The Forests Dialogue
***TREE PLANTATIONS IN THE LANDSCAPE* INITIATIVE**
CHILE FIELD DIALOGUE
31 May – 3 June 2016 – Temuco, Chile

BACKGROUND PAPER

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1. Introduction: setting the context

The Forests Dialogue's Scoping Dialogue on Intensively Managed Planted Forests (IMPF) (September 2015, Durban, South Africa) agreed to convene a series of field dialogues to discuss key issues associated with tree plantations, as a particular form of planted forests. The dialogue series was renamed *Tree Plantations in the Landscape* (TPL) to emphasise its focus, and the landscape context of tree plantations. The Chile TPL Dialogue is the first in this series, and focuses on the unique context and experience of Chile.

The Durban Scoping Dialogue agreed on five priority areas for future dialogue about tree plantations [1] (Box 1). Scoping Dialogue participants noted that the particular mix and emphasis of priorities discussed at each field dialogue would depend on its context.

Box 1. Priority topic areas for any future dialogue about tree plantations

1. Plantation forests in the context of the global development agenda (as represented, for example, by the Sustainable Development Goals) & megatrends, and in the contexts of development at multiple scales, from global to local. This topic would also include consideration of:
    - the definition and scope of plantation forests and 'IMPF', and associated data and reporting issues;
    - articulation of a shared vision for the roles of plantation forests.

2. The design and implementation of plantation forests in the context of a landscape approach, and at different scales & geographies. This topic includes consideration of approaches to landscape-scale integration of forestry & agriculture, and of meeting multiple demands from and through sustainable productive landscapes. It also includes exploration of the contribution of plantation forests and planted trees of other forms to landscape restoration.

3. Approaches to enable good governance and inclusive development, including (but not limited to):
    - recognition of rights holders in decision processes;
    - implementation of the principle of Free, Prior and Informed Consent;
    - exploration of how different models of plantation forest development can act as models for inclusive development and locally-controlled forestry;
    - exploration of the complementary and synergistic roles of key actor groups (e.g. governments, financiers, businesses, consumers);
    - promoting of the flow of information between stakeholders and across scales.

4. Identifying key externalities associated with the development and management of plantation forests, from the perspectives of multiple stakeholders; identifying gaps in knowledge; and considering the net impacts and externalities of plantation forestry as key decision criteria. This topic would also consider the definition and assessment of environmental and social services associated with models of plantation forestry, and how they might be monitored.

5. The diversification of the forms and species composition of plantation forests, the sustainability of plantation forestry systems, and access to and use of new technologies.

Source: TFD IMPF2 Scoping Dialogue, Co-Chairs' Summary Report[2].

The Background Paper for the IMPF2 Scoping Dialogue[3] also noted other relevant initiatives related to tree plantationsthat informed that dialogue, and are also relevant here. Those with a global focus are shown in Box 2.

Box 2. Other global-scale initiatives relevant to TPL

- Global initiatives such as the New Generation Plantations Platform (NGPP)[4] managed by WWF international, the International Union of Forest Research Organizations (IUFRO)[5]; and some civil society groups[6]: Forests Peoples Programme, Global Justice Ecology Project, and the World Rainforest Movement;
- The 3rd International Congress on Planted Forests;[7]
- Related TFD past initiatives[8], including those on Free, Prior and Informed Consent (FPIC); Food, Fuel, Fibre and Forests (4Fs); Understanding Deforestation-Free (UDF); Genetically Modified Trees (GMT); Investing in Locally Controlled Forestry (ILCF); and Forest Certification;
- The FAO's statement of principles and voluntary guidelines on planted forests;[9]
- The 2015 Sustainable Development Goals (SDG) based on the Millennium Development Goals (MDG), most of which consider forests as key components to achieve a global sustainable development;[10]

In the Chilean context[11], there are a number of initiatives relevant to TPL. These include the National Forest Dialogue (DFN) (focused on tree plantations in the landscape), ProgramaBosques (led by WWF Chile), CODEFF (Corporation for theDefence of Flora and Fauna),Ética en los Bosques, DAS Temuco (managed by the Archbishop of Temuco), and the NGP Chile 2013 Study Tour and 2015 Encounter[12]. These are discussed later in the paper, as appropriate.

The purpose of the Chile's TPL Field Dialogue is to explore the perspectives of the spectrum of stakeholders on issues associated with tree plantations in context of Chile, and how these plantations might better contribute to sustainability goals. This purpose has been translated into a number of specific objectives (Box 3).

Box 3 Objectives for the Chile's TPL Field Dialogue.

1. Incorporate experiences from Chile in the international arena to add to discussions on key themes, such as landscapes, land use, local development and impact mitigation.
2. Understand a participatory methodology for discussion and collaborative work that allows groups with distinct interests and objectives advance toward a common vision, while also representing their diverse interests.
3. Have the opportunity to share visions of how the tree plantation sector contributes to the development of sustainability challenges.
4. Explore diverse forms of coexistence for diverse, productive, recreational and cultural activities and land uses.
5. Share experiences on the prevention, mitigation, and management of impacts from the tree plantation sector.

This Background Paper is supports the Chilean TPL dialogue by providing contextsfor tree plantations in Chileand the forest industry based on these plantations; their governance; major issues associated with these plantations, and thus "fracture lines"[13] and possible issues of focus for dialogue; some of the main challenges for the Chile TPL Field Dialogue initiative; and topics that might be explored in the context of the Field Dialogue objectives.

The Durban IMPF2 Scoping Dialogue preceded the XIV World Forestry Congress[14] and the parallel Civil Society Alternative Programme (CSAP).[15] One of the issues raised at the both the Scoping Dialogue and CSAP was that of the definition of "plantation forests" (Box 1 above, point 1). This issue is discussed further in Annex 1.

2. Tree plantations in Chile

2.1 Chile

The Republic of Chile is a stable democracyin the South American continent, which is politically and administratively organized as a unitary state. The country's economy is mainly based on natural resources with no further processing[16]. Chile embraces a free-market economic model, and due to its sustained economic growth in the last decades, sound macroeconomic policies and numerous international trade agreements has reduced poverty, increased income per capita, and ranks very high in its human development index[17](although income inequality remains relatively high when compared with other OECD countries). Notwithstanding that the World Bank classified Chile as a high-income country[18] and corruption index remainsrelatively low[19], the country is still considered as an "emerging economy" since is not fully developed in many aspects, challenging classical distinctions between "developed" and "developing" countries.

According to some 2015 estimates[20]Chile's populationtotalizes some 18,006,407 million people, who are mostly concentrated oncentral regions (around Santiago capital city), centralizing most of the available lands for households, commerce, industries and associated services. As of 2015 total country GDP totalizedaround US$ 238 billion[21]and the nominal GDP per capita some US$ 17,047.[22]

2.2 The landscape and land use context

Geographically, Chile is like a long narrow strip of land of around 750,000 km2, with a wide variety of climates and landscapes: arid deserts such as the Atacamain the north, bush lands in central regions, and temperate forests of Patagonia and Tierra del Fuego in the south. The country is characterized by a dividing mountain range on the east, which is known as the Andes Mountains that constitute a natural border with Argentina. To the west, the natural border is the Pacific Ocean. Those landscapes thus determine diverse land uses: while mining is concentrated north to Santiago, forestry, agriculture and fisheries are mainly concentrated in the south. Figure 1 shows the main land uses/types of the country.

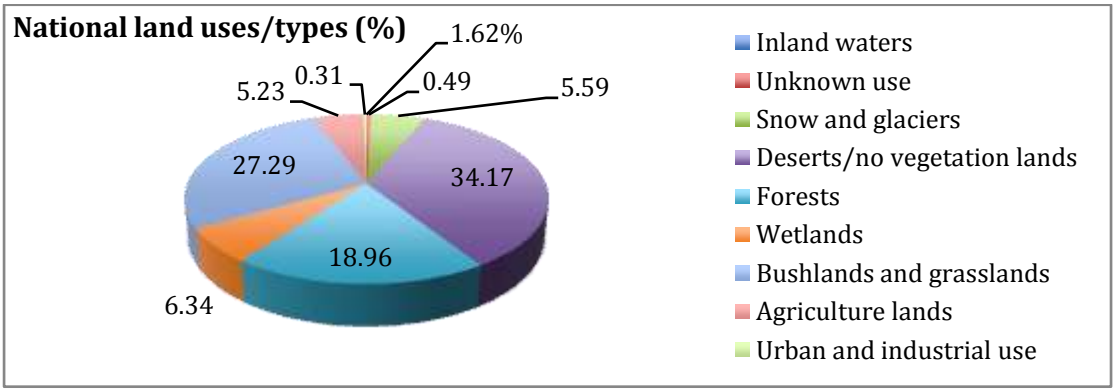

Figure 1. Total land uses/types of Chile's available land area (756,096 km^2). Source: Vidal and Santibañez 2014.[23]

Forests comprise 19% of total Chilean land area. Tree plantations are concentrated in southern Chile, between the O'Higgins and Los Lagos regions (a 'region' is the major administrative division in Chile).[24] Forestry usually coexists with agricultural land uses includinglivestock farming, fish farming (freshwater cycle), diverse food industries, rural and indigenous settlements, urban developments,and conservation uses (national parks and nature reserves).Forest types and ownership are categorised as in Table 1.

Table 1. Chilean forest areas by type and ownership

Forest ownership, type andarea (ha)[25]		
Owner type[26]	Native forests	Plantation forests (net area)[27]
Large Small and medium-sized	2,000,000 (33%)[28] 4,000,000 (67%)[29]	1,540,912 (63%) 904,980 (37%)
Public ownership	7,424,000 ha in the SNASPE[30]	1,700
Total	13,424,000[31]	2,447,592

Table 1Chilean forest ownership by forest type and size.Source: modified from Leyton (2009) and updated data provided by INFOR (2015b).[32]

As evident from Table 1, native forests comprise most (84.5% by area) of Chile's forests, and are constituted by a diversity of species, particularly in *Nothofagus*temperate forests. They are unique in terms of biodiversity, with high levels of endemism. Additionally, they provide significant cultural (e.g. ceremonial, medicinal and religious uses) and economic values (e.g. firewood andnon-timber forest products – NTFPs) to local communities and Indigenous peoples who depend on them for their livelihoods.[33]

In terms of land tenure and forest ownership, plantation forests for commercial purposes are almost exclusively owned by private enterprises: most of them (circa 63%) are owned by large and vertically integrated multinational corporations[34] (accounting for some 1.5 million hectares), leaving a minority of tree plantations owned by small and medium-sized forestry businesses (circa 37%)[35]. In contrast, most individual small/medium-sized forestry businesses own forestlands that not exceed 60,000 hectares each.[36] As apparent, large forestry businesses are usually better resourced and more technologically/organizationally sophisticated than small and medium-sized forest owners. All Chilean forest owners also hold legal rights over land tenure. There are no forest concessions in Chile: all forestlands are titled lands.

Plantation forestry businesses – both large and small/medium-size enterprises – also own significant portions of natural ecosystems and native forests within their estates, as well as overlapping with many cultural sites for Indigenous peoples. For example, some of the largest Chilean plantation forestry businesses also own some 600,000 hectares of natural ecosystems[37], including forests, within their plantation estates.These natural ecosystems represent up to 28% of the forest area owned by large forestry businesses, helping to meet important conservation goals for both biodiversity and ecosystem management.

