Narrating changing foodways: wild edible plant knowledge and traditional food systems in Mapuche lands of the Andean Temperate Forests, Chile

by

Antonia Barreau Daly

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ABSTRACT

Despite increases in food production worldwide, we face a global food crisis. Yet, the literature on food vulnerability tends to emphasize cultivated foods, overlooking the importance of wild edible plants. This work explores the state of ethnobotanical knowledge on wild edible plants and changing foodways in a Mapuche community residing in the Andean temperate forests, Chile. This research contributes to an understanding of the influence of historical and contemporary eco-cultural processes on traditional ecological knowledge and food systems. I used ethnography, complemented with ethnobotanical techniques, weekly food diaries, local market surveys and oral histories. A total of 47 wild edible plants (28% exotic) belonging to 34 families were recorded. While some species were still consumed, many were no longer used. Despite a wealth of knowledge held by adults and elders, new generations were not learning what the elders had once learned. Since the Mapuche pedagogy is oral and in situ, the lack of access to forests and the formal school regime were reported as interrupting the transmission of environmental knowledge and skills. The decreasing consumption of wild edibles was mostly associated with a lack of access to gathering sites due to land grabbing, the scarcity of many species, the absence of children to go gathering and the loss of knowledge as a result of temporary migration. Wild edible plants are part of a wider Mapuche food system which, according to participants, has drastically shifted overtime. These shifts and increasing dependence on industrialized foods were associated with common chronic health conditions and lower life expectations. The decreased use of wild edibles and the changes on traditional foodways are interlinked, and land tenure regimes are a key for understanding current scenarios. While ancestral land claims remain unresolved, protected areas that surround the community may play an important role for local wellbeing by reinforcing knowledge systems and traditional practices related to food procurement and healthcare. Projects aiming to revitalize traditional foods are needed to recover the local food cultures of indigenous peoples for long-term collective health, and the reclamation of food sovereignty as a right.
PREFACE

This dissertation is an original, unpublished, independent work by the author, Antonia Barreau Daly. The fieldwork, conducted between November 2012 and April 2013, was covered by UBC ethics certificate number H12-02151.
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DEDICATION

A Tomás y mi Nahuel
Por estar conmigo
Por hacerme inmensamente feliz
Y por las innumerables noches sin dormir
... pero juntos
1. INTRODUCTION

This work investigates traditional ecological knowledge of wild edible plants by a Mapuche indigenous community inhabiting the temperate forests of southern Chile. It analyzes key dimensions like availability, accessibility, cultural acceptability and the hold of specific plant knowledge to successfully make use of food plants. These dimensions are contextualized and related to historical and present eco-cultural processes influencing today’s use of wild edible plants, foodways\(^1\) and management decisions for Mapuche families. Wild edible plants are considered part of the Mapuche traditional food system which is, as the culture itself, constantly changing and adapting. The dynamics of food and health systems are explored, and the impacts that these shifts may have on local subsistence, knowledge systems, and prominently, people’s health are investigated. Nutritional transitions and the loss of traditional ecological knowledge of wild foods are contextualized within the broader domain of food sovereignty as a political concept that asserts the rights of people to define their own food systems.

1.1 Wild edible plants for food sovereignty and health

Despite important increases in food production worldwide, we face a global food crisis (Rosin et al. 2012). With one billion people undernourished, two billion malnourished, almost one billion suffering chronic hunger, nearly two billion overfed and food prices continually rising, globalization has impacted food systems and food sovereignty\(^2\) at all levels (Alexandratos and Bruinsma 2012; FAO 2009; Rojas 2009; World Health Organization 2014). The prevailing economic

\(^{1}\) Foodways can be defined as the cultural, social and economic practices relating to the production and consumption of food. The intersection of food with culture and history is understood through the study of foodways (Darnton 2012). This includes all of the activities, attitudes, beliefs and behaviors associated with the food in people’s daily life, including customs of food production, procurement, preparation, presentation, consumption, marketing and uses of food products other than for eating of a people, region or historical period (MacDowell 1982). According to Harris et al. (2005),"...everything about eating including what we consume, how we acquire it, who prepares it and who’s at the table – is a form of communication rich with meaning. Our attitudes, practices and rituals around food are a window onto our most basic beliefs about the world and ourselves."

\(^{2}\) The latter being a much stronger and more political concept as it asserts the rights of people to define their own food systems in an ecologically, socially, economically and culturally appropriate ways according to their unique circumstances (Definition of food sovereignty from the Declaration of Nyéléni – Forum for Food Sovereignty 2007). In contrast, food security refers to availability for meeting daily dietary needs. According to Rojas (2011), the concept has evolved to comprise a broader set of dimensions (e.g. accessibility, affordability, utilization, stability, among others).
model has led to a wave of ecological and cultural (hereafter eco-cultural) degradation (i.e. quality loss) and homogenization (i.e. diversity loss) that has deeply transformed ecosystems and associated local food systems, which are an integral part of people’s cultures (Anderson 2010; Ibarra et al. 2011; Kuhnlein et al. 2009; Rozzi 2003). These transformations have also had dramatic health effects since nutrition-related chronic diseases are becoming more frequent (Kuhnlein and Receveur 1996; Uauy et al. 2001). While today, the world’s food basket diversity is shrinking and simplifying at an alarming rate, with only around 20 domesticated species supplying up to 85% of the world’s food base, the literature on food vulnerability still tends to emphasize cultivated foods, overlooking the importance of wild edibles (Abbasi et al. 2013; Bharucha and Pretty 2010; Scarpa 2012; Sunderland 2011; Turner et al. 2011).

Wild edible plants (e.g., those yielding edible leaves, flowers, stems, fruits, seeds or starchy underground parts, including fungi), refer to species that are neither cultivated nor domesticated, but are accessible from their natural environments and used for nourishment (Lulekal et al. 2011). Human societies all over the world have depended on wild edible plants for hundreds of thousands of years (Turner et al. 2011). Numerous types of edible plants can be found in all types of ecosystems from arid deserts to temperate rainforests (Eyssartier et al. 2011a; Grivetti and Ogle 2000; Kane 2011; Turner et al. 2011). While historically, wild edible plants were sole dietary components for hunter-gatherer societies, at present, they remain significant constituents of the food systems of many agrarian societies who continue to rely on these species to meet part of their daily nutritional and cultural needs (Afolayan and Jimoh 2009; Bharucha and Pretty 2010; Lulekal et al. 2011; Turner et al. 2011).

