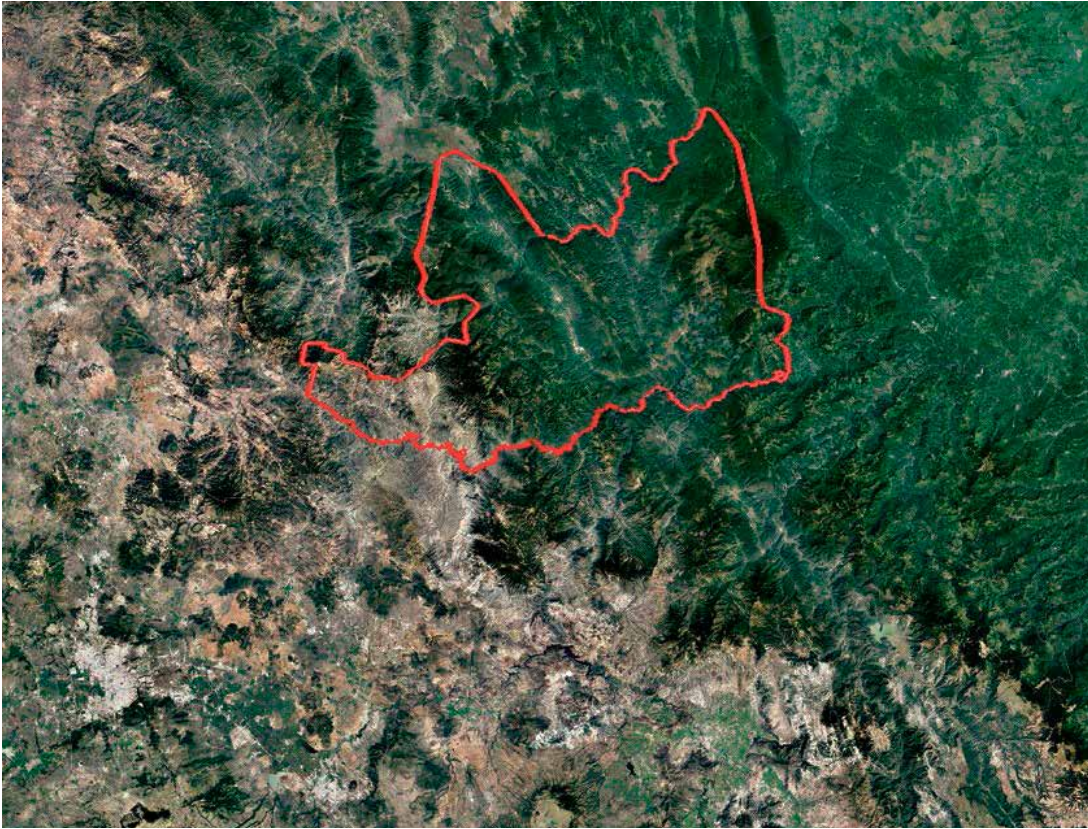
SIERRA GORDA

Biosphere Reserve.

QUERÉTARO

ROBERTO PEDRAZA RUIZ

It behooves us to search for an effective and beneficial framework that reframes the concept of economic development such that it is inextricably linked to the protection of ecosystems.



The Sierra Gorda Biosphere Reserve, which encompasses five municipalities, covers 383,567 hectares, or 32.02% of the state of Querétaro.

Grupo Ecológico Sierra Gorda (GESG) is a local grassroots organization that is intimately familiar with the region's socio-environmental dilemma, and, since its foundation 34 years ago, has focused its efforts in establishing and developing an economy based on conservation.

Currently in rural Mexico economic development and ecosystems' protections have conflicting interests operationally, e.g., the severe soil erosion caused by both cornfield farming on steep hillsides and free-roaming cattle-grazing in forests. This damage is compounded by extensive livestock farming, responsible for the clear-cutting of millions of hectares, that negatively impacts the internal structure of forests and jungles and disrupts the natural processes of plant regeneration. In addition, both of these traditional practices of land use arouse unavoidable conflicts with wild predators, such as pumas and jaguars, who roam in their natural environment. The same can be said of the destructive impact of mining and timber harvesting. There is always an unavoidable imbalance which hurts the interests of both sides—economic gains vs protection and conser-

vation of flora and fauna.

