

## The Rufford Foundation

### Final Report

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Congratulations on the completion of your project that was supported by The Rufford Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other format. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. Please note that the information may be edited for clarity. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to [jane@rufford.org](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

Grant Recipient Details	
<b>Your name</b>	Marco Braasch
<b>Project title</b>	Natural regeneration of Pinus oocarpa under controlled silvopastoral grazing in absence of fire: a strategy to conserve forests in the Sierra Madre of Chiapas
<b>RSG reference</b>	17207-1
<b>Reporting period</b>	May 2015 – June 2016
<b>Amount of grant</b>	£4400
<b>Your email address</b>	marcobraasch@gmail.com
<b>Date of this report</b>	03.06.2016

**1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.**

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Census of natural seedling establishment.				The census of naturally recruitment has been successfully finished. Together with local guides we realized six 1 km large transects in the transition zone of forests, pasture and agriculture land.
Forest inventory				In June 2015 we created a forest inventory in the two experimental sites. It was planned to repeat this in 2016 to determine any changes in seedling establishment or mortality. However, pine seedlings were so scarce that we couldn't repeat the inventory. Instead we conducted another census of natural recruitment (see below).
New objective: Monitoring of natural pine seedling establishment				Due to the absence of tree seedlings in the forest inventory plots, we realised a detailed monitoring of natural pine seedlings in three sites. a) native grass dominated forest, b) exotic grass dominated forest and c) recently burned forest. Along 15 transects we measured soil vegetation cover and the number of seedlings.
Recruitment Experiment:				The recruitment experiment was successfully carried out. During the whole year we measured in 30 experimental plots amongst other things: the pine plant survival, pine growth rate, grass growth, grazing pressure, soil humidity and temperature.
Vegetation Maps:				For each community, we produced a land use map. These maps were the foundation of the fieldwork and the interviews. It was helpful to identify the present forest types, the grade of land degradation and the ownership. Each community received a copy of the map as well.

Interviews with local farmers			We conducted 52 interviews with local farmers to identify: a) reasons for deforestation in the past, b) personal interests in forest use in the future c) fire management, d) resin production, e) cattle management and f) local knowledge for forest management.
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**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).**

At first we had difficulties to obtain enough pine seedlings for our experimental study because there was a high demand for forest plants throughout 2015 because of different reforestation projects from the National Forestry Agency (CONAFOR) and the National Conservation Agency (CONANP). We then contacted the local forestry authority of Tuxtla Gutierrez and told them about our project, the great interest for the local farmers and the problems we were facing. As a result we could thankfully receive a donation of 2500 plants from CONAFOR.

The strong El Niño effect in 2015 delayed the transplanting for one month. Usually the rainy season starts mid-May or in the beginning of June, whereas this year the region was still experiencing droughts by this time. When it began to rain in July tree planting competed with the season of bean cultivation. Due to the importance of beans as one of the basic foods for people living in the rural areas of Mexico we experienced difficulties in hiring planters for our cause. However, thanks to the involvement of two farmers we were able to mobilize 12 people, who were assisting us with the transplanting and we were therefore able to finish the task on schedule.

One of our objectives was the replication of the forest inventory to identify changes in seedling establishment in the forest ground. We found the pine recruitment in these sites to be so scarce that we had to change location as well as the method. By the time the rainy season started we were able to realize 15 transects in three different pine forest sites. These forest sites consisted of forest that were dominated by either a) natural grasses or b) exotic grasses or c) were a result of an accidental burning of the forest during the dry season. The study of the burnt area confirmed the hypothesis that fire is a major parameter in forest ecology in this landscape due to its strong influence on tree establishment and the expansion of exotic grasses.

One of the key components of our study was the involvement of the local farmers in the area. In the beginning of the study we were facing some hardships gaining their trust since the area is characterized by a history of conflicts between the National Conservation Agency and the communities over the burning and deforestation within the Sepultura Biosphere Reserve. Throughout time, our work collaboration and our frequent presence in the village we were able to establish a strong and trustful relationship with the local people. This became especially visible during the interview period one year later when people showed interest in our work and answered the interview questions confidently and truthfully.