2.3 Tree plantations in Chile – brief history and current status

The large-scale establishment of tree plantations in Chile was precipitated by the enactment of the decree law 701 (DL 701) in 1974 (see Section 4), during the first years of Augusto Pinochet's military regime. Originally, the law was intended to encourage afforestation in soils that had been damaged by unsustainable agricultural practices in southern and south-central Chilean regions. This goal was largely achieved, resulting in an exponential growth of tree plantations. Such an expansion transformed the country and the forestry sector: from c. 83,000 of new hectares of tree plantations (totalizing c. 300,000 ha)[38]added during 1975, plantation extent increased to c. 2.4 million ha in 2013.[39]

The total extent of tree plantations in Chile is now 2,447,592 ha:*Pinusradiata* plantations comprise 60%, y *Eucalyptus globulus* (23%) and *Eucalyptus nitens* (10%) (Figure 2)[40]. Other species, viz. Atriplex spp., Ponderosa pine and Douglas-fir comprise the majority (4%) of the "other" tree plantations. These tree plantations are predominantly concentrated in central and south-central regions of Chile (see Figure 4): 77 percent of tree plantations are concentrated in the three regions of Biobío (38%), Araucanía (20%) and Maule (19%).[41]Within these regions, when tree plantations cover more than 50%of the total land area of a commune (Chile's smallest administrative division), such a commune is usually called a "forestry commune",reflecting the significance of forestryas an economic activity.[42]

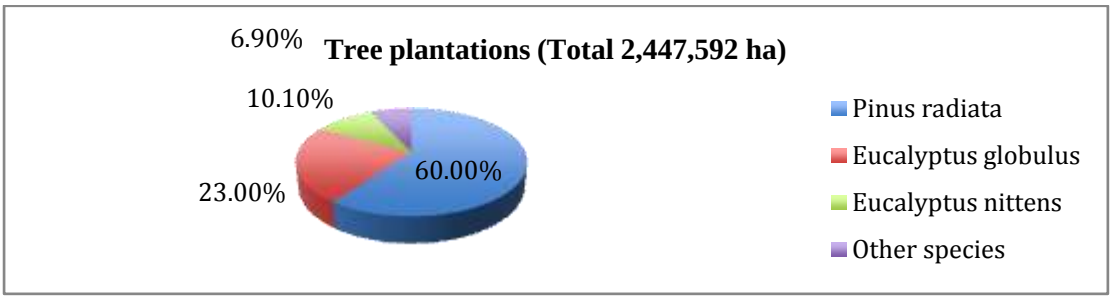

Figure 2. Main tree plantation species in Chile. Source: INFOR.

There is a trend of increasing forest exports from Chile[43]. Despite a modest economic growth of the country during the last two years and a recent drop in timber prices, since 2014 the tree plantation industry exported more thanUS$ 6,000 million of forest products as total exported sales (see Figure 3).This representedaround 8.1% of total Chilean exports, and contributed with some US$ 4,829million to the national gross domestic product(GDP), in 2014[44]. The main exported forest products have been (2014 INFOR data)chemical pulpwood (US$ 2,902.9 million), followed by sawn wood (US$ 709.3 million), wood panels and veneers (US$ 577.2 million), wood mouldings (US$ 458 million), and planed wood (US$ 208.1 million). It is noteworthy that there is also a small (not exceeding US$ 100 million) – but relatively important – international market for non-timber forest products (NTFP).

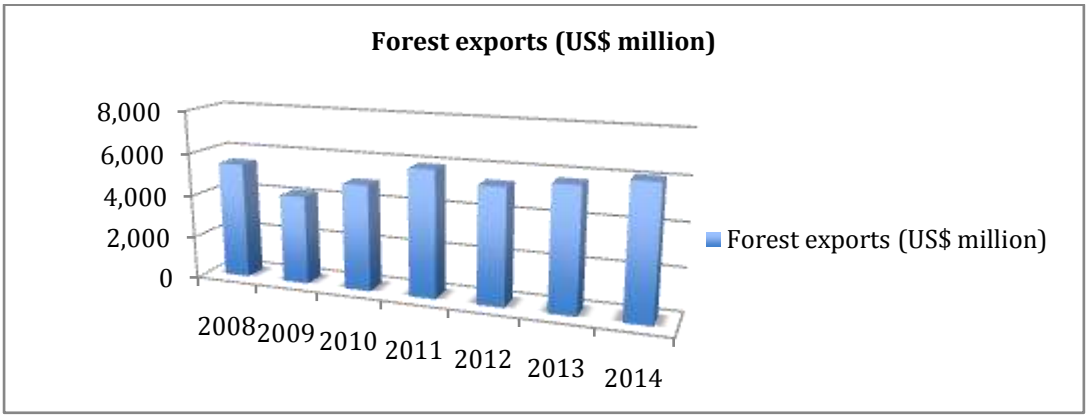

Figure 3. Chilean forest exports in US$ million. Source: INFOR.

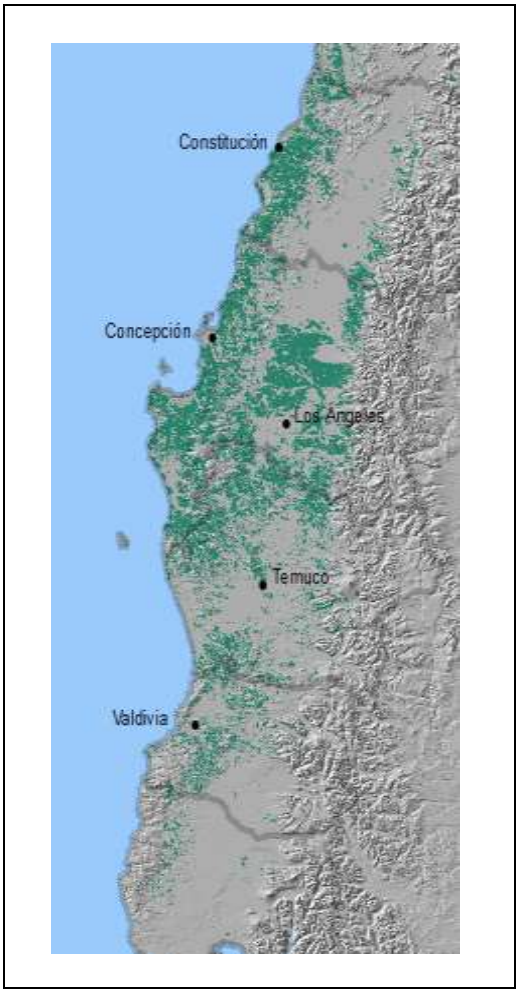

Figure 4. Main extent of tree plantations (shaded green) in Chile. The cities of Constitución (in the Maule region), Concepcion and Los Angeles (in the Biobío region), Temuco (in the Araucanía region) and Valdivia (in Los Ríos region) are shown.Immediately next to them are the O'Higgins and Los Lagos regions, further north and south, respectively.Source: CONAF.

2.4 The Chilean forestry sector

The Chilean forestry sector is the third largest export sector of the country after the mining and agriculture/food industry.[45] This sector is almost exclusively based on exotic tree plantations, as outlined above: they are considered, along with Brazil's tree plantations, one of most productive plantation estates in the world.[46] International markets –US$ 6,094 million FOBin 2014 – for Chilean forest products include, in order, China (23.6%), US (13.5%), Japan (7.8%), South Korea (5.9%), the Netherlands (5.6%), Mexico (5.1%), Peru (3.9%), Italy (3.3%), Taiwan (3.2%) and a mix of "other" countries (28.2%). The Chilean share of global roundwood and pulpwood production, its main exports, is around 2.2 and 3%, respectively.[47]

Over the last decade, the domestic markethas also driven a significant increase in the consumption of forest products. Although it is hard to make comparisons between different forest products obtained from those 42.6 million m^3 of roundwood yielded in 2014[48], most pulpwood (viz. 87% of pine and 93% of eucalypt pulpwood) and eucalypt wood chips (83%) are exported, while most sawnwood is consumed by the domestic market (viz. 63% of pine and 99% of eucalypts sawnwood); both hardwood and softwood species supply these products. INFOR reported that US$ 1,394 million of forest products were imported in 2014 including paper, paperboard, furniture, construction lumber, manufacture goods and wood

panels as the main ones.Although it is hard to provide a global figure, important amounts of timber in Chile are not only used as fibre source for diverse uses but also as biomass (975 MWfor electricity areobtained from tree plantations[49]) and biofuel (527,000 $m^3$for residential use, mostly from native forests)[50] sources, replacing the use of native tree species in many cases (at least 37% of biofuel consumption come from plantations[51]). The largest forestry corporations have made substantial progress towards energy self-sufficiency by using biomass as their main energy sources; today some of them are even providing energy to the "Central Interconnected System"[52], a Chilean energy system that supplies energy both to households and industry.

In brief, despite a recent slowdown in Chilean exports, tree plantations in Chile continue to be an economically successful sector that contributes significantlyto the national GDP (nearly 5%), in terms of exports and domestic wood processing industry,[53] as well as helpingdiversify Chilean exports – after the overwhelming contribution of the mining sector. This forestry sector also provides a significant number of direct and indirect jobs (estimated at 300,000), as discussed in Section 4.1.But notwithstanding a trend towards an increase in the consumption of forest products – both from domestic and international markets – there are constraints to further expansion of the plantation forestry sector, as discussed in the next sections.

3. Forest governance

3.1 State forest governance

Forest policies and regulatoryframework:

The principal legal instruments that govern tree plantations in Chile are summarized in Table 2.

Table 2. Principal legal instruments governing tree plantations in Chile

Legal instrument (dates)	**Summary**
Decree 2374 (1937 – present)	This was the first regulation in setting the requirements that forest operations must meet in order to protect watercourses and riparian buffer zones (establishing specific buffer zone widths), particularly on slope and certain forests types. This regulation was not originally intended to be applied in plantation forests.
Decree Law 701 (DL 701) (1974 – 2012)	This is also known as "the law of forest development" and is the landmark for the massive afforestation with exotic tree plantations in Chile. This law promoted the participation of private actors in the forestry economy by offering subsides (covering 75% of afforestation costs) and tax exemptions to set tree plantations on eroded soils. Due to the concentration of land property and tree plantations in only a handful of large forest companies, in 1998 the law was modified to subside small plantation forest owners. However, as of 2012 the law expired, and tree plantations are still concentrated inlarge forestry businesses;subsides are no longer available despite some recent attempts to extend them.
Decree No 259 (1980 – present)	This regulation specified how the DL 701 ought to operate, viz.what soil types could be afforested and the technical requirements of forest management plans. Additionally, it set general forest management requirementsfor native forest types; it also allowed reforestation of native forests with exotic tree species (but subject to the approval of the National Forest Corporation). Successive modifications of this decree and other regulations have explicitly prohibited the conversion of native forests to tree plantations.

1994 General Environmental Law (19300, modified by law 20417 in 2010) and their associated decrees (1994 – present)	The General Environmental Law set a precedent for the industry since all forest operations (located in central and south-central regions, that is, where tree plantations are concentrated) exceeding 500 hectares of clear-cuts per annumrequired an environmental impact assessment (EIA). Successive decrees (no 30, no 95, and the last one, no 40) have established how these EIAs must be performed.As most tree plantation forests had expanded before 1994, progressive increases of forest cover were in practice regulated by CONAF and then by forest management plans as requested by the authority thereof (provided that they were established on eroded soils with "forest aptitude"). Before the rise of forest certification in the early 2000s, EIAs were the only way by which local governance through decision-making processes at the municipal level addressed both forestry and sustainable forest management (SFM) issues.
Decree No 193 (1998 – present)	This regulation specified the operation of the DL 701 and updated and upgraded some of the requirements contained in the decree No 259. It provided some useful definitions and requirements for landowners to qualify their lands as "poor soils to be afforested" and, thus, to be eligible to access afforestation subsides as set in the DL 701 (which are now no longer available). This decree also made compulsory the implementation of forest management plans; however, this was only compulsory on afforested lands covered by state subsides, not in the case of tree plantations established on soils with no "forest aptitude".
Law No 20283 –law of native forests (2008 – present)	Although the aim of this law was to promote sustainable forest management of native forests through subsides, some large plantation forestry companies have adopted some of their recommendations concerning buffer zone widths, as we will see below.

Key state actors

The two government agencies most relevant for Chilean forestry are the National Forest Corporation (CONAF) and Forest Institute (INFOR).