Due to their important role as sources of energy, fiber and micronutrients, the consumption of wild edible plants can contribute to dietary diversity and maintenance of health (Afolayan and Jimoh 2009; Arnold et al. 2011; Grivetti and Ogle 2000; Nabhan 2014; Ogle et al. 2003; Pfoze and Kumar 2012). Multiple compositional and nutritional studies have shown the nutritious values of wild edibles plants (Lulekal et al. 2011). In addition, countless wild edible plants that are retained in local food systems are inseparable from traditional therapeutic systems, having a dual role (Abbasi et al. 2013; Etkin 1982, 2006; Ogle et al. 2003). Accordingly, the literature has coined the term “traditional functional foods” to those plants that are ‘good for your health’, traditionally used both as foods and as medicines (Valussi and Scirè 2012). For example, Afolayan and Jimoh (2009) showed that the protein and mineral values of four leafy wild species consumed in South
Africa were found to be comparable with or higher than those of commonly cultivated vegetables. Schreckinger and Lotton (2010) studying South American berries, proved their rich and diversified composition of bioactive compounds with health promoting properties. Analysis on different wild mushrooms has illustrated their high protein and fibre contents, low fat/energy concentrations and their importance as sources of nutraceuticals³ (Agrahar-Murugkar and Subbulakshmi 2005; Barros et al. 2008a; Díez and Alvarez 2001; Kalač 2009; Longvah and Deosthale 1998; Sanmee 2003).

Wild edible plants can also play a key socio-economic role as natural dyes, shelter, fibers, and in the culture’s cosmology, as some species are used for sacred and ceremonial purposes (Abbasi et al. 2013). Therefore, for many peoples, including indigenous groups, the contribution of wild edible plants goes beyond nourishment (Pilgrim et al. 2010). For indigenous societies, the use of wild edibles is a source of cultural identity, reflecting a deep connection to the land and the hold of a complex body of knowledge about the environment and its dynamics, survival and sustainable living known widely as traditional ecological knowledge (Turner et al. 2011, p. 200). Traditional ecological knowledge, which includes the ethnobotanical knowledge, is not only an accumulated body of knowledge passed through generations, it is a type of knowledge that is embodied in the practice, rooted in the landscape and interlaced with a system of beliefs about nature (Berkes et al. 2000; Ingold 2001; Toledo 2002). Consequently, with the underestimation of the importance of wild edible plants comes the danger of ignoring the nurturing and healing landscapes and traditional ecological knowledge systems that sustain the diversity of local food systems (Bharucha and Pretty 2010; Grivetti and Ogle 2000; Mazhar and Buckles 2007; Pilgrim et al. 2008).

1.2 Forests as sources of nourishment

For local communities that live in close relation with forests, forest ecosystems are a vital source of biodiversity and, as such, are intimately linked to people’s food, health, socio-economic and belief systems in many fundamental ways (Arnold et al. 2011; Herrmann 2005; Ingold 2001; Laird et al. 2011). Evidence indicates that more than 300 million people currently gain part or all of their livelihood and food from forests (Abbasi et al. 2013; Bharucha and Pretty 2010; Pimentel et

³ Nutraceuticals can be defined as substances that may be considered a food or part of a food that provides health benefits like the prevention and treatment of disease (Barros et al. 2008b).
An ecosystem that has been well-conserved for generations can provide at least the minimum food and food diversity to support good health and social function (McCune and Kuhnlein 2011). Forests provide wild game, fish and edible plants, which are free and healthy foods and, for which, local people usually hold a vast knowledge. Examples of this are the over 500 plant and fungus species known among Aboriginal peoples of northwestern North America to have particular cultural uses, the majority being forest species (Kuhnlein and Turner 1991; Turner 2000). In southern Chile, the Mapuche of Icalma recognize uses for 97% of the plants of the mountainous forest ecosystem, including native and introduced species (Bragg 1981). Because forest foods may add essential nutrients and minerals that people might not obtain otherwise, in addition to the multiple functions they can provide (e.g. medicinal, ceremonial, handicrafts and construction materials, among others), they should be considered more than just a ‘safety net’ as they are referred to in much of the literature (Delang 2006a; Karjalainen et al. 2010). Their contributions can also support people’s nutritional resilience in the face of socio-cultural, economic and environmental change (Powell et al. 2011).

It has been suggested that communities that incorporate wild edibles in their diets are more likely to be secure in terms of food provisioning (Arnold et al. 2011; Delang 2006a; Ibarra et al. 2011). More importantly, because forests can offer local communities with a substantial quantity of foods, while being ecologically sound and culturally acceptable, forest biodiversity can strengthen people’s food sovereignty (Arnold et al. 2011; Delang 2006b; Ibarra et al. 2011; Karjalainen et al. 2010; Sunderland 2011). But what people use as food from the environment is a multi-factor based choice contextualized in space and time, and dependent on key dimensions like availability, accessibility, cultural acceptability and the hold of a localized traditional ecological knowledge which incorporates practical knowledge in order to successfully make use of the existing resources (Berkes 2012; Kuhnlein and Receveur 1996; Myers et al. 2004; Turner et al. 2011). Therefore, the use of forest wild edible plants relates to a wide range of environmental, societal, and personal influences (Kuhnlein and Receveur 1996). For many indigenous groups that have long made use of these forest resources, historical and contemporary socio-ecological processes, such as land grabbing, displacement, forest degradation and changes in land use, have limited the use of wild edible plants. On the other hand, collective processes of acculturation, migration and lifestyle changes have replaced wild foods with industrialized foods that are associated with such concepts as progress, modernity and development (Delang 2006a; Kuhnlein 1997).
and Receveur 1996; Uauy et al. 2001). Knowing where a specific edible plant grows, what the plant looks like, what part of the plant is needed, the seasonality and regeneration cycles and techniques for harvesting, processing and preparing in sustainable ways, are necessary in order to successfully and safely consume specific wild edible plants. The erosion of this ethnobotanical knowledge can also interfere with the consumption of wild edible plants as knowledge is no longer transmitted (Ladio 2001). Consequently, the frequent stigmatization of wild foods as the ‘food of the poor’, ‘reserve food in case of famine’ or ‘minor forest products’ does not help the continuity of forest wild edible plants consumption and associated ethnobotanical knowledge (Delang 2006a).

