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“Achieving sustainable development in Chile’s forestry sector: a case study in Cabrero”

by

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ABSTRACT

The forestry sector (FS) could play a key role in the achievement of sustainable development (SD), especially in the context of the sustainable development goals (SDGs). In the case of Chile, the FS is a pillar of the national economy, however, its contribution to the SD of the rural communities where it operates, is not so clear. Cabrero is a Chilean commune with a high presence of the FS and with an important percentage of rurality, therefore, this study sought to evaluate the impact of the FS on the SD of the rural communities of Cabrero. Based on a methodology of mix methods, it is concluded that the FS has a negative impact over the communities’ SDGs, which is attributed to CSR practices that failed to meet the expectations and needs of rural communities. These practices have an important role given that the current normative framework does not effectively protect rural communities from the negative impacts of forest operations and there is a low institutional capacity of local governments to mitigate and monitor these impacts. However, despite the latter, there is a positive attitude of the stakeholders to increase the contribution of the FS to communities. Therefore, this study ends up proposing actions that allow to mitigate the impacts of the sector and increase its contribution to the achievement of the SD of the communities.

Keywords: Forestry sector, rural communities, SDGs, CSR, Chile
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INTRODUCTION

Forests are essential for Sustainable Development (SD). As described in the Brundtland report, forests protect ecosystems by making available habitat, contributing to climate systems and protecting soils and watersheds. In addition, forests are sources of economic and social development by providing timber and non-timber resources (WCED, 1987). Therefore, sustainable forest management (SFM) has become a global priority, especially when there is a world commitment to achieve SD by 2030, through the sustainable development goals or SDGs. SFM is understood as the management and use of forest resources in a way, and at a rate, that allows the forests to maintain their ecological, economic and social functions for present and future generations (MCPFE, 1993). In the case of the economic sector that derives from forests, known as the forestry sector, the development of SFM that allows the adequate provision of forest ecosystem services (ES) from productive plantations is crucial to achieving SD (Milledge, 2015; Sing et al., 2015). In addition, corporate social responsibility (CSR) practices from forest companies are essential to increase the contribution of the sector to SD (FAO, 2012). The latter, is especially relevant for countries whose growth and economic development is influenced by the sector, such as Chile.

The Chilean forestry sector has been developing for decades and is now a fundamental pillar of the national economy. In 2015, the sector generated 5.4 trillion dollars in exports, contributing to 10.8% of national exports and employing directly and indirectly more than 300,000 people (CORMA, 2017a; INFOR, 2016a). The sector is distributed throughout the central-southern zone of the country, mainly in the Biobío Region, where 70% of national exports are produced (CORMA, 2017b). Even though the economic contribution of the sector to the country is undoubted, the effects at the local level are not clear, especially in the case of rural communities that coexist with the sector and that depend on one form or another of the actions and decisions of companies operating in the areas (Andersson et al., 2016 and Prado, 2015). In this context, the contribution of the forestry sector to the SDGs of the communities’ entails overcoming the economic aspects and focus their efforts towards social and environmental development, especially in the communes with a significant percentage of rurality and with a high presence of the forestry sector. This is the case of Cabrero, commune of the Biobío region, where the three largest forestry companies in the country operate and where more than 40% of the commune’s surface is surrounded by productive plantations (Municipality of Cabrero, 2013). However, despite the importance of the forestry sector, there are few studies evaluating the contribution of the sector to the SD of the rural communities. Moreover, there are no studies in
Chile that evaluate the contribution of the sector to the SDGs of rural communities. Therefore, this study aims to contribute to create knowledge regarding the impact that the forestry sector could have on the SD of rural communities, analysing the case of Cabrero. The above, through the identification of the areas of influence of the forestry sector in the commune; recognition and analysis of the forestry sector impacts on the SD of rural communities, declared by forest companies, communities and local governments; identification of the opportunities and challenges for the SD of the communities and, finally, the proposal of practices, from the forestry sector, that contribute to strength SD in the rural sector of Cabrero.

This study is organized in four chapters. Chapter 1, describes the contribution of forests to the SDGs and the impacts of the forestry sector on the SD of rural communities, trough the provision of ES as well as CSR practices. In addition, the chapter describes and introduce the Chilean forestry sector. Chapter 2 provides details of the study site, Cabrero. Chapter 3 describe the methodology used for this study. Chapter 4 presents the results regarding the research objectives. Chapter 5 presents the discussion and propose practices from the forestry sector to increase communities’ SD and finally, Chapter 6 presents the conclusions.
CHAPTER 1

LITERATURE REVIEW

1.1 Forests and its contribution to SDGs

Since the publication of the Brundtland report, there have been various international agreements to contribute to the achievement of SD, a development in which forests play a major role (UN, 2017a). The most recent international agreement corresponds to the Sustainable Development Goals or SDGs (Figure 1.1). The set of 17 goals and 169 targets aims to achieve SD by 2030 (IAEG-SDGs, 2015). Among them, Goal 6 and Goal 15, specifically mention forests. For example, Goal 6, in its target 6.6, mention the need to protect and restores water-related ecosystems such as forest, while Goal 15 “Life on Land” aims to "protect, restore and promote sustainable use of terrestrial ecosystems, SFM, combat desertification, and halt and reverse land degradation and halt biodiversity loss", including among its targets, ensuring conservation, restoration and sustainable use of forests and promote SFM by providing financial assistance and incentives to its achievement, especially in developing countries (UN, 2017b).
Figure 1.1: Sustainable Development Goals. Source: UN, 2017c.
In addition to goals 6 and 15, as shown in Figure 1.2, forests could contribute to the achievement of all SDGs through SFM that ensure the provision of ES (Figure 1.3) and that create enabling conditions for forests to deliver other SD outcomes (Figure 1.4).

Figure 1.2: Direct contributions from forests to SDGs (dark green) and targets\(^1\) that create the enabling conditions for forests to contribute to SD (light green). Source: Milledge, 2015.

\(^1\) For targets’ details see IAEG-SDGs, 2015.
Although SFM allows the achievement of the SDGs, it is important to acknowledge that the contribution of forests it is supported in the understanding that SDGs and its targets operate as a network with synergies and trade-off (Le Blanc, 2015; Nilsson et al., 2016). The latter is especially relevant when forests are used as raw material for the development of the forestry sector.
1.2 Forestry sector and SD

According to Lebedys (2004), forestry sector includes all the economic activities that are dependent upon the production of goods and services from natural or planted forest such as the production of wood fibre for industrial roundwood, wood fuel, charcoal, sawn wood, wood based panels, pulp and paper; the commercial production and processing of non-wood forest products (NWFPs); the subsistence use of forest products, and the economic activities related to production of forest services. In many countries, forestry sector constitutes a source of economic growth and generation of wealth (World Bank, 2017). However, when analysing the effects at the local level, the benefits are not so clear, especially in the case of rural communities that coexist with forestry activity (D’Amato et al., 2017; Pirard et al., 2017). Here, the influence of the forestry sector on the SD of these communities appears to be conditioned by factors such as the ability of a productive planted forest to provide ES (Bauhus et al., 2010; Sing et al., 2015) and forest companies interest in contributing to the SD of communities through CSR practices (FAO, 2012).

1.2.1 Plantations and ES

FAO (2017) defines productive planted forests or productive plantations as trees established by planting and/or seeding of native or exotic species, as result of afforestation or reforestation, that aim to produce wood and non-woods products. In 2010, 75% of the planted forest was used for productive purposes (FAO, 2010), an amount that is expecting to rise as result of increasing market demand and government policies, higher marginal cost of extraction of natural forests and the international pressure to increase conservation of natural forests (Warman, 2014).

Besides the economic purpose of plantations, they could also emulated ES provide by natural forests. For example, Kelty (2006) mentions that sustainable manage plantations are recognized for their ability to sequester carbon and restore degraded lands. In addition, plantations tackle climate change and the effects in food production by stabilizing soils, climate and water flows and enabling pollination and are natural predators of agricultural pests (FAO, 2016). Also, as demonstrated May et al. (2011), forest products from plantations have low embodied energy, and when use as bioenergy, have a strong potential for greenhouse gases mitigation.

Regardless of the latter, as described by Baral et al. (2016), Brockerhoff et al. (2012) and D’Amato, et al. (2017), the provision of ES from plantations and hence their contribution to
communities’ SD is not so clear when analysing the alternative land use (Table 1.1). For example, conversion of agriculture or deforested land into plantations could have a positive effect in regulating, supporting and provisioning services, however, the effect is contrary when natural forests are converted to plantations, especially in terms of cultural services (Baral et al., 2016; Williams, 2014).

Other important factor of land use change is the provision capacity of ecosystems and the socio-economic consequences. According to Bauhus et al. (2010), changes from degraded land or unproductive land into plantations increase the provision of goods such as wood, which could lead to positive socio-economic outcomes; however, changes from agriculture to plantations could have the opposite effect, especially in rural communities where, as mentioned by Switzer (2014), this change could lead to a decline in income generation and food production for small-farmers.

Table 1.1: Differences in the provision of ES between plantations and other land uses.

<table>
<thead>
<tr>
<th>ES</th>
<th>Natural forest</th>
<th>Degraded land</th>
<th>Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil formation</td>
<td>Lower</td>
<td>Higher</td>
<td></td>
</tr>
<tr>
<td>Nutrient cycling</td>
<td>Lower</td>
<td>Higher</td>
<td></td>
</tr>
<tr>
<td>Primary production</td>
<td>Variable</td>
<td>Higher</td>
<td></td>
</tr>
<tr>
<td>Provisioning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Habitant for species</td>
<td>Lower</td>
<td>Higher</td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>Lower</td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Fibre</td>
<td>Higher</td>
<td>Higher</td>
<td>Higher</td>
</tr>
<tr>
<td>Fuel</td>
<td>Variable</td>
<td>Higher</td>
<td></td>
</tr>
<tr>
<td>Genetic resources</td>
<td>Lower</td>
<td>Variable</td>
<td></td>
</tr>
<tr>
<td>Natural medicines,</td>
<td>Negative</td>
<td>Higher</td>
<td>Higher</td>
</tr>
<tr>
<td>Freshwater (quantity)</td>
<td>Variable</td>
<td>Lower</td>
<td>Higher</td>
</tr>
<tr>
<td>Freshwater (quality)</td>
<td>Variable</td>
<td>Higher</td>
<td>Higher</td>
</tr>
<tr>
<td>Regulating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air quality</td>
<td>Lower</td>
<td>Higher</td>
<td>Higher</td>
</tr>
<tr>
<td>Erosion control</td>
<td>Similar</td>
<td>Higher</td>
<td>Higher</td>
</tr>
<tr>
<td>Water purification and treatment</td>
<td>Lower</td>
<td>Higher</td>
<td>Higher</td>
</tr>
<tr>
<td>Biological control and pest management</td>
<td>Lower</td>
<td>Higher</td>
<td>Higher</td>
</tr>
<tr>
<td>Pollination</td>
<td>Lower</td>
<td></td>
<td>Higher</td>
</tr>
<tr>
<td>Carbon sequestration and storage</td>
<td>Higher</td>
<td></td>
<td>Higher</td>
</tr>
<tr>
<td>Groundwater recharge</td>
<td>Lower</td>
<td></td>
<td>Higher</td>
</tr>
<tr>
<td>Natural hazard regulation</td>
<td>Lower</td>
<td></td>
<td>Higher</td>
</tr>
<tr>
<td>Cultural</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spiritual and religious values</td>
<td>Lower</td>
<td>Similar</td>
<td></td>
</tr>
<tr>
<td>Aesthetic values</td>
<td>Lower</td>
<td>Similar</td>
<td></td>
</tr>
<tr>
<td>Recreation and ecotourism</td>
<td>Lower</td>
<td>Similar</td>
<td>Higher</td>
</tr>
</tbody>
</table>

Source: Baral et al., 2016; Brockerhoff et al., 2012.
The differences in impacts are also seen within plantations, were most of the ES that contribute to SD are challenged when productive plantations are intensively manage monocultures (IMM) rather than polycultures. IMM correspond to productive plantation of one type of species, generally exotic, such as eucalyptus and pines, which through intensive silvicultural practices provide higher average yields of usable wood in short rotation, than natural forests or extensive plantations provide (O’hehir & Nambiar, 2010). As presented in Table 1.2, IMM have higher ability than polycultures to provide timber, but lower ability to provide regulating, supporting and cultural services.

Table 1.2: Differences between polycultures and IMM.

<table>
<thead>
<tr>
<th>ES</th>
<th>Polyculture</th>
<th>IMM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biodiversity</td>
<td>Higher</td>
<td>Lower</td>
</tr>
<tr>
<td>Efficient use of soil nutrients</td>
<td>Higher</td>
<td>Lower</td>
</tr>
<tr>
<td>Provision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timber</td>
<td>Lower</td>
<td>Higher</td>
</tr>
<tr>
<td>Regulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk of damage by insects and disease</td>
<td>Lower</td>
<td>Higher</td>
</tr>
<tr>
<td>Contribution to water quality</td>
<td>Higher</td>
<td>Lower</td>
</tr>
<tr>
<td>Adaptive capacity</td>
<td>Higher</td>
<td>Lower</td>
</tr>
<tr>
<td>Mitigation against hazards such as forest fires</td>
<td>Higher</td>
<td>Lower</td>
</tr>
<tr>
<td>Cultural</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation and aesthetic values</td>
<td>Higher</td>
<td>Lower</td>
</tr>
</tbody>
</table>


Some of the deficiencies of IMM in the provision of ES can be overcome by ensuring an adequate land plan, such as the triad zone approach (TZA). The latter consist of the division of forests by zones, so that each zone is managed with the goal of delivering different forest products and services (Montigny & MacLean, 2006). TZA permits the allocation of zones of IMM plantations, but also allows for the allocation within the same territory of ecosystem management areas where natural forest is emulated, as well as for areas of conservation and of scientific study (Côté et al., 2010).

1.2.2 Forest companies and their contribution to SD

The contribution of the forestry sector to SDGs could be achieved through companies’ CSR (Hopkins, 2016; ISO, 2016). CSR is defined by the European Commission (2011, p.6) as the

---

2 Silvicultural practices correspond to the practices that aim to control the establishment, growth, composition, health, and quality of plantations to achieve its objectives. These practices could include: spacing, weeding, pruning and thinning (NZ Forestry Commission, 2017).
"responsibility of enterprises for their impacts on society". According to this definition, compliance with the normative framework, it is a prerequisite for an enterprise to be socially responsible. Under CSR framework, local communities are understood to be communities living within the operation site of companies, likely to be affected by a management decision or action and likely to influence the management decision or action (Alexander, 2008). CSR implies that companies consider communities’ interest and expectations when defining its strategies and operations in a way that enhance their positive impacts and reduce the negative effects of their operations (ISO, 2010). The latter could become tangible through CSR practices that aim to increase communities' development and provide an adequate environment that increase communities’ well-being (Figure 1.5; For details see Appendix A).

<table>
<thead>
<tr>
<th>CSR practices to increase communities' development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companies involvement with communities</td>
</tr>
<tr>
<td>Education and culture to promote socio-economic development</td>
</tr>
<tr>
<td>Employment and training to promote socioeconomic development</td>
</tr>
<tr>
<td>Technology to create an environment that benefits communities</td>
</tr>
<tr>
<td>Contribution to wealth and income generation of communities</td>
</tr>
<tr>
<td>Contribution to communities' health</td>
</tr>
<tr>
<td>Social investment to improve socioeconomic aspects</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CSR practices to ensure adequate environment for communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable resource use to ensure the availability of resources</td>
</tr>
<tr>
<td>Prevention of pollution to improve environmental performance</td>
</tr>
<tr>
<td>Protection and restoration environment and biodiversity</td>
</tr>
<tr>
<td>Mitigation and adaptation to climate change</td>
</tr>
</tbody>
</table>

Figure 1.5: CSR practices that increase communities’ development and well-being. Source: ISO, 2010.
In the case of the forestry sector, the incorporation of CSR practices is critical given the role of the sector in rural communities’ development (Arato et al., 2016). Therefore, companies should promote CSR practices that seek to increase the SD of communities (Figure 1.6) and reduce those that generate the opposite effect (Figure 1.7). The latter, is crucial for countries where the sector has a major role as Chile.