National Forest Corporation (CONAF): The National Forest Corporation was established in 1973. According to its 2014 corporate report, "CONAF's main tasks are to administer the forest policy, promote the development of the forest industry and protect the natural resources and cultural heritage of the country".[54]CONAF has three strategic objectives directed at the sustainable use of forest resources, the protection of forest ecosystems, and the efficient administration of the SNASPE (National System of Protected Wild Areas by the State), all aimed to enhance environmental, social and economic benefits from forests. CONAF is the forest agency responsible for enforcing the state forestry laws and regulations.

The current status of CONAF as a "corporation" poses significant challenges for its role in forest governance. There have been numerous initiatives to modify its status from "corporation", withmodest enforcement and sanctioningpowers, to the status of "Service", i.e. becoming a "National Forest Service". However, the last attempt to do this in 2011 failed, arguably due to the lack of consensus between the two most important political coalitions.

The Forest Institute (INFOR): This institute was created in 1965 by the Chilean state. The functions of this institution include research on diverse forest industry issues, and provision oftechnical information to support decision-making processes for the forestry sector (planted and natural forests) at public and private industry level - including smallholders.

INFOR pioneered research on exotic tree species between 1960s and 1980s[55], and as of 1974 such efforts led to the massive introduction of pine and eucalypts plantations in central south-central Chilean regions.

Twoother public institutions with relevant roles in forestry are the Agriculture and Livestock Service (SAG) and the Directorate of Labor. SAG enforces laws and regulations concerning the use of chemical products (chiefly, fertilizers and pesticides) on forest operations, sanitary protection of forest resources, and inspection of forest exports. The Directorate of Labor enforces labor and occupational lawsconcerning the welfare of forestry workers.

A "Council for a Forest Policy" was established in 2015[56] by the Ministry of Agriculture, in an effort to overcome the forest governance failures discussed below, and provide an appropriate framework for the sustainable management of forest resources (including natural and plantation forests). To date, the council has drawn up a draft for the next 20 years (2015 – 2035) by soliciting different views[57] (viz. forestry workers, forestry companies, small and medium-sized forest owners, contractors, researchers, NGOs, local communities, peasants, and indigenous groups), and seeking a consensus among key actors in forest governance on topics such as productivity, environmental issues, land tenure, labor relations, and inclusion of small landowners in the afforestation model based on tree plantations.

Commentary on policy framework

As evident from Table 2, forest policies for tree plantations have been focused on promoting plantation-based economic development and the rehabilitation of degraded sites. Only relatively recently have public policies focused on providing afforestation subsides for smallholders to offset the concentration of forest ownership in large firms. However, as DL 701 – which was the principal vehicle for these subsidies - is no longer available, such an expansion of smallholder ownership is unlikely in the short term, and so the potential of tree plantations in rehabilitating sites where they might deliver protective functions –estimated to be some 1,000,000 hectaresin the central regions of O'Higgins and Maule[58]and at least 2.6 million ha at the national level[59]– is unlikely to be realized.

The second aspect of state forest governance in which institutional capacity and resources have been lacking is to enforce and monitor forestry practices, particularly for small and medium-sized forestry businesses[60]. Furthermore, there is a lack of regulations directed specifically at forestry practices in tree plantations; instead, some laws and regulations originally intended to address native forest management issues have been "adapted" to plantation forestry.

A third issue of state governance is that it has been unable to address effectively some of negative consequences associated with Chilean afforestation model. A deficient regulatory framework and CONAF's modest enforcement and monitoring capabilities have contributed to inadequate environmental regulation and management. In the social context, the absence of proper policies to ensure all stakeholders share in the benefits– not only the costs – of tree plantations have led to a multiplication of conflicts.[61]

3.2 Non-state forest governance

Due to the failure of state governance to address many of the negative consequences associated with tree plantation expansion, some multi-centric and non-state forms of forest governance have emerged in Chile, particularly during the last decade, as outlined below.

3.2.1 Forest certification

Two forest certification schemes operate in Chile: the Forest Stewardship Council (FSC) and the Chilean System of Forest Certification (CERTFOR), which is associated with the international Program for the Endorsement of Forest Certification (PEFC).

The first attempts to introduce the FSC in Chile emerged during the late 1990s due to environmental concerns, particularly from some NGOs, about the clearing of native forests to allow the establishment of commercial tree plantations. However, by 2001, only two plantation forestry companies certified their operations under the FSC standard; in contrast, the biggest plantation forestry businesses of the country decided instead, with the support of some government agencies, to create their own PEFC-endorsed forestry scheme, CERTFOR, in 2002.[62] Previously, those forest corporations, pressured by the NGO *Forest Ethics*, had agreed to not log their own native forests.[63] Ultimately, and pressured by international market forces, the biggest forest corporations decided to adopt the FSC scheme in 2009. Now, more than 1.9 million hectares[64] are certified under CERTFOR (only plantation forests) and 2.3 million hectares[65] under the FSC (most are plantation forests, including small, medium-sized and large forest owners).The 1.9 million ha of tree plantations certified under CERTFOR are now also certified under FSC.

Both forest certification schemes, and particularly the FSC since 2009, have had important impacts both on forest management practices[66] and forest governance. In environmental terms, tree plantation companies have reduced the extension of their clear-cuts, adopted more sustainable forestry practices, and rehabilitated thousand of hectares of previously cleared native forests, as well as decreasing the conversion of native forests, by an estimated 2-23%[67]. In social terms, although there remain adverse impacts for local communities, indigenous peoples and forestry workers, certification has encouraged companies to mitigate the impact of forest operations on their stakeholders by seeking, in many cases, mutually collaborative agreements.[68] In economic terms, the main impact of certification is the maintenance of access to environmentally sensitive international markets.

A particular issue of concern of certification is the identification of high conservation value areas (HCVAs),for both environmental services (e.g. water supply catchments or biodiversity) and cultural values for local communities. Despite the efforts of large companies in identifying and protecting HCVAs – as requested by certification schemes – the procedures to identify those areas in conjunction with local communities have failed, in many cases,to meetthe original expectations of local communities. This appears to be due to procedural technicalities (i.e. use of complex language) in some cases, and in others to excessive influence of some companies incommunities'decision-making processes.[69]

In terms of forest governance, certification has clearly changed the power balance between forestry companies and their stakeholders[70]. The FSC in particular has catalyzed a multi-stakeholder dialogue among diverse actors in forest governance, from which initiatives like the National Forest Dialogue have emerged; therefore, stakeholders have increasingly leveraged decision-making processes of the forest industry.

3.2.2 The National Forest Dialogue

A logical consequence of the multi-stakeholder dialogue process catalyzed largely by forest certification is its formalization in a more mature and independent initiative. The National Forest Dialogue (DFN, Spanish acronym) emerged in 2009 from some civil society members concerned about the impact caused by tree plantations in the landscape, and the key externalities associated with plantations.[71] The DFN has followed a participatory approach by organizing workshops in regions where forestry is relevant (2009); then it identified the key issues affecting those stakeholders and the civil society (2011), and encouraged a shared diagnosis across different actors (viz. companies, civil society and researchers) on what key issues needed to be addressed (2012).

The DFN has a steering committee made up of an Executive Secretary, members of forestry companies (the three biggest), social and environmental Chilean NGOs (WWF Chile, CODEFF, Ética en los Bosques,DAS Temuco and AIFBN), and the Chilean ILO. The DFN's purpose is to implement a dialogue process to facilitate changes in forestry practices that lead to concrete social and environmental changes in the areas where large tree plantations are established, and to stimulate discussion on key issues at the regional and national level.

In terms of governance and tangible actions, the DFN steering committee sets strategic goals, annual plans, and analyses work proposals suggested by technical work teams, which are focused on ecosystem restoration and local economic development. Those technical work teams are made up of researchers, academia, government officers, and local representatives who draw up their work proposals based on the main sustainability issues in different areas. Drawing on those proposals, the Executive Secretary schedules meetings and workshops with the members of the steering committee so as to implement work plans at a local scale.

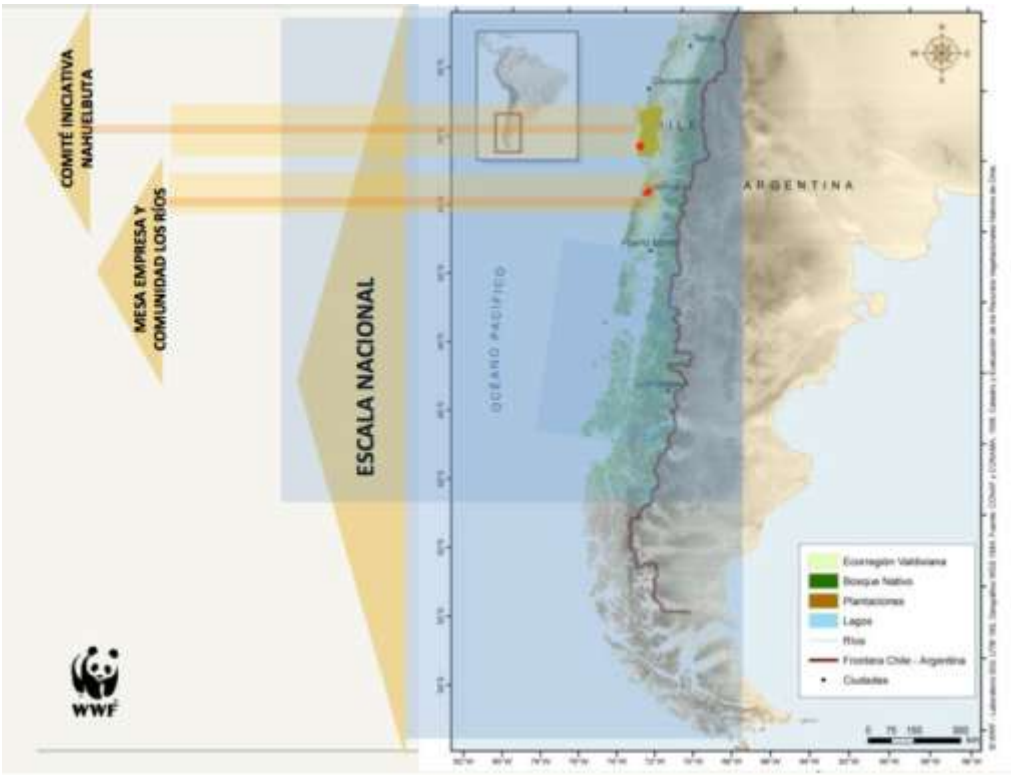

Figure 5. Areas where the DFN is working: Nahuelbuta and Los Ríos. Source: courtesy of the DFN and WWF Chile.

The key DFN priority issues are identified between companies and stakeholders to determine the areas where those issues need to be addressed first. Once the priority areas are determined, the DFN establishes formal agreements between the interested parties and a work plan to implement and monitor those agreements.

Today the DFN is conducting restoration efforts at a large landscape level, including:

- Protection of watersheds, basins and landscapes.
- Local economic development based, for example, on NTFPs.
- Tree plantation densities and reductions of forest clear-cuts.
- Wildfires.
- Cultural sites for local communities (shared catchments).

So far there are two priority areas where the DFN is working on landscape restoration: Nahuelbuta and Los Ríos. Besides the collaborative work between companies and NGOs, the DFN also works with local and regional governments, state agencies, and local community members. But while the DFN has reached important agreements in the benefit of local communities and the environment, the scope of such an initiative is currently limited to these few areas.
The DFN also organizes national seminars to analyze the sustainability issues that need to be addressed at a national scale, in which members of public institutions, private organizations, academia and the civil society,participate. The DFN convenes "territorial boards" the instances where regional and national agreements, amongst different actors, are executed and where other proposals, concerning issues that need to be solved at a national scale,are identified. In this context, the 2016 Chile's TPL Field Dialogue is a collaborative initiative with the DFN, focused on stimulating discussion (not proposing or executing action plans) among stakeholders on issues concerning tree plantations and how those plantations can better contribute to sustainability goals in Chile (see Box 3).

