The Rufford Small Grants Foundation

Final Report

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

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. 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. 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.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Paula Meli
Project title	Ecological restoration of riparian vegetation in the Lacandona rainforest, Mexico: Importance of environmental filters and functional traits for revegetation success.
RSG reference	40.11.09
Reporting period	April 2010 – September 2011
Amount of grant	£5,935.55.-
Your email address	paula@naturamexicana.org.mx; atajacaminos@yahoo.com
Date of this report	15.10.2011

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
To evaluate the importance of environmental filters			X	We selected 10 species for restoration. We collected seeds and propagated more than 2000 native plants in a nursery constructed by the project. Plants were transplanted to ten plots in five *ejidos*. 850 trees were transplanted in October 2010, while other 650 plants in September 2011. Plots were previously characterised by their soil and microclimate condition, hydrological dynamic, and remnant vegetation. Plants were equally transplanted to four conditions: (1) control, (2) removal of grasses, (3) de-compaction on soil and, (4) both removal and de-compaction, to evaluate the importance of the environmental filters. Our results suggest that competition is harder to overcome than soil compaction to obtain a primary vegetation cover in streams. Flooding does not appear to be determinant to the establishment success, instead dry season, which is short in time, but hard in intensity.
To integrate scientific and empirical knowledge from local communities			X	First, we developed vegetation censuses in natural and secondary riparian vegetation. Second, we review literature about the ecological characteristics of the species founded in those censuses. Third, we developed four workshops in four *ejidos* to involve and consult local communities about the suitable species for restoration and to decide the location of the restoration plots. Four, we integrate ecological and social information in a "Selection Species Index", that allowed us to obtain a list of 40 potential species for restoration uses. We expected this index to be suitable for select species in other tropical regions. These results were presented in the 4th World Conference on Ecological Restoration and are being considered for

				publication in Restoration Ecology.
To test functional traits as indicators of establishment ability			X	We used data provided by a student from the same research group (Alejandra Tauro), who is also oriented by MMR. We found that wood density and specific leaf area are negatively related to tree survival and they could be used as indicators of demography and other population characteristics.
To develop a restoration protocol		X		A restoration protocol is not a specific objective of this project, given that to get a good protocol it is necessary to obtain results in the medium-term. However, we included it here because we expect this project could contribute in develop this protocol at least in the first steps. For instance, through this project we could recommend at least 10 species with potential use for restoration purposes, and we may give some recommendations for their propagation and their manipulation in the field.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

All restoration plots are active pastures, and some of them are a border between different landowners. We constructed fences to prevent livestock entry in all plots. However, in most restoration plots mortality was due livestock attack, mainly during dry season when food is scarce. At the same time, although the agreements with the owner to take care of the plants, other persons pass through the plots and in two of them people stole plant's ID.

These two difficulties forced us to reinforce fences and replace plant's ID. Although we had have planned to transplant only one cohort of trees in 2010, we decided to replant native trees again in September 2011. Therefore, field work was harder than expected and also, we needed more material and supplies. We decided not to purchase the digital camera and laptop (Equipment), all necessary to complete field work and get more exhaustive and powerful data.

On the other hand, Dr. Rey Benayas was invited to participate in the III National Congress of Ecology, developed in April 2011 in Veracruz, Mexico. Therefore, the funds considered for the technical visit of Paula Meli to Spain was not necessary. Part of those funds was used for material and supplies and the other part was used to assist to the 4th World Conference in Ecological Restoration, organised by the Society for Ecological Restoration (SER) in Merida city, Mexico, in August 2011. We communicated some activities of this project in two oral presentations in that Congress.

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

- Social perceptions about the most suitable species for restoration of riparian vegetation does not coincide with the most abundant and frequent species detected in the censuses. It means that the species selection could reach different outcomes when using ecological or social criteria, and therefore remarks the importance to integrate ecological and social criteria when selecting species for restoration.
- The information about collect and propagation of riparian species in the study region are scarce. Therefore, we recommend promoting new projects particularly focused in developing suitable and reliable information to deal with seed collection, germination and propagation of these species, in order to contribute future restoration aims.
- During the first year after transplanting native trees, competition with remnant vegetation could be an important factor that limits tree establishment, maybe harder to overcome than soil compaction. At the same time, wood density and specific leaf area (SLA) could be used as indicators of tree survival. Species with low wood density and SLA showed higher survival.

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

Local communities were involved in the processes of selecting restoration sites and species. They participated in four workshops developed in four *ejidos*, where we discussed about the suitable species for riparian restoration. We developed other four reunions aimed to all the interested people in the riparian restoration project. In these reunions we could identify the landowners that were willing to cede a part of their plot for restoration purposes. We visit all that plots with every owner and discuss with them about the restoration actions to implement.

Part of our team (PM and JC) has developed some previous projects with local communities in the region, and also some previous technical experiments about species selection and propagation for restoration purposes and establishment of native trees in degraded areas of Marqués de Comillas region. Considering these previous and actual researching, Mesoamerican Biologic Corridor (CBMM in Spanish [www.cbmm.gob.mx]) invited us to disseminate our knowledge and results in a technical publication. We developed a "technical manual" titled: "*Ecological Restoration of riparian vegetation. Manual for the recovery of riparian vegetation of streams in Lacandona rainforest*". This manual has already published, and it will be in pdf version in the web page of CBMM. The language of the manual is simple and understandable by local communities. It has been distributed in the five *ejidos* where we are working. We expect that the information included in the manual would be useful for local communities interested in the recovery of riparian vegetation.