**Figure 1.6:** Example of actions that contribute to SD of rural communities. Source: Dawson et al., 2014; Estruch et al., 2013; FAO, 2006; Kusters et al. 2006; Liu et al., 2013; Schirmer and Tonts, 2003.

**Figure 1.7:** Example of actions against SD of rural communities. Source: Charnley, 2006; Cid, 2015; Muñoz-Pedreros, 2017; Murphy and Williams, 2015; Schirmer and Tonts, 2003; Williams, 2014.
1.3 Chilean forestry sector

The Chilean forestry sector has been developing in the country for decades, however, the consolidation of the activity as a national economic pillar started in the 70’s with a series of structural economic policies such as the liberalisation of the economy and the declaration of the legislative decree 701 or DL701 (Andersson et al., 2016; WRM, 2011). The DL701 aimed to encourage reforestation of eroded soils or land degraded from agriculture by the provision of subsidies of companies, up to 75% of their costs incurred by plantations (Cid, 2015). The latter result in the rapid expansion of forest plantations (Figure 1.8) and the development of globally recognized forestry enterprises (Salas et al., 2016). Furthermore, today Chile is a top producer of industrial roundwood and it is among the countries with the largest area planted with productive plantations (FAO, 2015; Payn et al., 2015).

![Figure 1.8: Plantations surface in Chile between 1978 and 2014. Data source: INFOR, 2016b.](image)

The national forestry sector is characterized by the concentration of the activity in three large business conglomerates CMPC, Arauco, and MASISA, which provide global markets with pulp, chips, sandwood, paper, paperboards, panels and veneers (INFOR, 2016a; Salas et al., 2016). In the case of plantations, 63% are owned by the companies mentioned and the rest by small and medium forest owners or SMFO (Tricallotis & Kanowski, 2016). Plantations correspond
to IMM of exotic species, where *pinus radiata* and *eucalyptus globulus* cover the greater surface (Figure 1.9).

![Figure 1.9: Distribution of forestry plantations (hectares) by specie. Data source: INFOR, 2016b.](image)

Industries and plantations are located mainly in the rural areas of the country, between the Valparaiso Region and Los Lagos Region\(^3\) (INFOR, 2016a; 2017a), where the Biobío region concentrates the greatest forestry activity in terms of forest industries and where 38.25% of the national productive plantations are located (INFOR, 2016a).

### 1.3.1 Contribution of the forestry sector to the SD of Chilean rural communities

The contribution of the forestry sector to the development of communities is not clear and there are opposing visions between actors. For example, PROGEA (2014), and Tricallotis and Kanowski (2016), highlight the contribution of the sector to the generation of employment, poverty reduction and the decrease in inequalities for communities where forestry operations exist. In contrast, Benedikter and Siepman (2015) mentioned that communities with a high presence of forestry activity rarely benefit from the industry, remaining in conditions of poverty and

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\(^3\) Chile is administratively formed by 15 regions. Each region is formed by provinces, which are divided in communes (SUBDERE, 2017).
underdevelopment. Furthermore, Andersson et al. (2016) found that Chile has a positive relationship between plantations surface area and higher poverty levels.

From the environmental point of view, the situation is still controversial. CORMA (2017c) highlights the contribution of the sector to climate change mitigation, soil recovery and watershed regulation. In contrast, Cid (2015) and Tricallotis and Kanowski (2016), mentioned that forestry industries in rural areas have been characterized by atmospheric, water and soil pollution, affecting communities’ well-being and the productive capacity of rural producers. In the case of plantations, the main impacts are related with the displacement of communities by land acquisitions and unsustainable silvicultural practices in the management of monocultures that affect water resources, increase the risk of forest fires and chemical pollution (Cid, 2015; Peña & Valenzuela, 2004; Torres-Salinas et al., 2016).

In addition to the opposing views, Tricallotis and Kanowski (2016) mention that in the case of the negative impacts, the government has failed to mitigate them, resulting in forest companies acquiring a fundamental role in rural communities’ SD. The latter has led to the development of CSR initiatives from companies that seek to increase communities’ development, however, the effectiveness and contribution of these to the SD of communities remains uncertain, especially in the context of SDGs. Assess this contribution is especially important in the communes of the country where there is a large presence of the forestry sector and a considerable percentage of rurality, as in the case of the commune of Cabrero.
CHAPTER 2
SITE OF STUDY

Cabrero is a commune of the Biobío Region that has a population of 29,563 inhabitants, where 28.7% of its population live in rural areas (INE, 2017). There are 48 rural localities identified, where the most important according to the number of inhabitants are: Charrúa, Chillancito, Los Aromos, Estero Los Sapos, El Manzano, Coihuico, Los Leones, Quinel, Colicheo, El Progreso and Los Canelos (Municipality of Cabrero, 2013).

2.1 Local socio-economic development

In terms of its social development, the CASEN 2013\textsuperscript{4} shows that 31.4% of the inhabitants of the commune are in a situation of income poverty, which is superior to the regional and national level which reached in the same survey 22.3% and 14.4%, respectively (BCN, 2015). In addition, the Social Progress Index or SPI that was applied in the commune during 2016 showed differences between rural and urban areas in terms of social progress (Social Progress Imperative, 2017). As explained by González et al. (2016) rural communities have lower access to basic human needs than urban areas, as result of the lack of access to drinkable water and existence of a sewage system. In addition, rural sectors also have higher rates of illiteracy and people that did not finish primary school, which affect its social progress. In addition, they also present low access to information and communications which, although it is very low in the whole commune, is especially critical in the rural sector.

2.2 Forestry sector in Cabrero

According to Barrera and Gormaz (2009), Cabrero is a commune with rural traditions linked to the primary sector, which is currently lead by the forestry sector. As describe by the

\textsuperscript{4} CASEN is a national survey that assess the situation of Chilean households in relation to education, health, housing, labour and income aspects, as well as the impacts of government social policies (MDS, 2017).
Municipality of Cabrero (2013), the profile and vocation of the commune is influenced by the existence of the sector in the area, which impacts all Cabrero’s economic activities.

The presence of the forestry sector in the commune includes forest industries and plantations. In Cabrero, there are 15 forest industries in operations, which correspond to sawmills, chipper, board factories, and a plant nursery (INFOR, 2017b). However, as described by Falabella and Gatica (2014), there is a large forestry industry on the periphery of the urban sector, which acts as a star network from which the greatest amount of economic activity is derived and that exerts the greatest socio-economic influences at the communal level.

In the case of plantations, there are 233 registered forest farms located in the rural sector, corresponding to 26,672.78 hectares, that is, 41.89% of the commune surface (INE, 2007). From this surface, 81.87% correspond to productive plantations where the main species is pinus radiata (Figure 2.1).

![Figure 2.1: Distribution of productive plantations by specie in Cabrero. Data source: INE, 2007.](image-url)
Considering that there is a high presence of the forestry sector in Cabrero which influence the socio-economic development of the commune, that there are significant differences in terms of social progress at the expense of the rural sector and that, there is a no existing assessment of the relationship between forestry sector and SD of rural communities, this study aims to assess the impact of the forestry sector in the SD of rural communities in Cabrero by the following research objectives (RO) to:

RO1: Identify geographical areas of influence of the forestry sector in rural areas

RO2: Recognise and analyse reported impacts by local government, rural communities and forestry companies, from the forestry sector in the SD of rural communities

RO3: Identify opportunities and challenges for SD in rural communities

RO4: Propose practices the forestry sector could take to strengthen SD in rural communities.
CHAPTER 3
METHODOLOGY

To achieve the aim and objectives of this dissertation, a descriptive and cross-sectional study was undertaken. The study used a combination of four methods: Geo-referencing, data analysis, document analysis and interviews. The sample, materials and type of analysis for each method and the general procedure are described below.

3.1 Geo-referencing

To achieve RO1, the first method entailed the geo-referencing of the forestry sector in Cabrero to determine its distribution through the commune and to identify rural communities in which the sector could have an influence (For details, see Appendix B). The latter, considering Alexander (2008) definition of local communities and the established by Mayers (2005) who mentioned that local communities, in the case of the forestry sector, can be determinate by its proximity to forests, woodlands and trees and forest enterprises.

The first step of geo-referencing considered the creation of different layers using the software Google Earth Pro that included the location of industries, plantations and communities. From this, and using the software QGIS, the previous layers, in addition to three governmental layers, were integrated to form a final map. Once geo-referenced, two criteria were established. First, in the case of forest industries, all industries located within the rural sector or in the urban limits, were established as industries that could impact communities. Second, in the case of plantations, communities located at 100 metres or less from plantations limits were considered local communities. The latter was based on international legislation (Konrad et al., 2007) and a declaration made by IEB-Chile et al. (2017) respect to those communities located at less than 100 metres from plantations are at risks of environmental and social impacts from plantations.

3.2 UDEC-database analysis

Following geo-referencing, to achieve RO2, a data analysis was performed to identify possible environmental and resource management impacts, declared by rural communities, that could be related to the forestry sector based on the literature review and the results of the geo-
referencing process. The impacts detected from the analysis were used as inputs for the interviews guides. The database used was created by the Social Responsibility Studies Programme or PERS from the University of Concepcion, Chile (See Figure F.1, Appendix F for authorization of PERS to use the database). The data was collected during 2016 from a representative sample of 303 households, of which 84 correspond to rural households distributed in 13 rural communities. The database considers information on different areas related to the social progress of the commune; however, for this study, questions from the section "Environmental quality" were considered (Figure 3.1). From the data, a descriptive analysis was performed that considers frequencies and averages of the different answers using Excel (For details, see Appendix C).

<table>
<thead>
<tr>
<th>Question: Degree of environmental degradation</th>
<th>Question: Reasons for environmental degradation</th>
<th>Question: Environmental impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Possible answers:</td>
<td>• Possible answers:</td>
<td>• Possible answers:</td>
</tr>
<tr>
<td>• Very high degradation</td>
<td>• Lack of law for its protection and conservation</td>
<td>• Droughts</td>
</tr>
<tr>
<td>• High degradation</td>
<td>• Poor companies management</td>
<td>• Transit of high-tonnage lorries on rural roads</td>
</tr>
<tr>
<td>• Regular degradation</td>
<td>• Lack of government enforcement</td>
<td>• Noise pollution</td>
</tr>
<tr>
<td>• Low degradation</td>
<td>• Poor education and environmental culture of people</td>
<td>• Air pollution</td>
</tr>
<tr>
<td>• No degradation</td>
<td>• Lack of municipal intervention</td>
<td>• Surface water pollution</td>
</tr>
<tr>
<td></td>
<td>• Inadequate practices of people</td>
<td>• Pollution by industrial residues</td>
</tr>
</tbody>
</table>

Figure 3.1: Items considered from UDEC-database. Source: Author’s elaboration.

3.3 Document Analysis

The third method consisted of the analysis of documents publicly available, and issued by the local government (Figure 3.2) and two companies that own forest plantations in the commune (Figure 3.3). According to Bowen (2009) document analysis could be used as part of triangulation, especially when analysing a case of study, where can offer background information to contextualized the case, supplementary research data and could suggest some questions when structuring interview guides. In this study, document analysis was used to achieve RO2 and RO3 and to provide inputs for the development of the interviews guides (For details, see...
Appendix D). The document analysis was performed using thematic analysis were after a pattern recognition, emerging themes are used as categories for analysis (Fereday & Muir-Cochrane, 2006).

**Municipal Development Plan or PLADECÓ**
- Main instrument of communal development. It includes the actions that local governments will lead to satisfice the needs of communities and promote their social, economic and cultural progress. In the development of the plan, citizen participation needs to be considered, as well as different public services and organizations that operates in the commune.
- **Analysis document:** PLADECÓ 2014-2017 (Municipality of Cabrero, 2013)

**Communal Regulatory Plan or PRC**
- Territorial planning instrument that includes the socio-economic background of the commune, demographic growth and industrial development. It also includes a feasibility study to expand or provide potable water and sewage, in relation to the projected urban growth and the development of blueprints which graphically express land use, zoning, equipment, road links, urban boundaries, priority areas for urban development, among others.
- **Analysis document:** PRC, 2009 - Still in force (Municipality of Cabrero, 2009).

Figure 3.2: Definition of documents analysed from Cabrero’s local government. Source: MINVU, 2017; SERPLAC, 2011.

**Arauco social management plan**
- This document details the social management of Arauco between 2015 and 2016. For this study, the section “local communities” was analysed. The section details the management of local development strategies and actions that the company pursued in the communes where it operates. The communes are classified in four levels of social management prioritization. Here, Cabrero is categorized as community of influence, which corresponds to the lowest level of intervention.

**CMPC integrated report – 2017**
- This document corresponds to CMPC’s financial, economic and environmental performance, including Mininco, during 2016. Within this document, the analysis was focused in the section “Sustainable management”

Figure 3.3: Documents analysed from forest companies. Source: Arauco, 2016; CMPC, 2017.
3.4 Interviews

From the triangulation of the previous method, three interview guides were created (See Appendix E). The interviews correspond to structure and semi-structure interviews that include questions related with the positive and negative impacts perceived from the forestry sector in terms of SD of rural communities (RO2) and future contributions of the sector to SD of the communities (RO3). Once the guides were built, four criteria were developed to select the sample:

- To be representative of the rural community.
- To be a manager of a forestry company that has a position related to the development of CSR practices or community engagement.
- Willingness to participate voluntarily and in a timely manner.
- To have prior collaborative experiences in previous researches in the commune related to the topic and/or to be referred by these (Snowball sampling).

Once the detection of possible participants was done, it was necessary to obtain ethical approval and the UCL data protection registration (See Appendix F). After completing the above, the possible participants were contacted and provided with the participant information sheet and the right to voluntarily agree to be part of this study (See Appendix G).

Seven interviews were carried out during July in three modalities: Written responses, Skype and face-to-face interviews (Figure 3.4). In the case of latter, interviews were done by a third party in Cabrero. This decision was made based on the resources and time available to carry out this study, which could present a limitation of the same. However, to minimize possible negative effects, different considerations were taken, which are detailed in Section E38 of Appendix F.

<table>
<thead>
<tr>
<th>Face-to-face interviews</th>
<th>Skype interviews</th>
<th>Written interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Five representatives of rural communities</td>
<td>• One representative of a forest industry</td>
<td>• One representative of forest industry</td>
</tr>
</tbody>
</table>

Figure 3.4: Description of the interviews’ sample. Source: Author's elaboration.
For face-to-face and Skype interviews, the answers were recorded, with previous consent of the participant, transcribed and later anonymised. As a final step, transcripts from all interviews were analysed using the Codification Model from Auerbach and Silverstein (2003) which consists of 5 stages for coding: Identification of relevant text; identification of repeated ideas; categorization of repeated ideas in themes; classification of topics in theoretical constructs and organization; and synthesis of theoretical constructs in theoretical narrative.

Once the interviews analysis was performed and the main theme and sub-theme were identified, two more interviews were done with academics of the University of Concepcion that were involved in the Cabrero’s SPI. The aim of these interviews was to incorporate experts' comments regarding the effects of the detected impacts over the SDGs for the rural communities (See Appendix I). For these interviews, the same ethical considerations describe in appendix F, were taken.

Finally, a comparative analysis of the development opportunities identified for rural communities by all actors was carried out. From the latter, points of agreements between actors were identified, to elaborate a proposal of practices from the forestry sector that could increase its contributions to communities' SD by considering the existent impacts.
CHAPTER 4

RESULTS

This chapter presents the main results from the methodology. The analysis is divided into three themes: areas of influence of the forestry sector in the rural sector of Cabrero, main impacts of the sector in the SD of communities, and opportunities and challenges for SD in rural communities in which the forestry sector could contribute.

4.1 Areas of influence of the forestry sector

The result of the geo-referencing process is presented in Figure 4.1. According to the integrated map, the forestry sector is distributed mainly in the rural areas. Five forestry industries are located in the urban areas' limits, while the rest are in the rural sectors near to the main roads. In the case of plantations, these are located in the rural areas, surrounding rural communities. Regarding its proximity, 90% of the rural communities are less than 2 kilometres away from the plantation centroid. However, all plantations' limits are less than 100 metres from communities. Therefore, by considering the selection criteria, all Cabrero’s rural communities could be considering as local communities for the forestry sector, meaning that its operations affect all rural communities.
4.2 Impacts of the forestry sector on SD of rural communities

From the integrated analysis of results four themes emerge, which are presented in Figure 4.2. Details of the results of the document analysis and interviews analysis are presented in Appendix D and H, respectively.