4. Chilean tree plantations – major issues

Although the expansion of tree plantations in Chile has brought economic and other benefits, there have alsobeen concerns about some negative externalities since afforestation laws and policies were implemented,from the late 1970s. This section examines both positive and negative externalities associated with tree plantations in Chile.

4.1 Positive externalities

Environmental effects

Thefirst effect of the establishment of exotic tree plantations in central and south central Chile was the rehabilitation of lands severely degraded by former cropping and cattle grazing from the 17th to 20th centuries. Soil erosion in these areas was perhaps the main environmental concernfor much of the 20thcentury (see for example Figure 6). Thus, in 1974, the main state policy response was to enact a decree law (DL 701) to encourage afforestationof those eroded landscapes, through subsides covering 75% of afforestation costs. Such landscapes were afforested with exotic tree plantations on soilsclassified as "for forest aptitude" due to their poor performance for other uses. One of the reasons advanced for the use of introduced pine and eucalypts species was their outstanding performance on severely damaged soils as compared with native species; usually native tree species have more demanding soil requirements than exotic tree plantations[72]. Moreover, pine and eucalypts plantations grow quickly in Chile, two to three times faster than in their native habitats and at least half of the time of Chilean native tree species. Some industry estimates[73] are that at least 86% of exotic tree plantations were established on degraded sites.

Figure 6. Soil erosion in Ñuble, central Chile; first half of 20th century.
Source: courtesy of the National Library.

Another positive environmental effect of tree plantations is that they had reduced deforestation pressure – mainly for fibre –on Chilean temperate native forests. Although it is hard to provide estimates about how many native forest hectares had been "saved" from deforestation, it is the case that 98% of forest exports are based exclusively on tree plantations, and only 2% from native tree species[74].

Figure 7. Chilean tree plantation forests. Source: courtesy of Forestal Mininco.

Overall, if properly managed tree plantations can provide a range of ecosystems goods and service[75], including roles in biodiversity conservation, recreational uses, carbon sequestration, water quality control (particularly for downstream populations) and the erosion control and soil rehabilitation role mentioned above. The role of Chile's plantations in mitigating climate change by sequestering carbon has been quantified: 2011 estimates[76] are of 223,434,197

tonnes of CO_2 tonnes sequestered by Chilean tree plantations (see Table 2). This represents c. 20% of the total Chilean emissions of greenhouse gases.

Species	CO2 tonnes
Pinus sp.	158,174,900
Eucalyptus globulus	23,030,660
Eucalyptus nittens	42,228,637
Total	223,434,197

Table 2. Sequestered carbon by tree plantations in 2011.
Source: CORMA.

Moreover, as noted in Section 2.2, the protection of c.600,000 hectares of natural ecosystems within the lands of the biggest plantation forestry businesses also constitutes an important ecosystem service.

Social and economic effects

The establishment of tree plantations, on an unprecedented large scale, certainly brought major changes for the workforce in the regions where those plantations were established. According to INFOR 2014 estimates, the forestry sector provides jobs for 124,472 people; most jobs would be associated with tree plantations. CORMA and Universidad de Chile (University of Chile) estimates, however, are of some 300,000 direct and indirect jobs provided by the forestry industry.[77] Although tree plantations were established in rural communes that had poor human development indexes, this situation has improved since the 2000s, and poverty and inequality indexes in these communes have since diminished.[78]Traditionally,Chilean rural communes have had low development indexes, and so the state has provided financial assistance through a number of policy instruments (e.g. subsidies and direct financial help).[79]

Forestry based on tree plantations has also created regional business clusters that have attracted diverse industrial actors directed to international markets. Thesebusiness clustershave added value to regional Chilean economies.[80]

Lastly, the tree plantation-based sector has contributed significantly to the national economy, as discussed in Section 2.3.

4.2 Negative externalities

Notwithstanding the benefits identified above, the Chilean tree plantation model also brought some significant negative effects, as discussed below.

Environmental effects

The most well-known and widespread negative environmental effects of tree plantations in Chile have been conversion of natural forests to tree plantations[81], pollution associated to forest operations, and in some cases environmental degradation of soils and watercourses. The conversion of natural forests was a major issue until around the end of the 20th century. It remains controversial: depending on the definition of "forest" (which varies from trees of 3 metres height only, or also areas of bush, seedlings and young trees), estimates of conversion between 1995 and 2011 range from 33,000 ha to 81,463 ha[82];this compares to estimatesof up to 200,000 ha of native forests converted between 1974 and 1992[83], the period during which most conversion occurred.

The second set of adverse environmental impacts is degradation of soils (e.g. by harvesting on slopes or using slash-and-burn practices), water (affecting its quality and quantity by siltation caused by road building or other forestry activities) and pollution (by accidental application

of chemical products on watercourses, e.g. aerial spraying) associated with forest operations. The magnitude of these issues is largely determined by the scale of the business and the type of forestry practice[84]. Therefore, while large forest operations had the greatest aggregate environmental impact on landscapes (because they own more than 70% of tree plantations), they are likely have less environmental impact per hectare, at least in recent decades, since progressive mechanization has introduced more environmentally friendly machinery (e.g. logging towers). However, the consequent large size of clear-cuts (400-500 hectares) has been an important concern about some large forest operations. In contrast, small and medium-sized forest operations have much less aggregate environmental impact but, in many cases, they do not follow sustainable forest practices or lack the financial resources to afford environmentally friendly machinery. Many small and medium-sized forestry businesses would thus have more impact per hectare than larger companies. The exception would be low intensity operations practised by some small and medium-sized agroforestry businesses.

Lastly, another issue linked with the establishment of tree plantations is water scarcity. Widespread concerns with regards to the water availability in many southern Chilean landscapes have attracted the attention of NGOs, local communities and researchers.[85] Some researchers have estimated some 42% decrease in water run-off due to the substitution of native forest cover by tree plantations over the last 40 years.[86] These effects would be greater for eucalypt plantations than for pine plantations.[87] Nevertheless, the geographical context in which tree plantations were established, in catchments showing soils degraded by agriculture, the positive impacts of afforestation by increasing infiltration, water storage and streamflow, are also important in determining outcomes.[88]

Social and economic effects

Historically, the expansion of tree plantations also had negative social outcomes on local communities and on some working conditions for forestry workers, as well as exacerbating long-standing land tenure conflicts between Indigenous peoples and the Chilean state.

Firstly, tree plantation expansion in Chile occurred during the late 1970s, after the 1973 military coup. The military government of Augusto Pinochet set a new free-market economic model leaving forestry development in private hands; the aim was to rehabilitate eroded soils, modernize the sector, and promote forest exports based on pine and eucalypt plantations. This was achieved by enactment of the decree law 701 (DL 701), promoting subsides and tax exemptions, resulting in an exponential growth of tree plantations, as noted in Section 2.[89]

Notwithstanding the success of this afforestation model in fostering plantation expansion and subsequent industry development, various stakeholders (smallholders, peasants, indigenous communities, some NGOs and civil society members) perceive the late 1970s afforestation process as illegitimate. First, as Chile was not ruled by a democracy, all new laws lacked democratic consent and, consequently, legitimacy. Second[90], the afforestation model implied the privatization of thousands of hectares of public lands, seeking to reverse the agrarian reform initiated by the former presidents Salvador Allende and Eduardo FreiMontalva. Thus, state lands and forestry companies (including sawmills and pulpmills, were auctioned off "at bargain prices" to well-connected financial groups.

Furthermore, the privatization of forestry and expansion of tree plantations also had social costs: many peasant smallholders and indigenous communities were forced to sell their lands, as new forestry encroachments took place, due to a combination of coercive and dishonest tactics.[91] Many former peasants then became forestry workers in the new logging camps, sawmills and pulpmills.

The outsourcing of most forest operations was another important consequence of the new afforestation model: from 1980, most forestry workers (69% according to 2012 estimates[92]),

were hired by contractor companieslosing important social benefits in those previously state owned forestry companies.[93]This allowed important power asymmetries in the supply chain between forestry companies and contractors, which continue to the present; contractor firms, in turn, replicated those asymmetries to the detriment of forestry workers. These power asymmetries have been translated into modest working conditions in many contractor companies (e.g. work overload associated with salaries based on productivity rate per hour), and long shifts away from home[94]. While the large plantation forest industry has made considerable progress[95] in the last 20 years in improving the welfare of forestry workers (viz. improved logging camps, meals, better shift systems and, particularly, their OHS outcomes due in part to the mechanization of this industry), there are some significant issues[96] yet to be addressed, such as wages, local hiring policies, forestry workers' qualification system and anti-union practices.Certification processes have addressed some of those issues, such as local hiring policies: in the last 5 years, some large companies have been hiringmore indigenous peoples as forestry workers.[97]

Importantly, most improvements in working conditions over the past 20 years have been concentrated in the large forestry businesses. In contrast, many small and medium-sized forest operations still struggle with precarious working conditions, a poorly skilled workforce, and poor OHS practices and training.[98]

Lastly, in terms of gender issues, the forestry sector is a strongly masculinized sector: 98.4% of forestry workers in primary production are men, with most women inonly administrative roles.[99]

A second set of negative social issues consequent to the afforestation model is that local communities have not realised the benefits of tree plantation expansion; rather, they have been impacted adversely by forest operations[100]. Mostly, local communities' complaints have pointed to operational impacts, viz. logging trucks speeding, noise and dust lifting caused by forest machinery, application of chemicals, and damage to public roads by trucks. Additionally, conflicts concerning the use of water resources have also emerged between companies and local communities, whose members have resented the lack of local development opportunities in their areas (e.g. jobs and development of alternative business models based on forests). All those conflicts have increased previous tensions between those actors, originating around 40 years ago, when large plantation owners decided to fence off and expel peasants and indigenous communities from their lands.[101]

Third, since the late 1990s large plantation forestry businesses have faced a long-standing land tenure conflict with Indigenous peoples, particularly with the *Mapuche*peoples, which in some cases has turned violent. The roots of this conflict originate in the War of Pacification of the Araucanía (1861-1883), when *Mapuche* peoples were militarily defeated and most of their lands expropriated by the Chilean state.Although, after the war, the Chilean state recognized 2,918 "Merced titles" (Indigenous reservations) for Indigenous peoples [102] (totalling 510,387 hectares), significant areas of Merced titles were acquired from Indigenous communities by both legal and illegal mechanisms between 1930 and 1972, by private landowners (e.g. mostly farmers and agriculture businesses) and even some public entities. Some estimates suggest that 100,000 ha of Indigenous lands were expropriated during that period.[103]This conflict was exacerbated during tree plantation expansionin the 1970s: many Indigenous land rights were abolished under Augusto Pinochet's regime, due to the privatization of land property and subsequent land use changes following the overthrow of the Allende government.

Given successive land use changes over the last century, it has been common for forestry lands to overlap with Merced titles. However, recent efforts by the Chilean state to return Merced titles - which are recognized as legal land tenure rights - to Indigenous communities, by purchasing claimed lands to forestry companies, agriculture businesses and European-

descendant farmers, have also found that many communities claim ancestral or customary rights – which are not recognized as legal by the Chilean state -over agricultural lands as well as forested landscapes with tree plantations.In the case of these forested landscapes, the access of community members to collect non-timber forest products (NTFPs), cultural and ceremonial sites inside forested landscapes, as well as their right to circulate between forested territories has represented a challenge for, particularly, large forestry corporations. Forest certification, in this regard, has helped to address these issues, as mentioned in Section 3.2.1, in terms of collaborative agreements between the parties.

It is also relevant to consider the traditional*Mapuche* view of forests and forestry: for *Mapuche* peoples, native forests are integrated within a broader concept *ItrofilMoguen*, by which biodiversity elements and spiritual entities are inextricably linked,giving them strength. In contrast, tree plantations represent *Anemka*, which means imposition.[104]

Importantly, in terms of state governance, as of 2008 Chile ratified the Indigenous and Tribal Peoples ILO Convention (No 169); but, unlike certification, this has not been translated into effective actions to address land tenure issues.

