



Southeast Regional Research Center
Chetumal Experimental Field

Chetumal, Quintana Roo on March 4, 2022

RESTORATION OF 645 HECTARES OF DEGRADED LAND AT THE EXPERIMENTAL SITE SAN FELIPE BACALAR

Activities carried out, recommendations and lessons learned during 2021

Executive summary of the activities carried out

Based on conversations that began at the end of 2020, the National Institute of Forestry, Agricultural and Livestock Research, and Plant for the Planet, A C., agreed to jointly execute a project aimed at undertaking reforestation actions for the restoration of a total of 645 hectares in the Experimental Site San Felipe Bacalar. Of this total area, 339 ha corresponded to an area of medium evergreen forest that was affected by a forest fire that occurred in 2019. Another 220 ha were home to the same type of vegetation and had also been degraded by a forest fire that started in 2020. The remaining 85 ha is an area with coconut plantations that have been withdrawn from their original project and are available to rehabilitate to their original land use. of reforestation, from plant production to plantation maintenance, and that INIFAP's actions be limited to technical advice and training to ensure that the actions programmed by Plant for the Planet are carried out correctly considering the conditions of the Experimental Site San Felipe Bacalar; It was also considered that between 2021 and 2023, at least an area of 215 ha would be intervened for reforestation annually.

Following these conversations, in April 2021, Plant for the Planet began reforestation actions at the San Felipe Bacalar Experimental Site; Simultaneously, both institutions were working on the draft of the collaboration agreement for the execution of the project. The first actions undertaken by Plant for the Planet were carried out on the area affected by the 2019 fire, that is, 339 ha. Those initial actions consisted of dividing the area by intervening in smaller areas or blocks by establishing gaps that would allow one area to be distinguished from another. With those "major breaches" opened, Plant for the Planet preceded minor breaches. These secondary breccia were established in a west → east direction and were 4 m apart in a south → north direction. Subsequently, from July 2021,

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Planet initiated the establishment of seedlings of 12 native tropical tree species present at the San Felipe Bacalar Experimental Site; The establishment of the seedlings in the plantation gaps was carried out respecting a distance of 2 m between plants, based on a prior agreement with INIFAP.

During August 2021, the final version of the Agreement between INIFAP and Plant for the Planet for the execution of the project was received and in that same month the agreement was signed. As stipulated in the agreement, Plant for the Planet provided resources for \$104,600.00 (There are one hundred four thousand six hundred 00/100MN)for INIFAP to use them as fuel during the technical tours to be carried out in the areas under intervention.

Later, in November of that same year, due to the death of some of the initially established individuals, Plant for the Planet began replanting work to replace the dead individuals. From the beginning of the works, Plant for the Planet carried out maintenance actions in the area under intervention. The maintenance actions carried out in the project consisted of the elimination of weeds in the plantation gaps and planted individuals and the establishment of firebreak gaps and guardrails in the intervened area during 2021.

Finally, at the end of the first stage of the project, in December of last year, Plant for the Planet had established 312,585 trees, of which 27,ZIS corresponded to individuals used to replace dead individuals. Plant for the Planet delivered to INIFAP, then, a total area intervened by 2021 of 339 ha. However, it should be mentioned that the intervention for reforestation was carried out only in 219 of those 339 ha, since 120 ha of that area had not really been affected by the fire and housed species protected by Mexican legislation. Together with INIFAP, Plant for the Planet agreed that carrying out reforestation on those 120 ha would cause more harm than good and it was proposed that, instead, the intervention consisted in the establishment of firebreaks and firebreaks to protect that area from a possible fire. For its part, INIFAP's activities in the initial stage consisted of technical advisory visits to the work area, a technical tour of the nursery that supplies Plant for the Planet to provide recommendations that help improve plant quality, a training course on good practices in forest nurseries, attention to a professional from the sector who made a stay at Plant for the Planet and a field trip to publicize the progress of the project during its first stage. In 2021, INIFAP exercised \$38.81459 (thirty-eight thousand eight hundred fourteen 59/100MN) ofthe \$104,600.00 initially ministered.