Figure 4. 1: Geo-referencing of the forestry sector in Cabrero. Source: Author’s elaboration

Figure 4. 2: Themes analysed from the integrated results. Source: Author’s elaboration.
1.2.1 Main impacts of the forestry sector on rural communities

From the integrated results, six main impacts were identified: Employment, productive processes, silvicultural practices, social investment, land use change and rural-urban migration. The perception of each actor against each impact is summarized in Table 4.1.

Table 4.1: Perception of impacts from each actor

<table>
<thead>
<tr>
<th>Impacts</th>
<th>Local government</th>
<th>Communities Representatives</th>
<th>Forest companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>Mostly positive</td>
<td>Mostly negative</td>
<td>Positive</td>
</tr>
<tr>
<td>Productive processes</td>
<td>Negative</td>
<td>Negative</td>
<td>Almost nonexistent</td>
</tr>
<tr>
<td>Silvicultural practices</td>
<td>Negative</td>
<td>Mostly negative</td>
<td>Almost nonexistent</td>
</tr>
<tr>
<td>Social investment</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>Land use change: Change from agriculture to plantations</td>
<td>Negative</td>
<td>Negative</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>Land use change: Change from unused land to plantations</td>
<td>Not mentioned</td>
<td>Positive</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>Land use change: Change from natural cover to plantations</td>
<td>Negative</td>
<td>Negative</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>Rural-urban migration</td>
<td>Variable</td>
<td>Variable</td>
<td>Not mentioned</td>
</tr>
</tbody>
</table>

Source: Author’s elaboration

a) Employment

Employment is an impact mentioned by all actors. However, the positive or negative connotation depends on each actor. Forest Companies (FCs) mentioned that they prioritize local hiring in their companies, which includes rural communities. In the case of plantations, employment opportunities are related with weeding, pruning and harvesting, while in the forest industry, work opportunities are related to machine operations. Nevertheless, in the case of forestry industries they acknowledge that they prioritise neighbouring communities. For example,
one FC when describing employment in industries, recognised that most of the people employed come from the urban areas rather than from rural sectors, describing its contribution to rural employment as “passive rather than positive”. In the case of local government (LG), they recognise that the sector is an important source of employment for the commune, however, they highlight three aspects: First, companies provide permanent and temporary employment. Second, there is a scare participation of women in the sector. Finally, there has been a decrease in employment for the commune due to the concentration of firms’ properties, which has led to an increase in economies of scale, declining the use of local labour.

In the case of communities’ representatives (CRs), they describe forest industry as a major source of employment for the urban sector but not rural communities. However, the few employed by the industries have permanent and long-lasting jobs. In the case of plantations, CRs mentioned that companies do not seek to prioritize local employment, and that they usually bring outsiders to work in plantations, leaving locals with low skill and low salary employment opportunities that do not provide alternatives to raise their socio-economic level. However, one CR mentioned that even though plantations are not a source of employment for them, plantations provide jobs opportunities indirectly to people living in urban areas, through forest industries.

b) Silvicultural practices

Actors recognized watershed management, pest control and prevention of forest fires as the main silviculture practices that impact rural communities. In terms of watershed management, CRs perceive that plantations have an impact in water quantity and water quality due to the overexploitation of soils. LG does not refer to this impact, while one FC declare in a report the existence of a “monitoring and conservation water collection system”.

In relation to pest control, LG mentioned that the utilization of pesticides and chemicals could represent a risk for workers’ and communities’ health. In addition, CRs mentioned that pest control affects their livelihood by reducing rabbit population which is used as food and by declining beekeeping production, which is an important source of income for communities.

The last impact is related to the risk of forest fires and their effects on communities. No actor mentioned that the fires are companies’ responsibility, however, the spread of these, is related to the lack of preventive silvicultural practices such as weeding, pruning and forest management planning to minimize impacts on human settlements. For example, LG documents highlight the imminent risk of forest fires to communities due to the proximity of plantations to
roads and human settlements. In this line, CRs mentioned that lack of weeding and the proximity of plantations to households help the propagation of forest fires and impact them directly. One FC representative also acknowledges that the lack of pruning and weeding influenced the propagation of fires, but climate change and intentionality also plays a role in its propagation. CRs also mentioned the lack of interest and concern of the companies towards the effects that fires could have on them, arguing that they only care about what happens in their plantations. Regarding the vision of FCs, these mentioned that forest fires represent a risk for plantations, therefore they have prevention and mitigation programmes that include firefighters paid by the companies to protect plantations and their surroundings, including rural communities. However, one FC specifies that the coverage is up to 2 kilometres from their property.

c) Productive processes

According to LG and CRs, companies’ productive processes have a negative impact over communities. The latter is exemplified through pollution by the forestry industries and the transit of high-tonnage lorries on rural roads. In the first case, LG and CRs mentioned the discharge of residues into estuaries that affect water quality and the development of recreational activities for communities. Nevertheless, in the case of LG, they clarify that this discharged is according to environmental regulations. There is also an impact related to air pollution declared by both actors. In this case, they emphasise that the impact originates in the urban area but it spreads throughout the commune affecting rural communities. In addition, some CRs also stated that air pollution is enhanced by the presence of various thermoelectric plants in two rural communities. Soil pollution from productive processes is also identified as an impact in LG documents and it is mentioned by one CR, which stated the possible impact over soil acidification.

In the case of high-tonnage lorries, LG and CRs identified the deterioration of rural roads as the most important impact, followed by dust lift, noise and high-speed transit, which reduce road safety. CRs mentioned that companies are aware of this impact but they do not show a constant concern about this impact. Furthermore, CRs state that companies often commit to reducing these impacts, mitigate them once, and then abandon mitigation plans.

In the case of FCs, they recognize the potential impacts of productive activity, however, they state that these are mitigated. Moreover, one FC representative mentioned that in the rural sector there are no impacts related to water and lorries transit. In the first case, given the modernization
of the liquid waste management process and in the second, because lorries transit was diverted to a highway inaugurated in 2016.

d) Social investment

All actors agree that social investment is a positive impact from forest companies. Although the companies do different social investment actions, the most mentioned are goods derived from plantations and education. In the first case, according to the CRs, provision of wood, animal forage and access to NWFPs correspond to the most important action in the communities. Wood is used as fuel, so they mentioned that the access to free wood reduces energy costs for them. The same occurs for animal forage, where there is a reduction of cost for communities, but is also is considered a way to reduce fuel vegetation around the trees which reduces the spread of fires. In addition, access to NWFPs as the collection of mushrooms is a source of temporary work, especially for women. However, CRs recognised that the income generated by these is low and that only generates subsistence income and not real opportunities for development. In the case of education, CRs acknowledge that FC provided a range of training courses that aimed to improve natural resource management and develop and improve leadership and entrepreneurship skills of people living in rural areas. Despite the latter, CRs also mentioned that in some cases, the courses are not commensurate with the characteristics of the rural population. FCs mentioned the provision of training opportunities for further employment opportunities within and out of the forestry sector and courses for adults that seek to finish secondary education. In both cases, this was not acknowledged for communities.

e) Land use change

Land use change to plantations is perceive as an impact to communities from LG and CRs, however, whether it is defined as positive or negative depends in the previous land use. For example, CRs perceive that the change from natural cover, as prairies and native forest, to plantations reduces biodiversity leaving few available natural ecosystems. The latter, is also supported by the LG, who described that the plantations generate a homogeneous mass of high economic value but that lacks ecological interest. In addition, CRs mentioned that this change has an effect in social interactions and increases the sense of enclosure due to a poor planning
of plantations distribution. CRs also mentioned the change from unused land to plantations which has a positive effect due to higher employment opportunities and social investment actions from forest companies. Finally, LG and CRs mentioned the change from agriculture to plantations. LG mentioned that this change generates land use conflicts, especially when agriculture is understood as a traditional activity in the area. In the case of CRs, they perceive that this change had decrease employment for communities mainly because plantations are less labour intensive than agriculture and because there is an impact on small farmers due to the decrease in available land and soil productivity.

f) Rural-urban migration

The effects of the forestry sector in migration are only mentioned by CRs. CRs see that the forestry sector increases migration due to the economic incentive to sell land to forestry companies, and the influence that forestry industries located next to the urban areas have in people seeking job opportunities. Beside the latter, CRs also mentioned that migration is a phenomenon that goes beyond the forestry sector and is a result of the few educational opportunities for young people and the disconnection between youth and agricultural economic activities. The LG documents also mentioned rural-urban migration as a complex phenomenon where cities attract people, especially youth, due to the accessibility to services and infrastructure.

4.2.2 Variables that influence impacts perception

The analysis of the interviews also showed two variables that influence the impacts detected: relationships between community-company relationship and the Influence of local political actors on the detected impacts.

4.2.2.1 Community-company relationship

Both CRs and FCs mentioned the relationship between communities and companies as a determinant of the magnitude of the sector's impacts on communities. According to the actors, this relationship is affect by proximity, communities' proactivity, management policies, and
manager characteristics. In the first case, the distance of communities to plantations or industries determines the existence of a relationship with the communities, the degree of concern to reduce impacts, and the interest in developing social investment. In all cases companies are more concerned about impacts involving neighbouring communities. Nevertheless, the latter is also affected by communities’ proactivity, meaning the abilities of communities to organise and seek support from companies. In the case of management policies, FCs mentioned that companies implement different types of participatory management to seek a relationship with communities such as the discussion of companies’ operations with communities. Also, one FC mentioned that they are implementing a new conception of a company-territory relationship, which recognizes that the impact of companies is superior to only its neighbouring local communities, which will seek to include rural communities in their social investment actions. Finally, the CRs mentioned that the characteristics of the forest ranger, who supervises the plantations, influences the perception of communities regarding companies’ commitment with them. The foregoing conditions determine the will of communities to establish relationships with the companies and condition the possibility of both working together on certain issues.

4.2.2.2 Influence of political actors on the impacts detected

CRs mentioned the ability of local political actors to influence impacts in positive and negatives ways. In the first case, political actors seek alliances with forest companies to increase companies’ social investment, through the provision of training courses and supporting local entrepreneurship, while in the second case, CRs mentioned three factors that influence impacts in a negative way. First, there is a lack of time and capacity of the municipality to deal with the impacts produced by the forestry activity. Second, there is no regulatory agency on site to ensure compliance with legal regulations and third, there is a distrust in law enforcement from governmental services caused by two factors: conflict of interest, and alteration of pollution reports. In the first case, it is argued that there is no possibility of law enforcement or promoting local actions to minimize the negative impacts of the sector, due to family relationships between plantation owners and a congress representative. While in the second case, it is mentioned that the lack of law enforcement is result of an alteration of the pollutant emissions reports done by governmental agencies, which aim to reduce the amount of pollution done by industries.
4.2.3 Impacts of the forestry sector in rural communities’ SDGs.

Figure 4.3 presents the impact of the forestry sector on the achievement of SDGs for rural communities according to experts’ perceptions. For details, see Appendix I. The experts mentioned that the forestry sector influences SDGs in a positive (green), variable (yellow) and negative (red) way, where this connotation is given mainly by the companies’ CSR practices that manage to meet the expectations and needs of communities according to the impacts detected.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Employment</th>
<th>Land use change from agriculture to plantations</th>
<th>Land use change from unused land to plantations</th>
<th>Land use change from natural cover to plantations</th>
<th>Productive processes</th>
<th>Rural-Urban migration</th>
<th>Silvicultural practices</th>
<th>Social investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal 1</td>
<td></td>
<td>[Red]</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Figure 4.3: Results of impact on SDGs according to experts. Source: Author’s elaboration.

4.2.4 Future actions proposed by CRs to mitigate impacts in rural communities.

The future actions proposed by the CRs are related to three of the detected impacts: silvicultural practices, productive processes and land use change. These actions are described in Figure 4.4. CRs also mentioned the need to increase company-community relationship.
According to CRs, companies, especially plantation owners, should recognize them as valid stakeholders within their territory of influence and seek to form a continuous and friendly relationship. Furthermore, CRs mentioned their willingness to establish better relationships with forest companies, including the creation of partnerships to increase Cabrero’s development. However, they acknowledge that to work together, companies need to take into consideration and mitigate the impacts that they have in their communities.

Figure 4.4: Future actions proposed by CRs to mitigate forestry sector impacts. Source: Author’s elaboration.

4.3 Opportunities for the SD of rural communities in which the forestry sector could influence.

Figure 4.5 shows the development opportunities proposed by the CRs and FCs, where the forestry sector could contribute, and which are consistent with the development opportunities declared by the LG for the rural communities of Cabrero. According to the latter, access to water, reinforcement of agricultural practices, education, access to public services, infrastructure, and increased government support for rural development are the opportunities for development in which the forestry sector could contribute.

It is important to mention that even though rural tourism is a possibility for rural development according to LG documents, CRs discard this option due to the lack of biodiversity and ecological interest of the area as a result of plantations.
Figure 4.5: Points of agreement on development opportunities between local government (left) and FCs and CRs (right). Source: Author’s elaboration.
CHAPTER 5

DISCUSSION

This study aimed to assess the impact of the forestry sector in the SD of the rural communities in Cabrero. Based on the results and, considering the RO1, it was possible to establish that the operations of the forestry sector have an impact in all rural communities. From these operations, six impacts were identified: employment, social investment, production process, silvicultural practices, rural-urban migration and land use change. When analysing the results by impacts, it was found that there are different perceptions regarding forestry sector contribution to communities' development, especially between companies and communities. Furthermore, there are impacts perceived by communities that are declared as non-existent by companies. The difference in the perceptions of stakeholders' respect to the impacts of the forestry sector was also noted by Eriksson (2012) and Hemström et al. (2014) who attribute this difference of perceptions to the uses and ownership of the forest by the different stakeholders. In addition, Gordon et al. (2012) mentioned that this difference could be related to the scare involvement of companies with rural communities and the inability of CSR practices in meeting the needs and expectations of communities. While analysing the results, the main differences in perception are related to employment, productive processes and silvicultural practices. In contrast, in the case of social investment, all stakeholders considered it as a positive impact, while in the case of rural-urban migration and land use change, these impacts were only observed by local government and rural communities, who considered that their impact on communities is variable.

Regarding employment, companies declared that local employment is an important economic contribution to rural communities. However, the communities do not perceive that this is a common practice and in the rare cases that it exists, it generates employment of low qualification and remuneration, which it is insufficient to generate local socio-economic development. The latter, agrees with previous studies developed by Schirmer and Tons (2003), Charnley (2006) and Williams (2014) when analysing the contribution of the sector to rural communities and noting that the employment opportunities generated by the sector, do not increase the socio-economic development of communities, especially in employment opportunities from plantations.

As for the production process, both local government and communities, perceived pollution by forestry industries and deterioration of road infrastructure as important impacts that affect communities' well-being, which was also identified by Cid (2015), Murphy and Williams
(2015) and Schirmer and Tonts (2003). However, companies mentioned that these impacts are mitigated according to their CSR standards and national legal framework. The latter, is also supported by the local government. Although the impacts generated are in line with the regulatory framework, for companies to be truly contributing to communities, CSR practices should include actions that are above the country’s regulatory framework, especially when these regulations are not efficient (Anwar & Hansen, 2008; Tricallotis and Kanowski, 2016). However, it is also a challenge for the central government to increase institutional capacity at the municipal level and increase law enforcement to cope with the multiple challenges of the forestry sector, especially when there is evidence of corruption and major conflicts of interest in the area, which according to Uphoff and Buck (2006), can represent an obstacle to achieve sustainable livelihoods in rural areas.

In the case of silvicultural practices, the three impacts were detected: watershed management, pest control, and the lack of preventive silviculture. In relation to the first impact, communities mentioned that overexploitation of soils with plantations increases water scarcity in the area and intensive silvicultural practices affect the quality of the available water. This was also observed by Brown et al. (2007) and Hopmans and Bren (2007), who found that plantations have local impacts in terms of the quantity and quality of available water, mainly related to silvicultural practices. The second impact, pest control, is mostly related to the effect of chemicals in the reduction of beekeeping production. Although the above is supported by Allsopp et al., (2014), the observed decline in production could also be a consequence of the lack of flora due to monocultures, which affects the nutrition of bees (Bekić et al., 2014).