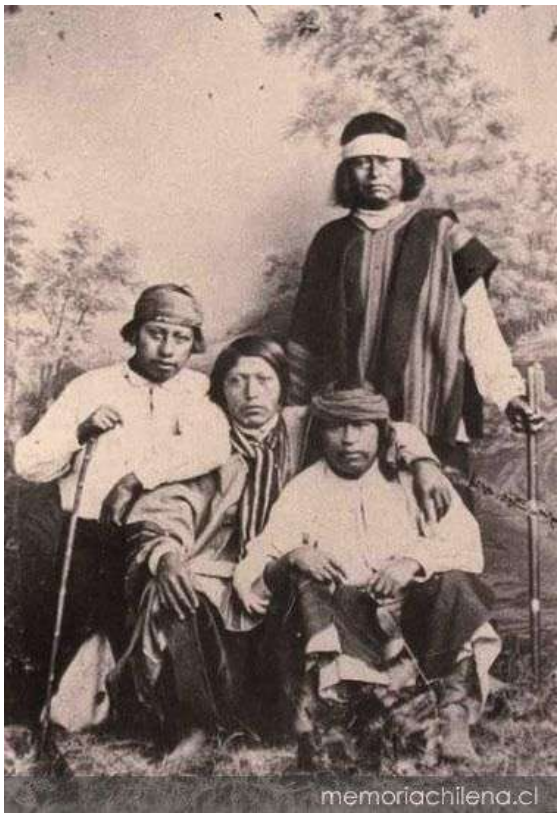

Figure 8. Group of *Mapuche* men, circa 1890. Source: courtesy of the National Library.

To conclude this section, while the afforestation model based on exotic tree plantations has rehabilitated eroded landscapes and brought economic success to plantation forestry businesses, a number of negative externalities have built negative perceptions of tree plantation. Some stakeholders (including NGOs, civil society members and indigenous communities) thus feel that they have only paid the costs of this afforestation model, and not reaped any of the benefits. Beyond the obvious need of addressing those key externalities, it is also essential to start building trust among different actors.

5. Challenges that might be explored by the Chile TPL Field Dialogue

This section identifies key themes emerging from the Chilean context (Sections 3 and 4) in the context of the objectives and priority topics for TPL Field Dialogues (Section 1). Each of those is presented below to stimulate further discussion. While some options to address those key themes are presented here to encourage discussion, they should be read as no more than "discussion starters".

5.1 The need to settle conflicts over land tenure

As addressed in the sections above, a number of conflicts remain between large plantation forestry companies and Indigenous peoples, particularly *Mapuche* people in southern Chilean regions. Although certification processes have made notable progress by reducing the number of conflicts with indigenous communities[105] (e.g. one company reduced them from 200 to only 20), there are territories where high-intensity conflicts still persist and solutions remain distant. Moreover, despite the achievements of certification, complaints concerning some company commitments (e.g. insufficientmonitoring of and lack of systematic proceduresfor some agreements concerning benefits or mitigation measures for communities), with both indigenous and non-indigenous communities, have been identified in a significant number of cases by various FSC audits and some NGOs.[106]

Unresolved conflicts with local communities and Indigenous peoples can be detrimental to all interested parties, as a number of TFD Reviews[107] note. Companies may suffer reputational damage, be denied market access and experience reduced market share, increased business risk for investors, higher operational costs and negative impact on the long-term financial sustainability of plantation forestry businesses. All of these are important concerns for Chilean forestry businesses. Governments may experience tax revenue losses, and loss of investments and local development opportunities. On the other hand, local communities, both Indigenous and non-indigenous, may (and in the Chilean case, have) suffer forced displacement, loss of local natural resource-based livelihoods, low wages and precarious working conditions, as well as loss of cultural and recreational assets, and from inadequate measures to settle disputes (e.g. legal actions and use of the force).

The TFD Initiative on "Free, Prior and Informed Consent" (FPIC) speaks to these issues. FPIC refers to the right of Indigenous peoples to be informed about forest operations to be performed and their consent should be granted before any operation, with the potential to affect them, to begin.[108] The right to FPIC has been reaffirmed in the 2007 United Nations Declaration of Rights of Indigenous Peoples[109] and in some human right treaties to which Chile is an active member. However, as Chilean legislation has not specifically addressed those concerns, and only in recent years improved public consultation processes in certain statutory law and regulations, it is necessary for companies not only to continue taking a more proactive role concerning FPIC issues (initiated, in general, by certification processes), but also to explore other forms of relationship with communities[110], particularly those already implemented by small plantation forestry businesses – which enjoy, in general, a mutually collaborative relationship with Indigenous peoples and local communities.

5.2Integrated land use planning in the Chilean context

The coexistence of multiple forms of land use within the same landscape or territory is the main goal of an "integrated landscape approach", which attempts to balance those often-competing demands amongst different land uses, and also achieve sustainable use of landscapes.[111] As the TFD 4Fs (food, fibre, fuel and forests) initiative[112] hasnoted, the forest sector is both a key and an experienced actor in undertaking multi-stakeholder initiatives to lead cross-sectorial (particularly, in the private sector) discussions on land use at both regional and national levels.

Usually, in the Chilean context, there are competing land demands for tree plantations, biodiversity conservation, human settlements, agriculture (both peasants and commercial farmers), and Indigenous communities. Moreover, as in many other places[113], there are few platforms in Chile to discuss land use planning across different economic sectors and stakeholders; this is exacerbated by government agencies (e.g. CONAF, Agricultural and Livestock Service "SAG" and the Chilean Tax Service "SII") often being inefficient in sharing information. In the Chilean case, the centralized tax systems has returned little benefit to people living in regions where forestry production primarily occurs[114].

Traditionally, forestry inChilehas been planned at the catchment level, over short time periods[115] and independent of other land uses in many cases[116]. In this regard, recent natural disasters[117] in Chile have shown the absence of policies to manage landscapes in integrated ways, including forests, water basins, and areas for economic activities as well as for conservation and cultural uses.

Implementing an appropriate policy framework to balance different land uses is essential for a sustainable and equitable use of landscape resources, including land for tree plantations. An appropriate framework would capitalize on the potential synergies amongst different land uses (e.g. tree plantations may provide some ecosystem services for population settlements, viz. water and natural hazard regulation) at larger spatial and temporal scales.[118]

Given some concerns about excessive state bureaucracy[119], some authors have proposed that this policy framework should be a decentralized and "bottom-up" (instead of a top-down planning) process based on a multi-stakeholder platform for land planning discussion: this would ensure a participatory approach and facilitate a fairer distribution of benefits and trade-offs among different actors[120]. The large spatial scale of management of some tree plantations means that conflicting interests may be subjugated[121] which, in turn, may affect the potential of realizing sustainable outcomes.

In this context, recent Chilean efforts have been mostly focused either on the restoration of converted native forests and the actions being undertaken by the DFN to address key externalities of the Chile's afforestation model, as noted above. However, the main challenge remains how to develop a landscape planning process that balance the economic values of tree plantations interests with those of protecting ecosystems, other economic activities, natural resources and community livelihoods; which has been the main concern of past TFD 4Fs initiatives and NGPinitiatives worldwide.[122]

5.3 The growing importance of tree plantations as sources of fibre and fuel

As highlighted in the IMPF2 Scoping Dialogue in Durban[123], tree plantations and particularly intensively managed plantation forests (IMPFs), continue to grow both in area covered and significance. While natural forests are still the bulk of the world's forests (93% of natural forests versus 7% of planted forests), planted forests share is increasing worldwide.[124]The roles of tree plantations as sources of fibre and fuel (biomass and biofuel) are expected to increase; some estimates amount to one-third of global industrial wood may be supplied by tree plantations[125], replacing the role that natural forests have traditionally met. Likewise, pressures for biofuels and other bioproducts that are increasingly concentrated in the southern hemisphere make tree plantations an attractive option to address concerns about global food insecurity and food sovereignty.[126]

These contexts are very relevant for Chile's tree plantations. As discussed in Section 2.1, both exports and domestic consumption of Chilean forest products are expected to increase over the next decade. In the former case, a growing global concern for legal timber sources and the clout of "zero deforestation" campaigns[127] might increase demand for Chilean plantation wood, provided that there is an agreed definition of what is accepted as "unacceptable" deforestation, as noted in the TFD Understanding Deforestation-Free (UDF)

initiative[128]. The increasing use of tree plantations as biomass source for industrial and residential uses (mostly in southern Chilean regions) is already apparent. As the economic development of Chile is expected to continue, and demands for energy are expected to double[129] that of economic growth, tree plantations may increasingly be seen as relatively clean energy sources.

5.4 Relevance of Chile's tree plantations in meeting Sustainable Development Goals (SDG), role in climate change mitigation and other TFD initiatives

The international community agreed in 2015 to adopt 17 Sustainable Development Goals (SDG)[130]. Those goals, drawing on the Millennium Development Goals (MDG), are ambitious and with a sophisticated and complex implementation and monitoring framework; they are now part of the 2030 Agenda for Sustainable Development.

SDGs are universal in nature, including both developed and developing countries, and were built through a global "bottom-up" multi-stakeholder consultation process. Forests, including tree plantations contribute to most, if not all, SDGs.[131]Table 3 flags potential links toand questions associated with relevant SDGs in the Chilean context, as to stimulate discussion and reflection during Chile's TPL Field Dialogue. It also notes links to related TFD initiatives.

Sustainable Development Goal (SDG)	Link or questions in Chilean context
SDG 1 – No poverty SDG 3 – Good health and Well-Being SDG 11 – Sustainable cities and Communities	• Alleviation of poverty: many smallholders (including indigenous communities) whose livelihoods depend on a mix of small tree plantations/natural forests and farming in south-central and southern Chilean regions. E.g. only during 2014, 649 smallholders afforested 1,431.26 hectares of their properties, mostly with tree plantations.[132] Additionally, some estimates[133] amount to 87,996 tree plantation hectares owned by smallholders. Importantly, much of those tree plantations have protective uses, viz. tree "fences", cattle shelter, soil rehabilitation; and are not necessarily employed for logging uses. However, now DL701 afforestation subsides are no longer available and despite some green procurement policies (Chile Compra, Sistema de ComprasSustentables del Estado[134]) to certainly encourage a supply of sustainable products (including forest products), their outcomes have been modest. • TFD 's Investing in Locally Controlled Forestry (ILCF)[135] initiative has paid attention to the contributions to sustainable development and poverty alleviation in forestlands managed by smallholders, community groups and forest-dependant peoples. Main concerns of the ICLF initiative are focused on poor or misplaced investments on such small forestry enterprises. In the Chilean context where smallholder tenure rights are relatively well defined, ICLF are likely to be worthwhile since these groups have a better social licence to operate, reduced risks and better long-term management opportunities.[136] Ultimately, building partnerships and alliances between investors, smallholders, governments and intermediaries would be necessary to enable ICLF projects to success. Questions that arise are: Do small forestry businesses and communities get enough funding and technical assistance to develop a sustainable business?Do we have appropriate policies to deal with these challenges? • Likewise, it is important to highlight the contribution small industrial associations to regional and local Chilean economies, as well as the provision of local job sources, and local timber supply chains.[137] – How do we manage for equity in the supply chain between large forest corporations and small timber producers? • Chilean smallholder farmers can contribute to the provision of

	ecosystem goods (e.g. commercial cropping traded with nearby cities and towns) and services (e.g. water regulation and air quality) in the well-being of urban and rural landscape inhabitants. – How do we enable these smallholders to increase those contributions?
SDG 2 – Zero Hunger SDG 6 – Clean water and sanitation	• Opportunities for local development and employment based on the trading of NTFPs by local community members. Recent 2015 studies in central Chile have revealed that NTFPs make up an important diet source (43%)[138] of local peoples – Logical questions are: What is the role of large plantation forestry firms on providing access to NTFPs? How does this relate to diverse diets and nutrients (e.g. mushrooms and wild berries) obtained from wild resources (either from biological corridors/natural ecosystems inside plantations or from tree plantation themselves), for local communities? • Sustainable use of landscapes requires an "integrated landscape approach" view to resolve competing land uses. – How do agroforestry businesses complement the role met by IMPFs?