Invariably, the cost of maintaining and preserving "intact" the natural infrastructure of wild lands, or, at minimum, of keeping them in the best condition possible, falls on their impoverished landowners. It is a fact that we all benefit from the environmental services that forests and jungles provide, thus it is right and just to develop a compensation framework that will reimburse landowners for preserving their lands without suffering the loss of their income. We must search for a beneficial and effective framework that will not put at odds the benefits of economic gain with the protection of ecosystems.

If such a conciliatory framework is not developed, and if owning and preserving ecosystems do not provide palpable economic returns or benefits, there will be no incentive for impoverished landowners to care for and preserve their wildlands. There are no other reasons, normative protocols, or zoning laws that would persuade, motivate or oblige a landowner to conserve them.

The best antidote against climate change is the conservation of ancient forests that host traditions and a collection of biological communities that are unparalleled.

Cover: Don Blas Fonseca, forest landowner and provider of environmental services, now sees his forest as an asset instead of an economic burden.

The natural capital of the Sierra Gorda

From arid shrublands to temperate forests, from dry tropical forests to riverside forests shielded by old Moctezuma Cypressess, and with cloud forests in its most humid corners, the Sierra Gorda is truly opulent in its natural spaces. Its dramatic landscape is a result of abrupt mountain ranges that, combined with a rich cultural heritage, transformed it to a very bountiful space, yet, its survival is in the hands of impoverished communities that lack productive skills.

Fed by the tributaries of the Moctezuma and Santa María rivers that have carved imposing canyons through the Sierra Gorda, the watershed of the Pánuco river flows and discharges into the Gulf of Mexico. Given its geological characteristics, predominantly made up of karst, the superficial waters in the fluvial river currents are just a small fraction of the water captured therein, because without a doubt, there is substantial reservoir of subterranean water that has yet to be quantified. And in terms of carbon sequestered in its abundant vegetation, we are convinced that global protocols, such as Kyoto's and mechanisms like those introduced in the Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) program, are far from the reality on the ground in Mexico. They are inoperable as written, thus we have developed a voluntary framework to offset carbon emissions, verified under the ICAT guidelines, involving viable protocols and procedures, to quantify the amount of

carbon in local oak forests. This framework has produced palpable economic benefits that clearly override the opportunity costs.

This innovative economy, based on conservation, is being forged as we speak; it is one in which ecosystem services are the products and their proprietors are the beneficiaries.

The value of the natural infrastructure

One line of action that GESG has been developing since 1996 is the Wildlands Program that purchases plots with high biological significance and ensures their strict conservation. These acquisitions constitute a network of privately-owned natural reserves where all productive enterprises are prohibited, e.g., logging, livestock roaming, tourism, etc. It is the principal strategy to ensure the conservation of its most valuable ecosystems, and that has resulted in the resurgence of the essence of ancient wildlands in the temperate and cloud forests.

The increased presence of jaguars, and most recently, of the first video-recorded sighting of a black bear in central Mexico, attests to the success of the Wildlands Program. Currently we oversee 10 reserves that encompass 8,000 hectares (19,768 acres) of temperate and cloud

The protection of the headwaters of rivers is basic to mitigate the effects of droughts and climate change. The forests are authentic water factories.





Excellent representatives from both the north and the south, a jaguar and a black bear, were photographed using motion detection cameras in the Sierra Gorda, thanks to the protection in situ developed by GESG.

forests. And the results of this investment to protect the biodiversity seen in these reserves have had an expanding influence and engendered a desire to protect on the part of neighboring landowners due to the fact that they have ongoing communication with the reserves' caretakers who visit occasionally. It is through this process of observing the benefits of wildland conservation that a new economy of conservation is being forged where landowners profit from the products that are their own ecosystem services.

Another line of action is payment for hydrologic environmental services, for conservation of biodiversity and for the capture and storage of carbon in priority areas threatened by extractive activities all of which are occurring in oak forests. Forests are not only authentic water factories, in the Sierra Gorda five (5) have increased their natural capital and augmented their capacity to provide environmental services; annually they capture 30,000 tons of carbon. Furthermore, the protection of the rivers' headwaters is essential to mitigate the destructive effects of draughts and climate change.

The first step to develop a new economic model of conservation was taken in 2003 when GESG got the National Forestry Commission (CONAFOR) to invest substantial resources into the Sierra Gorda Biosphere Reserve (RBSG in Spanish) through its program for Payment for Hydrological Environmental Services. This program has been operating for the last five years and has benefited more than 50 property owners of 15,000 hectares (37,066 acres) located in priority areas.