### 1.3 Traditional food systems in a changing world

Food systems, as well as traditional ecological knowledge, are not static. Rather, they are in constant evolution and adaptation (Berkes 2012; McCune and Kuhnlein 2011; Zent 2009). With the encroachment of industrialized food resources into all corners of the world, changes in indigenous peoples’ food systems is global (Kuhnlein and Receveur 1996; McCune and Kuhnlein 2011). Today, many indigenous groups are increasingly distant from traditional foodways, as they become more disconnected from natural ecosystems and more dependent on industrialized foods (Damman et al. 2008; Kuhnlein et al. 2004; Pilgrim et al. 2010; Pyle 2003; Uauy et al. 2001). The shift towards modern market-based foods generally has adverse impacts on local subsistence, knowledge systems, biodiversity and, prominently, people’s health (Damman et al. 2008; Ibarra et al. 2011; Kuhnlein and Receveur 1996; Kuhnlein et al. 2007; Popkin 2004). Rapid dietary change of indigenous peoples is posing threats to the use of traditional foods, such as wild edible plants, and the traditional ecological knowledge required for traditional food system maintenance (McCune and Kuhnlein 2011). Such nutritional transitions lead to increasing rates of obesity and chronic nutrition-related diseases, especially among indigenous groups (Burns and Thomson 2006; Diamond 1992). In response, there has been an emergence of ‘traditional foods revitalization projects’ that aim to maintain and reclaim the food culture of indigenous peoples and, more broadly, reconnect people to the land and the foods it provides for long-term individual and collective health, and food sovereignty (Krohn and Segrest 2010; Pilgrim et al. 2010). Communities
involved in these projects are reviving the livelihood skills, practices and knowledge needed to find, gather and prepare traditional foods (Pilgrim et al. 2010).

Furthermore, since traditional knowledge on wild edible plants is being eroded along with indigenous people and their cultures, encouraging research on wild food plants is critical so as to safeguard this information for future societies (Lulekal et al. 2011, p. 72).

1.4 Research questions and objectives

“Traditional food systems, once lost, are hard to recreate, underlining the imperative for documentation, compilation, and dissemination of knowledge of biodiversity and its uses, especially when it is eroding in the face of acculturation and globalization” (Ibarra et al. 2011, p. 13; Johns and Sthapit 2004)

In the southern Andean temperate rainforests of Chile, Mapuche indigenous communities are living in close relation with forests ecosystems dominated by *Nothofagus* species and Monkey-puzzle trees (*Araucana araucana*) in the higher elevations. The name Mapuche, meaning people (=che) of the land or earth (= mapu), reflects their interdependence with the landscape they inhabit (Rozzi 2008). Wild edible plants of the temperate forests have been, for centuries, gathered by Mapuche families as a complement to their crop-livestock system (Bengoa 2003; Coña and de Moesbach 2010; Montalba and Stephens 2014). Since the Mapuche, as a nation, dwell in a vast biogeographic territory, different degrees of interrelatedness with the natural environment may be found. To date, some ethnobotanical studies have been conducted in different Mapuche communities (Coña and de Moesbach 2010; Contreras 2009; Egert and Godoy 2008; Gumucio 1999; Herrmann 2005; Meza and Villagrán 1991; de Mösbach 1992; Smith-Ramírez 1994, 1996; Valenzuela 1981; Villagrán 1998), but most of them have been conducted in Argentina (Ladio and Lozada 2000, 2003, 2004a, 2004b; Ladio 2004; Molares and Ladio 2012; Rapoport and Ladio 1999). There is a need for studies addressing the Mapuche traditional ecological knowledge through a more relational perspective in order to understand the interrelatedness between the state of this knowledge, the maintenance of knowledge transmission and their relation to historical and

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4 Some successful examples are found in indigenous communities of North America: The Traditional Foods of Puget Sound Project (Krohn and Segrest 2010); The Lummi Traditional Foods Project and The Muckleshoot Food Sovereignty Project of the Northwest Coastal Indians; and The Mino-Miijim (good food) Program of Mississippi Band Anishinaabeg (White Earth Land Recovery Project 2011).
contemporary ecological and cultural processes. This thesis addresses the state of ethnobotanical knowledge of wild edible plants and its transmission in a Mapuche community in the Andean temperate forests, as only one domain of the countless complex patterns of traditional ecological knowledge (Wyndham 1993).

Accordingly, the first objective of my research is to (1) document ethnobotanical knowledge and current consumption of forest wild edible plants in order to answer the following questions: What do Mapuche people know about wild edible plants? How is this knowledge put into action? Is this knowledge transmitted to younger generations? The second objective is to (2) explore local perceptions of current and past people-wild edible plant relations, foodways, knowledge systems and landscape change, aiming to answer the question of: What do people perceive has been the evolution of traditional knowledge on wild edible plants and food practices in their life and communities? An ultimate goal is to (3) investigate the factors and historical eco-cultural processes influencing today’s use of wild edible plants, food choices and management decisions for Mapuche families: What are the restrictions or difficulties for consuming or reasons for deciding not to include wild edibles in their food systems? According to their perceptions, in what way are these changes and/or restrictions related to historical eco-social processes in the region?

Food systems offer important insights for understanding the functional and relational aspects of the culture, environment and health of the people using them. Wild edible plants are local foods and part of this system. The research was planned with the purpose of contributing to efforts to assist a specific Mapuche group interested in re-rooting their food systems and, in so doing, revitalize ethnobotanical knowledge and determine the local manifestations of globalization of food systems upon them. Outcomes will provide insights into how plant knowledge and food systems evolve as an adaptation to changing human-environment relations due to historical processes of eco-cultural homogenization. Additionally, they will inform how access to forest ecosystems can contribute to the maintenance of traditional ecological knowledge, food sovereignty and long-term health for community members.
2. STUDY AREA AND RESEARCH PARTICIPANTS

2.1 Ecological characteristics

The study was carried out in Menetue (39° 19´ S, 71° 43´W) located in the Andean zone of La Araucanía Region of central-southern Chile (IX region), Cautín province (Figure 1). La Araucanía Region ranges from 35°35’ and 39°37’ south latitude, limited by Argentina to the east and the Pacific Ocean to the west. Menetue, although belonging to the Pucón district, lays in the boundary with the Curarrehue municipality, being its nearest town. Although it is only 26 km away from Pucón, it can be considered an isolated area of difficult access because there are only two roads, one which is very steep and in poor condition, and most of the times, impassable during winter. The climate is temperate, with a mean annual precipitation of 1,945 mm, falling as snow in higher altitudes (> 750 m.a.s.l.). The mean temperature is 15.1°C for the warmest month and 1.9°C for the coldest month usually June and July (Di Castri and Hajek 1976). Elevations range from 300 to > 1,500 m.a.s.l. in mountainous topography. The vegetation is comprised of deciduous forests dominated by Nothofagus species at lower altitudes and mixed deciduous with conifer forests at higher altitudes (Gajardo 1993). In higher elevation habitats, high-Andean deciduous forests are dominated by the conifer Araucaria araucana, a species that extends to the tree-line at approximately 1,500 m.a.s.l. (Gajardo 1995; Veblen 1982). Temperate forests cover approximately 29% of the Region (908.501 hectares), and are largely protected in several National Parks, National Reserves (304.990 ha, 9.58% of total regional area) and private protected areas.