### **3. Briefly describe the three most important outcomes of your project.**

The first most important result of the project is the observation that in open forests, exotic grasses like *Hyparrhenia rufa* or *Melinis minutiflora* are very abundant and don't allow natural recruitment. In rather closed forests, exotic grasses are scarce, but the accumulation of pine needles also doesn't permit a successful seed establishment. Both factors are a result of past fire management techniques.

Secondly we discovered that the mortality rate of planted trees in the exotic grass plots is not higher than in the control plots. That implies that the competition effect is not as high as we had expected. On the other hand, in sites with overgrazing plant mortality is very high due to trampling, while regulated grazing allows successful seed establishment.

The third most noteworthy outcome was the advancement in the stakeholder involvement throughout our study. For many people in the two communities the revenue from the pine resin production is an important part of their total income especially in the dry season when they lack of other revenue streams. This leads to a great desire to maintain these tree species in the future, which could be observed during many occasions in the participation throughout the whole year. We also noticed a very strong interest in our study from the biosphere personal and the local forestry agency.

We hope that together with the different stakeholders and the outcomes of our study, ecological observations, experimentation and the integration of local knowledge, we were able to open up a passageway and that it will be possible to generate a management plan for this pine species in the future.

### **4. Briefly describe the involvement of local communities and how they have benefited from the project (if relevant).**

From the beginning of our study local people were integrated in all project steps. The objectives of the study were presented in the local council session of the community and we chose the experimental sites together with the farmers. The lot owners established the experimental plots, transplanted the trees and cleaned the control plots together with their family members. When we visited the study area we always consulted the farmers in their households and informed them about our current results. We also instructed two farmers on how to operate pluviometers, which are able to measure precipitation and temperature in both villages. The farmers were very interested in learning about climate, due to its implication on their crop cultivation. The discussion of our work was held in a workshop of the biosphere reserve together with members of CONANP and a community council of the biosphere reserve La Sepultura, where each Ejido sent their respective representative. Finally, 52 farmers of the different age and gender were interviewed about their future plans for forest usage, forest management, local knowledge and conflicts of interest between the biosphere reserve and land use practices in the past, present and future.

In the near future we will realize a workshop in the field to discuss our results with the local people.

#### **5. Are there any plans to continue this work?**

Once the experimental part of our work is finished and the total amount of data is analysed we can proceed with the second stage of my PhD study. We plan to generate an agent-based model in Netlogo to simulate forest dynamics and socioecological consequences by the end of 2016. Throughout the method of accompanying modelling we hope to be able to find a compromise between farmers and other stakeholders to generate a management plan for this part of the biosphere reserve. This phase of the study will be supported by another project of my Ph.D. director.

#### **6. How do you plan to share the results of your work with others?**

The first results of the forest inventory and census of natural recruitment have been presented and discussed in Tuxtla Gutierrez on the 20th anniversary of the biosphere reserve La Sepultura in October 2015. Soon after we were invited to the National Forestry Agency and were able to share our results in the congress of resin production of Chiapas. The whole ecological work will be published in a scientific journal by the end of this year. The ecological work will also be integrated in my thesis and will be available for other students at Ecosur as well as to students from other institutions in Mexico.

There are also plans for creating a technical report or management plan, which will consist of a dense and easy written Summary of our work, addressed to the local people in the study area. Lastly we will conduct a workshop for the local people, where we will hold a presentation summarizing our whole project.

#### **7. Timescale: Over what period was The Rufford Foundation grant used? How does this compare to the anticipated or actual length of the project?**

The grant was used from May 2015 to June 2016. Originally we planned a time scale of 18 months, but we were able to finish all the major activities in just a 14 month period. The greatest amount was needed to cover the running cost during the fieldwork along the study and the soil analysis. Another important cost driver was the installment of the 30 experimental plots during May and August 2015 (material and salaries for the local guides and the workers). This project was the first part of my PhD study, the understanding of ecological forest dynamics and the determination of local knowledge and identification of conflicts for land use practice between stakeholders. The second part, starting by the end of this year, will be dedicated to the study of forest dynamics throughout accompanying modeling in the future.