5. Are there any plans to continue this work?

Yes. This project constitutes part of PM PhD Thesis and it will continue for 2 more years. During these years we expect to: (1) review the recovery of ecosystem services of river, streams and other wetlands worldwide; (2) evaluate the recovery of ecosystem services of riparian vegetation and streams after restoration in our study sites; (3) evaluate the needs to implement this restoration project at landscape level and; (4) develop medium-term indicators of restoration success.

We also consider, probably in 2013, to develop new workshops with local communities to share the final results of this project and to promote similar restoration actions in other communities of the region.

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

As detailed in question 4, a technical publication could be part of the information of this project as a manual. This information is available to scientists, practitioners, local communities, local governments and other stakeholders, including non-governmental organisations. We expect to develop also a manuscript about the importance of conservation and restoration of riparian vegetation for a general audience.

At the same time, results of this project will be shared specifically with the scientific community through the publication of several research papers in specialized journals and the participation in scientific events (as congresses or meetings). During the next two years we expected to obtain the specific products:

Objective 1: *Riparian restoration: Importance of environmental filters in revegetation success* (Objective 1). The results will summarize in one manuscript that will be summited to *Ecological Restoration*.

Objective 2: *Species selection for restoration: The importance of considering multiple criteria*. The results of this objective were shared as an oral presentation in the 4th World Conference on Ecological Restoration in August 2011 and will be a manuscript submitted to Restoration Ecology.

Objective 3: *Functional traits as indicators of revegetation success in restoration projects*. This information will be summarised in a scientific paper, maybe submitted to the Journal of Vegetation Science.

7. Timescale: Over what period was the RSG used? How does this compare to the anticipated or actual length of the project?

The RSG was used between April 2010 and September 2011. As we detailed in question 5, this project is part of a PhD Thesis, and it will continue for two more years. We have some funding already secured by the project "*Restauración ambiental en Marqués de Comillas para favorecer la conservación de selva y aumentar la conectividad del paisaje a través de la recuperación de riberas*", developed by Natura y Ecosistemas Mexicanos A.C. Natura cover part of costs of: field assistant, equipment, field work and others; however, it will be necessary other financial support. When RSG finish we will intend to continue funding this project by applying for WWF or 2nd RSG. Our expectation is to convert this 2-year project in a long-term study.

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.

Item	Budgeted Amount (M$1=£18.8)	Actual Amount	Difference	Comments
Field Assistant	896.00	797.87	98.13	Differences are related to changes in the local exchange since budgeted.
Material and supplies	2683.07	3535.71	-852.64	Unforeseen difficulties forced us to spend more in this item (see question 2). We use funds previously considered for the technical visit to Spain and for equipment
Equipment (Digital camera and Laptop)	528.64	0	528.64	This difference was used in the item "Field work" and "Material and Supplies" (see question 2).
Field work (air and terrestrial tickets)	1111.04	1605.46	-494.42	Differences are related to the last field work in September 2011 that was not previously expected. We used funds previously considered for Equipment.
Technical visit to Spain	716.80	0	716.80	It was not necessary because Dr. Rey Benayas visited Mexico in April 2011. These funds were used for the item "Material and Supplies" and to assist to the SER Conference (see question 2).
TOTAL	5935.55	**5939.05**	-3.49	

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

We think is crucial to continue the work with local communities because they are the owners of the land and the natural resources. It is also important to bring them more information about the importance of riparian vegetation for the maintenance of the natural dynamics of the ecosystems and landscape of the rainforest, and for the maintenance of human well-being. The valuation of recovery of ecosystem services of riparian vegetation through restoration could be a good way to demonstrate this importance.

On the other hand, although it exceeds the objectives of this project, we think it is necessary to develop and evaluate suitable and reliable indicators to monitoring the success of restoration goals, not only at a local level but also at landscape and watershed level.

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

Yes. RSGF logo was used in two posters presented in the III National Congress of Ecology and Meeting of the Mexican Scientific Society of Ecology (SCME, in Spanish), in April 2011 in Veracruz, Mexico, and in two oral presentations in the IV World Conference on Ecological Restoration, by Society for Ecological Restoration (SER) in August 2011, in Mérida, Mexico. Logo will be used again in the oral presentation at the II International Congress on Ecosystem Services in the Neotropics, in next November 2011 at Asunción, Paraguay.

RSGF Logo was also included in the reports of the organization I represent (Natura), among the institutions that provide financial support.

11. Any other comments?

We are grateful to Rufford Small Grant Foundation for supporting our project and for being interested in Lacandona rainforest. We want to emphasise that the flexibility in the use of the funds was critical to obtain results. This is particularly important for our work in Marqués de Comillas, because in this is an isolated region where field work sometimes can be complicated, and it is not always possible to solve the problems in a fast way.