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5 The area has recently received the status of Biosphere Reserve, the “Araucarias Biosphere Reserve” (UNESCO 2010), and presents one of the highest densities of protected areas in the country.
Figure 1. Study area. Red dot indicates the location of the indigenous community. Bare soil areas correspond to high altitude zones, and in most cases, are volcanoes.

The landscape is characterized by valleys where agricultural fields, native forest fragments of diverse sizes, exotic tree plantations, lakes and rivers constitute a heterogeneous mosaic in the lowlands. These plains give way to increasingly forested slopes interspaced by grasslands and shrublands, which turn into woody mountains as the elevation increases. Some culminate in volcanoes such as the Villarrica and Quetrupillan. In the municipality, protected areas are represented by two national parks (Villarrica and Huerquehue), one national reserve (Hualalafquen) and two private land conservation initiatives (Santuario El Cañi and Namuncahue), all located at high Andean locations (> 700 m.a.s.l). Lowland forests surrounding these protected areas are considered to be a conservation priority as they are constantly threatened by the

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6 Small (8-20 ha) and large (100-300 ha) forest fragments (Söhn 2012).
establishment of exotic tree plantations and increasing development pressures (Armesto et al. 1998).

In the foothills of the Andes, there are Mapuche farms and communities interspersed with fundos (large farms) characterized by intense logging history and, more recently, cattle (sometimes deer) ranching. The indigenous population comprises 29.2% of the total inhabitants of the district (22,168 total inhabitants), close to 6,500 people, mainly concentrated in rural areas and a growing presence in the urban centre, Pucón (INE 2005). Seventeen indigenous communities are located within the district, mostly located in the pre-Andean zones. They are distributed in 13 rural sectors such as Quelhue, Quetroleufu, Carileufu, Huife, Coilaco Bajo, Pichares, Menetue, San Luis, Relicura, Loncofilo, Palguín Bajo, Llafenco and also the urban sector of the district capital. The district’s main economic activities are tourism, agriculture and forestry, as well as livestock and fish farming, according to the 2002 national census (INE 2002)7.

In the Pucón district, the land is distributed unequally: large surfaces are occupied by fundos, which own several hundred or thousand hectares. The majority of the rural population lives, nonetheless, on very small properties (Söhn 2012). Mapuche people in Menetue own small farms (< 5 ha) which are disperedly located as two large fundos, owned by non-Mapuche outsiders, divide the community, interfering with their social and spatial fabric. Mapuche families live in close association with non-indigenous rural families most of them immigrant descendants. Steep unpaved roads connect all the families, each owning a small farm with some remnants of temperate forest. Simple houses are immediately surrounded by home gardens, a quinta (orchard) and chacras (potato fields), which are followed by very well defined grasslands for cattle and crop fields (Figure 2). There is a pampa or nguillatwe (arena) for the celebration of the Nguillatun, as well as an Indigenous cemetery in the lowlands.

7 Pucón can be described as a very polarized municipality due to the co-occurrence, which does not means interacting, of rurality and its inhabitants - indigenous and non-indigenous - and the tourism industry. It is one of the most important touristic spots of the country with almost 400,000 tourists visiting each summer (SERNATUR 2013).
In addition, this region is one of the poorer ones in the country, with high poverty indices and socio-economic inequalities. This is reflected in the facts that 42% of the Mapuche in La Araucanía Region subsists under the poverty line and 15% live in indigence situations, due to historical national and regional policies that have not respected the rights and integrity of indigenous peoples and the establishment of a neoliberal economic model which is, still today, the prevailing development model.

2.2. Ethnographic background

2.2.1 The term “community” for Mapuche

For the present research, the term “community” will be used to refer to Mapuche indigenous groups as a socio-cultural organization inhabiting a certain territory, but it is important to be aware of the history of the concept as it may not be coherent with the “indigenous community” conception that the reader may have, as well as for some Mapuche ways of thinking, especially among elders.

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In Chile, households whose income is less than the minimum to meet the basic needs of its members, are considered to be under the poverty line (the poverty line for 2009 was estimated in CHL $64,134 per person in urban areas and $43,242 in rural areas). Households whose incomes are less than the minimum established to meet the food needs of its members are considered to be in a situation of indigence (the indigence line for 2009 was estimated in CHL $32,067 per person in urban areas and $24,710 in rural areas) (Ministerio de Desarrollo Social de Chile 2009).
The term community was first used for Mapuche people in the Indigenous Law (Law 19.253) of 1993 during Patricio Aylwin’s Government. In the text of this law, the term, “indigenous communities” was used to replace the original term, “reducción indígena” or indigenous reservation that was used between 1884 and 1919 in a process called “Ley de Radicación Indígena (Indigenous Establishment Law)”. Through this legal process, the collective right of use of a circumscribed area was given to a number of indigenous families, called “Título de Merced or Merced de Tierra”. This was given by virtue of a writing of transfer issued on behalf of the ‘head’ of the group at the date of issuance (Stuchlik 1999). This is why most reservations are still identified by the name of a person. The aim of this operation was to provide and enhance the public lands of the Chilean Government under a vision of economic expansion and, of course, to limit the scope and usage of the overall landscape by the indigenous people (Toledo Llancaqueo 2006). In this reservation, the Mapuche people could survive, but were isolated from the rest of the Chilean society (Bengoa 2000; Miranda 2013; Montalba and Stephens 2014)\(^9\). After independence in the early 1800’s, the Chilean government began an intensive wave of transformation characterized by a strong Euro-centrism. In order to “improve the breed” and enlarge the labor force, Chile promoted the immigration of European settlers to different parts of the country (Bengoa 2000). In the Mapuche territory in southern Chile, the government promoted the transfer of indigenous territories to German farmers that not only dispossessed and displaced Mapuche people from their lands, but also burned and cleared great expanses of temperate forests in order to open lands for agriculture and cattle (Rozzi 2003). As a general trend, less desirable lands were granted to Mapuche people (Armesto et al. 2001; Montalba and Stephens 2014; Peredo and Barrera 2005). Therefore, Mapuche people living in rich soils areas were displaced to low productivity areas sometimes with extreme weather conditions, such as the mountainous lands.