The Payments for Environmental Services (PES) from the National Forestry Commission (CONA-

FOR) only covers five years of work for each beneficiary, while the demand to participate in the program exceeds the available funds. Consequently, the GESG took on the responsibility of finding other sources of funding like the World Bank's Development Market, the World Bank's Global Environmental Facility (GEF), and the Gonzalo Río Arronte Foundation which allowed it to build a bridge and give continuity and permanence to the program while developing an ecosystem product.

These efforts evenolved into the ecosystem product known as "Biodiverse Carbon" which relies on solid biodata to measure its value and measures the carbon capture in oak forests. In initial studies,



A kinkajou rests in the canopy looking curiously at the photographer. This species is basically tree-dwelling, its existence depends on conserved forests and rainforests.

A family of green macaws converse amicably on a dry branch. With strong wings, these birds embody the wild spirit of the Sierra Gorda.



with data methodically and intensively collected by GESG staff and with the technical assistance of the USDA Forest Service, compared CO₂ captured in forests where livestock roamed and grazed freely with forests where no livestock was allowed. The results of those studies are surprising in that they show that a simple step like the removal of livestock can have immediate, positive effects for the revival of forests. The increase in biomass and natural regeneration captured an average of 3.96 tons of additional carbon dioxide per hectare, per year.

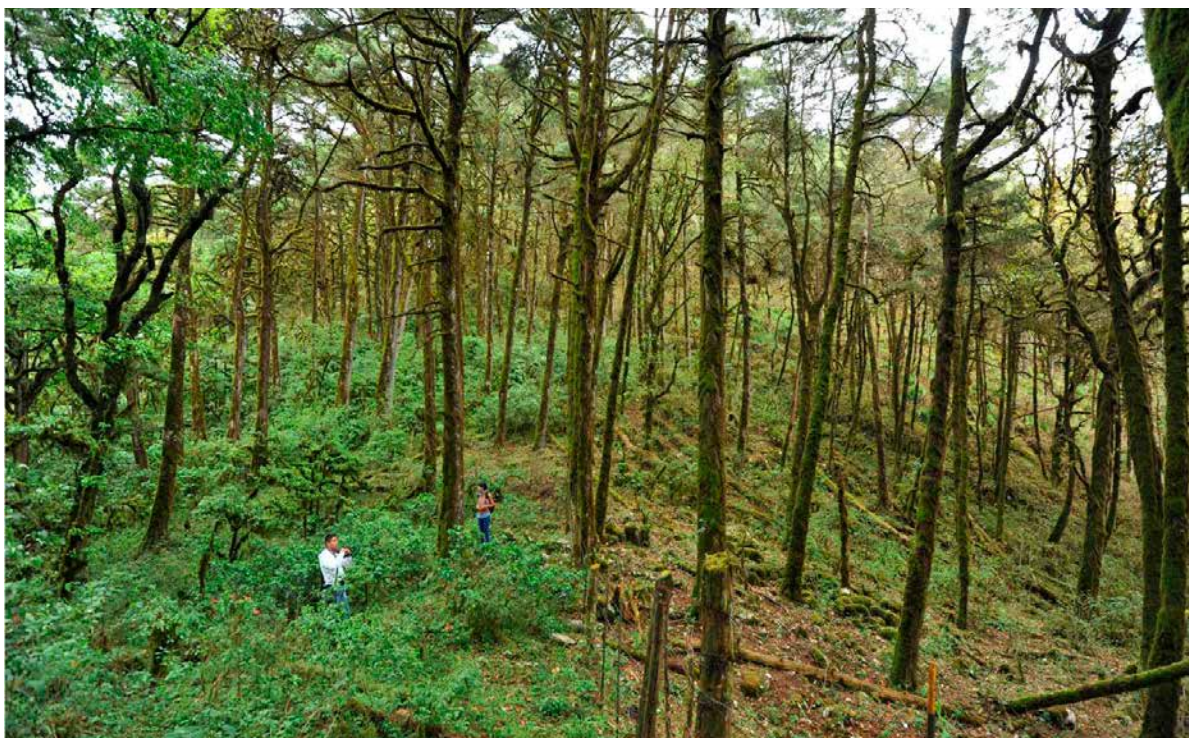
Moreover, livestock-free oak forests allow the return of healthy and nutritious flora that attracts small and large endemic fauna. Large predators, in turn, can feed themselves without the need to prey on livestock and thereby eliminate societal conflicts related to the loss of livestock and income. The result is a win-win situation in that by eliminating the presence of farm animals and promoting flora regeneration and the return of wildlife, poverty is reduced while combating climate change by capturing carbon and protecting biodiversity. Let us remember that domestic livestock are not endemic to wildlands and should be considered exotic fauna. Part of the problem is that traditionally in Mexico, protected forests are considered pasture lands for livestock.