SDG 4 – Quality education SDG 5 – Gender equality SDG 10 – Reduced Inequalities SDG 16 – Peace, Justice and Strong Institutions	• Ensuring access to cultural and ceremonial sites, water-supply catchments, and roads, NTFPs and to other communities, inside tree plantations landscapes. How do companies make sure that customary rights of Indigenous peoples are respected? • Gender equality: empowerment of *Mapuche* women that have active and leading roles in the biological conservation of forested landscapes (e.g. Corporación de Mujeres Mapuche AukiñkoZomo[139]). In central Chile, 89% of NTFP collectors are women[140] – How do we empower/include more women in the management of forest resources& forestry jobs? How do plantation forestry businesses help local communities to access to education and training programs? How do companies help communities access local labour opportunities?
SDG 7 – Affordable and Clean Energy SDG 13 – Climate Action	• Bioenergy for residential (heating) uses is mostly harvested from firewood native forests; however there is an increasing trend to use firewood from introduced tree plantations (e.g. eucalypts). A well-managed native forest of 30 hectares forest provides an income of around US$450 per month; in 10 years this amount can be doubled and in 30 years this income can be up to four times the original amount.[141] Investment return periods from fast growing tree plantations may be even shorter.Use of "certified" dry sources of firewood are a growing and urgent need for southern Chilean cities because of high levels of pollution due to the use of heating systems. – How do we encourage the use of "certified" dry firewood to avoid pollution? • Biomass from large industrial tree plantations now makes up a significant input for the Chilean energy system.According to CORMA, and the Kyoto Protocol, sources of energy based on forests biomass have an emissions factor equal to zero, that is, due to carbon sequestration from trees the biomass combustion does not represent significant increases in atmospheric CO_2.[142] Moreover, now the biomass represents up to 2.3% of the Chilean energy mix and some 25% of the contribution of renewable energies in the country. – How do we increase thisshare? A 2016 TFD initiative is focusing on these issues: "Sustainable Woody Biomass for Energy"[143]to explore how woody biomass is increasingly used on an industrial scale for heat and power, especially as developed and developing countries seek to increase the share of renewable energies in the total energy mix. • Carbon sequestration and climate change: Afforestation and

	sustainable forest management are cost efficient climate change mitigation options.[144]As addressed in Section 2.2, more than 200 million of CO_2tons are sequestered annually by Chile's tree plantations. This represents between 20 to 30% of the total greenhouse gas (GHG) emissions of the country. Furthermore, some large Chilean plantation companies are now active members of the Low Carbon Technology Partnerships initiative[145] for action on climate change. It is important, however, to consider that carbon sequestration by plantations is finite and time-bound; so a permanent tree plantations reservoir need to protect those gained carbon stocks[146] – How do we increase the participation of such carbon sinks to take more effective climate action?
SDG 8 – Decent Work and Economic Development SDG 9 – Industry, Innovation and Infrastructure SDG 12 – Responsible Consumption and Production	• Responsible investments on sustainable businesses and management practices throughout the timber supply chain should be promoted. E.g. financial institutions should follow the Equator principles before deciding to invest in certain business projects. Investments should be also targeted on smallholder production systems to support their integration and the supply value chain and enhance their ability to compete.[147] How do we encourage more responsible investments in the Chilean forestry sector? • Power asymmetries and increasing stakeholders empowerment between large forestry businesses and contractors/forestry workers should beproperly addressed in the Chilean case. As discussed in Section 2.2, such asymmetries have had a negative impact on the social performance of large companies and in the economic performance of contractor firms, affecting the welfare of forestry workers. Forest certification has made an important progress to solve these issues but it has not significantly changed yet, in Chile, salary schemes and work overload issues associated with the plantation forest industry (notwithstanding that some dialogue instances between companies and workers are underway). More important, there is an increasing empowerment and awareness both from the civil society and forestry workers concerning their rights and social issues. Chilean stakeholders and companies, in this regard, would benefit from community-based forestry experiences[148] where multiple levels of decision-making can find together a consensus view on certain issues so as to strengthen the environmental, social and economic viability of tree plantation forestry. – How do we take advantage of the civil society/forestry workers empowerment in the long-term business sustainability?
SDG 15 – Life on land SDG 14 – Life below water	• Diversified forestry models: e.g. both small and medium-sized forest owners might further explore agroforestry models. Agroforestry models may represent a viable land use solution for many timber producers since they promote biodiversity conservation without jeopardizing the economic sustainability of the business.[149] Many forest owners would also perform agroforestry in Chile. – How do we make landowners more aware of alternative models of forestry? • A related TFD initiative, the Dialogue on Small Landowners and Sustainable Forest Practices was held in Europe in 2007. The "take-home" message was that worldwide small forest landowners (often family owners) own million of hectares and they tend to be heterogeneous, have multiple objectives (beyond only economic ones), but many lack the financial capacity to afford sustainable practices. • Forest landscape restoration efforts in Chile have been directed towards the rehabilitation of converted native forests by tree plantations between companies and NGOs. As addressed in the

	forest governance section, the DFN has led these processes in Chile at the landscape level. An optimal restoration process must identify, prioritize, monitor and promote integrated landscape approaches to optimize social and ecological benefits of increase tree cover. This not only includes management of regeneration of natural forests but also to improve plantation forestry to incorporate a mix of species suited to specific landscapes.[150] The logical question here is how do we ensure an optimal restoration process at the landscape level?

Table 3 Possible links between Chilean TPL and 2015 Sustainable Development Goals (SDGs).

5.5 The contributions of forest certification

Forest certification in Chile has been an important catalyst of change across a number of key actors in forests and their governance. It has had a significant impact on the environmental and social performance of certified tree plantations, since most large corporate tree plantations are now certified. A further expansion in the area of Chile's certified forests. and realization of the attendant environmental and social benefits, relies on the adoption of certification by small and medium-sized forestry businesses. In Chile, as elsewhere, this has its challenges.

The introduction of FSC International Generic Indicators (IGIs)[151] may pose challenges for Chilean companies, particularly the large ones, and their stakeholders. The higher environmental and social requirements, particularly for forestry workers and local communities and Indigenous peoples, are central issues. Lastly, as noted in Section 3.2.1, improving procedures to identify HCVAs, in conjunction with communities, is also an important concern.

6. Summary points

This section does not attempt to make any conclusion on specific topics, but to highlight the main points across this background paper in order to stimulate discussion around them.

- Chile's tree plantations are an economically successful and export-oriented sector, with a growing domestic market for fibre and (bio) energy and products.
- Three quarters of Chile's tree plantations are concentrated in a handful of forestry companies. All productive forest tenure in Chile is privately owned.
- Plantation forestry businesses also own significant portions of natural ecosystems and native forests.
- Positive externalities of Chile's tree plantations model include the rehabilitation of eroded soils, reduced pressure for harvesting from natural forests, and the contribution of tree plantations as sources of biomass and biofuel.
- Negative externalities of Chile's tree plantations model include the conversion of natural forests to plantations, nuisance tolocalcommunities caused by forest operations, controversial effects on ground and stream water, land tenure conflicts with local communities and particularly Indigenous peoples (*Mapuche*), and power asymmetries between companies and their stakeholders.
- State forest governance has been unable to address many of the negative externalitiesof tree plantation expansion. Ultimately, new forest policy and governance initiativesmay change this.
- Non-state forest governance, including market-driven forest certification as well as National Dialogue Processes (DFN), have started to build trust amongst a number of key actors; certification in particular have yielded positive environmental and social outcomes, as well as changing the power balance between actors.

- Key challenges that might be prioritized and discussed within this TPL Field Dialogue are:
    - The need to settle conflicts over land tenure, and implementation of the principle of FPIC
    - Integrated land use planning in the Chilean context;
    - The growing importance of Chile's tree plantations as sources of fibre and fuel;
    - The relevance of Chile's tree plantations in meeting SDG commitments, through a number of specific areas of concern in the Chilean context
    - The importance of forest certification and the introduction of the FSC International Generic Indicators (IGIs).

7. References

[1]In the IMPF2 Co-Chairs Summary, the term "forest plantations" was used in the headings of Boxes 1 & 2. This term has been changed to "tree plantations" to be consistent with the retitled TPL Dialogue. Use of the term "plantation forests" has been retained in the body of Box 1 at this stage, as that text was negotiated.

[2]http://theforestsdialogue.org/publication/co-chairs-summary-scoping-dialogue-intensively-managed-planted-forests-2

[3]http://theforestsdialogue.org/sites/default/files/tfd_impf2_background_paper_24aug15.pdf

[4]See http://newgenerationplantations.org/en

[5]See http://www.iufro.org/

[6]See http://www.forestpeoples.org/background/about-forest-peoples-programme; http://globaljusticeecology.org/; http://wrm.org.uy

[7]A summary report of the 3rd International Congress on Planted Forests is presented on the following website: http://www.efi.int/files/attachments/icpf_report_summary/14-congress-summary-report-final-2013-07-03.pdf

[8]See on http://theforestsdialogue.org/initiatives/FPIC; http://theforestsdialogue.org/initiatives/4Fs; http://theforestsdialogue.org/initiative/understanding-deforestation-free-udf; http://theforestsdialogue.org/initiatives/GMT; http://theforestsdialogue.org/initiatives/ILCF; http://theforestsdialogue.org/initiatives/forest-certification

[9] See on http://www.fao.org/forestry/plantedforests/67508/en/

[10]See on https://sustainabledevelopment.un.org/sdgs

[11]See http://www.dialogoforestal.cl/; http://www.wwf.cl/que_hacemos/reduciendo_impactos/industria_forestal/; http://www.eticaenlosbosques.cl/; http://obispadodetemuco.cl/accionsocial/

[12]See NGP Chile 2013 Study Tour http://newgenerationplantations.org/multimedia/file/9e275a7b-7a28-11e3-92fa-005056986313; and 2015 Encounter on: https://www.youtube.com/watch?v=0UpFKt9yhZI&index=6&list=PL_YdtxsDh9TexvlheWpHswBIOt_DqXhmM; http://newgenerationplantations.org/multimedia/file/89b78855-e1a4-11e4-9137-005056986313

[13] "Fracture lines" – the term used by TFD to describe key areas of contention.

[14]http://www.fao.org/about/meetings/world-forestry-congress/en/

[15]http://www.csap-durban.org

[16]OECD. 2013. OECD Economic surveys: Chile 2013. http://dx.doi.org/10.1787/eco_surveys-chl-2013-eng

[17]UNDP 2014. Human Development Report 2014. *Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience*, http://hdr.undp.org/sites/default/files/hdr14-report-en-1.pdf

[18]Word Bank. 2013. Data - New Country Classifications. http://data.worldbank.org/news/new-country-classifications

[19]Transparency International. 2015. *Corruption Perceptions Index 2015*, Transparency International International Secretariat, Germany. http://www.transparency.org/country/#CHL

[20]National Institute of Statistics (INE): http://www.ine.cl/canales/chile_estadistico/familias/demograficas_vitales.php

[21]Central Bank of Chile. 2015 Statistics. http://si3.bcentral.cl/Siete/secure/cuadros/arboles.aspx?idCuadro=CCNN2008_P0_V2

[22]International Monetary Fund. 2015. Report for Selected Countries and Subjects. http://www.imf.org/external/pubs/ft/weo/2015/01/weodata/weorept.aspx?

[23]Vidal, S., Santibañez, F. 2013. Suelos*inEstado del Medio Ambiente en Chile 2012 - Informe País*, Universidad de Chile, Instituto de AsuntosPúblicos, Centro de Análisis de PolíticasPúblicas, Santiago, Chile. pp. 267-332.