Because of the conflicts that arose in the region as the European settlers invaded the Mapuche territory, the government undertook a single-minded military campaign in 1861 to control the Mapuche, called the “Pacificación de la Araucanía” (pacificación meaning peacemaking) (Rozzi 2003). This process, more aptly referred to as the Araucanía occupation, was the strategic and repressive policy of expansion and subordination of the Mapuche people pursued by the Chilean state. The expansion was a simultaneous and coordinated process on both

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\(^9\) During this period, 3,078 Mercy Titles (Títulos de Merced) comprising 475,000 hectares were given to 78,000 people. In 1929, this process was terminated when the Ley de Radicación Indígena was repealed.
sides of the Andes mountain range, called “Campaña del Desierto” by the Argentinian government (Toledo Llancaqueo 2006). The Títulos de Merced and process of indigenous reservations were introduced as remediation measures to the dispossession and dismemberment of the Mapuche nation after the Araucanía occupation (Consejo Nacional de la Cultura y las Artes 2011). The Mapuche Nation (Wallmapu) was violently invaded, fragmented and incorporated militarily to the sovereignty of the Chilean and Argentinian states in a process of republican expansion, unleashed by deep ideological, geopolitical and economic processes (Toledo Llancaqueo 2006).

One of the more serious issues of this violent reform was how indigenous families were arbitrarily grouped in Título de Merced, disregarding the traditional patrilineal organization. Different families belonging to different lineages, thus under the authority of different chiefs (called Lonkos or Caciques), were grouped in the same reducción or indigenous reserve, creating major disputes and conflicts. Through this process, many community leaders, such as the Lonkos, lost their authority (Miranda 2013). Therefore, the concept of “community” is alien to previous generations of Mapuche society and it only appears in the post-reducionista period replacing the traditional Mapuche social and spatial organization called “Lof or Lovche” which comprised more extensive territorial units and social structures (Bengoa 2000; Cayuqueo 2012). Traditionally, a Lof corresponds to the basic unit of organization rooted in the patriarchal family, comprising a group of families related by blood that occupied a common territory and that recognizes a common Lonko as their main political figure or chief. Therefore, the Mapuche community, as well as the concept comunidad reduccional, do not represent a traditional social organization, and do not imply a specific political or economic integration. Rather, the term denotes a territorial and social organization imposed by the dominant culture (Faron 1969; Perasso 2012).

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10 This is why elders still talk about reducción instead of community, as it makes more sense to them. They tend to refer to someone and let you know of what reducción he or she belongs to.

11 As described in literature, once there were other higher levels of organization that apparently are no longer in practice (at least not explicitly), since they were not mentioned or observed during the investigation. Traditionally, a group of Lofs, related to each other by kinship or through economical alliances, formed a Rewe as a secondary level of social organization. The Ayllarewe appears as a greater and third level of organization composed by several rewes (nine) and which were strengthened with traditional ceremonies, other social or economic activities and reinforced through the covenant marriages among the most influential families (Bengoa 2000, 2003; Municipalidad de Pucón and Programa Orígenes de CONADI 2012).
The re-settlement process remained unfinished in 1927, and since a series of laws and decrees began to be enacted in order to liquidate the indigenous community property (Toledo Llancaqueo 2006). Originally, a reservation was, by law, a unit of undivided ownership of land. In 1979, through the post-military coup reform process, the Decree Law No. 2568 was issued, amended by Decree Law No. 2750, which established the mechanisms to divide the Mapuche reservations. The most visible effect of the application of the Decree 2.568 was in land tenure, transforming the common property into small individual farms. By 1986, 1,739 reservations had been divided already, which resulted in 48,346 small Mapuche farms, leaving only 288 reservations to divide (Toledo Llancaqueo 2006). Consequently, the delivery of individual titles left the Mapuche in a situation of vulnerability which has facilitated the appropriation and usurpation of land by non-Mapuche individuals and institutions, including the Chilean Government.

Even though the political and social structures have definitely been simplified over time, the community, as a spatial unit, has been, over the years, the space where Mapuche families have recreated their culture and have re-structured their socio-political organization (Sierra 2010). Today, according to CONADI’s\textsuperscript{12} official records, community members of these indigenous communities or indigenous associations (with juridical personality) as they are also referred to, are formally or legally considered socios - meaning partners - of the community and a sort of ‘administrative’ board is recognized, composed of a president, vice-president, secretary, treasurer and counselor, disempowering the leading figure of the Lonko\textsuperscript{13}. Families are not always related by blood and the political figure of the Lonko, even though still present in most communities, has partly lost his authority due to the lack of indigenous autonomy. The authority of the Lonko is relegated to the realm of religious ritual (Faron 1969).

In Chile, the terms reservation and community are often used interchangeably (Stuchlik 1999). Although, in Menetue, most elderly and some adults in the community still use the word reducción, for the purpose of this research, the term community will be used as it is the word used today by most of the adults and younger generations.

\textsuperscript{12} Corporación Nacional de Desarrollo Indígena (National Corporation of Indigenous Development) was created in 1993 together with the enactment of the Indigenous Law No. 19,253. It is responsible for the inscription and registration of Indigenous Communities and Associations and also for granting legal personality.