The results of the studies we carefully carried out eventually became the foundation of a proposal we submitted to the State of Querétaro to financially support our framework through the establishment of an emissions tax on its vehicular fleet. This was the first collaboration between the Querétaro State government and the GESG through

the Secretariat of Sustainable Development (SE-DESU) and the State Carbon Offset Mechanism, which led to the creation of a program whereby all vehicle owners in the state pay a modest tax along with the annual renewal of their license plates, thereby mitigating their personal emissions. Presently, a proportion of the funds thus collected are paid as financial compensation to the owners of the oak forests in the Sierra Gorda Biosphere Reserve for preserving and maintaining their wildlands through the removal of livestock, prevention of logging, and the general protection of the ecosystem. This covers the opportunity costs of the limited productive activities in the region such as ranching.

In September 2019 the State of California called for a General Assembly of the Under2 Coalition, and Querétaro was the only Mexican state, as well as the only governmental entity of all Latin America, to submit a “green” proposal, the one presented here, that integrated carbon capture, biodiversity protection, and the mitigation of poverty and of climate change. Thanks to a number of Mexican resources (CONAFOR, SEDESU, Biodiverse Carbon donations) the landowners of 37,575 hectares (92,850 acres) of forest land presently receive compensation payments for a number of ecosystem services that include hydrologic environmental stewardship, biodiversity and carbon sequestration, livestock removal. These are the best practices that ensure forest conservation, natural regeneration and increased biodiversity.

Lastly, some ranches of the Sierra Gorda and in



A mountain cloudforest protected by GESG without livestock eating the undergrowth, is a significant contrast from its counterpart where livestock have eradicated the understory and the processes of regeneration.

other states in Mexico are conducting integrated pilot projects designed to increase and enrich the organic layer of their pastures and meadows' soils through the regenerative management agriculture and grazing practices. Regenerative soil management produces an accumulation of organic material rich in carbon through which the previously depleted soils' capacity to filter and store water is restored.

Presently we feel very proud that through efforts led and coordinated by Grupo Ecológico Sierra Gorda it qualified to register a NAMA entity, Nationally Appropriate Mitigation Action, dedicated to support, "Subnational mitigation actions for the regeneration of landscapes." This NAMA has been registered before the Secretariat of Environment and Natural Resources and the NAMA Registry of the United Nations Framework Convention on Climate Change (UNFCCC), an extraordinary achievement in and of itself for a civil society organization. It stands out as the only NAMA from Mexico with the sole focus of forest and soil restoration. Through its implementation, we expect to capture 825,268 tons of carbon dioxide per year in forest biomass and for the period from 2015- 2030 a total of 9,300,559 tons of carbon dioxide in the forest. In ranchlands in the northern Mexico benefitting from enriched organic carbon in soil, we calculate a total of 33,267,091 tCO₂ e.

As a participant in this NAMA, the State Government of Querétaro and its subnational model are a reference in national and international events for its successful strategies of mitigating climate

change in the forest and ranching sectors. We have met with the governments of the state of Chihuahua, Nuevo Leon, and Aguascalientes, who have shared their interest in applying similar strategies in their states.

In a country like Mexico, which is particularly vulnerable to the effects of climate change, these lines of action constitute without a doubt a real option for reducing poverty, preventing desertification, recuperating the productivity of the soil, maintaining biodiversity and ensuring the provision of environmental services, on which we all depend.

In its totality, through the persistent work of the GESG to collaborate with multiple actors, working with landowners, and using solid measures to obtain accurate biodata to verify its achievements, its ecosystem product of Biodiverse Carbon is proving to be an effective and beneficial strategic framework that redefines the concept of economic development such that it is inextricably linked to the protection of ecosystems, reconciling the needs of human beings with those of wild nature. Through this model, the landowners of the sierras have received payments that amount to 35 million pesos, thus transforming conservation from a burden to a valuable asset, while making UNESCO's concept of a biosphere reserve a reality on the ground.

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