

## 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. 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>	Rene Reyes
<b>Project title</b>	Fuelwood and forest degradation in the Chilean Temperate Rainforests
<b>RSG reference</b>	12456-1
<b>Reporting period</b>	8th November 2012 – 17th November 2013
<b>Amount of grant</b>	£5531
<b>Your email address</b>	<a href="mailto:renereyesgallardo@gmail.com">renereyesgallardo@gmail.com</a>
<b>Date of this report</b>	31 December 2013

**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
<p>a) Identify the current main fuelwood production areas in "Los Rios Region", by analyzing agricultural censuses, and interviewing producers and traders.</p>			X	<p>Based on 350 surveys carried out in Los Rios Region, and the 2007 agricultural census, we got the following results:</p> <ul style="list-style-type: none"> <li>- In Los Rios Region there are 16,529 private rural properties (landownerships), of which 83% are inhabited (inhabited by the owner, the owner's relatives, and/or workers). The 93% of the inhabited properties produce firewood for self-consumption, while the remaining 7% buy it. The main reasons related to the firewood buying are the plot size (few forest), and the age and health of landowners (difficulties for harvesting).</li> <li>- The 12% of landowners are producing firewood for sale (2,050 landowners). While these are distributed along the entire region, it is possible to observe a greater concentration in the municipalities of Valdivia, Panguipulli, Lanco and Paillaco (Annex 1). The 90% of firewood sellers have less than 200 ha (small landowners), the 8% have between 200 and 1,000 ha (medium landowners), and the 2% have more than 1,000 ha (large landowners).</li> <li>- Firewood sellers own 180,000 ha of native forests and 29,000 ha of forest plantations (exotic species), which represents 12% of the regional area of native forests and forest plantations. Small landowners own 25% of native forests, the medium ones 31%, and large ones 44%. So, the small landowners represent 90% of the total firewood sellers but only own 25% of native forests, while the large ones represent the 2% and own the 44% of native forests.</li> <li>- There is a clear geographic differentiation of firewood sellers. While 63% of the small landowners are concentrated in the northern and coastal municipalities (Panguipulli, Lanco, Mariquina, Valdivia, and Corral), 73% of the large landowners are located in the southern and Andean municipalities (Panguipulli, Futrono, Lago Ranco, Río Bueno and La Unión).</li> <li>- 26% of firewood sellers belong to the Mapuche people (First Nation). 78% of them are located in</li> </ul>

			<p>the northern and coastal municipalities. In Panguipulli, Mapuche firewood sellers represent 70% of the total firewood sellers, while in Lanco and Mariquina they represent 40%. In the other municipalities the indigenous presence is much lower.</p> <ul style="list-style-type: none"> <li>- In term of land tenancy, 64% of firewood sellers have formal land tenure while the remaining 36% are in irregular situation. The northern and coastal municipalities show a larger level of irregular land tenancy (43%) than the centre and southern ones (29%). This coincides with the distribution of firewood sellers by plot size. So, those municipalities where small landowners are more abundant have more land tenancy problems than the rest.</li> <li>- In term of education, 10% of firewood sellers does not have formal education, 65% have primary (complete or incomplete), 14% have secondary (complete and incomplete), and 11% have technical or university education. Firewood sellers located in municipalities of the center valley have a higher level of schooling.</li> </ul>
<p>b) Analyse market failures pushing forest degradation in the main fuelwood production areas, incorporating producer feedbacks.</p>		<p>X</p>	<p>In order to analyse the market failures that are pushing deforestation and forest degradation, firewood sellers were classified in two groups, peasants and non-peasants. Peasants are defined as those landowners that live in the countryside and do not hire permanent workers (family is the main manpower), while non-peasants can live or not in the countryside and hire permanent workers. The peasant's economy is oriented to the family survival (subsistence economy), while the non-peasant's economy manages different kinds of capital (especially financial) to create wealth (accumulation economy).</p> <p>In the case of peasants, we identified several market failures related to deforestation and forest degradation:</p> <ul style="list-style-type: none"> <li>- Labour: off-farm incomes reduce logging on native forests and by doing that reduce forest degradation. The data show a negative relationship between the volume of firewood produced (m<sup>3</sup>/year) and the importance of pensions and subsidies in the total income (%) (C. Pearson: -0.30). So, to the extent that the family ages and physical strength decreases, forestry income starts to be replaced by pensions, subsidies or other off-farm sources. However, when these off-farm income</li> </ul>