\textsuperscript{13} These types of communities are not necessarily pre-constituted. Many have been constituted and registered to be eligible for the benefits of the law.
2.2.2 The community of Rayen Lelfun in Menetue: social and cultural overview

In the official records of the CONADI, Rayen Lelfun was constituted in December 2002, and is composed of 20 families (and 39 partners or members\textsuperscript{14}), but in 2012 there were, about 15 families left as the rest have migrated to urban settlements mainly Pucón or Villarrica, but also nearby villages like Curarrehue or Catripulli. In particular, young adults and couples migrate to find better working opportunities in urban areas. Therefore, the population in the community is aging, reflected by fewer children and youth. According to the census I conducted, the average age in the community is 46 years and households are made up of three people on average, deeply contrasting with the family structure of the previous generation where, according to adult participants, families were constituted by parents, six or ten children and sometimes grandparents (more than eight family members per household). The community still has a Lonko, which is the eldest man in the community and most of the families are related to him by blood. He represents the community in traditional events and religious ceremonies and also acts as a representative (not legally), along with the president of the community, in matters of municipal affairs and politics. Although the figure of the Lonko in the community is still respected and valued, in everyday life he no longer has the authority he used to have to make decisions for the community or act as a mediator in internal conflicts, unless he is family-related to either of the affected parties. When the community was established in 2002, the criterion for the grouping of these families was the participation in the Nguillatun, the most important religious celebration for the Mapuche. As the President of the community mentioned to me: “\textit{all the families that participate in the Nguillatun in our pampa (arena) were included in this community. Before, we were all considered under the same Mercy Title and celebrated a single Nguillatun together with the neighbor communities, but when they took from us our old pampa, we divided in three and each has their own Nguillatun}\textsuperscript{15}”. The history of how this particular community was constituted after the process of Radicación Indígena (Indigenous Establishment), is influenced by contemporary

\textsuperscript{14} Community members are over 18 years old; youth and children are not recognized as members.

\textsuperscript{15} [\textit{Todas las familias que entran al Nguillatun en nuestra pampa fueron incluidas en la comunidad. Antes estábamos todos bajo un mismo Título de Merced y sacábamos un solo Nguillatun con las comunidades vecinas, pero cuando nos quitaron la pampa antigua nos dividimos en tres y cada una saca sus propio Nguillatun}] (E ♀ 6)

15
land grabbing\textsuperscript{16}. A Mercy Title of 2,475 hectares was given to the Lonko or Cacique, Julián Collinao in 1908. He divided the land among different families, not without disputes and conflicts as he favoured families and friends with bigger pieces of land (as many participants told me). Today, from this reducción, three small communities or indigenous associations have been formed with less than 20 families each. This situation is common in the area and reflects that indigenous communities or associations with fewer partners or families comprise zones where there are more than two adjacent communities. Therefore, the organization and structuring of communities according to Law 19.253 is often a type of functional organization rather than a territorial one.

### 2.2.3 Local economies

People in Menetue practice agriculture and animal husbandry, raising mostly cattle, pigs and sheep, and chicken (Table 1). Because farms are small, nowadays these agro-pastoral practices are more for subsistence than for commercial purposes. As one elder noted, “\textit{in past times the Mapuche raised so much cattle that from afar prairies seemed to be populated by ants due to the many head of livestock they had}”\textsuperscript{17}. The production and trade of cattle used to be the main economic activity and, therefore, wealth was determined by the number of head of livestock that people possessed\textsuperscript{18}. Today, with a couple of hectares, people try to raise a couple of cows for milking and breeding, and a yoke of oxen for labouring\textsuperscript{19}. As there is not enough land, they usually rent someone else’s land nearby in order to raise more animals if they can afford it. In many cases, families often have more animals than the carrying capacity that the land can support, causing

\textsuperscript{16}As people told and also showed me, they used to have a great Nguillatun celebration which included people from Menetue, Relicura and San Luis (three neighboring locations under the same Merced de Tierra) in a big pampa located in Menetue Alto. Some years ago, a winka bought a farm that included this sacred place where they celebrated the Nguillatun in the title of property. Despite pleas, a purchase offer by the community and a lawsuit against him, they were not able to recover this place. As a result, people had to split and began celebrating three different and smaller Nguillatun, which also corresponds to three different constituted communities.

\textsuperscript{17}\textit{[En tiempos antiguos, los Mapuche tenían tanto ganado que desde lejos los campos parecían tener hormigas de tantas cabezas de ganado que los antiguos tenían]} (I o’14)

\textsuperscript{18}From the mid-eighteenth century, livestock, especially cattle, horses and sheep revolutionized the Mapuche economic system leaving gathering, hunting, fishing and subsistence horticulture in the background (Bengoa 2000; Toledo Llancaqueo 2006). They rapidly perfected Spanish animal husbandry becoming, major producers and traders of cattle, this became the currency of exchange with the Spaniards and also within Mapuche.

\textsuperscript{19}According to census, only 18\% of the families own a yoke of oxen and, on average, they possess 3 cows per household.
serious erosion problems\textsuperscript{20}. In the year when the *Nguillatun* is celebrated in the community, livestock becomes very important as they need meat to feed their invitees for three days, reciprocating to neighboring communities who invited them in previous years. Every household has one or two home gardens where they grow vegetables and useful plants and mainly function during spring and summer. They grow peas, broad and *green* beans, lettuces, carrots, chards, cabbages, onions and maize among others, but also chives, coriander and parsley as condiments. Some women have built greenhouses with plastic coverage as part of municipal or governmental development programs, but because winter is so harsh, not many vegetables can be grown inside. *Chacras*, the name given specifically to a potato garden, are always present and are very important as they provide sufficient potatoes, one of their staple foods, for the whole year. Although there are different varieties of potatoes still planted, many of them have been lost or are difficult to obtain. In addition, every family has an orchard or *quinta* that provides them with fruits, such as plums, cherries and quinces, but most of all with apples in order to make cider, also produced in high volumes to be stored for the rest of the year. These fruits, rather than being eaten fresh, are prized as jams and preserves for the winter. Until very recently, most families used to sow cereals and grains such as wheat, barley, rye and oats, but due to poor soil quality because of a lack of land and poor yields most of them abandoned this activity.

\textsuperscript{20} This has been described as the result of the transition from large scale ranchers to small subsistence ranchers (Bengoa 2003)
The foundation of social life is the patrilineal family as many farming activities were accomplished with the help of kin. Because nowadays extensive agricultural labour, such as wheat plantings, are scarce, most activities can be completed by the nuclear family and there is less need of collaboration between kin. As soon as a woman gets married, she moves to the territory of the husband’s family and integrates into this social network that secures the whole family’s welfare. So it can also be considered that the nuclear family is the basic social unit in which both husband and wife play equally vital and complimentary roles in the functioning of the family economy and social activities. Men are in charge of cattle, the maintenance and fencing of paddocks, managing the fodder, firewood gathering, cider making, grain crops (mainly wheat), wood craftsmanship and many of them have additional remunerated jobs in nearby farms or fundos. Women, on the other hand, are in charge of the household domain which includes all domestic chores, food preparation and acquisition, small animal husbandry (mainly poultry and pigs), home garden maintenance, childcare and especially craftsmanship in wool. They share some tasks like cow milking, planting