Finally, the third impact, the lack of preventive silviculture, is the one that generates the greatest concern among the stakeholders’ due to the perception of risk of forest fires. This perception is corroborated by the declaration of Cabrero as one of the 42 communes in Chile with the highest risk of forest fires (CONAF, 2017; Haltenhoff, 2010). According to the UK Forestry Commission (2014), the inclusion of forest management planning to develop forest resilience to fires is critical, especially in the context of climate change. In addition, when considering the statements made by the stakeholders regarding the area of coverage of the companies’ fire mitigation plans, Cid (2015) mentions that these actions are insufficient because the forest law framework does not consider the responsibility of forest companies on the damage to third parties such as rural communities.

In the case of rural-urban migration, communities identify that this is increased by the presence of plantations, however, they also mentioned that this is exacerbate by the loss of agricultural traditions and the greater educational and employment opportunities in cities, especially for young people, which is also stated in the documents from the local government. Rural-urban migration as a greater phenomenon, was also noticed by Prado (2015) who
described that rural-urban migration in Chile, it is a social phenomenon that goes beyond the existence of the forestry sector.

Respect to social investment, although all the actors perceive it as a positive impact, according to the experts interviewed, these actions are not contributing to communities’ SD. The latter, because these investments do not consider the real needs of the communities in terms of SD, but rather are based on short-term actions that do not generate sustained well-being and are not substantial when compared to the negative impacts generated by the sector. This was also found by Gordon et al. (2012) in analysing the CSR practices of forest enterprises in Australia and finding that while communities recognize these actions as contributing to their well-being, many of these practices are not efficient in contributing to communities’ development, since they do not consider the real needs and expectations of rural communities.

Finally, the last identified impact is related to land use change. According to the results, the positive or negative connotation of this impact is given by the comparison of communities’ benefits from the alternative land use and the management of plantations that allow the provision of ES. The latter, was also identified by Baral et al. (2016), Brockerhoff et al. (2012), Prado (2015), Sing et al., (2015) and Stephens and Wagner (2007) who mentioned that the impacts of land use change from agriculture, natural cover or degraded land to plantations are more related to land planning and companies’ management decision than the ability of plantations to provide ES per se. For example, according to communities and local government, in the case of the change from agriculture to plantations, the impacts are negative for communities, because plantations produce less employment opportunities than agriculture, which was also mentioned by Williams (2014). In addition, this change reduces the land available for small farmers which leads to a decrease in income generation for communities (Switzer, 2014). Nevertheless, when analysing the change from unused land to plantations, rural communities mentioned that this generates positive impacts due to new employment opportunities, which was also noticed by Nair and Rutt (2009). Finally, the change from natural cover to plantations, according to communities and local government, causes biodiversity loss. This was also found by Stephens and Wagner (2007), when analysing the change from native forest to monocultures. Communities also mentioned that the loss of biodiversity affects the development of recreational activities such as rural tourism and reduces social capital, especially for the way in which the plantations are distributed in the sectors, mainly surrounding communities and covering the few hectares of native flora that creates the perception of a homogeneous mass which lacks ecological interest. This was also noticed in studies by Muñoz-Pedreros (2017), Schirmer and Tonts (2003) and Williams (2014), when analysing the effects of plantations in landscape and social interactions.

To comply with the RO2 and, considering the impacts detected and the evaluation of the same by the experts, it is concluded that the forestry sector has an impact on all the SDGs of the
rural communities, the latter being mostly negative. According to the experts, this result is related to the poor companies’ ability to contribute to communities’ SD through CSR practices. This is a key finding that enhance the role that the private sector could have in the achievement of SDGs, especially when there is a weak institutional capacity and an insufficient normative framework to tackle the impacts of the forestry sector. In this scenario, communities expect that the role of companies in their development should be greater than what they do today, especially when the development of the sector implies the reduction of alternative sources of development for communities, such as agriculture or rural tourism.

However, despite the negative results, communities and companies present a positive attitude toward increasing community-company relationship and the idea of generating partnerships for the development of communities. Moreover, when identifying the opportunities to comply with the RO3, it was possible to identify points of agreement between communities, companies and local government, which would boost a higher contribution of the sector. Nevertheless, to generate these alliances, according to communities, it is necessary to mitigate the negative impacts and enhance the positive ones to increase the willingness of the communities to establish relationships of trust and mutual benefit with companies that aim to increase Cabrero’s SD. The latter, it is also mentioned in ISO 26000 guidelines as a key aspect to develop strong and efficient CSR practices (ISO, 2010). In this line and to fulfil RO4, the following actions could be taken to reduce the negative impacts of the forestry sector over communities’ SD and generate further development opportunities:

Employment

- Provision of training related with forestry sector, considering companies needs and the characteristics of the rural population.

Silvicultural practices

- Reduce the risk of forest fires by considering the construction of fires belts, wider fire break, use mix silvicultural systems (polycultures) and fragment high-risk species into smaller areas (UK Forestry Commission, 2014; García-Chevesich et al., 2017).
- Avoid eucalyptus plantations due to the high risk of forest fires in the commune (CONAF, 2017; UK Forestry Commission, 2014).
- Apply integrated pest management (FAO, 2011).
- Reduce pressure on water resources through plantations of trees of varying ages (Brown et al., 2007).
- Implement buffer zones of undisturbed natural forest that separate plantation from water streams (Hopmans & Bren, 2007).
Productive processes

- Evaluate the effectiveness of existing programs to mitigate environmental impacts and apply ISO 26000 environmental practices (For details, see Appendix A).
- Create a road management system, including agreed maps routes (FITG, 2014).

Land use change

- Evaluate the possibility of incorporating the TZA.

Social investment

- Provision of training non-related to forestry sector compatible with the characteristics of the rural population.
- Provide support to workers and their families who migrate from the rural sector to work in the forest industries.
- Implement the existent projects between FCs and NGO to improve the quality of the rural potable water.
- Create a project that seeks to incorporate small farmers as food suppliers to companies. The project must include training and technology necessary to achieve the objective.
- Seek the development of a joint venture related to NWFPs.
- Develop alliances to increase the provision of public services in the rural areas from the local government according to the Chilean Lobby Law (Gobierno de Chile, 2017).
- Develop company’s social investment plan with active participation of rural communities.
CHAPTER 6

CONCLUSION

This study evaluated the impact of the forestry sector to the SD of the rural communities of Cabrero. Through the proposed methodology, it was possible to establish that forestry sector operations have impacts in all rural communities, however, the connotation of these differed among actors, especially between communities and companies. When analysing the effect of these impacts on communities' SDGs, it was found that overall, these affect them negatively, which is attributed to companies' CSR practices that fail to meet the expectations and needs of rural communities. According to the results, these practices play a major role given the inefficiency of the normative framework to protect rural communities from the impacts of the sector and the lack of institutional capacity of local governments to monitor and mitigate the impacts generated by the sector. Despite the latter, stakeholders have a positive attitude towards the possibility of establishing alliances to increase the contribution of the forestry sector in communities' SD, therefore, different practices were proposed to strengthen its contribution to communities.

This study constitutes the first step to increase the involvement of the forestry sector in the SD of the rural communities of Cabrero. Nevertheless, further research needs to be done to analyse the impacts of the sector under a broader perspective that includes new stakeholders' visions that allows the design of an integrated and agreed proposal that could increase the SD of rural communities. In addition, it is necessary to investigate the conflicts of interests and cases of corruption that could be occurring in the area to avoid obstacles in the correct contribution of the sector to the SD of the communities. Finally, although the results obtained are framed in the Cabrero context, the proposed methodology could be replicated in other communes and rural areas with a high presence of forest operations, in order to increase the contribution of the forestry sector to the sustainable development of the rural communities of Chile.


APPENDIX A

CSR PRACTICES

Table A.1 and A.2 describe the CSR practices that aimed to increase communities’ development and communities’ well-being related to environmental aspects.

Table A. 1: CSR practices that increase communities’ development.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Companies involvement with communities</strong></td>
<td>Include the community in social investment decisions</td>
</tr>
<tr>
<td></td>
<td>Participate in local associations</td>
</tr>
<tr>
<td></td>
<td>Maintain relationships with local government</td>
</tr>
<tr>
<td></td>
<td>Contribute to development programmes</td>
</tr>
<tr>
<td><strong>Education and culture to promote socioeconomic development</strong></td>
<td>Promote and support education</td>
</tr>
<tr>
<td></td>
<td>Promote cultural activities</td>
</tr>
<tr>
<td></td>
<td>Facilitate human rights education</td>
</tr>
<tr>
<td></td>
<td>Conserve and protect cultural heritage</td>
</tr>
<tr>
<td><strong>Employment and training to promote socioeconomic development</strong></td>
<td>Invest for employment creation</td>
</tr>
<tr>
<td></td>
<td>Select technology that maximize employment</td>
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<tr>
<td></td>
<td>Analyse outsourcing decisions</td>
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<tr>
<td></td>
<td>Create direct employment</td>
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<tr>
<td></td>
<td>Develop training programs</td>
</tr>
<tr>
<td></td>
<td>Promote framework to create employment</td>
</tr>
<tr>
<td><strong>Technology to create an environment that benefits communities</strong></td>
<td>Develop technology to solve social and environmental issues</td>
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<tr>
<td></td>
<td>Develop low-cost technology that are easily replicable</td>
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<tr>
<td></td>
<td>Partnerships with organizations to enhance technology development with the community</td>
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<tr>
<td></td>
<td>Transfer and diffusion of technology</td>
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<tr>
<td><strong>Contribution to wealth and income generation of communities</strong></td>
<td>Consider impacts of entering / leaving a community</td>
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<tr>
<td></td>
<td>Support initiatives to stimulate diversification</td>
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<tr>
<td></td>
<td>Prefer local suppliers</td>
</tr>
<tr>
<td></td>
<td>Assist organizations to operate within the legal framework</td>
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<tr>
<td></td>
<td>Contribute to programs and partnerships that help the community</td>
</tr>
<tr>
<td></td>
<td>Encourage the efficient use of resources</td>
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<tr>
<td></td>
<td>Assist the development of community entrepreneurs</td>
</tr>
<tr>
<td><strong>Contribution to communities’ health development</strong></td>
<td>Eliminate negative impacts of production process</td>
</tr>
<tr>
<td></td>
<td>Promote good health</td>
</tr>
<tr>
<td></td>
<td>Prevent health threats and major diseases</td>
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<td></td>
<td>Support universal access to healthcare services</td>
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<tr>
<td><strong>Social investment to improve socioeconomic aspects</strong></td>
<td>Consider community development in the planning of social investment projects</td>
</tr>
<tr>
<td></td>
<td>Avoid social actions that generate dependence on the company</td>
</tr>
<tr>
<td></td>
<td>Partnership with organizations to use complementary resources, knowledge and skills</td>
</tr>
</tbody>
</table>

Table A. 2: CSR practices that aimed to increase communities’ well-being through environmental actions.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Action</th>
</tr>
</thead>
</table>
| Prevention pollution to improve environmental performance | Control emissions to air  
Control discharges to water  
Waste management  
Control use and disposal of toxic and hazardous chemicals  
Identify and control other forms of pollution |
| Sustainable resource use to ensure the availability of resources | Improve energy efficiency  
Improve and optimize water use and access  
Improve efficiency in the use of materials  
Minimized resource requirements of a product |
| Mitigation and adaptation to climate change | Minimize GHG emissions  
Plan with a changing climate |
| Protect and restore environment and biodiversity | Value and protect biodiversity  
Value, protect and restore ecosystem services  
Use land and natural resource sustainably  
Promote the rational development of the rural and urban environment |

APPENDIX B

METHODOLOGY: GEO-REFERENCING PROCESS

This appendix provides details of the geo-referencing process. The information used to geo-referenced 153 forest plantations, 17 forestry industries and 48 rural communities is provided in Table B.1, while Figure B.1 presents an example of a layer created using Google Earth Pro.

Table B. 1: Secondary sources used for the geo-referencing of the forestry sector in Cabrero.

<table>
<thead>
<tr>
<th>Object</th>
<th>Location method</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry industries</td>
<td>Company address</td>
<td>Forestry Yearbook – 2017</td>
</tr>
<tr>
<td>Celco Plantations</td>
<td>Approximate location through map overlay</td>
<td>Arauco’s forest assets. Map available in company’s website</td>
</tr>
<tr>
<td>Mininco Plantations</td>
<td>Location through geographic coordinates</td>
<td>Mininco’s forest assets. Map provided by the company</td>
</tr>
<tr>
<td>SMFO Plantations</td>
<td>Location through geographic coordinates</td>
<td>Map available in SITRURAL</td>
</tr>
<tr>
<td>Rural communities</td>
<td>Approximate location through map overlay</td>
<td>PLADECO</td>
</tr>
<tr>
<td>Cabrero’s geographical boundaries</td>
<td>Layer download in SHP format</td>
<td>Administrative division of Chile</td>
</tr>
<tr>
<td>Cabrero’s road network</td>
<td>Layer download in SHP format</td>
<td>Chilean road network</td>
</tr>
<tr>
<td>Cabrero’s urban centres</td>
<td>Layer download in SHP format</td>
<td>Chilean urban areas</td>
</tr>
</tbody>
</table>

Once the integrated map was form, the distance between rural communities and plantations limits, was determinate. The proximity between plantations centroid and the nearest rural community was determinate using the distance matrix tool of QGIS. Results of the latter, are presented in Table B.2. From this, to comply with the distance criteria, Google Earth Pro was used to establish the distance between plantation’s limits and the nearest community as it is shown in Figures B.2 and B.3.
Table B. 2: Distance between forestry plantation’s centroid and the nearest rural community.

<table>
<thead>
<tr>
<th>Rural community</th>
<th>Distance (Km)</th>
<th>Rural community</th>
<th>Distance (Km)</th>
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</thead>
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<tr>
<td>Chillancito</td>
<td>3.3</td>
<td>Quinel</td>
<td>0.9</td>
</tr>
<tr>
<td>Santa Sara</td>
<td>2.7</td>
<td>Quinchereguia</td>
<td>0.9</td>
</tr>
<tr>
<td>Salto del Laja Camino La</td>
<td>2.2</td>
<td>La Isla</td>
<td>0.8</td>
</tr>
<tr>
<td>Aguada</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Rafael</td>
<td>2.1</td>
<td>Rio Claro</td>
<td>0.8</td>
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<td>2.1</td>
<td>Parrarillo</td>
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<td>Penuelas</td>
<td>2.0</td>
<td>Los Leones</td>
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<td>Lomas de Angol</td>
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<td>La Mancha</td>
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<td>Los Canelos</td>
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<td>Porvenir</td>
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<td>El Progreso</td>
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<td>Los Caulles</td>
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<td>Ninhue</td>
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<td>La Granja</td>
<td>1.2</td>
<td>El Guindo</td>
<td>0.6</td>
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<td>Coihuco 1</td>
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<tr>
<td>Bucalemu</td>
<td>1.1</td>
<td>Membrillar</td>
<td>0.6</td>
</tr>
<tr>
<td>Paredones</td>
<td>0.9</td>
<td>Obras de Rio Claro</td>
<td>0.4</td>
</tr>
<tr>
<td>La Bajada</td>
<td>0.9</td>
<td>Charrua Sur</td>
<td>0.4</td>
</tr>
<tr>
<td>El Manzano</td>
<td>0.9</td>
<td>El Huape</td>
<td>0.4</td>
</tr>
<tr>
<td>La Mata Redonda</td>
<td>0.9</td>
<td>Coihuco 2</td>
<td>0.3</td>
</tr>
<tr>
<td>Estero Los Sapos</td>
<td>0.9</td>
<td>Maquehua</td>
<td>0.2</td>
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</tbody>
</table>

Source: Author’s elaboration.
Figure B. 2: Location of Santa Sara rural community and centroid of plantation. Source: Author’s own elaboration based on Google Earth Pro, 2017.

Figure B. 3: Selection criteria for communities of influence. Source: Author’s own elaboration based on Google Earth Pro, 2017.
APPENDIX C

UDEC-DATABASE RESULTS

This appendix presents the results obtained from the analysis of the information contained in the UDEC-database. It presents the geo-referenced of the sample, the results from the data analysis and the inputs used for the development of the interview guide. Figure C1 presents the locations of the communities of which there is information in the database.

Figure C.1: Geo-referencing of rural communities for which information is available within the database. Source: Author’s elaboration.

