

## Final Project Evaluation Report

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Your Details	
Full Name	Rocío Antonieta Fritz Tapia
Project Title	Logging management in the temperate rainforest of southern South America: application of gap-phase dynamics to control bamboo invasion.
Application ID	22399-1
Grant Amount	£5,000
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Date of this Report	09 September 2018

1. 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
Identification of how the community values the forest				We achieved this objective successfully. We recognise the principal ecosystem services gathering by the community and the dimensions of the values of biodiversity. We achieved the collaborative work with the community. Chusquea association with the forest survey was also carried out. In addition, we determine the most relevant perturbation recognise by the community.
Identification of management methods currently used by the community				We achieved the identification of the techniques and methodologies used in logging. The community was however not able to allow us to participate in the survey of the information of training. In addition, not all the participants allow us to enter in his properties.
Elaboration of the sustainable forest logging protocol				We managed to develop a sustainable management protocol, only with part of the community. We established that the most relevant to avoid that <i>Chusquea quila</i> kidnaps the succession is the available light (measured as Leaf Area Index), more than the size of the clearing. The maximum of LAI that avoid the advance of the bamboo is 4, since this species is tolerant shade. With the GLAMA app (Gap Light Analysis Mobile Application © Lubomir Tichy 2014 - 2015), which is also free, the LAI can be determined in the field.
Implementation of a sustainable forest management protocol				We managed to evaluate the stages considered within the management protocol. However, we are still in a strategy for community development.

<p>Diffusion of the results, environmental education and monitoring</p>			<p>We managed to disseminate the results with the community. In addition, we carry out various environmental education activities associated with issues relevant to the community, such as: clearing dynamics, flora, fauna, disturbances and HANTA virus transmission. The monitoring of the activities is still pending, since we have presented several problems to incorporate more people from the community in the field activities.</p>
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**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.**

The first great difficulty was to establish a connection with the community. Initially, the community of Iñipulli refused to allow us to enter their communities. Thanks to the advice of Don Ricardo Muñoz, we achieved come to the Martín Tejada Guzmán School. The school, which brings together children and adults from different rural sectors. Therefore, this becomes an opportunity to take our objectives to broader territory and to more people. This forced us to readjust the budget in the function of the demands proposed by the school to obtain the development of the work. These changes forced to carry out a process of connection with the most progressive and most demanding community, since each activity requires a separate organisation for children and adults.

Once the dynamic was established and the objectives of our work were made known to the community, new difficulties arose, particularly with adults. There is a low participation of adults in extra-curricular activities; in addition to the people who participate are over 90% women. In general, they have a low interest in carrying out field activities and in showing, the work carried out on his land. We pretend solve this problem through the connections generated with the children.

Another problem that was presented was the scheduling of activities. We only can do activities during the children's class schedule; therefore, the deadlines that we were stipulated were extended. In addition, during the vacation break we could not carry out activities with the community.

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

- a) The community considers fires and rodents as the main negative factors associated to the forest. However, bamboo is considered as an intermediate factor, since they associate it with negative factors such as the presence of rodents and HANTA virus. However, it is also considering a refuge and food for livestock, and particularly by children, it is considered as a place for

playing games and obtain material of construction. The community recognises as one of the most frequent disturbances to (1) Fall of trees (2) Thunderstorms that would have as a consequence the fires and falling of trees as well.

- b) In the case of management methods, it was established that there is no knowledge of adaptive management techniques within the community, nor is there evidence of recognition of the benefits of these. The logging methodologies used account for a traditional logging where the monetary cost / benefit is privilege when selecting the tree to cut. Seventy percent of these use chainsaws as tools and 40% the complementary use of chainsaws and axes. The planning associated with this activity only considers the use of forests that are as far away as possible from the home of the property, therefore most require the use of some transport for handling. In addition, they recognise that this activity is group, where most of the family group participates in some of its stages of the process.
- c) The most relevant to avoid that *Chusquea quila* kidnaps the succession is the available light, more than the size of the clearing. The maximum of LAI that avoid the advance of the bamboo is 4. Therefore, after cutting a tree, the change in the available light can be measure after opening the clearing. In addition, know in advance if there is a risk or not that the bamboo can hijack the succession in that place.