			<p>opportunities do not exist, the pressure on native forests increases by hiring external workers, who produce firewood and timber without many environmental considerations.</p> <ul style="list-style-type: none"> <li>- Land: informal land tenure regimes are related to a larger quantity of families living inside a plot (C. Pearson: -0.32). This normally occurs when the landowners die, and their heirs do not reach an agreement to divide the property. So, several families (heirs) continue living and producing in the same piece of land without a legal possession of it. This situation increases the volume of firewood produced and the degradation of forests.</li> <li>- Public infrastructure: the location of the plot in the territory is also a relevant factor. For people living closer (in terms of time more than distance) to urban areas is easier to generate off-farm incomes, especially wages, which reduces the volume of timber harvested from native forests. This fact is directly related to the quality of roads. In areas where public roads are in bad conditions is harder to travel, which reduces the chances to get off-farm jobs. So, when public infrastructure limits people movement it can push deforestation and forest degradation at a local level.</li> <li>- Beef production: the main component in the per capita peasant's income is livestock (C. Pearson: 0.52). From an economic point of view, livestock is more important than agriculture and forestry production. As the plot area increases, the quantity of cattle also increases, which has a significant and positive impact on the familiar income. With higher incomes, families can buy new equipment (truck, tractor, chainsaw, etc.) which show a positive relationship with the volume of firewood produced (C. Pearson: 0.36). Unfortunately, this is an unsustainable process because more cattle in the plot imply more pressure for land use changes (forests to grasslands).</li> </ul> <p>In the case of non-peasants, we observed the following:</p> <ul style="list-style-type: none"> <li>- Beef and milk production: the volume of firewood produced shows a positive relationship with the quantity of equivalent cows<sup>1</sup> and the grasslands area (C. Pearson: 0.64 and 0.56, respectively). So,</li> </ul>
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<sup>1</sup> All animals inside a plot were converted in "equivalent cows" (cow of 500 kilograms). For example, an average calf represents 0.3 equivalent cows, while a sheep equals to 0.1 equivalent cows.

				<p>the volume of firewood produced is strongly related to the expansion of the livestock frontier. As the quantity of animals inside the plot increase, their density also increases (cows equivalent per hectare of grasslands), which goes putting pressure on the border between grasslands and forests. This effect augments in plots dedicated to dairy, where cattle density is higher.</p> <p>Therefore, when market conditions for beef and milk improve there is an increment in deforestation and forest degradation.</p>
c) Generate policy proposals to reduce forest degradation based on the active participation of rural families.			X	<p>Based on meetings with groups of firewood producers, we developed a set of policy proposals oriented to reduce deforestation and forest degradation. The main proposals are the following:</p> <ol style="list-style-type: none"> <li>1. Public infrastructure: the improvement of roads facilitates the movement of people from the countryside to urban and industrial areas, connecting them with off-farm income opportunities. The removal of barriers to the labour market should be a priority to improve the socioeconomic conditions of peasant families and reduce the pressure over natural resources, especially for small and medium landowners. This proposal aims to close the quality gap between the central valley roads (agricultural production areas) and those located in marginal territories, where forests are being strongly degraded.</li> <li>2. Technical support: many times, forest degradation is consequence of lack of technical support. So, one of the more frequent suggestions from peasants was the implementation of a forestry programme, which should be oriented to improve their knowledge about forest management, trade their products in a more convenient way, and work legally with the support of professionals. An adequate technical support program should not be only focused on forest management, but also in agriculture and livestock, due to the multidimensionality of the peasant production system.</li> <li>3. Economic incentives: in 2008, the Chilean government enacted a new legislation to promote the sustainable management and recovering of native forests. However, five years after its enactment it is possible to say that the Act has failed, because of bureaucracy and the lack of significant incentives. Peasants and non-peasants claim for the strengthening of this law, and propose</li> </ol>

			<p>to augment the incentives, specially thinking in recovering degraded forests, and reduce access barriers.</p> <p>4. Complementary subsidy for older people: native forests are an important component of the peasant's economy. Forests are an income source for families through time, from the earliest stage (family formation) until the old age (heredity). The last stages, when parents get older, could be a good moment for recovering the productive potential of forests, by establishing an economic incentive oriented to reduce logging. This incentive would be a kind of pension complement that would allow offset forestry incomes. The technical assistant, provided by the state (see point 2), could serve as a witness in the process. A reduction in logging intensity during 5, 10 or more years could be a good opportunity to recover forests for the following generation.</p> <p>5. Land tenancy: 36% of landowners do not have regularised land tenancy, which increases logging and forest degradation. Therefore, one of the proposals is improving this situation by: a) reducing bureaucracy in the process of land partition (in order to get it faster and cheaper), and b) pushing a land regularisation process in priority areas, where both poverty and forest degradation are higher.</p> <p>6. Livestock: this is the topic where there were more difficulties to get a consensus between peasants, no-peasants and technicians. Beef and dairy production are the main economic activities in the countryside of Los Rios Region (even in those plots where firewood production was economically relevant), so it is a very sensitive issue. As a summary of the main agreements we can mention the following: a) improve the productivity of grasslands and shrublands in order to produce more fodder and avoid damaging forests, through fertilization and soil improvement treatments; b) explicitly define forest areas where cattle can get protection and food during winter (natural barns) - these areas could receive a different silvicultural treatment to maintain them (for example, protecting high value trees by using movable fences); and c) define a minimum forest cover per plot (%), both in flat lands (valley) and slopes (mountains), with the active participation of small, medium and large forest owners. This process should end with a land use plan for Los Rios Region</p>
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				(mandatory for all landowners).
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**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).**