Figure C.2 and C.3 shows the perception over the degree of environmental degradation from rural communities and the perception of the reasons behind this degradation.
In terms of the environmental impacts perceived by people in their communities, Figure C.4 present the overall results for rural communities, while Figure C.5, C.6, C.7, C.8, C.9 and C10, present the results by rural community. From the results, the most perceive environmental impact are drought (66.27% of the sample), where in communities like El Manzano, the impact
perception reaches 100%. The second most important impact is the transit of high-tonnage lorries on rural roads, which is recognized by more than 50% of the sample. However, in communities such as Membrillar and Colicheo, its accounts for more than 75% of the sample. Noise pollution and air pollution appear with 22.89% and 21.69%, respectively. The Progreso and Charrúa have the highest percentage of noise pollution while Charrúa and Chillancito, presented the higher percentage of air pollution. In the case of industrial waste, Colicheu presented the highest level (50%), while in the case of pollution of surface water, Membrillar and Estero Los Sapos, with both 40% of the sample. Regarding the latter, it is important to mention that there are four communities that present 0% perception of impacts which could be the result of the absence of water sources in the zones.

Figure C. 4: Perceive environmental impacts from rural communities. Data source: UDEC-database.
Figure C. 5: Perception of droughts by rural communities. Data source: UDEC-database.

Figure C. 6: Perception of impacts from transit of high-tonnage lorries on rural roads. Data source: UDEC-database.
Figure C. 7: Perception of noise pollution from rural communities. Data source: UDEC-database.

Figure C. 8: Perception of air pollution from rural communities. Data source: UDEC-database.
Figure C. 9: Perception of pollution by industrial waste from rural communities. Data source: UDEC-database.

Figure C. 10: Perception of surface water pollution from rural communities. Data source: UDEC-database.
The results show a possible relationship between the operation of the companies and the impacts perceived by the rural communities. The above, can be established by considering the proximity between the sample and the plantations or forest industries and, communities' perception regarding that poor companies' management as the main reason for the environmental degradation. Therefore, for the interview guide, based on the literature review, it was decided to incorporate "droughts" and "transit of high-tonnage lorries on rural roads" within structured interview questions. Although the other impacts are also mentioned, since in the rural zone of Cabrero there are 6 thermoelectric power stations and electric substations operating within the territory, the perceived impacts could be related to these companies instead of the forest companies. Therefore, it was decided not to incorporate questions related with industry pollution but rather ask for negative and positive environmental impacts that the communities or companies perceive from the sector.
APPENDIX D

DOCUMENT ANALYSIS RESULTS

This appendix presents the results of the thematic analysis in terms of declare impacts from the forestry sector in communities (Figure D.1) and declare opportunities for development of rural communities by the local government (Figure D.2). In addition, the information used for the interviews guide is presented below.

a) Impacts

In structured interviews with the representatives of the rural community, questions specifically related to the change in land use and its impact on communities were added. In addition, communities and companies were asked about the risk of forest fires and local employment opportunities within the forestry sector.

b) Opportunities for development

Although the local government documents mention different development opportunities for the rural sector, only rural tourism was incorporated because it corresponds to the most mentioned.
Figure D. 1: Declare impacts of the forestry sector in rural communities from document analysis. Source: Author’s elaboration.
Figure D. 2: Declare opportunities for development of rural communities from local government documents. Source: Author’s elaboration.
Entrevista – Comunidades rurales
(Estructurada tercera persona)

Buenas tardes, como se informó en el documento de información al participante, esta entrevista tiene como fin evaluar como contribuye el sector forestal al desarrollo sustentable de las comunidades rurales de Cabrero. Por desarrollo sustentable vamos a entender al tipo de modelo de desarrollo que busca que la comuna crezca económicamente, que exista mayor inclusión de todos en este crecimiento, disminuyendo la desigualdad de cualquier tipo que pueda existir y a la vez que, para crecer, no sobrepase la capacidad que tiene el medioambiente para asimilar las actividades, además de usar los recursos naturales disponibles de una forma que las generaciones futuras puedan disponer de ellos.

Preguntas de zona

1. ¿En qué sector rural vive usted?
2. ¿Cuál es su rol en la comunidad?
3. ¿En qué trabaja principalmente la gente que vive en su comunidad?

Ahora, voy a hacerle algunas preguntas relacionadas con el sector forestal y su contribución, positiva y negativa, al desarrollo sustentable de la comunidad rural en la que usted vive.

Beneficios

1. ¿Cómo cree usted que las personas que viven en el sector, se benefician de la actividad forestal que se desarrolla en la comuna? Por actividad forestal nos referimos a la industria maderera: aserrados, planta industrial y a las plantaciones forestales.

Ahora, le voy a preguntar directamente por las tres ideas que le comenté que involucra el desarrollo sostenible.

A) ¿Cuáles cree usted son los beneficios económicos que le trae a su comunidad la industria forestal que se desarrolla en la comuna?

-Enfatizar aspecto empleo: De esta comunidad, ¿Hay gente que trabaje en las industrias forestales?
-En caso de sí. ¿Qué tipo de trabajo realizan?
-Si dice que no hay gente empleada, ¿Por qué cree usted que pasa esto?
B) ¿Cuáles cree usted son los beneficios económicos que le traen a su comunidad las plantaciones forestales que se encuentra rodeando su comunidad?
- ¿Hay gente empleada en su comunidad en las plantaciones forestales?
  - Si dice que sí, ¿Qué tipo de trabajo realizan?
  - Si dice que no, ¿Por qué cree usted que pasa esto?

C) ¿Usted cree que la actividad forestal que se desarrolla en la comuna y, especialmente en su localidad, contribuye a disminuir la desigualdad de oportunidades y de desarrollo entre las zonas urbanas y rurales de Cabrero? ¿Qué hacen estas empresas para ayudar a que esta condición se revierta?
A su parecer, ¿es suficiente? O ¿deberían hacer más?

D) ¿Qué beneficios cree usted que trae la presencia del sector forestal (plantaciones e industria) en temas ambientales y de recursos naturales en su comunidad?

Impactos

2. Ahora, vamos a hablar de los impactos negativos que usted cree que la industria forestal le puede traer a su comunidad. Le voy a preguntar por los dos tipos de actividad que se desarrollan en la comuna.

A) ¿Cómo cree usted que impactan negativamente las industrias a su comunidad?
B) ¿Cómo cree usted que impactan negativamente las plantaciones forestales a su comunidad?

A continuación, me gustaría saber cuál es su opinión respecto algunos impactos importantes que resaltan del trabajo del IPS y en el PLADECO comunal

Impactos importantes

Cambios en el uso de tierra

- ¿Para qué se usaba la tierra antes de que llegaran las plantaciones forestales?
  - Agricultura: ¿Usted cree que el cambio de agricultura a plantación forestal benefició o impactó negativamente las tierras?
  - Bosque nativo: ¿Cuál cree usted que es el efecto de la sustitución del bosque nativo por plantaciones forestales?
  - Ganado: ¿Cuál cree que es el efecto de la sustitución?
  - Otro

- ¿Cuál cree usted que fue el impacto en el cambio de las tierras (agricultura/bosque nativo) para las personas que viven en su comunidad?

Escases de agua y sequía

- En base a la información que se recolectó en el IPS de Cabrero, las personas que viven en localidades rurales afirmaron que la sequía es uno de sus mayores problemas, lo que se manifiesta en suelos menos fértiles y escases de agua. ¿Usted considera que las plantaciones forestales y/o industrias forestales que hay alrededor de las localidades rurales tienen alguna responsabilidad en esto?
**Riesgo de incendios forestales**

Chile tuvo el incendio más grande de su historia este año, en relación a esto se ha hablado mucho del rol de las empresas forestales en cuanto al tipo de plantación y la cercanía con las comunidades, lo que también se menciona en el PLADECO ¿Usted cree que esta es una preocupación para su comunidad?

Si: ¿Qué cree que deberían hacer para mitigar el riesgo?

No: ¿Qué cree hacen para mitigar este riesgo?

**Turismo rural**

El PLADECO menciona el turismo rural como una alternativa de desarrollo para el sector rural, ¿Cómo cree que afectan las plantaciones forestales a esta oportunidad?

**Conclusión**

¿Cómo cree usted que es la relación entre su comunidad y el sector forestal?

En caso de mala, ¿Cómo cree que debería contribuir el gobierno local a mejorar esta relación? En caso de buena, ¿Usted cree que el gobierno local ha contribuido a que haya buena relación? ¿Cómo se imagina usted que en el futuro debiese ser la relación entre el sector forestal y su comunidad?

Considerando los beneficios e impactos negativos de los que hemos conversado, ¿Cómo cree que ha contribuido el sector forestal al desarrollo de su comunidad?

Fuera del sector forestal. ¿Cuáles son los desafíos que cree usted que tiene su comunidad? ¿Cómo cree usted que el sector forestal pudiese contribuir a superar estos desafíos?

Para terminar, ¿Hay algo que no haya preguntado y que a usted le gustaría añadir?

Gracias por su tiempo y colaboración con este estudio.
Buenas tardes, como se informó en el documento de información al participante, esta entrevista tiene como fin evaluar como contribuye el sector forestal al desarrollo sustentable de las comunidades rurales de Cabrero. Por desarrollo sustentable vamos a entender al tipo de modelo de desarrollo que busca que la comuna crezca económicamente, que exista mayor inclusión de todos en este crecimiento, disminuyendo la desigualdad de cualquier tipo que pueda existir y a la vez que, para crecer, no sobrepase la capacidad que tiene el medioambiente para asimilar las actividades, además de usar los recursos naturales disponibles de una forma que las generaciones futuras puedan disponer de ellos.

Producto de lo anterior, hoy me gustaría preguntarle sobre las contribuciones de la empresa al DS de estas comunidades y las oportunidades y desafíos que se le presentan en este tema.

En primer lugar, vamos a hablar de las contribuciones de la empresa al DS de las comunidades rurales.

**Beneficios**

¿Qué beneficios cree usted que trae su empresa a las comunidades rurales? ¿En qué cree usted que se pueden beneficiar de sus operaciones?

Ahora, le voy a preguntar directamente por las tres ideas que le comenté que involucra el desarrollo sostenible.

E) ¿Cuáles cree usted que son los beneficios económicos que le trae a la comunidad rural su empresa?

F) Social: ¿Usted cree que su empresa contribuye a disminuir la desigualdad de oportunidades y de desarrollo entre las zonas urbanas y rurales de Cabrero? ¿Qué hace la empresa para ayudar a que esta condición se revierta?

G) ¿Qué beneficios ve usted que trae la presencia de su empresa en temas ambientales y en manejo de recursos naturales?

**Impactos**

3. Ahora, vamos a hablar de los impactos negativos que usted percibe que le puede traer su empresa a las comunidades rurales.

¿Cuáles cree usted que son los principales impactos negativos que su empresa pudiera generar en las comunidades rurales?

Económico:

Social:

Ambiental:

4. Ustedes utilizan madera proveniente de las plantaciones forestales para las operaciones de su empresa. ¿Los proveedores de sus maderas operan en la comuna? Si es así, ¿Existe algún protocolo de la empresa para asegurar que sus proveedores también sean parte de los esfuerzos de la empresa para contribuir con el DS de las comunidades?
En el caso de los pequeños y medianos empresarios forestales, ¿Cómo cree que es para ellos comprometerse a esto? ¿Qué tan fácil cree que es comprometerse con esto?

Por otro lado, sabemos que en enero de este año Chile sufrió el incendio forestal más grande de la historia. Ustedes dependen de las plantaciones forestales para operar, por tanto, estos eventos presentan un riesgo para sus operaciones. ¿Cómo maneja la empresa estos riesgos? ¿Existe algún procedimiento que busque resguardar no solo sus materias primas sino también a las comunidades que se ven más afectadas por esto?

En conclusión

¿Cuál cree usted que son las oportunidades de la empresa para incrementar el DS de las comunidades rurales?

¿Cuáles son los principales desafíos que se le pudiesen originar a la empresa en busca de este desarrollo?

¿Cómo se imagina usted que debiese ser la relación entre Empresa y las comunidades rurales en el futuro?

¿Qué cree usted que las comunidades esperan de ustedes? Y ¿Qué esperan ustedes de ellos?

¿Hay algo que no le haya preguntado y que deseara agregar?…

Muchas gracias por su tiempo

Entrevista – Empresas dueñas de plantaciones forestales
(Estructurada – Respuestas escritas)

Buenas tardes, como se informó en el documento de información al participante, esta entrevista tiene como fin evaluar como contribuye el sector forestal al desarrollo sustentable de las comunidades rurales de Cabrero. Por desarrollo sustentable vamos a entender al tipo de modelo de desarrollo que busca que la comuna crezca económicamente, que exista mayor inclusión de todos en este crecimiento, disminuyendo la desigualdad de cualquier tipo que pueda existir y a la vez que, para crecer, no sobrepase la capacidad que tiene el medioambiente para asimilar las actividades, además de usar los recursos naturales disponibles de una forma que las generaciones futuras puedan disponer de ellos.

Preguntas de zona

4. ¿Cuáles son las principales operaciones de la empresa en el sector rural?

Ahora voy a hacerle algunas preguntas relacionadas con su empresa y su contribución al desarrollo sustentable de las comunidades rurales que conviven con sus operaciones
**Beneficios**

5. ¿Cómo cree usted que las personas que viven en el sector se benefician de la actividad forestal de su empresa?

Ahora, le voy a preguntar directamente por las tres ideas que le comenté que involucra el desarrollo sostenible.

H) ¿Cuáles cree usted son los beneficios económicos que le trae a las comunidades rurales la actividad forestal de su empresa?

- Si dice que sí: ¿Qué tipo de trabajo realizan?
- Si dice que no hay gente empleada, ¿Por qué cree usted que pasa esto?

I) ¿Usted cree que su empresa a nivel comunal, contribuye a disminuir la desigualdad de oportunidades y de desarrollo entre las zonas urbanas y rurales de Cabrero? ¿Qué hace su empresa para ayudar a que esta condición se revierta?

J) ¿Qué beneficios cree usted que trae la presencia de las plantaciones en temas ambientales y de recursos naturales a la comunidad?

**Impactos**

Ahora, vamos a hablar de los impactos negativos que usted cree que la industria forestal le puede traer a la comunidad.

C) ¿Cuáles cree usted que pudiesen ser los impactos negativos que trae su empresa a las comunidades rurales?

A continuación, me gustaría saber cuál es su opinión respecto algunos impactos importantes que resaltan del trabajo del IPS (explicar breve) y en el PLADECO comunal

**Impactos importantes**

*Cambios en el uso de tierra*

- Se menciona el cambio de tierras de agricultura a plantaciones forestales como un impacto de la actividad forestal, ¿Cómo cree que afecta este cambio a las comunidades? ¿Cree usted que los beneficios mencionados anteriormente, superan este impacto?

*Escases de agua y sequía*

- En base a la información que se recolectó en el IPS de Cabrero, las personas que viven en localidades rurales afirmaron que la sequía es uno de sus mayores problemas, lo que se manifiesta en suelos menos fértiles y escases de agua. ¿Usted considera que las operaciones forestales de su empresa, especialmente las plantaciones que hay alrededor de las localidades rurales, tienen alguna responsabilidad en esto? ¿Cómo la empresa busca mitigar estos impactos?
**Riesgo de incendios forestales**

Chile tuvo el incendio más grande de su historia este año, en relación a esto se ha hablado mucho del rol de las empresas forestales en cuanto al tipo de plantación y la cercanía con las comunidades. En cuanto a su empresa, ¿Qué aspecto cree usted que resalta su compromiso con prevenir y mitigar estos sucesos, entendiendo que tanto la empresa como las comunidades se ven afectados por estos?

**Turismo rural**

El PLADECO, menciona el turismo rural como una alternativa de desarrollo para el sector rural, ¿Existe algún compromiso de la empresa para trabajar este tema? ¿Cómo cree usted que afectan las plantaciones forestales a esta posibilidad?

**Conclusión**

¿Cómo cree usted que es la relación entre su empresa y los sectores rurales?

En caso de mala, ¿Cómo cree que debería contribuir el gobierno local a mejorar esta relación?

En caso de buena, ¿Usted cree que el gobierno local ha contribuido a que haya buena relación?

Considerando los beneficios e impactos negativos de los que hemos conversado, ¿Cómo cree que contribuido su empresa al desarrollo sustentable de las comunidades?

¿Cómo se imagina usted que debiese ser la relación entre su empresa y las comunidades en el futuro?