**Table 1.** Data gathered by census conducted in the community. December 2012.

<table>
<thead>
<tr>
<th></th>
<th>Average per household</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land</td>
<td>Total Land</td>
</tr>
<tr>
<td></td>
<td>4.5 has.</td>
</tr>
<tr>
<td></td>
<td>Cultivated land</td>
</tr>
<tr>
<td></td>
<td>0.2 has.</td>
</tr>
<tr>
<td></td>
<td>Forest</td>
</tr>
<tr>
<td></td>
<td>0.8 has.</td>
</tr>
<tr>
<td>Livestock</td>
<td>Cattle</td>
</tr>
<tr>
<td></td>
<td>3 units</td>
</tr>
<tr>
<td></td>
<td>Pigs</td>
</tr>
<tr>
<td></td>
<td>1.5 units</td>
</tr>
<tr>
<td></td>
<td>Sheep</td>
</tr>
<tr>
<td></td>
<td>6.8 units</td>
</tr>
<tr>
<td></td>
<td>Chicken</td>
</tr>
<tr>
<td></td>
<td>29.7 units</td>
</tr>
<tr>
<td></td>
<td>Horses</td>
</tr>
<tr>
<td></td>
<td>0.3 units</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>Home garden</td>
</tr>
<tr>
<td></td>
<td>90%</td>
</tr>
<tr>
<td>Chacra / Potato garden</td>
<td>54%</td>
</tr>
<tr>
<td>Quinta /Orchard</td>
<td>73%</td>
</tr>
</tbody>
</table>

*Percentage of households that have the agricultural unit
and harvesting of chacras (potato fields) and confinement of animals, among others. Sons and daughters usually help their fathers and mothers, respectively, in their responsibilities. Although the tasks are fairly gender-specific, new generations admit that nowadays the chores are more shared than before.

2.2.4 Language

The local language called Mapuzungun or Mapudungun (mapu=earth and zungun=speak or speech, the language of the earth), has gradually been lost in the Mapuche territory, surviving in more isolated areas. The cultural dominance of Chilean society imposing Spanish as the official language, together with discrimination and a national education system that does not incorporate multiculturalism into their curriculum, has led to a continual loss of the language among many younger generations (Söhn 2012). Their language has survived the unequal conditions of a language that is oral and spoken by a minority (Aldunate and Lienlaf 2002). Therefore, the use of Mapuzungun has been relegated to certain intra-community spaces and events, due to the low functionality and social status it has in the rest of Chilean society. In Menetue, only some elders can speak fluent Mapuzungun, but most of the inhabitants speak Spanish as their first language and know basic words in the native language. When adults were asked why they did not learn from their parents, there was a general notion that it was due to discrimination. For many of them, their parents preferred not to teach them as they could be discriminated against at school and it could also be an issue when looking for a job. “Sometimes I said to myself, I will talk to my mom in mapuzungun to see how she answers and I would talk to her in mapuzungun and she replied back in Spanish. That made me mad and I used to say to her: how do you want me to learn if I talk to you in mapuzungun and you reply back in winka (winka ~ non-Mapuche, meaning non-Mapuche language), how am I going to learn. She would stare at me without saying a word.”

Discrimination happened even inside families: “My mom married a Chilean who was a bit difficult and did not allow me go to where my grandparents live. They knew a lot [mapuzungun], but I was only allowed to go just for a little while. I would have known much more, if I had spent more time

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21 [De repente yo decía, le voy a hablar en Mapuche a mi mamá a ver que me contesta y le hablaba yo a ella en mapuzungun y ella iba y me contestaban en castellano. Entonces ahí me la agarraba yo: ¡como quiere que yo aprenda si yo te habla en mapuzungun y usted me contesta en winka, como voy aprender yo así! Y me quedaba mirando y no decía nada] (G♀7)
with them”\textsuperscript{22}. A Lonko of a nearby community commented that “the ones that do not speak our Mapuche language are not true Mapuches”\textsuperscript{23}, and he strongly felt that the loss of the Mapuzungun was the biggest harm to the culture as a whole. It meant the loss of their identity and their connection with nature and deities. He highlighted the repercussions that this has had in their traditional ceremonies as they must be in Mapuzungun otherwise the prayers may not be heard. “Ceremonies at the moment are artificial, thus Chau Dios does not hear the prayers. Chau Dios is annoyed because the traditions are being lost. [about the possibility of revitalizing the language] ... it will be impossible because people are used to Spanish and God gets angry”\textsuperscript{24}. That is why those who are fluent speakers and know the chants and prayers in the native language, as he does, are highly valued and therefore are usually invited well in advance to most religious events in the region to guide the ceremonies and rituals.

Even though there is an increasing interest in recovering and learning their indigenous language, most of the community members think it is too late for learning and usually have no one to practice with. Many efforts to revive the language in schools have failed because the form of teaching is not consistent with the Mapuche pedagogy. As was pointed out by a participant: “We learn by ear. Mapudungun has never been taught written that is why efforts like books and dictionaries have failed”\textsuperscript{25}. For children it gets even more difficult as most local schools do not include Mapuzungun in their curriculum, but include English as second language, even though there are a greater proportion of Mapuche children in the classrooms.

### 2.2.5 Religion, belief systems and spiritual practices

Both non-Christian Mapuche religion and cosmology and Christianity are important in the community. Despite the Mapuche having their own religion and cosmology, evangelization has historically been very strong and it still is today, evidenced by the fact that almost every

\textsuperscript{22} [Mi mamá se casó con un chileno que era medio delicado y no me dejaba ir donde mis abuelos. Ellos sabían mucho, pero me dejaban ir un ratito no más. Hubiera sabido mucho más si hubiera tenido más tiempo con ellos] (I♂ 5)

\textsuperscript{23} [Los que no hablan nuestra lengua mapuche no son mapuches perfectos] (I♂ 14)

\textsuperscript{24} [Las ceremonias de ahora son artificiales, por eso chau dios no escucha las rogativas. Chau Dios está enojado porque las tradiciones se pierden. [sobre la posibilidad de revitalizar su lengua]...va a ser imposible porque la gente está acostumbrada con el castellano y Dios se enoja] (I♂ 14).