According to the methodology established for this study, we randomly defined points in the territory where samples (landowners) were taken (by using the software Google Earth). This process was slower than we estimated because many times landowners were not in their plots or simply, they were too busy to talk with us. So, we had to return several times to some places to carry out the interview, which increased study costs and times.

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

The most important project outcomes were the following:

- a) The project was supporting the PhD research project of Rene Reyes Gallardo (main researcher), which is entitled “Energy demand and native forest conservation in Chile. Analysing the process of forest degradation and its relationship with the woodfuel market.” This topic has been poorly studied in Chile, where woodfuels continue being the third most important energy source (mainly firewood), after petroleum and coal, contributing with the 20% of the primary energy matrix.  
 This PhD research consists of 4 chapters (papers): 1) Firewood production in Los Rios Region, 2) Agroforestry systems in los Rios Regions, 3) Native forest degradation in Los Rios Region, and 4) The psychological dimension of forest degradation. These papers will be elaborated during 2014, though there is already an available draft of the first one.
- b) The research project was contributing to the “Continuous Inventory of Forest Ecosystems”, initiative that is led by the National Institute of Forest Research (in Spanish, INFOR). The Continuous Inventory aims to monitor the conservation state of native forests, in order to support the implementation of public policies. During previous years the inventory was focused on measuring biophysical variables related to forests, like vegetation composition, timber availability, natural regeneration, etc. However, from this PhD research INFOR has decided to include a socioeconomic dimension in current and future evaluations, due to the close link that exists between forest conservation and firewood production. From this perspective, this PhD research is influencing the way as the public sector looks forests, putting to humans inside and not outside forests.
- c) The project contributed to the elaboration of the Book “Firewood: Renewable Energy for the Conservation of Native Forests”, which is being supported by the Association of Foresters for the Native Forests ([bosquenativo.cl](http://bosquenativo.cl)). The logo of Rufford Foundation was included in this publication.  
 Reyes, R. and E. Neira. 2013. *Lena, energía renovable para la conservación de los bosques nativos de Chile*. MIRA ediciones. Valdivia, Chile. 77 p.  
 In this book we are summarising the main findings of the research concerning firewood consumption, trade, and production, and native forest degradation. This information will be very useful for stakeholders working in social and environmental issues around forestry. The definition of the firewood production areas is one of the most relevant contributions of this work, since it will facilitate the focalisation of programmes and policies aim to reduce deforestation and forest degradation.
- d) From this project, we are elaborating a document with the main forest policy proposals, which were discussed at local level. This process is starting. We are planning a workshop

during the first half of 2014 to open the discussion, including peasants and farmers from other regions. Once the document is ready, we will send it to different organisations to get feedback and support. Finally, we hope to discuss these proposals with the national government to put them into practice.

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

Local communities were involved in this project as the main information providers but also as experts looking for solutions (proposals). While, the project did not imply direct benefits for them, it did represent an opportunity to put on the table their problems and perspectives. So, we think that the project will produce indirect benefits in the middle term, as well as activities continue.

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

Yes, we have plans to continue. First of all, we will continue working with the National Institute of Forest Research to extend the socioeconomic analysis of deforestation and forest degradation to other regions of the country. We already have an agreement to take data in Los Lagos Region (a larger region to the south of Los Rios Region). Besides, we are going to develop a methodology that allows us to integrate the socioeconomic analysis to the Continuous Inventory of Forest Ecosystems. Moreover, we are organising a workshop for the first term of 2014 in which we will discuss the forest policy proposals with peasants and farmers of several territories. Later, we will present these proposals to the National Forest Service and other organisations. In the medium term we hope to improve the Native Forest Law, increasing the incentive for the sustainable management of native forests, and develop a forestry programme to support native forest owners. In terms of being more effective, we will create an independent research centre to push all these ideas.

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

Rene Reyes has been publishing articles in several electronic media during the last years<sup>2</sup>, which will be used to spread the main results and ideas generated during this project. We are also members of the Association of Foresters for the Native Forests ([bosquenativo.cl](http://bosquenativo.cl)) and the Corporation of Firewood Certification ([lena.cl](http://lena.cl)), organisations that have well known web pages where we can publish information. Rene Reyes is also member of ASHOKA Foundation ([ashoka.org](http://ashoka.org)) and AVINA Foundation ([avina.org](http://avina.org)), which are good platforms to share the results of this project to people in other countries.