Fuera del sector forestal. ¿Cuáles son los desafíos que cree usted que tienen las comunidades? (Nombrar), ¿Cómo cree usted que su empresa pudiese contribuir a superar estos desafíos?

Para terminar, ¿Hay algo que no haya preguntado y que a usted le gustaría añadir?

Gracias por su tiempo y colaboración con este estudio.
APPENDIX F

ETHICS APPROVAL

UCL Research Ethics Committee

Before completing this form, first check that your research is low risk using Step 4 checklist. Please also attach your answers to Step 4 Checklist to this low risk application form. This will help UCL monitor the numbers of different categories of low risk research.

Step 5 – Low Risk Application Form

Note to Applicants: It is important for you to include all relevant information about your research in this application form as your ethical approval will be based on this form. Therefore anything not included will not be part of any ethical approval. If the application does not address one or more issues adequately and requires re-submission, the revised application will only be considered a minimum of two weeks after the applicant was advised to re-submit. To avoid this, applicants are advised to pay particular attention to Section G on Data Protection and Q30a on Consent. Data collection cannot start until the project has research ethics approval.

You are advised to read the Guidance for Applicants when completing this form.

Application For Ethical Review: Low Risk

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<td>Are you applying for an urgent accelerated review?</td>
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<tr>
<td>Is this application for a continuation of a research project that already has ethical approval? For example, has a preliminary/pilot study been completed and this is an application for a follow-up project?</td>
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<td>If yes, provide brief details (see guidelines) including the title and ethics reference number for the previous study:</td>
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<td><strong>4 Principal Investigator</strong></td>
<td>MARIA VERONICA GONZALEZ</td>
<td></td>
</tr>
<tr>
<td><strong>5 Position held (Staff/Student)</strong></td>
<td>Msc Student</td>
<td></td>
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<tr>
<td><strong>6 Faculty/Department</strong></td>
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<tr>
<td><strong>7 Course Title (if student)</strong></td>
<td>Msc Sustainable Resources</td>
<td></td>
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<tr>
<td><strong>8 Contact Details</strong></td>
<td>Email: <a href="mailto:veronica.gonzalez.16@ucl.ac.uk">veronica.gonzalez.16@ucl.ac.uk</a></td>
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<td></td>
<td>Telephone: +447743567532</td>
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<td><strong>9 Provide details of other Co-Investigators/Partners/Collaborators who will work on the project.</strong></td>
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<td>Note: This includes those with access to the data such as transcribers.</td>
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<td>If you do not know the names of all collaborators, please write their roles in the research.</td>
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**10 If the project is funded (this includes non-monetary awards such as laboratory facilities)**

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<td>Is the funding confirmed?</td>
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**12 Name of Sponsor**

The Sponsor is the organisation taking responsibility for the project, which will usually be UCL. If the Sponsor is not UCL, please state the name of the sponsor.

**13 If this is a student project**

<table>
<thead>
<tr>
<th>Supervisor Name</th>
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<tr>
<td>Julia Tomei</td>
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Forestry accounts for 2.6% of Chilean GDP, 8.7% of national exports and employs directly and indirectly 4% of the Chilean labour force. Biobío region concentrates 38% of the forestry plantations and produce 80.2% of the Chilean exports related with the sector. Cabrero is a commune located in the region where 45% of its area corresponds to forestry plantations and where the Chilean biggest forest companies operate. Cabrero has 30,000 inhabitants, of whom 23.64% live in rural areas in coexistence with the forest activity.

Although the economic benefits associated with forestry are undeniable, it can have impacts on both community and environment which, if not properly managed, could have a negative effect on the sustainable development (SD) of rural communities. The main impacts in relation to forestry activities are associated with: the contamination of water sources and water scarcity; poorly harvested cropping systems and high soil nutrient demand lead to soil erosion; replacement of native forest threatening the survival of endemic species; conflicts of interest between local communities and forest enterprises, including competition for the use of land for subsistence and agriculture, among others. In the town of Cabrero, management of these impacts is vital because the industry is the main economic activity and source of direct and indirect employment for communities, therefore proper governance of the forestry resources could contribute to the SD of the communities. This project aims to assess the impact of forestry on the sustainable development of rural communities in Cabrero by using available secondary data and interviews with key actors, such as managers of the forest companies and community leaders. Expected outcomes are related to the detection of strengths and weakness of the current situation related to SD; trade-offs between the different facets of SD; and possible further actions to achieve or improve SD in Cabrero.
<table>
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<tr>
<td>Observation</td>
<td>Systematic review – (See Section D)</td>
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<td>Use of personal records</td>
<td>Secondary data analysis – (See Section E)</td>
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<td>Audio/visual recordings (including photographs)</td>
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*Attach copies to application (see below).*

16a Provide an overview of the project; focusing on your methodology and including information on what data/samples will be taken (including a description of the topics/questions to be asked), how data collection will occur and what (if relevant) participants will be asked to do. This should include a justification for the methods chosen.

Please do not attach or copy and paste a research proposal or case for support.

The study will involve the analysis of secondary data, as well as semi-structured and structured interviews. In the case of secondary data, three sources are going to be used. First, forestry companies sustainability reports and social strategies briefings. Both are publicly available via their website. Second, the Development Commune Plan for Cabrero made by the Cabrero’s Municipality. This document is public due to the Transparency Law for Public Institutions. Finally, a simple descriptive analysis is going to be performed based on a database made by the Social Responsibility Studies Programme to measure the social progress index and to propose public policies to be implemented in the commune. I have attached the letter from the programme, which grants me permission to use the database.

In the case of interviews, semi-structured interviews will be carried out by Skype, while structured interviews will be done by a third person in Cabrero due to the lack of financial resources to travel overseas.

Interviews will be carried out with between 6-10 individuals, including forestry company managers, and local community leaders.

16b Attachments

*Please attach a copy of any interview questions / questionnaires / workshop topic guides / test (e.g. psychometric), etc and state whether they are in final or draft form.*

*Please also attach your answers to Step 4 Checklist to this low risk application form. This will help UCL monitor the numbers of different categories of low risk research.*

17 Please state which code of ethics (see Guidelines) will be adhered to for this research (for example, BERA, BPS, etc).
18 Please indicate where this research is taking place.
- ☐ UK only (Skip to 'location of fieldwork')
- ☐ Overseas only
- ☒ UK & overseas

19 If the research includes work outside the UK, is ethical approval in the host country (local ethical approval) required*?

|   | Yes ☐ No ☒ |

If no, please explain why local ethical approval is not necessary/possible.

If yes, provide details below including whether the ethical approval has been received.

**Note:** Full UCL ethical approval will not be granted until local ethical approval (if required) has been evidenced.

In Chile there is no regulation that requires ethical approval of social research. Permission has been granted from the University of Concepción to use the PERS database (see attached letter). I was also involved in the data collection for the PERS study, and will follow the ethical standards adopted in that study.

*To check which local ethics committee you may need to apply to, the International Compendium of Human Research Standards contains information on over 100 countries, including key organisations such as local ethics committees. [http://www.hhs.gov/ohrp/international/compilation-human-research-standards/index.html](http://www.hhs.gov/ohrp/international/compilation-human-research-standards/index.html)

20 If you (or any members of your research team) are travelling overseas in person are there any concerns based on governmental travel advice ([www.fco.gov.uk](http://www.fco.gov.uk)) for the region of travel?

|   | Yes ☐ No ☒ |

**Note:** Check [www.fco.gov.uk](http://www.fco.gov.uk) and submit a travel insurance form to UCL Finance (see application guidelines for more details). This can be accessed here: [https://www.ucl.ac.uk/finance/secure/fin_acc/insurance.htm](https://www.ucl.ac.uk/finance/secure/fin_acc/insurance.htm) (You will need your UCL login details.)

21 State the location(s) where the research will be conducted and data collected. For example public spaces, schools, private company, using online methods, postal mail or telephone communications.

The interviews will be carried out via Skype and in public places when the interviews are carried out by a third party.

22 Does the research location require any additional permissions (e.g. obtaining access to schools, hospitals, private property, non-disclosure agreements, access to biodiversity permits (CBD), etc.)?

|   | Yes ☐ No ☒ |
If yes, please state the permissions required.

| 23 | Have the above approvals been obtained? | Yes ☐ No ☐ |

If yes, please attach a copy of the approval correspondence.

If not, confirm they will be obtained prior to data collection. Yes ☐ No ☐

**Access to data**

| 24 | If you are using data or information held by third party, please explain how you will obtain this. You should confirm that the information has been obtained in accordance with the UK Data Protection Act 1998. |

In addition to the interviews, a database from the Social Responsibility Studies Programme (PERS, in its Spanish acronym) of the University of Concepcion will be used. This database was built by the PERS in order to measure the social progress index (SPI) for Cabrero and for a descriptive analysis of the commune in order to propose public policies to achieve a better social progress in Cabrero. This database is not publicly available, and I have therefore received permission from the University to use this dataset. The permission letter is included with this application.

**Dissemination of results**

| 25 | How will the results be disseminated (including communication of results with participants)? |

A short summary (1-2 pages) of the main findings of the dissertation will be provided to the participants in Spanish.

### Section C: Details of Participants

In this form ‘participants’ means human participants and their data (including sensor/locational data, observational notes/images, tissue and blood samples, as well as DNA).

| 26 | Does the project involve the recruitment of participants? |

Yes ☒ Complete all parts of this Section.

No ☐ Move to Section D.

| 27 | I confirm that I have read the high risk checklist and this study will not include participants or data from participants that fall under sections 1-3. |

Yes ☒ Complete all parts of this Section.

No ☐ Complete the high risk checklist and apply to the UCL Research Ethics Committee.

**Participant Details**

| 28 | Approximate Number of participants required: 6-10 |

Approximate Upper age limit: 65 Lower age limit: 28
Justification for the age range and sample size:
The age range corresponds to the age of the people who I will seek to interview. The sample size is 6-10 due to practical reason and the need to comply with the time for the dissertation.

Recruitment/Sampling

Describe how potential participants will be recruited into the study. **NOTE:** This should include reference to how you will identify and approach participants. For example, will participants self-identify themselves by responding to an advert for the study or will you approach them directly (such as in person or via email)? Recruitment documents must be written in clear language appropriate to the target audience – see the accompanying guidance on writing information sheets.

The participants of this study correspond to key stakeholders involved in the evaluation of the sustainable development of Cabrero. This includes social leaders from rural communities, individuals responsible for corporate social responsibility and sustainability of forestry companies.

In most cases, participants correspond to people that I have worked with previously or people that have been referred to me by others (snowballing). Therefore, an initial approach will be made by telephone or email to see if they are interested in participating in the study. Once participants have expressed a willingness to participate, I will contact them again and provided them with the information sheet for the interviews and once they confirm their interest in participating, I will arrange the skype meetings and the interviews done by the third person.

Consent

Describe the process you will use when seeking to obtain consent. **Note:** This should include reference to what participants are being asked to consent to, such as whether their contribution will be identifiable/anonymous, limits to confidentiality and whether their data can be withdrawn at a later date.

For guidance on preparing information sheets and obtaining and recording consent see:
- accompanying guidance on writing information sheets in clear language appropriate to the target audience
- https://ethics.grad.ucl.ac.uk
- http://www.ucl.ac.uk/srs/research-ethics-committee/pages/ioe
- http://www.data-archive.ac.uk/create-manage/consent-ethics/consent

I will talk to each one of them by phone and/or email and I will send them the participant information sheet so they can evaluate their interest in, and consent to, participate via email. Also, I will be available at any time if they need more information or have further
questions regarding the study. I will also provide the contact details of my supervisor, Julia Tomei, in case participants have additional questions.

30b **Attachments** Please list them below:

*Ensure that a copy of all recruitment documentation (recruitment emails/posters, information sheet/s, consent form/s) have been attached to the application.*

30c If you are *not* intending to seek consent from participants, clarify why below:

---

**Section D: Secondary data analysis**

31 **Does your study involve the use of previously collected data?**

Yes ☒ Complete all parts of this Section.

No ☐ Move to Section F.

32 **Name of dataset/s:** Aplicacion IPS comuna de Cabrero

**Owner of dataset/s (if applicable):** Universidad de Concepcion

33 **Are the data in the public domain?**

Yes ☐

No ☒

If no, do you have the owner's permission/license? Yes ☒

No* ☐

34 **Are the data anonymised?** Yes ☒

No ☐

If no:

i. Do you plan to anonymise the data? Yes ☐

No* ☐

ii. Do you plan to use individual level data? Yes* ☐

No ☐

iii. Will you be linking data to individuals? Yes* ☐

No ☐

35 **Are the data sensitive (DPA 1998 definition)?** Yes* ☐

No ☒

36 **Will you be conducting analysis within the remit it was originally collected for?** Yes ☒

No* ☐
If no, was consent gained from participants for subsequent/future analysis?

| Yes ☐ | No* ☐ |

If you ticked any boxes with an asterisk (*), please ensure that you give further details in Section F: Ethical Issues.

### Section E: Ethical Issues

**Ethical Issues**

Please address clearly any ethical issues that may arise in the course of this research, including those highlighted earlier in the form, and how they will be addressed. Possible harms include physical, psychological, emotional, economic, reputational, and legal. The potential severity, duration and probability of harm vary from minimal to high. Further information and advice can be found in the guidelines.

**Note:** All ethical issues should be addressed - *do not leave this section blank.* If you think there are no ethical issues, you need to provide an explanation as to why.

The main ethical issue could arise from the need of participants to retain anonymity. Personal data collected will only include names, emails and position within the company or community. To preserve anonymity no participant will be mentioned by names in the write up and all data will be saved under a pseudonym. The information taken from the interviews will be kept in accordance with UCL’s data protection policies; a data protection number is being sought from UCL Legal.

Every participant will receive an information sheet, which will provide my and my supervisor’s contact details, the aims of the study, and will emphasise the voluntary nature of their participation, the possibility to withdraw at any time and the right to not answer any questions that they are uncomfortable answering. At the beginning of each interview, participants will be asked for permission to record the interview; if permission not given, detailed notes will be taken by me or the third person that will carry out the interviews in Chile. The information sheets also states that if the participant agrees to participate, they are providing consent for the answer to be used in the research project, also that allow them to withdraw at any time and that the personal information that I will collect will be for my own used and is related to the name, telephone number and email address and it will not appear at my written dissertation nor in any publication that I make related to the research project.

Some ethical issues might arise from the use of a third person that will carry out 4 interviews in Cabrero and Concepcion, Chile. These include i) interviewer bias, ii) risks to participants, and iii) researcher safety in the field. Structured interviews will be used to minimize interviewer bias. It is also likely that she will be allowed to record the interviews, which would reduce the risk of misinterpretation of the data. With regard to ii), I have collaborated previously with this researcher, including on research that involved undertaking interviews and questionnaires with rural communities. She therefore has the necessary training and expertise to carry out the interviews in an ethical way. I will also have a Skype meeting with her to explain the aims and objectives of the research, and the rights of participants to anonymity and to withdraw at any time.
In terms of her benefits, I will acknowledge her in my dissertation, I will pay her for her time and will cover transportation costs. Finally, the safeguards undertaken to protect her safety will include: a) Prior contacts between her and the participants by telephone. b) The time and place for the interview will be selected based on prior agreement between me, her and the interviewee. c) Wherever possible, interviews will be carried out in dependencies of the Social Responsibility Studies Programme, at the University of Concepción. This will ensure that other people are available in case any difficulties arise. If it is not possible to carry out interviews at the University, they will be held in a public place in Cabrero. A colleague will be informed of where and when the interview will take place, and the interviewer will call before and after the interview to confirm they are safe. Interviews in Cabrero will be held in near to both a police station and health facilities. The interviewer will also be provided with telephone numbers from the police station, municipality and health facilities in case of an emergency.

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<th>Risks &amp; Benefits</th>
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**Section G: Confidentiality, Data Storage & Security**

Please ensure that you answer each question and include all hard and electronic data.
Will the research involve the collection and/or use of personal data (this includes when individual participants are only identifiable by the researcher)?

Yes ☒  No ☐

**Personal data** is data which relates to a living individual who can be identified from that data OR from the data and other information that is either currently held, or will be held by the data controller (the researcher).