**8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used.**

**£1 GBP = \$ 23.45 MXN (29.05.2015) date of grand receipt**

Item	Budgeted Amount	Actual Amount	Difference	Comments
Travel and Subsistence Costs (gasoline, bus tickets, board and lodging in the field)	2318	2385	-67	Difference was used from the soil analysis item
GPS Magellan eXplorist 610	258	308	-50	When the project was planned at the beginning of 2015 we cottised de GPS Model eXplorist 510 but when we bought them in June this model wasn't available anymore, so we bought the newer version eXplorist 610, as well as rechargeable batteries for the GPS.
Barbed wire	193	200	-7	
Fence posts	129	205	-76	We needed more posts as estimated
30 Experimental plot Salaries Installation cost fencing, clearing of control plots etc.	429	337	+92	We used the difference for the barbed wire and posts.
Planting	215	200	+15	
Soil analysis and soil temperature data loggers	858	765	+93	We had to conduct a detailed soil analysis that wasn't planned when we submitted the project last year. The necessity for this analysis is rooted in the vast amount of heavy forest fires and the grazing activity in the past. The consequences of these disturbances were extreme soil erosion and a loss of ground nutrients. Therefore in each experimental plot we had to conduct an analysis of the actual soil texture, P, K, N, organic matter, bulk density, cation exchange capacity and pH-value. We came up for these costs by reducing the number of data loggers. Instead of humidity and temperature

				loggers we switched to only using soil temperature loggers. Soil humidity was measured with the gravimetric method.
Other sources (£ 2500) for: Pine seedling, soil data loggers congress workshops, and other materials	see comment			This amount was financed by other sources, pine seedlings were donated by the National Forestry Agency. The costs of the workshops, congress, data loggers have been covered by me, other project of my Ph.D. Director and assessors and Ecosur.
<b>Total</b>	<b>4400</b>	<b>4400</b>	<b>0</b>	

### 9. Looking ahead, what do you feel are the important next steps?

The farmers and the National Conservation Agency (CONANP) value the resin production as a sustainable land use technique that allows the combination of economic activity and forest protection in the buffer zone of the biosphere reserve. But we have to take into consideration that the resin pine *Pinus oocarpa* growth in this region is very slow, the actual tree density per hectare is also very low and the trees that are in production are only productive for around 15 to 20 years.

We can therefore determine the need of local people to follow different reforestation activities in the near future in sites that aren't in use anymore for agriculture or grazing and already degraded with exotic grasses.

A major issue for the two communities is the plant nursery with local seeds. It is of great importance to promote technology that allows natural recruitment of pine seedlings in the open forest.

We hope that the results of our study can contribute to a management plan that allows the development of a persistent use zoning plan for the pine resin in the future.

### 10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?

We used the logo in our presentation for the congress of CONANP in the capital of Chiapas in October at the 20th anniversary of La Sepultura. We will also soon use it again in a presentation in July at the resin congress of Chiapas organized by CONAFOR. Furthermore we will also mention the Rufford Foundations' kind support in our scientific paper that will be published by the end of the year.

### 11. Any other comments?

The grant we thankfully received from The Rufford Foundation was of great support to the fieldwork and a major carrier of my PhD study. It enabled the possibility to integrate the local people into the construction process as well as into the planting,

as well into many other occasions. The integration of the local people again improved the communication between the farmers and us allowed the combination of local and scientific knowledge. We also received feedback from other farmers that were not part of the study that they have visited the experimental plots to learn from our study. Which consequentially leads to the assumption that our study was and will be of great impact to the local community.

In conclusion we would like to speak out our sincere gratitude to the committee of The Rufford Foundation for their support of our Study. We appreciate your recognition.