Together with the Book “Firewood, Renewable Energy for the Conservation of Native Forests” we are going to publish complementary materials concerning the topic: a) educational poster about the peasant economy and the forests, and b) videos about different aspects concerning the process of deforestation and forest degradation.

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<sup>2</sup> See: <http://www.elmostrador.cl/autor/renereyes/>, <http://ciperchile.cl/autor/rreyes/>, [http://www.bosquenativo.cl/index.php?option=com\\_k2&view=itemlist&task=user&id=75:ren%C3%A9reyes](http://www.bosquenativo.cl/index.php?option=com_k2&view=itemlist&task=user&id=75:ren%C3%A9reyes)



**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 January 2013 and October 2013, which is very coincident with the anticipated length of the project. However, we see this initiative as a long-term contribution for the conservation of the Chilean native forests, therefore the project will remain.

**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	Actual Amount	Difference	Comments
Accommodation - Lodging in villages close or in field sites for 9 months (£135/month)	1,215	1,376	-161	The money was used to pay lodging in several villages and towns (hostels and campsites), due to the sampling covered a large territory. There was a small difference related to the budgeted, which was paid by the researcher.
Food and subsistence - 2 people for 9 months (£95/person/month) - Meetings (£65.5/meeting x 10 meetings)	2,365	2,294	71	Meetings with landowners were cheaper than the budgeted. The difference allowed us to cover deficit in other items.
Equipment – Tent, 2 sleep bags, GP, Flipchart, Laptop	196	262	-66	The GPS was a little bit more expensive than the budgeted. The difference was paid by the researcher.
Transportation - Jeep (£262/month x 9 months) - Gasoline (£144/month x 9 months)	1,296	1,486	-190	The difference concerning the budget is because there was an increment in the gasoline price.
Travel - Economy air ticket Canada-Chile for the project leader - 2 bus tickets Santiago-Valdivia for the project leader (£33/ticket)	852	902	-50	There was an increment in the price of bus tickets.
Book - Design and diagramming - Printing	1,834	1,834	0	
<b>Total</b>	<b>7,758</b>	<b>8,154</b>	<b>-396</b>	The difference was covered by the main researcher. Note: conversion rate 1 British Pound = 763 Chilean Pesos.

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

Looking ahead, I feel that the most important steps in the near future are socialise the main findings and ideas generated from this project, especially with local communities in other regions, and get a national agreement to change the current trend of deforestation and degradation of our native forests. The strategy should combine field research, communication and political actions in order to achieve deep changes in our forest policies, legislation, and public programmes.

The increment in the international price of fossil fuels is promoting the use of cheaper energy sources. Due to in Chile firewood is the cheapest one, many companies and institutions are starting to use it. I do not have doubts that this fuel shifting process will negatively impact in our native forests, if we do not do anything to avoid it. I really believe that our native forests can be used in a sustainable way to supply many products and services, among them energy. However, that will not be possible with our current forest policies and institutions.

**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, we used the RSGF logo in the book “Firewood, Renewable Energy for the Conservation of Native Forests”, which was sent to RSGF during September 2013. The logo will be also used in the materials aforementioned (poster and videos), and the Rufford Foundation will be recognized in all papers in preparation.

**11. Any other comments?**

We only want to thank to Rufford Foundation for supporting this research. I hope to continue working with you in future stages.

**ANNEX 1**

a) Regions of Chile (map and satellite image)



Source: own development based on Wikipedia 2011. In the satellite image is possible to identify the Atacama Desert in the north (regions I to III), a transition area between regions IV and RM, the “green area” from Region VI to XI (forests and grasslands), and incrementally ice and snow in the extreme south. In 2007, the Region X was divided. In the northern portion was created the Los Ríos Region (XIV), where this research was performed. The Images are available at [http://es.wikipedia.org/wiki/Archivo:South\\_America\\_satellite\\_plane.jpg](http://es.wikipedia.org/wiki/Archivo:South_America_satellite_plane.jpg) and [http://es.wikipedia.org/wiki/Regiones\\_de\\_Chile](http://es.wikipedia.org/wiki/Regiones_de_Chile)

b) Administrative division of Los Rios Region



Source: WikiLosRios ([http://www.wikilosrios.cl/index.php/Regi%C3%B3n\\_de\\_los\\_R%C3%ADos](http://www.wikilosrios.cl/index.php/Regi%C3%B3n_de_los_R%C3%ADos))  
The light green area is Valdivia Province with 8 municipalities, and the gray one is Lago Ranco Province with 4 municipalities.