[24]CONAF. 2013. Plantaciones y Pobreza en ComunasForestales: forestación y estilo de desarrollo. http://www.conaf.cl/wp-content/files_mf/1395859632PlantacionesyPobrezaenComunasForestales.pdf

[25]Data vary between sources, since there are no commonly agreed methodologies among different public institutions, gaps between updating periods, and the lack of detailed studies of forest tenure in Chile.

[26]According to the 1998 modification (law No 19.561) of the 1974 DL 701 (for tree plantations), small forest owners are those who own no more than 12 forest hectares and have annual sales not exceeding UF 3,500 (a Chilean financial unit, equivalent to US$131,857; exchange rate on May 17, 2016). As of 2011, the DL 701 also defined medium-sized forest owners as those who own more than 12 forest hectares and have annual sales not exceeding UF 100,000 (c. US$ 3,767,343). Large companies would exceed this annual sales threshold; the National Forest Corporation (CONAF) also defines themas usually having more than 50,000 hectares of forestlands,

[27]The plantations net area does not include the area covered by forest roads, lumberyards, and so on; otherwise, the area covered by plantation forests would be much larger (up to c. 2.9 million hectares according to CONAF 2013 estimates).

[28]2009 estimates from: Leyton, J. I., 2009. TenenciaForestal en Chile, *FAO (Forest tenure in Latin America). Estudio de Caso.*: 37. Available athttp://www.fao.org/forestry/17192-0422df95bf58b971d853874bb7c5755f7.pdf

[29]2009 estimates from: Leyton. 2009 ibid.

[30]SNASPE is the Spanish acronym for "National System of Wild Protected Areas by the State". Other CONAF sources claim that those 14,180,000 ha of native forests are actually included in the SNASPE. See INFOR. 2015a. Chilean Statistical Yearbook of Forestry. http://wef.infor.cl/publicaciones/anuario/2015/Anuario2015.pdf

[31]CONAF 2013 sources claim 14,180,000 ha of native forests. See: http://www.conaf.cl/nuestros-bosques/bosques-en-chile/

[32]M. Tricallotis (personal communication from INFOR presentation, 31 May 2016 during the TPL Chile's Field Dialogue);
INFOR. 2015b. Los Recursos Forestales de Chile. Informe Final: Inventario Continuo de Bosques Nativo y Actualización de Plantaciones Forestales:
http://biblioteca.infor.cl/index.asp?param=o%AD%88%92bj%91%8Dpb&Op=12

[33]Neira et al. 2002.Chile's Frontier Forests: conserving a global treasure. Global Forests Watch.
https://www.wri.org/sites/default/files/pdf/gfw_chile_full.pdf

[34] They own pulp mills, sawn mills and other processing facilities as well as control distribution and logistics of their operations. See: Colegio de Ingenieros Forestales de Chile (College of ChileanForesters). 2014. Propuestas para un Desarrollo Sustentable del Sector Forestal Chileno (2014-2018). Seeonhttp://cifag.cl/wp-content/uploads/2015/07/Propuesta-sector-forestal.pdf

[35]Leyton. 2009 ibid.

[36]Colegio de Ingenieros Forestales de Chile. 2014ibid.

[37]See on http://www.certfor.org/certfor.php?id=3&idrel=31#contenido

[38]CONAF. 2015. *Documentos.PlantacionesForestales: SuperficieAnualForestada y Reforestada*:
http://www.conaf.cl/nuestros-bosques/bosques-en-chile/estadisticas-forestales/;
M. Tricallotis (personal communication, 31 May 2016 during the TPL Chile's Field Dialogue)

[39]INFOR. 2015a. ibid;
CONAF. 2015 ibid.

[40] INFOR. 2015a ibid.

[41]See ibid.

[42]CONAF. 2013 ibid.

[43]See ibid.

[44]Considering anexchange rate of 1 US$ dollar = $570.35 CLP (Chilean currency) in 2014;
http://si3.bcentral.cl/Siete/secure/cuadros/arboles.aspx?idCuadro=DOLAR_OBS_ADO; INFOR. 2015 ibid.

[45] See the Central Bank of Chile's statistics:
http://si3.bcentral.cl/Siete/secure/cuadros/arboles.aspx?idCuadro=CCNN2008_PIB_REGIONAL

[46]Dauvergne, P., Lister, J., 2011. *Timber*, Polity Press. 200 pp.

[47]INFOR. 2016. Estadísticas Forestales (ForestryStatistics):
http://wef.infor.cl/sector_forestal/sectorforestal.php#/8

[48]INFOR. 2015a ibid.

[49]e.g. http://www.corma.cl/medioambiente/sustentabilidad-ambiental/energia

[50]INFOR. 2015a ibid.

[51]INFOR. 2016 ibid.

[52]Colegio de Ingenieros Forestales de Chile. 2014ibid.

[53]INFOR. 2016 ibid.

[54] CONAF. 2014. Memoria CONAF 2010-2014. 2010-2014. Editora e Imprenta Maval Ltda.http://www.conaf.cl/MemoriaCONAF2010-2014.pdf

[55]See the history of INFOR on: http://www.infor.cl/index.php/quienes-somos/historia

[56]See on http://www.conaf.cl/nuestros-bosques/bosques-en-chile/consejo-de-politica-forestal/

[57]See the following videos on
https://www.youtube.com/watch?time_continue=376&v=Ib5q8zE_ymU;
https://www.youtube.com/watch?time_continue=253&v=Qtm6h7fTnGc;
https://www.youtube.com/watch?time_continue=253&v=Qtm6h7fTnGc;
https://www.youtube.com/watch?time_continue=886&v=ssNELR2oxK0

[58]MOP. 2007. Infraestructura para la competitividad – El MOP en la Promoción del Crecimiento Económico. Gobierno de Chile, Dirección de Planeamiento MOP.http://www.dirplan.cl/centrodedocumentacion/documentosgenerales/Documents/Plan_de_Competitividad/Plan_Competitividad_2007_2012_Sector_Forestal.pdf

[59]M. Tricallotis (personal communication from INFOR presentation, 31 May 2016 during the TPL Chile's Field Dialogue)

[60]Espinosa, M., Acuña, E. 2007. Forest resources, forest types, forest retention, current issues, and forest protection *in* Forests and Forestry in the Americas, Wikihome, Society of American Foresters, International Society of Tropical Foresters
http://www.encyclopediaofforestry.org/index.php?title=Chile01#Legal_and_institutional_framework;
Tricallotis, M. 2015. Evaluating Native and Plantation forest certification schemes in Chile: Beyond traditional governance. Unpublished PhD thesis. The Australian National University.

[61]Reyes, R. and Nelson, H., 2014. A tale of two forests: why forests and forest conflicts are both growing in Chile, *International Forestry Review*,**16**(4): 379-388;
Gerber. 2011. Conflicts over industrial tree plantations in the South: Who, How and Why? Global Environmental Change, 21(1): 165-176.

[62]Tricallotis, M. 2015 ibid.

[63]Heilmayr, R., Lambin, E. 2016. Impact of non-state, market driven forest governance on Chilean forests. PNAS 113 (11): 2910-2915.

[64] CertforChile. 2015. Empresas certificadas: manejo forestal sustentable. See on http://www.certfor.org/certificadas.php

[65] FSC Chile. 2015. Superficie certificada FSC-Chile. See on https://cl.fsc.org/es-cl/certificacin/superficie-y-empresas-cetificadas-en-chile

[66] Cubbage, F., Diaz, D., Yapura, P. and Dube, F., 2010. Impacts of forest management certification in Argentina and Chile, *Forest Policy and Economics*,**12**(7): 497-504.

[67] Heilmayr, R., Lambin, E. 2016 ibid.

[68]Tricallotis, M. 2015 ibid; https://www.youtube.com/watch?v=YrfF1hztnCw

[69]WWF Chile. 2015. Análisis de la Problemática Social asociada al sector de Plantaciones y de industria celulosa y de papel en el sur de Chile. Consultoría Universidad de Concepción; Investigadora principal: Noelia Carrasco. 137 pp.

[70]Tricallotis, M. 2015 ibid.

[71]See onhttp://www.dialogoforestal.cl/; https://www.youtube.com/watch?v=mnWB9BCJr4s

[72]Colegio de Ingenieros Forestales de Chile. 2014ibid.

[73]CORMA. 2016. Medio Ambiente: Recuperar suelos:
http://www.corma.cl/medioambiente/beneficios-de-los-bosques/recuperar-suelos

[74]INFOR. 2016 ibid.

[75]De Groot RS, PJ van der Meer. 2010. Quantifying and valuing good and services provided by plantation forests. *In* Bauhus J, P van der Meer, M Kanninen eds. Ecosystem Goods and Services from Plantation Forests. UK, USA. Earthscan. p. 16-42.

[76]CORMA. 2016. Medio Ambiente: Frenar el cambio climático: http://www.corma.cl/medioambiente/beneficios-de-los-bosques/frenar-el-cambio-climatico

[77]See "2014 final report on evaluation of the social and economic contribution of forestry sector" in: http://www.corma.cl/_file/material/informe-final-evaluacion-del-aporte-economico-y-social-del-sector-forestal-2014.pdf

[78]See ibid.

[79]CONAF. 2013 ibid.

[80]Felzensztein, C., Brodt, S., Gimmon, E. 2014. Do strategic marketing and social capital really matter in regional clusters? Lessons from an emerging economy of Latin America. Journal of Business Research 67 (2014): 498-507.

[81]Nahuelhual L, A Carmona, A Lara, C Echeverría, ME González. 2012. Land-cover change to forest plantations: proximate causes and implications for the landscape in south-central Chile. *Landcsape and Urban Planning* 107: 12-20.

[82]Lara, A., Reyes, R., Urrutia, R. 2013. BosquesNativos*inEstado del Medio Ambiente en Chile 2012 - Informe País,* Universidad de Chile, Instituto de AsuntosPúblicos, Centro de Análisis de PolíticasPúblicas, Santiago, Chile. pp. 141-188.

[83]OIT Santiago. 2012. El trabajo decente en la Industria Forestal. http://www.ilo.org/santiago/publicaciones/WCMS_206093/lang--es/index.htm

[84]Tricallotis, M. 2015 ibid.

[85] See for example http://newgenerationplantations.org/multimedia/file/9e275a7b-7a28-11e3-92fa-005056986313

[86] Little, C., Lara, A., McPhee, J., Urrutia, R. 2009. Revealing the impact of forest exotic plantations on water yield in large-scale watersheds in South-Central Chile. *Journal of Hydrology* 374(1-2):162-170.

[87]Huber, A., Iroumé, A., Mohr, C., Frêne, C. 2010. Effect of *Pinusradiata* and *Eucalyptus globulus* on water resource in the Coastal range of Biobío region, Chile. Bosque 31(3): 219-230.

[88]Keenan, R., Van Dijk, A. 2010. Planted Forests and Water *in*: Ecosystem Goods and Services from Plantation Forests. J. Bauhaus, Van Der Meer, P., Kanninen, M. (eds.). Earthscan, 77-95.

[89]CONAF. 2015. *Documentos.PlantacionesForestales: SuperficieAnualForestada y Reforestada*: http://www.conaf.cl/nuestros-bosques/bosques-en-chile/estadisticas-forestales/

[90]Klubock, TM. 2004. Labor, Land, and Environmental Change in the Forestry Sector in Chile, 1973 – 1998 *in:* Victims of the Chilean Miracle: Workers and Neoliberalism in the Pinochet Era, 1973-2002. Peter Winn (ed.). Drake University Press. 337-387.

[91]Some reports mention the use of intense pressure (e.g. by isolating and encircling communities with plantations, exposing crops and livestock to aerial spraying of pesticides, fencing plantations and forbidding people to trespass them) to force indigenous (*Mapuche*) and non-indigenous peasants to sells their lands (at "bargain prices") – in the late 1970s – to new and well-connected financial groups that were supported by the military authorities. See Gerber. 2011 ibid;
Frênet, C., Nuñez, M. 2008. Hacia un Nuevo ModeloForestal en Chile. Revista Bosque Nativo. http://revista.bosquenativo.cl/volumenes/47/2_opinion.htm;
Klubock, TM. 2004 ibid;
Kröger, M. 2012. Global tree plantation expansion: a review. ICAS Review paper series No. 3. 25 pp.
Vergara, C., 2006. Utilización de recursos forestales en dos comunidades campesinas de la provincia de Valdivia, *inBosques y comunidades del sur de Chile* (Eds, Catalán, R., Wilken, P., Kandzior, A., Tecklin, D. and Burschel, H.) Editorial Universitaria, Santiago, Chile, pp. 210-224.;
Reyes, R. and Nelson, H., 2014 ibid.