This includes:
- Obviously identifiable data such as email/postal addresses, many names, etc.
- any expression of opinion about the individual and any intentions of the data controller or any other person toward the individual.
- sensor, location or visual data which may reveal information that enables the identification of a face, address, etc (some postcodes cover only one property).
- combinations of data which may reveal identifiable data, such as names, email/postal addresses, date of birth, ethnicity, descriptions of health diagnosis or conditions, computer IP address (if relating to a device with a single user).

All research projects using personal data must be registered with UCL Legal Services (http://www.ucl.ac.uk/legal-services/research) before the data is collected.

This process will help researchers, supervisors and investigators meet their legal obligations under the UK Data Protection Act 1998 (the UK legislation implementing the EU Data Protection Directive 1995).

To complete this process you will need to think about how the data is being protected, e.g. whether personal data will be stored separately from the research data and linked using a link code, and whether personal data will be shared outside the research team. The following may be helpful:
- A practical note for researchers on the limited exemptions from the UK Data Protection Act is here: http://www.adls.ac.uk/publications-and-documents/

Please provide your UCL Data Protection registration number: Z6364106/2017/07/22 Social Research

If the UCL Data Protection registration form asks for your UCL ethics application number, say that do not have one because you are applying for departmental ethics approval.

If you do not have a registration number from Legal Services, please clarify why not:

Is the research collecting or using
- sensitive personal data as defined by the UK Data Protection Act (racial or ethnic origin / political opinions / religious beliefs / trade union membership / physical or mental health / sexual life / commission of offences or alleged
offences), and/or
- data which might be considered sensitive in some countries, cultures or contexts.

If yes, state whether explicit consent will be sought for its use and what data management measures are in place to adequate manage and protect the data.

No

<table>
<thead>
<tr>
<th>During the project (including the write up and dissemination period)</th>
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*Please note that if you store your research data containing identifiable data on UCL systems or equipment (including by using your UCL email account to transfer data), or otherwise carry out work on your research in the UK, the processing will take place within the EEA and will be captured by Data Protection legislation.

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<th>After the project</th>
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ii. Where will the data be stored and who will have access? The data will be stored on a password protected laptop and/or encrypted USB device

iii. Will the data be securely deleted? Yes ☒ No ☐

*If yes,* please state when will this occur: 01/09/2018

iv. Will the data be archived for use by other researchers? Yes ☐ No ☒

*If yes,* please provide further details including whether researchers outside the European Economic Area will be given access.

Applicant Declaration: I confirm that the information in this form is accurate to the best of my knowledge.

Supervisor’s Declaration: I confirm that I have checked this completed form and that the information in it is accurate to the best of my knowledge.

<table>
<thead>
<tr>
<th>Signature</th>
<th>MARIA VERONICA GONZALEZ</th>
</tr>
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<tbody>
<tr>
<td>Date</td>
<td>26/06/2017</td>
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</tbody>
</table>

*If student*

<table>
<thead>
<tr>
<th>Supervisor Name:</th>
<th>JULIA TOMEI</th>
</tr>
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<tbody>
<tr>
<td>Supervisor Signature:</td>
<td>Julia Tomei</td>
</tr>
<tr>
<td>Date:</td>
<td>26/06/2017</td>
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</tbody>
</table>

This signed form and the ethics approval should be included as an appendix in the Masters Dissertation or PhD Upgrade Documents, whichever applies.
AUTORIZACION USO BASE DE DATOS

Dra. Gracia Navarro Saldaña, Directora Programa de Estudios sobre la Responsabilidad Social de la Universidad de Concepción, Chile (PERS), autoriza el uso de la base de datos de la Universidad de Concepción correspondiente a la aplicación del IPS en la comuna de Cabrero, Chile, para realizar investigación titulada Achieving sustainable development in Chile’s forestry sector: a case study in Cabrero, correspondiente a la tesis de MSC in Sustainable Resources de UCL de la Sra. María Verónica González

La autorización se hace efectiva en atención a que la investigadora, bajo la supervisión de su profesor/a guía en UCL, Dr. Julia Tomei, se compromete a no usar la información con fines de lucro, a mantener la confidencialidad de los datos y a compartir con el PERS los resultados de su tesis.

Concepción, mayo 2017

Figure F. 1: Authorization of PERS to use the database.
APPENDIX G

PARTICIPANT INFORMATION SHEET

Información para el participante

Título del Proyecto de Investigación: Achieving sustainable development in Chile’s forestry sector: a case study in Cabrero

Mi nombre es María Verónica González y en este momento me encuentro realizando un magíster de Recursos Sustentables en University College London (UCL) en Inglaterra. Como parte final de mis estudios, estoy haciendo mi tesis la cual evalúa la contribución del sector forestal al desarrollo sostenible de las comunidades rurales de Cabrero. Mi tesis se encuentra apoyada por la universidad y es supervisada por la doctora Julia Tomei. Como parte de mi tesis, usted ha sido invitado a participar. Antes de concretar su participación, es importante que entienda que implica ser parte de este estudio. Por favor, lea la información siguiente. Si tiene dudas o algo no está claro, no dude en contactarme. Muchas gracias por su tiempo y colaboración.

¿De qué se trata el estudio?

El objetivo de este estudio es evaluar como contribuye el sector forestal al desarrollo sostenible de las comunidades rurales de Cabrero. Este estudio incluye entrevistas que serán realizadas vía Skype por mí y, en caso de no poder usar este medio, una tercera persona en Cabrero y Concepción me ayudará realizando las entrevistas presenciales para quienes lo deseen. Cada entrevista durará aproximadamente una hora.

¿Por qué he sido invitado a participar?

Usted ha sido invitado a este estudio porque es representante de las comunidades rurales/empresas forestales que operan en Cabrero, por lo tanto, su percepción sobre el tema es valiosa y fundamental para los objetivos del estudio.

Usted ha sido invitado a este estudio porque es un académico de la Universidad de Concepción que colaboró en el IPS de Cabrero, por lo tanto, su percepción sobre el tema es valiosa y fundamental para los objetivos del estudio.

¿Puedo retirarme del estudio?
Su participación en este estudio es voluntaria. Si una vez iniciado el estudio usted decide abandonarlo podrá hacerlo libremente.

¿Cómo se realizarán las entrevistas?, ¿Cuál será el procedimiento?

En el caso de las entrevistas por Skype, la entrevista la realizó en el horario que usted estime conveniente. La entrevista durará aproximadamente una hora y, en caso de contar con su aprobación, esta será grabada con el fin de facilitar la transcripción de las respuestas. En el caso de las entrevistas presenciales realizadas por una tercera persona, el nombre de quien las realice será informado a usted con anterioridad. Esta persona le preguntará si usted permite que sus respuestas sean grabadas, si usted no lo desea, esta persona tomará nota de sus respuestas.

Una vez transcrita la entrevista, sus respuestas serán guardadas en un documento digital, sin embargo, estas no contendrán su nombre y serán codificadas para mantener el anonimato. Nadie, excepto yo y Dr. Julia Tomei, tendrá acceso a las respuestas y los documentos serán destruidos una vez que el estudio sea finalizado lo que ocurrirá el 1 de septiembre de 2017.

¿Existe algún riesgo para mí durante el estudio?

Los riesgos asociados con las entrevistas son bajos. Las preguntas no incluyen aspectos personales, nombres ni lugares de trabajo, sino más bien su percepción en cuanto a la contribución del sector forestal al desarrollo sostenible, desafíos y oportunidades de mejora. Además, si existe alguna pregunta de la cual usted no se sienta cómodo respondiendo, puede decidir no hacerlo y avanzaremos a la próxima pregunta.

¿Cómo me beneficio de este estudio?

No existen beneficios inmediatos en relación a la participación de las entrevistas. Sin embargo, su participación aporta conocimientos que pudiesen ayudar a identificar y mejorar las oportunidades y desafíos para el desarrollo sostenible de las comunidades rurales de Cabrero. El aumento de información disponible contribuye a mejorar el proceso de toma de decisiones para los actores involucrados en las distintas actividades vinculadas al desarrollo sostenible.

Confidencialidad y entrega de resultados

Como se mencionó anteriormente, las respuestas de entrevistas serán anónimas, los datos serán guardados con clave en documentos digitales y serán destruidos una vez terminado el estudio. La única información personal que recolectaré será su nombre, teléfono y email personal el cual utilizaré para comunicarme con usted y en ningún momento esta información aparecerá en mi tesis o en cualquier publicación que yo realice. En relación a sus respuestas, algunos extractos anónimos serán incluidos en los resultados de mi tesis. La tesis completa
estará disponible en la biblioteca de UCL y si usted lo desea, podrá pedir un resumen de los resultados obtenidos.

Si después de leer este documento usted decide participar en las entrevistas y responder a las preguntas, usted está dando su consentimiento para que las respuestas sean utilizadas en este proyecto de investigación.

Contacto
Si usted tiene preguntas o quejas sobre las entrevistas o el proceso mismo puede contactarme directamente utilizando la siguiente información:

<table>
<thead>
<tr>
<th>María Verónica González</th>
</tr>
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<tbody>
<tr>
<td><a href="mailto:veronica.gonzalez.16@ucl.ac.uk">veronica.gonzalez.16@ucl.ac.uk</a>; <a href="mailto:gonzalezn.veronica@gmail.com">gonzalezn.veronica@gmail.com</a>; <a href="mailto:mariavgonzalez@udec.cl">mariavgonzalez@udec.cl</a></td>
</tr>
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Usted también puede contactar a mi supervisora:

<table>
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<tr>
<th>Dr. Julia Tomei</th>
</tr>
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<tr>
<td><a href="mailto:j.tomei@ucl.ac.uk">j.tomei@ucl.ac.uk</a></td>
</tr>
</tbody>
</table>
From the thematic analysis of the interviews, five themes arise which are presented in Figures H.1, H.2, H.3, H.4 and H.5.

Figure H. 1: Perceive impacts of the forestry sector in rural communities. Source: Author's elaboration.
Factors that influence the existence and characteristics of the relationship

Proximity
- Communities’ proactivity
- Manager characteristics
- Management policies

Local political actors influence on impacts

Positive
- Partnership with forestry sector

Negative
- Lack of Institutional capacity
- Inexistence of a local regulatory agency
- Distrust in law enforcement
- Conflicts of interest
- Alteration of pollution reports

Figure H. 2: Community-Company relationship. Source: Author’s elaboration.

Figure H. 3: Influence of local political actors in impacts detected. Source: Author’s elaboration.
Figure H. 4: Future actions to mitigate detected impacts. Source: Author’s elaboration.
Figure H. 5: Opportunities for SD of rural communities. Source: Author's elaboration.
APPENDIX I

EXPERT COMMENTS ON SDGs AND THE FORESTRY SECTOR

This appendix shows the expert opinion regarding the impact of the forestry sector in the rural communities' possibility of achieving the SDGs. For the latter, experts were provided with a verbal description of each impact detected considering the different stakeholders’ opinions (companies, communities representatives, and local government). From here, experts were asked about how they think that these impacts affect communities’ SDGs (Table I.1 and Table I.2). By considering their answers, a codification process was carried out. First, in the case that an impact was detected as positive over the achievement of a SDGs, it was coded as 2. Second, when an impact was detected as variable, was coded as 1. Finally, when an impact was declared as negative, was coded as 0. Table I.3 and I.4 show the codification for each expert.

In cases where the experts did not agree in their opinion about the effect on a goal, this effect was named as a variable.

Table I. 1: Comments from Expert 1 on the SDGs that are affected by each impact detected.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Opinion</th>
<th>SDGs</th>
</tr>
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<tbody>
<tr>
<td>Employment</td>
<td>“Depende como se aborde, tu podrías por ejemplo a través del empleo, aunque sea de baja calificación y de baja remuneración se podrían establecer cuotas de trabajo que podrían ayudar al objetivo 5 de igualdad de género, por lo menos en Chile es un tema que esta súper en boga por la diferencia de salarios entre hombres y mujeres, y el nivel de calificación del tipo de trabajo (estatus) que desempeñan hombres y mujeres. Si se apunta que el trabajo tenga una paridad de condiciones para hombres y mujeres se puede estar apuntando al objetivo 5. También se puede atacar al objetivo 8, nuevamente, si es que se establecen condiciones mínimas de trabajo, que a lo mejor no van a ser de alta calificación, pero si para gente de jefaturas intermedias o más abajo. Si es que se tiene un trabajo bien remunerado con condiciones contractuales decentes (Previsión, salud, etc) también puede aportar al objetivo 5 y al 8. Siempre teniendo en cuenta que la mayoría de la gente de las comunidades corresponde al quintil más pobre.”</td>
<td>5, 8</td>
</tr>
<tr>
<td>Employment</td>
<td>“Yo creo que no, solo por el hecho de que la actividad de una industria no es estable, por lo tanto, si quieres contribuir al objetivo 1 lo que tienes que hacer es que la industria provea recursos para que se generen acciones que favorezcan la autonomía. Mientras el trabajo sea dependiente de la industria, ese trabajo va a estar sometido a fluctuaciones propias del mercado. Como por ejemplo que la industria deje de ser negocio y se vayan, que la industria cambie sus operaciones o que explore en otras alternativas dentro del rubro. Entonces siempre que sea una solución empresa dependiente, es probable que no aporte directamente al objetivo 1.”</td>
<td>1</td>
</tr>
<tr>
<td>Employment</td>
<td>“También creo que ayuda al objetivo 10 pensando en que cuando hombres y mujeres tienen condiciones laborales decentes (igualdad de salarios, previsión, salud, etc.) permite que no ellas mismas, sino que la generación siguiente puedan ir mejorando en términos de la escala social. Que es como lo que pasa con los jóvenes que van a la universidad, los padres se esforzaron para que ellos pudieran estudiar y debido a que tenían un trabajo que les permitía pagar ciertas condiciones de vida y luego sus hijos pueden subir un peldaño”</td>
<td>10</td>
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<tr>
<td>Land use change from unused land and natural cover to plantations</td>
<td>“Yo creo que puede contribuir al 8 cuando se habla del cambio de la cubierta natural y la tierra sin usar. En el fondo, el mejor aprovechamiento de los recursos que tiene para generar más empleo o mayor crecimiento económico de la localidad. Eso en positivo y como un efecto directo.”</td>
<td>8</td>
</tr>
<tr>
<td>Land use change from unused land to plantations</td>
<td>“Si se pone desde un punto de vista positivo y se hace un buen manejo de las tierras, se puede transformar el sistema en algo más productivo o mejorar la calidad de los suelos. Siempre y cuando el trabajo hecho sea serio.”</td>
<td>15</td>
</tr>
<tr>
<td>Land use change from natural cover to plantations</td>
<td>“En términos de lo negativo, de forma directa afecta al 6, 11, 13 y el 15. Evidentemente si hay una depredación y rentismo en la industria van a explotar todo lo que hay. El 6 es por el tema del agua, por el uso excesivo de los recursos hídricos de la zona o por contaminación de estos. El 11 porque no vas a dejar sustrato sobre el cual hacer ciudades o comunidades sostenibles, entendiendo como sustrato a las áreas verdes, bosques nativos, humedales, en general cosas que estaban ahí, en síntesis, sustrato es el ecosistema. Hay cosas del ecosistema que no son reemplazables después. El 13 en una medida pequeña por el tamaño de la comunidad, porque en el fondo le esas quitando el pulmón a la tierra, estas reduciendo por ejemplo zonas de bosque nativo para poner plantaciones. Por otro lado se tienen las emanaciones de la industria. El 15 igual directo... El 3 si están contribuyendo al perjuicio de la calidad medio ambiental eso puede tener impactos en la salud, sea por reemplazo de bosques o áreas que son naturales por otras que son menos naturales o por el hecho de la contaminación de la industria.”</td>
<td>3, 6, 11, 13, 15</td>
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</table>
Land use change from agriculture to plantations

“En el caso del 1 porque de alguna manera si estas eliminando, siempre viéndolo a largo plazo, las industrias van y vienen y cuando se acaba el negocio, cuando deja de ser rentable la gente se va y la comunidad queda ahí y hay tanto menoscabo de la tierra y de las condiciones naturales que rodean a la comunidad que después ya no se puede hacer agricultura. Cuando el motor económico no sea esa industria, ya no va a haber manera de retroceder, por ejemplo, para cultivar la tierra, tener agua limpia para hacer actividades agrícolas o de otro tipo. En el fondo el desmedro de las condiciones, nuevamente el sustrato físico, biológico de la zona, lo que hace en el fondo es dejarte en peores condiciones y con pocas capacidades para superar la pobreza, de modo que se va la industria y te quedas sin sueldo y con un entomo hecho pedazos.”