**4. Briefly describe the involvement of local communities and how they have benefitted from the project.**

We have increased awareness of the importance of biodiversity present in the forest, especially the importance of *Chusquea quila* in the dynamics of these ecosystems. Know the community consider *Chusquea* an endogenous component, despite being associated with complex events for people, it is a crucial factor in the maintenance of biodiversity. In addition, people were able to learn about the preventive measures and the current state of knowledge of the Hanta virus, of which several cases have been reported in the region. We build the capacity of the local community on identification of species are contagious.

We also have a transversal initiative with in Helvecia School with two kids, which make an investigation associated with this project. Thanks to this initiative and the participation of " *Abramos nuestros laboratorios: naturaleza, sociedad y tecnología 2017*", they were able to exhibit at the *ESI AMLAT 2018 Latin American Expo*. From this experience, they were able to obtain a space to present at the *ESI 2019 International Science Expo*, which will take place in Abu Dhabi.

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

Yes, we are interested in continuing the project that aims to be a long-term project. Although we are aware that the type of knowledge generated in this project allows an easy transfer between the people of the community and other communities. However, training, monitoring and constant training of members is necessary. In

addition, it is possible and necessary to transfer this knowledge to communities in other regions of the country where other problems may arise.

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

First, the results of this research will be part of my defense of master's thesis, which was already approved in a first phase that correspond strictly to writing. Then, in December, the public defense of results will take place.

Then the results of this work are expected to be published in a scientific journal, such as Plants People Planet (attached link (1)), for which we have already begun the development of a manuscript that we hope to send later this year.

(1) <https://nph.onlinelibrary.wiley.com/journal/25722611>

We are preparing a joint interview with the journalist associated with the Faculty of Sciences of the Austral University of Chile, a report with the results obtained in this investigation. Which will have the same coverage as the interview mentioned in point 10.3 of this report.

In addition, we have planned a series of presentations of the project. We have already done one of them, which was carried out at the Universidad Austral de Chile. This was aim at undergraduate students in the Marine Biology career and Bachelor of Science in their different mentions (i.e. biology, chemistry, etc.). In addition, during this presentation we provide information to students on how to access funding from the Rufford Foundation.

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

The Rufford Small Grant Foundation was used from September 2017 through August 2018, enabling me to conduct a research portion for my master's research.

**8. Budget: 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. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.**

Item	Budgeted Amount	Actual Amount	Difference	Comments
Field trips				

Fuel	775	3525	+2750	Due to the problems that we presented in the community selection in which we executed the project, we had to divert the money destined in the Car Rent to Fuel item. Otherwise we would not have enough financing to mobilize. To properly execute the budget, some of the assistants facilitate their personal vehicles.
Car rent	2750	0	-2750	Diverted to the Fuel item.
Coffee break	520	520	0	We spend the expected amount
Informal lunch	670	670	0	We spend the expected amount
<b>Equipment</b>				
Voice recorder	120	0	-120	We realized that when buying a cell phone, we could use the budget for multiple utilities. (1) Recording the audios of the surveys (2) Recording the videos of the activities of logging and environmental education (3) Making the calls to reorganize the sampling sites.
Tape measure	125	125	0	We spend the expected amount
Office supplies	40	40	0	We spend the expected amount
<b>*Alteration</b> : Cellphone Huawei Y6 II + Memory Card 32 Gb	0	120	+120	Diverted
<b>Total</b>	5000	5000	0	Date of transaction: 04 September 2017. £5.000 GBP are equivalent on that date to \$3.862.050 CLP. The budget is in Pounds Sterling.