Recommendations and lessons learned

Production of forest seedlings in nursery

- ✓ The main criterion for collecting germplasm is to cover the greatest amount of genetic variability possible in the least number of samples.
- ✓ In the germplasm collection process, it is necessary to identify populations of each species of interest to the foundation and select at least 30 individuals per population. These individuals must keep a minimum distance of 100 m from each other; if possible, a distance in kilometers is recommended.
- ✓ The fruits from which the seeds will be obtained must be of a good size, vigorous, without physical damage and free of pests and diseases.
- ✓ Once the seeds have been extracted, they must be stored and transported in bags that allow them to aerate.
- ✓ The foundation must be guided by the germplasm movement regionalization map established in the Mexican Forest Germplasm Standard (2016), in order to obtain and use germplasm from the same region and not carry out indiscriminate movement of germplasm between regions.
- ✓ Given the protected status of the cedar (*Cedrela odorata*), to avoid legal problems, proof that the seed for plant production comes from a Forest Germplasm Production Unit is enough.
- ✓ It is necessary to schedule the production processes for each species, in order to guarantee the supply of seeds, production of plants, delivery of plants and timely planting. For this, both the foundation and the person in charge of the nursery and collectors must have adequate knowledge of the phenology of each species of interest with the intention of programming the optimal moment for the collection and production of plants.
- ✓ Chacté can be scarified by hydrating recently collected seeds until they appear swollen and then planting. As these are stored seeds, scarification is carried out by immersing the seeds in hot water at 80 °C and letting them soak for 12 to 24 hours and sowing.
- ✓ It is recommended to replace the trays with containers with a volume of 500 ml. Current containers also show wear on the inside of the walls, which makes it difficult to extract the plants and causes heterogeneous growth of the roots.

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- ✓ Ensure that the mixture of the substrate for the production of the plants has a balanced and homogeneous composition and that the preparation is carried out by the same person to promote an adequate homogeneity of the substrate.
- ✓ A good mix should not fall apart when pressed by hand, it should retain moisture and have a good balance between peat moss, vermiculite and agrolite.
- ✓ When plants are produced in bags, try to place a polyethylene sheet under the bags to prevent the growth of roots towards the ground below the bag.
- ✓ It is recommended that, during the transfer of the plants to the planting site, packing boxes are used and that the vehicle box is covered with a tarpaulin to protect the plants from the air generated by the movement of the vehicle.
- ✓ It is advisable to diversify the number of plant suppliers, to avoid supply problems for one or some particular species that occurred during 2021.

planting practices

- ✓ Establishing individuals outside of the rainy season should be avoided.
- ✓ During the opening of planting gaps and cleaning of the area to be intervened, individuals belonging to species under any status should not be felled. of protection in the NOM-059.
- ✓ It is recommended that when establishing the individuals in the plantation gaps, the skewer is replaced by digging, since compaction problems that affect root development are avoided.
- ✓ The main factors behind the survival of the plant are the quality with which it comes from the nursery and maintenance practices (elimination of weeds), rather than the number of established plants. Therefore, it is recommended to prioritize these aspects over the number of individuals to be planted.
- ✓ It is advisable that the leftover substrate in the workers' bags during planting is not discarded on roadsides, but placed at the base of the plants when they are established.
- ✓ In areas with a great abundance of vines, it could be considered to wait two or three years for the ecological succession to advance before carrying out any intervention, considering the maintenance efforts and the complications of planting in those sites.
- ✓ Define, together with INIFAP, a methodology for the evaluation of the seedling survival that can be verified by both institutions.





- ✓ Any change in the plantation arrangement or in the species to be introduced must be mutually agreed upon with INIFAP.
- ✓ As stated in the agreement, do not establish less than 10 native tropical tree species from the list recommended by INIFAP. It is recommended to give priority to the less abundant species in SE San Felipe Bacalar. However, if possible, a more rigorous evaluation of the species affected by the fires is recommended, since until now the selection and recommendation of species is made only empirically based on knowledge of the Site.
- ✓ If there is no availability of any of the originally planned species, it can be replaced by another or increase the number of individuals of another available species, prior agreement with INIFAP.
- ✓ Periodically create firebreak gaps and guardrails in intervened areas to prevent a future forest fire from affecting them again.
- ✓ Install camera traps in the work area to monitor hunters and loggers who enter the areas under intervention.

personnel management

- ✓ INIFAP and Plant for the Planet must jointly present the project to the ejido authority of Lázaro Cárdenas "La Ceiba". During that presentation, Plant for the Planet's rules for hiring and managing staff should be disclosed.
- ✓ To the extent possible, and when it suits the interests of the foundation, prioritize the hiring of personnel from La Ceiba, as mentioned in the impacts of the project's Technical Annex.
- ✓ Ask Reforma staff not to go fishing in the San Felipe lagoon, even with the invitation of La Ceiba staff, to avoid misunderstandings with the ejido.
- ✓ Share with INIFAP lease contracts that are made with the ejido authority to have arguments towards the ejido when it requests the intervention of INIFAP.

Resource management

- ✓ Given the nature of the project, it is recommended that Plant for the Planet grant financial resources to be spent on other items besides fuel, such as cafeteria expenses, food services, travel expenses, tools, maintenance of





vehicles, among others. This would make it easier to carry out other activities, in addition to technical visits, linked to the project and that strengthen institutional collaboration, such as courses, demonstration events, visits to the headquarters of Plant for the Planet in Constitución, Campeche, survival evaluations, among others. others.

- ✓ **Considering the Collaboration Agreement between the institutions, the use of INIFAP facilities and the transfer of its personnel in institutional vehicles for specific events related to the project are made available to Plant for the Planet, prior agreement between both parties.**

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