[92]OIT Santiago. 2012 ibid.

[93]Klubock, TM. 2004 ibid.

[94]Frênet, C., Nuñez, M. 2008 ibid.;Klubock, TM. 2004 ibid.; Tricallotis, M. 2015 ibid.

[95]Ackerknecht, C. 2010. El Trabajo en el Sector Forestal: Cuestionesque se plantean para una fuerza de trabajocambiante.*Unasylva,***61**(234/235): 60-65;

Meyer F, D Tappin. 2014. Social Sustainability in the Chilean Logging Sector. *In* Sun W ed. Corporate Social Responsibility and Sustainability: Emerging Trends in Developing Economies. Emerald Group Publishing. p. 269-294.

[96]Some examples include: deficiencies concerning the training program under CORMA (the Chilean Corporation of Timber, a forestry association) to qualify forestry workers, insufficient evidence of better wages (or payment schemes) due to certification processes, and anti-union practices aimed to avoid collective bargaining processes or the creation of unions. Anti-union practices have not yet been completely addressed by certification. See for further reference: Dirección del Trabajo. 2007. Los derechos laborales del tratado de libre comercio Chile-Estados Unidos en la Industria Forestal y en la Industria del Salmón.Cuaderno No 32, http://www.dt.gob.cl/m/1620/w3-article-95495.html;
Klubock, TM. 2004 ibid.;
Frênet, C., Nuñez, M. 2008 ibid.;
Jordana and Torres. 2009. Los trabajadoressubcontratistas de BosquesArauco y Codelco ¿Un movimiento en vías de politización? Revista Mad. No 20: 71-89
http://200.89.78.45/index.php/RMAD/article/viewArticle/13795; and for a recent update see also:
Tricallotis, M. 2015 ibid.

[97]For instance, one forestry company hired 600 members of *Mapuche* communities during 2014 as part of a regular and systematic program. See: CMPC. 2014. Sustainable Development Report. http://s2.q4cdn.com/093357708/files/doc_downloads/Sustainability_Reports/Sustainable-Development-Report-2014.pdf

[98]Tricallotis, M. 2015 ibid.

[99]OIT Santiago. 2012 ibid.

[100]Andersson K, D Lawrence, J Zavaleta, MR Guariguata. 2016. More Trees, More Poverty? The Socioeconomic Effects of Tree Plantations in Chile, 2001-2011. *Environmental Management* 57(1): 123-136;
WWF Chile. 2015 ibid.

[101]Klubock, TM. 2004 ibid.

[102]CONADI. 2014 Sistema de información territorial indígena. Ministerio de Desarrollo Social: http://www.conadi-siti.cl/;http://chilegeospatialforum.org/2013/pdf/Ricardo_Nancupil_SITI.pdf; Comisión Verdad Histórica y Nuevo Trato con los Pueblos Indígenas. 2008. Volumen 2 – Anexo. Resultados del Estudio Relativo a la Propiedad Actual de las Tierras Comprendidas en 413 Títulos de Merced de las Provincias de Malleco y Cautín. http://biblioteca.serindigena.org/libros_digitales/cvhynt/

[103]Comisión Verdad Histórica y Nuevo Trato con los Pueblos Indígenas. 2008ibid.

[104]M. Tricallotis (personal communication, 02 - 03 June 2016 during the TPL Chile's Field Dialogue)

[105]Astorga, L. 2013. La credibilidades factor fundamental en la certificación FSC (AIFBN): http://bosquenativo.cl/respaldo/index.php?option=com_k2&view=item&id=1097:la-credibilidad-es-elemento-findamental-en-la-certificaci%C3%B3n-fsc&Itemid=21

[106] See detailed audit reports in: FSC. 2015. *Public Certificate Search*, FSC International Center. Available on: http://info.fsc.org/certificate.php;
WWF Chile. 2015 ibid.

[107]Wilson, E. 2009. Company-Led Approaches to Conflict Resolution in the Forest Sector. The Forests Dialogue (TFD). Research paper, No 4: http://theforestsdialogue.org/publication/company-led-approaches-conflict-resolution-forest-sector

[108] Colchester, M. 2010. Free, Prior and Informed Consent – Making FPIC work for Forests and People. The Forests Dialogue (TFD). Research paper, No 11:
http://theforestsdialogue.org/initiatives/FPIC

[109] United Nations (UN). 2007. United Nations Declaration on the Rights of Indigenous Peoples: http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf

[110]See for example, some projects of community forestry and multi-level governance in Oregon have been relatively successful, see: Cromley, C. M., 2005. Community-Based Forestry Goes to Washington, In *Integrating Science, Policy and Decision Making* (Eds, Brunner, R. D., Steelman, T. A., Coe-Juell, L., Cromley, C. M., Edwards, C. M. and Tucker, D. M.) Columbia University Press, New York, pp. 221-267. However, community forestry is not a "magic bullet" to solve all governance issues and, therefore, poor governance and limited access to forest resources may an unfortunate outcome. Thus, a thorough analysis of the different options should be conducted first. See: Hajjar et al.

2016. *The data not collected on community forestry*. Conservation Biology, http://onlinelibrary.wiley.com/doi/10.1111/cobi.12732/epdf;
Anderson et al. 2015. Managing leftovers: Does community forestry increase secure and equitable access to valuable resources for the rural poor? Forest Policy and Economics, 58: 47-55.

[111]Sayer et al. 2013. Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. *PNAS*, 110(21): 8349-8356, http://www.pnas.org/content/110/21/8349;
Reed, J. et al. 2014. What are "Integrated Landscape Approach" and how effectively have they been implemented in the tropics: a systematic mapping tool. Environmental Evidence, 4(2), https://environmentalevidencejournal.biomedcentral.com/articles/10.1186/2047-2382-4-2;
Bruña-García, X, Marey-Pérez, M. 2015. La planificaciónforestalparticipadacomo base de la gobernanza rural. Bosque.36(2): 187-197, http://mingaonline.uach.cl/scielo.php?pid=S0717-92002015000200005&script=sci_arttext

[112]For a detailed analysis see: Field Dialogue on Food, Fuel, Fibre and Forests (4Fs). Co Chairs' Summary Report. 2012. The Forests Dialogue. (TFD). http://theforestsdialogue.org/initiatives/4Fs

[113]Field Dialogue on 4Fs. Co Chairs' Summary Report. 2012. TFD ibid.

[114]Arredondo, C. 2011. La descentralización en Chile: una Mirada desde la Economía Política y el Neoinstitucionalismo. Tesis Magister Universidad de Chile. http://repositorio.uchile.cl/tesis/uchile/2011/cf-arredondo_cs/pdfAmont/cf-arredondo_cs.pdf

[115]However, large Chilean plantation forestry businesses usually plan their operations for periods of 50 years (equivalent to two pine rotation cycles) – but there are no planning processes considering interventions at a landscape level and other land uses.

[116]Campos, J., Villalobos, R. 2008. Manejo Forestal a escala de Paisaje: Un Enfoque para satisfacer Múltiples Demandas de la Sociedad hacia el Sector Forestal. Apuntes CATIE, 14(1): 181:199, http://biblioteca1.infor.cl/DataFiles/26528.pdf

[117]See the news "Manejo integrado de cuencas hidrográficas pudo haber aminorado los efectos en Atacama" (Integrated management of hydrological basins could have ameliorated the effects in Atacama"): http://radio.uchile.cl/2015/04/25/el-manejo-integrado-de-cuencas-hidrograficas-pudo-aminorar-los-efectos

[118]De Groot RS, PJ van der Meer. 2010 ibid.

[119]Campos, J., Villalobos, R. 2008 ibid.

[120]Sayer et al. 2013 ibid.

[121]Bauhaus, J., Pokorny, B., van der Meer, P., Kanowski, P., Kanninen, M. 2010. Ecosystem goods and services – the key for sustainable plantations. *In* Bauhus J, P van der Meer, M Kanninen eds. Ecosystem Goods and Services from Plantation Forests. UK, USA. Earthscan. p. 205-227.

[122]See the case of the "Sustainable Forest Mosaic Initiative" by FibriaCelulose S.A. in Brazil: http://newgenerationplantations.org/en/casestudies/21

[123] Kanowski, P. 2015. Background Paper: Intensively Managed Planted Forests (IMPF) – Durban, South Africa. The Forests Dialogue, Yale, http://theforestsdialogue.org/sites/default/files/tfd_impf2_background_paper_24aug15.pdf

[124]FAO. 2015. Global ForestResourcesAssessments. http://www.fao.org/forest-resources-assessment/current-assessment/en/

[125] Kanowski, P. 2015 ibid.

[126] Mayer et al. 2015. Patterns of Global Biomass Trade – Implications for food sovereignty and socio-environmental conflicts. *EJOL* Report No 20. 106 pp.;
To, H., Grafton, Q. 2015. Oil prices, biofuels production and food security: past trends and future challenges. Food Security, 7 (2): 323-336.

[127]For a detailed summary see: Co Chairs' Summary on Understanding Deforestation-Free (UDF). 2014. The Forests Dialogue (TFD). http://theforestsdialogue.org/initiative/understanding-deforestation-free-udf.

[128]Co Chairs' Summary on UDF. 2014. TFD ibid.

[129]Comisión Nacional de Energía (NationalCommission of Energy). 2015. Studies. http://www.cne.cl/estudios/; http://www.revistaei.cl/2015/10/22/cne-corrige-proyeccion-de-demanda-electrica-ya-no-se-necesitara-instalar-el-equivalente-a-seis-ralco/

[130]See them in detail onhttps://sustainabledevelopment.un.org/sdgs

[131]CIFOR. 2016. CIFOR Strategy 2016-2025 – Stepping up to the new climate and development agenda. Bogor, Indonesia: CIFOR. www.cifor.org

[132]CONAF. 2015. Plantaciones efectuadas durante el año 2014. http://www.conaf.cl/wp-content/files_mf/1444913474Plantaciones2015.pdf

[133]Leyton, J. I., 2009 ibid.

[134]Inostroza, T. 2013. Chile Compra: Hacia un Mercado de Compras Públicas Inclusivas y Sustentables. http://www.mma.gob.cl/1304/articles-56034_Trinidad_Inostroza_Chile_ChileCompras.pdf

[135]Elson. 2012. Guide to Investing in Locally Controlled Forestry.http://theforestsdialogue.org/initiatives/ILCF

[136]Elson. 2012. ibid;

For a general reference see: Gunningham and Sinclair. 2002. *Leaders and laggards: Next-generation environmental regulation.* Greenleaf Publishing. 224 pp.

[137]Some small timber associations group a number of small timber producers, many of those base their livelihoods on forestry, farming and other economic activities; e.g. http://pymemad.cl/#/about; http://www.probosque.cl/

[138]Muñoz et al. 2014. Background on the collection and marketing of non-timber forest products (NTFPs) in rural towns in the Maule Region, Central Chile. Bosque, 36(1): 121-125.

[139]Pichicón, M., 2006. Modelo de Trabajo con mujeres y manejo de la biodiversidad desde una perspectiva mapuche, *in* Bosques y comunidades del sur de Chile (Eds, Catalán, R., Wilken, P., Kandzior, A., Tecklin, D. and Burschel, H.) Editorial Universitaria, Santiago, Chile, pp. 283-290.

[140]Muñoz et al. 2014 ibid.

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[142]E.g. see http://www.corma.cl/medioambiente/sustentabilidad-ambiental/energia

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