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

Through the realization of this project we have been able to realize that there is a great diversity of problems associated with the interaction of the community with the ecosystem. However, communication and collaboration with scientists is scarce. Therefore, a very important, but challenging, next step would be to continue the work done in conjunction with the Martin Tejada Guzmán School and the associated community, considering other aspects of conservation. Given that these communities will continue to be exploited for productive purposes, it is very important to identify the gaps and opportunities that would allow the maintenance

of biodiversity and ecosystem services. In addition, it is of extreme urgency more knowledge, on the part of the community, of the species present in this ecosystem and the identification of which of them are native. Another important challenge would be to implement a knowledge and prevention system for Hanta virus infections, which are increasing in the region and most of them result in death. Since its contagion is highly associated with the present of *Chusquea quila*, prevention protocols could be implemented in response to its contagion and protection measures in the flowering and weeding activities. In addition, finally, it is very interesting the approach generated by the community to establish a prevalence over time of a sustainable school system, which is directly linked to the activities carried out in the community. Therefore, it is extremely urgent, as a first step to implement a recycling and waste separation system, which would generate the transfer of this knowledge from the school to the homes of each child.

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

The Rufford Foundation logo was featured in both an oral presentation about the project in all the activities at the Martin Tejada Guzman School during September 2017 to July 2018. I have also mentioned the support of the Rufford Foundation in two interviews done by (1) the virtual newspaper "El Ciudadano" and (2) Science Faculty of University Austral of Chile press.

- <https://www.elciudadano.cl/entrevistas/la-selva-valdiviana-es-un-ecosistema-unico-leno-de-desafios-y-de-historias-que-estan-esperando-a-ser-contadas/09/22/>
- <http://sitiosciencias.uach.cl/2577-2/>

This interview, related to scholar project associated to this project, was supported by 15 virtual newspaper (i.e. Diario Austral de Valdivia, Diario de Futrono, Diario de Río Bueno, Diario San José, etc.), which have full scope at regional and national level.

- <http://www.cienciaenchile.cl/estudiantes-valdivianos-viajaran-a-abu-dhabi-a-representar-a-chile/>

The logo will appear in all printed and digital materials generated for the dissemination of results and t-shirt of the labourers. In addition, the Rufford Foundation support will be acknowledged in upcoming talks, seminars, and other events.

**11. Please provide a full list of all the members of your team and briefly what was their role in the project.**

I. Team members:

Name	Role in the project
<b>Rocío Fritz:</b>	Team Leader. Organize the material, the budget and the activities that every member of the project realize. Additionally, I lead the presentations and register the activities.
<b>Magdalena Huerta:</b>	Participate in produce and organize the didactic material for all the presentations. It facilitated the use of your personal vehicle.
<b>Ricardo Muñoz:</b>	Participate as a direct connection between the School and us. Additionally, give us particular information about the territory that allow us to manage better our resources.
<b>Susana Paula:</b>	Supervise the accordance of the activities to the objective of the project.

II. Assistants from undergraduate and postgraduate:

Name	Role in the Project
<b>Luisa Parra:</b>	Collaboration in diffusion talks. Realization of diffusion material.
<b>Marina Jiménez:</b>	Collaboration in diffusion talks. Management of technical equipment. It facilitated the use of your personal vehicle.
<b>Pablo Saldivia:</b>	Collaboration in diffusion talks. It facilitated the use of your personal vehicle.
<b>Alexis Olivares:</b>	Collaboration in diffusion talks.
<b>Loreto Aguilar:</b>	Collaboration in diffusion talks. It facilitated the use of your personal vehicle.
<b>Nicolás Díez:</b>	Collaboration in diffusion talks.
<b>Juan Pablo Toledo:</b>	Realization of diffusion material.
<b>Emilio Guto:</b>	Transport. Collaboration in informative talk "Hanta Virus". It facilitated the use of your personal vehicle.

12. Any other comments?

We want to thank the Rufford Foundation for give us the opportunity to carry out this project and the advices to carry out the best possible improvement. In addition, we want to thank Martin Tejada Guzmán School for all the trust given, for providing us with their dependencies and for the enthusiasm to participate in our activities. In addition, we want to thank the San Martín Experimental Forest for providing us with its dependencies to carry out some of the activities in the field. We hope to project and replicate this initiative in other sectors with other communities, and also improve and increase the achievements of this project in the future.



Field trip.



Above the bamboo thicket



Below the bamboo thicket