Productive processes

(Transit of high-tonnage lorries) “Yo creo que el 3 por ejemplo, porque en el fondo el deterioro de los caminos lo que haces que te pone en situación de aislamiento y eso evidentemente empeora tus condiciones de vida, por ejemplo, si tienes que caminar por el barro o llegar mojado a tu trabajo te puede dar pulmonía u otras cosas. Te puedes contagiar microorganismos. Afecta la conectividad, pero no solo eso, afecta la calidad de tu transito común, por un lado te vas a aislar pero por otro lado los que transitan o pueden transitar no lo hacen en las condiciones más óptimas. El 8 en el sentido de que si tú tienes malos caminos te puede perjudicar la actividad económica de otro tipo que hayan, como por ejemplo la misma agricultura o la cosecha de los berries. Al final todos tienen que usar caminos y si los caminos están malos les hechas a perder sus camiones o evitas que puedan trasladar sus productos. La 9 porque en el fondo te hecha a perder la infraestructura pública, en el fondo es uno de los bienes más importantes que sostiene el desarrollo económico. Es decir, los caminos, la logística, la luminaria, la señalética, es un bien público súper importante para que haya crecimiento y desarrollo. El 10 te produce más desigualdad porque la gente más pobre o menos urbanizada queda aislada y tiene menos acceso a los servicios, menos acceso o peor calidad de accesos, te genera mayor nivel de desigualdad, lo que tienen plata van a poder invertir en sus caminos o que vivan más cerca de la ciudad o tener mejores autos. En cambio la gente que tiene menos recursos va a tener peores condiciones.”

Rural-urban migration

“Puede ser positivo para los puntos 3, 4 y 10. El 3 por un tema de acceso porque queda más cerca, el ir a la posta, al consultorio, etc. El 4 también por un tema de acceso a la educación, a lo mejor el niño que vivía lejos no iba por su lejanía y si viven cerca de la ciudad van a ir a lo mejor. El 10, por esto mismo, te deja más a disposición de los servicios, tienen los servicios más a la mano y de manera más oportuna.”
“De manera negativa a lo mejor el 8 y el 10. El 8 en el sentido de que cambiar tu actividad productiva (con lo que te ganas la vida) de algo que es estable, duradero, que está basado en un bien raíz, a cambiarlo por ejemplo por un trabajo asalariado puede implicar un riesgo. De lo mismo que estábamos hablando, si la industria se va y a mí me capacitaron para plantar árboles quede sin opciones. En cambio, si tu tenías tu tierra y tus cultivos no te ibas a hacer millonario o ibas a tener una renta mucho menor, pero era algo propio y estable. En el caso del 10, lo mismo porque tu estas entregando bienes raíces a grandes empresas y eso aumenta la desigualdad.”

Silvicultural practices (forest fires) "Con el 1 por ejemplo, porque evidentemente que se te queme tu casa o tus cosas en general, te vuelve a una situación de pobreza y si el tema es permanente o sostenido en la comunidad peor todavía porque significa que las personas no puedan surgir básicamente. Es una piedra en el camino para que la gente surja. El 3 porque los riesgos vitales que ello conlleva, te puedes morir quemado o intoxicado por el humo. El 8 porque cualquier incendio forestal implica que hay que gastar para poder recuperar, a lo mejor va a generar un incentivo a la mano de obra en esa comunidad, pero en el fondo estas gastando recursos públicos para poder compensar los daños de la industria. Eso no contribuye porque esos mismos recursos públicos se podrían usar para otras cosas que les permiten desarrollarse más sin tener que estar supliendo necesidades básicas. El 10 porque la gente que se ve más menoscabada son las personas que tienen menos recursos, tienen menos posibilidades de salir adelante en condiciones de este tipo versus los que sí tienen. El 15 y el 13 porque bueno el incendio en general no discrimina, sino que arrasa con todo, incluido lo que es el subsuelo, lo que es el aire y lo que son los bosques que pueden ser de otro tipo. También los incendios te elevan las emanaciones de contaminación y todas esas cosas.”

Social investment “Pero si va a contribuir si la empresa desarrolla acciones que permitan mejorar la calificación de las personas o que presten ayuda a sus emprendimientos o que haya una alianza con el sector público para generar una nueva industria. Son cosas de mirada a más largo plazo, más estable.”

Source: Author’s elaboration.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Opinion</th>
<th>SDGs</th>
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</thead>
<tbody>
<tr>
<td>Employment</td>
<td>&quot;Esto afecta al objetivo 1, que tiene que ver con el fin de la pobreza porque en la medida que la empresa no les garantiza un trabajo adecuado la comunidades rurales siguen viviendo en situación de pobreza.&quot;</td>
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<tr>
<td>Employment</td>
<td>“También impacta al 2 que es el tema del hambre, salud y bienestar, por la misma razón porque es lo básico que necesitan las familias para poder vivir de manera medianamente adecuada, es tener un empleo digno y con una renta apropiada que permita satisfacer al menos lo básico.”</td>
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<td>Employment</td>
<td>“También con el tema del 10 que es la reducción de las desigualdades, mientras tengamos gente sin un trabajo decente que es el 8, sin ingresos apropiados, vamos a tener desigualdad, vamos a tener menor crecimiento económico, vamos a seguir teniendo pobreza, hambre, dificultades para acceder a la salud, para acceder a la educación en Chile y ahí tocamos el 4.”</td>
<td>3, 4, 8, 10</td>
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<tr>
<td>Employment</td>
<td>“Entonces es esencial que las empresas den trabajo digno y apropiado en términos de renta a las personas que viven en el sector, si es que van a operar en ese sector y van a estar teniendo utilidades en ese sector.”</td>
<td>8</td>
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<tr>
<td>Land use change from agriculture to plantations</td>
<td>“en términos negativos en la medida que implique que las personas que antes trabajaban la tierra para producir y tenían cierta independencia y lograr recursos a partir de esta producción, ahora tienen menos espacio para producir, han sido invadidos por otros desde la empresa y por lo tanto van a ir cayendo en situación de pobreza. Con eso van a afectar a los mismos objetivos que se aplicaban con la primera pregunta.”</td>
<td>1, 2, 3, 4, 6, 8, 10</td>
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<td>Land use change from unused land to plantations</td>
<td>“Pero por otra parte efectivamente que la empresa use un terreno que antes no tenía ninguna utilidad va a contribuir al logro de objetivos de desarrollo sostenible, pero solo en la medida que este uso de la tierra que antes no estaba implique que de verdad les van a dar trabajo digno y bien remunerado a las personas que viven en el sector.”</td>
<td>8</td>
</tr>
<tr>
<td>Land used change from natural cover to plantations</td>
<td>“Ahora hay otro impacto negativo del cambio del uso de los suelos que tiene que ver con el objetivo 15 que es la vida de los ecosistemas terrestres.”</td>
<td>15</td>
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<tr>
<td>Land used change from agriculture and natural cover to plantations</td>
<td>“Con el objetivo 16 que tiene que ver con la paz, justicia e instituciones sólidas y con el objetivo 11 que son las ciudades y comunidades sostenibles. ¿Por qué el 16?, porque en la medida que la empresa pasa a ser una amenaza que agrede directa o indirectamente o daña a la gente que vive en el sector, eso genera resentimiento social y genera conflicto entre la empresa y las comunas, y te lleva a problemas tan graves como lo que ocurre por ejemplo en el sector forestal con los mapuches en la novena región. Entonces de ahí es que el tema de que se afecta la paz. El objetivo 11, ciudades y comunidades sostenibles, lo mismo. Para que una ciudad o una comunidad sea sostenible tiene que haber una interacción saludable entre todas las personas y grupos que cohabitan, y si uno de los grupos, en este caso la empresa quita a la gente de las comunidades lo que antes tenía y no retribuye, eso entonces va a hacer que la ciudad termine o el campo o el sector que sea termine no siendo sostenible.”</td>
<td>11, 16</td>
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<td>Land used change from natural cover to plantations</td>
<td>“El 17 por el mismo tema, en la medida que se afecte el capital social no se pueden llegar a establecer las alianzas que se necesitan para lograr los objetivos porque no hay una buena interacción entre los distintos grupos y por lo tanto no va a haber colaboración y cooperación entre los distintos grupos.”</td>
<td>17</td>
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<tr>
<td>Productive process</td>
<td>“El 12, producción y consumo responsable. El 11, ciudades y comunidades sostenibles. El 10, reducción de las desigualdades. El 15, ecosistemas terrestres, por el tema de la contaminación. Y desde mi lógica debiera afectar también el 16 y el 17.”</td>
<td>10, 11, 12, 15, 16, 17</td>
</tr>
<tr>
<td>Productive processes</td>
<td>“El 17 por lo mismo, aquí estamos pensando de que un grupo o stakeholders o como les queramos llamar, un grupo dentro de una comunidad está haciendo las cosas de manera que está contaminando el aire, el agua y el suelo, que debiera ser un bien común, lo necesitan todos los grupos, todas las comunidades.”</td>
<td>17</td>
</tr>
<tr>
<td>Productive processes</td>
<td>“Tenemos también que un grupo para su accionar está poniendo camiones que circulan regularmente, que son pesados, que deterioran los caminos por lo tanto afectan a la conectividad, que además van a afectar la salud mental de las personas porque les genera dificultades para moverse, para ir de un lado para el otro y además les genera ruidos que son inadecuados. La reacción natural del común de las personas es que si tú tienes un socio que está haciendo todo eso, no vas a tener ningún interés de relacionarte con ese socio y trabajar con el, al contrario lo que surge es la presión producto de la frustración que generan con su accionar.”</td>
<td>3, 9</td>
</tr>
<tr>
<td>Rural-urban migration</td>
<td>“Desde mi perspectiva la única razón que lleva a que sea adecuado que las personas se desarraigan o que salgan del lugar donde viven, donde tienen armado su mundo, su vida, es que efectivamente al traspasarse del sector rural al urbano tengan oportunidades reales y tengan un nivel de ingreso que les permita acceder a lo que hay en el sector urbano, que en general tiende a ser más caro que lo que hay en el sector rural. Entonces, si las empresas que están en el sector urbano tienen incentivos para que la gente del sector rural se vaya hacia allá y esos incentivos son reales, perfecto, yo creo que puede ser de utilidad para ellos y no va a haber ningún inconveniente desde el punto de vista de su calidad de vida. Pero si este traslado del sector rural al urbano es en malas condiciones, va a generar un montón de problemas de adaptación por una parte y de calidad de vida en general por otro.”</td>
<td>1, 3</td>
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<tr>
<td>Rural-urban migration</td>
<td>“Ahora si se da el caso de que la migración de rural a urbano se debe fundamentalmente en que las empresas que operan en el sector rural están llevando a su gente para allá y no hay oportunidades laborales en el sector rural, y esto haga que la gente se vaya al sector urbano, va a darle por lo menos una posibilidad de acceder a trabajo y pasaría a ser positivo, pero si no logran, igualmente que, en el caso anterior de estar en condiciones adecuadas, va a generar impactos muy negativos. Porque desarranigan a la gente, que está acostumbrada y la llevan a armar una vida nueva, pero con condiciones que no son adecuadas. El traslado de rural a urbano, según las condiciones en que se dé puede perpetuar la pobreza y aumentar la pobreza de la gente que era del sector rural. Puede apuntar al objetivo 2 que es el hambre cero, pero depende de las condiciones en que se de la migración rural a lo urbano. Podría afectar el 3, salud y bienestar. Podría afectar el trabajo decente (8). La reducción de las desigualdades que es el 10. El 11, ciudades y comunidades sostenibles, que eso también está demostrado. El 16 y el 17 nuevamente, estos por las mismas razones anteriores.”</td>
<td>1, 2, 3, 8, 10, 11, 16, 17</td>
</tr>
<tr>
<td>Silvicultural practices</td>
<td>“Primero el 12, producción y consumo responsable, porque evidentemente el generar todos estos impactos habla de una tremenda irresponsabilidad. Lo mismo que te contaba antes, si uno de los convivientes del sector actúa de esa manera y con eso afecta a otro eso hace que la ciudad y las comunidades no sean sostenibles, aquí está el 11. Eso hace que estén en permanente situación de desigualdad, por lo tanto, afecta al 10. Va a afectar al 16 y al 17 por una parte porque se genera un clima que no es de paz y no es de justicia y eso impide que haya una alianza para lograr objetivos. Afecta directamente al tema 6 que es el agua limpia y saneamiento, y no sé si dará para afectar la vida submarina. La vida de los ecosistemas terrestres por supuesto, sí están dañando los conejos se está dañando el ecosistema. Contribuye también a la pobreza, en la medida que no hay grandes beneficios para la gente que vive ahí y al contrario se queda en situación de desmedro para vivir. En la falta de mantención a las plantaciones, va a afectar el 3, salud y bienestar. (¿Crees que el efecto es mayor a la gente en pobreza?) Por supuesto, supone que un incendio forestal, esa gente se queda en cero y están expuestos regularmente a eso.”</td>
<td>1, 2, 3, 6, 8, 10, 11, 12, 14, 15, 16, 17</td>
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</table>
### Social investment

**Provision of plantations woods** “No afecta en nada. Yo creo que eso es mínimo comparado con el daño que hacen y si me preguntas a mí que te permitan sacar leña y sacar hongos no va a minimizar los impactos negativos que están generando. Entonces la verdad es que eso vale cero a los ojos de esta especialista...Mantengo mi postura que no sirve para nada, porque hay una situación de inequidad espantosa y si la gente vive en una situación tan desmedrada para que las mujeres solo puedan dedicarse a recoger hongos para poder sobrevivir es que la empresa no está contribuyendo, no está retribuyendo y no se está haciendo cargo ni siquiera en parte de los problemas sociales. Yo esperaría que una empresa que trabaja en el sector forestal con todos los recursos que genera, invierta en dar una educación de calidad a la población, en contribuir a mejorar la salud de la población, y en dar trabajo digno y bien remunerado.”

### Social investment

**Education and training** “Si esta formación que dan permite tener un trabajo decente, contribuiría al objetivo 8 y eso para por que la calidad de los cursos que hagan realmente den oportunidades para tener un trabajo decente. También podría ayudar en el 10 a disminuir las desigualdades, siempre y cuando sean cursos efectivos. Insisto que ayuden, no cursos en actividades relativamente superficiales que más que nada van a tener a la gente entretenida y ocupada pero que no van a traer grandes aportes a sí mismos ni tampoco al desarrollo local, ni tampoco al desarrollo del país. Mientras estos cursos no sean para aumentar la producción del país, para aumentar la productividad de esas personas, o sea que ellos sientan que están produciendo a través de los cursos y para mejorar la calidad de vida, entonces el aporte que hacen es solo a tener a la gente ocupada y entretenida un rato durante el día.”

### Social investment

**Financial support for local fairs** “Eso podría ayudarles a vender lo que tengan. Mira si por ejemplo en relación al 5, lo que están haciendo es darles plata para que participen en la feria y las mujeres puedan vender sus productos podrían estar contribuyendo a la igualdad de género siempre que los hombres de ese sector tengan trabajo. Porque si el hombre no tiene trabajo no es igualdad de género que las mujeres tienen. Entonces el que les den acceso a estas ferias sea un aporte va a depender del contexto en que sea y que las condiciones reales que se den. También podría ayudar en el 12, producción y consumo responsable, de alguna manera están aportando a que otros también produzcan. Podrían contribuir al 8 al dar un trabajo decente, pero eso es relativo, porque lo que ellos están haciendo es permitirles que vayan a vender su trabajo, entonces no ayuda a eso.”

Source: Author's elaboration.
Table I. 3: Summary of comments given by Expert 1 on the impact of the forestry sector on community SDGs (2: positive, 1: variable, 0: negative).

<table>
<thead>
<tr>
<th>Expert 1</th>
<th>Employment</th>
<th>Land use change from agriculture to plantations</th>
<th>Land use change from unused land to plantations</th>
<th>Land use change from natural cover to plantations</th>
<th>Productive process</th>
<th>Rural-urban migration</th>
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<th>Social investment</th>
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Source: Author’s elaboration.
Table I. 4: Summary of comments given by Expert 2 on the impact of the forestry sector on community SDGs (2: positive, 1: variable, 0: negative).

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Source: Author’s elaboration.