\textsuperscript{25} [Nosotros aprendimos de oído. El mapudungun nunca se ha enseñado escrito, por eso los esfuerzos de libros y diccionarios no han resultado] (E♀ 6).
community in the area has either a Catholic and/or an Evangelical Church. Most of the community members identify with Catholicism, but without neglecting their Mapuche religion, highlighting that you can have or practice both; “It is good to pray and go to church sometimes, but first I am Mapuche”26. A small percentage of the members of the community have joined the Evangelical Church, which replaces their traditional beliefs and ceremonies as they are considered "pagan ceremonies that worship the devil", as an evangelical participant told me. There is more religious syncretism in the Catholic evangelization that has come from contact with peasant popular religiosity, than through the Catholic Church itself (Sierra, 2010: 45). It is common for many Mapuche to attend big peregrinations and religious festivals, especially those related to the Virgin Mary or patron saints such as San Sebastian (20th of January), San Antonio (13th of June) and San Juan (24th of June), the last of which coincides with the traditional Mapuche new year ceremony called the We Tripantu. There are also many symbols of Christianity found in Mapuche traditional ceremonies or sacred sites that have been reinterpreted from earlier beliefs. For example, a woman told me that, in the past, every grave in traditional cemeteries or eltwe used to have a Chemamüll erected beside it where nowadays you would find a cross27. A Chemamüll (meaning wooden people, Che ~ people or person and mamüll ~ wood) is a Mapuche totem consisting of a carved wooden pole about 2 meters high with humanoid features that served to mark the spot of the bodily remains and acted as a guardian of the soul of the deceased (Figure 3).

![Figure 3](image-url)

**Figure 3.** Images of a traditional Mapuche cemetery. This photograph was taken in 1905 in the Cautín Province. It shows a number of different types of chemamüll used by the Mapuche to the mid-1950s. (Source: Museo de Arte Precolombino, Chile)

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26 “Es bueno rezar y también ir a veces a la iglesia, pero yo primero soy mapuche” (F♂3)
27 According to the Museo Precolombino in Chile, these Mapuche statues date from 1250 AD up until the first decades of the twentieth century (Museo Precolombino, Chile).
As mentioned above, the Nguillatun is a three-day religious celebration, and the most important one, that takes place during spring or summer. Prayers are directed to Ngenechen (meaning “owner of the people”, Ngen ~ owner and Chen ~ people) or Chaw Dios - the supreme being for the Mapuche, and/or synonymous with God for most current Mapuche - and their forbearers for the common good, fertility and abundance of food, strengthened community bonding or acknowledgement of the benefits received. Probably as a consequence of Christian evangelization, Ngenechen is most commonly referred to as Chau Dios, which means ‘Father God’ today (Söhn 2012). Prayers are also directed to wenu mapu chaw and wenu mapu ñuke (wenu ~sky or heaven, mapu ~ land, chaw ~ father and ñuke ~mother), the celestial father and mother.

The Nguillatun happens only every three or four years in each community due to the high economic cost for families, but because every community in the area has a different date, there is always one or more Nguillatun happening which people attend. For the community in which I worked, their next ceremony was to occur in December 2013, but as they were invited to a neighbor community’s ceremony, I had the chance to attend one together with a family that took me with them. A community can invite another whole community or can individually invite relatives and friends, but on rare occasions they invite winkas (non-Mapuche). It is extremely forbidden to take photographs or to film. The ceremony takes place in a pampa (flat piece of land) traditionally called lepun o nguillatuwe which is a sacred place where the rewe or altar is positioned in the middle and the people construct ramadas or küni with wood and branches forming a semi-circle always facing the sunrise (has the shape of a horseshoe open to the east).

Every lineage of family has an established location in the ramada following traditional patterns facing the rewe. The pampa is well respected by the community, not used for any other activity during the time that is not part of the Nguillatun. It usually starts on Friday when the community sets the ramadas and butchers the animals that are going to be eaten and the invitees arrive on Saturday, preferably by horse, before sunrise and goes on until Sunday in the evening. People sleep under the ramadas of the family that invited them. The Nguillatun follows a fairly strict program of actions in which prayers, animal sacrifices, dances and traditional meals are interspersed. Food and drink are very important and should be abundant to reflect gratitude for

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28 As mentioned by participants, the frequency with which the Nguillatun is performed depends on each community but in the area is usually every three or four years. In other places it is held every year and sometimes two times in a year.
what the earth provides. Meat, *sopaipillas* (fried bread) and traditional preparations consisting of legumes and cereals are served three times a day. As a participant told me “*in past times it was forbidden to prepare beef as only horse meat was accepted, but as now people hardly breed horses today any kind of meat is allowed, but pork is prohibited*”\(^{29,30}\). *Muday*, which is a fermented drink made out of grains, most of the times wheat and sometimes maize or *piñones*, is widely prepared and shared, as is apple cider, but to a lesser extent. Alcoholic drinks have been prohibited during the *Nguillatun* in the past, but nowadays it is allowed, even though for some people, especially elders, it is considered offensive. Younger people sometimes drink to help cope with the cold nights.

There are distinguishable and important roles that certain people assume during the ceremony, such as: the *Ngenpiñ* or *Ngenpin* (*Ngen* ~ owner, *pin* ~ to say or tell) who is responsible for leading the ceremony and prayers; the *Pillan Kushe* (*Pilla* ~ spirit, *kushe* ~ old woman or grandmother) who is usually an older women who plays the *kultrun* the ceremonial drum; the *Sargento* that oversees order and good behavior of the participants; the *Kalfumalen* (*kalfu* ~ blue, *malen* ~ girl or young women) who are two young and single girls (not older than 14 years) that represent the pure feminine spirit; the *Capitanes* or *bastoneros* who are in charge of holding the flags and who holds the hearts of the sacrificed animals. Some of these roles are designated by the community, some are inherited and others are appointed through prophetic dreams, but one point that everyone agrees upon is that the person assuming the role needs to speak fluent Mapuzungun. The organization inside the community starts around four months prior to the ceremony, but every family begins buying animals and saving grains that they will need almost a year in advance.

Besides believing in *Ngenechen*, the supreme God, most people in the community believed in the existence of spirits and entities of the natural domain that influence or determine their activities. Of special interest is the existence of *Ngen*, which are the master spirits of nature or the terrestrial stratum (Grebe 1994). The lexeme "*Ngen*" refers generically to the owner of an entity that dominates, commands, rules and arranges, but also that cares, protects and preserves a certain natural entity or landscape. They can also apply punishments to those who act without

\(^{29}\) *Antiguamente estaba prohibido preparar carne de res pues solo se aceptaba la de caballo, pero como ahora la gente casi no cria caballos se permite todo tipo de carnes, menos la de chancho que está prohibida* (I♂ 14).

\(^{30}\) According to the census conducted in the community, 35% of the households owned a horse and just one.
‘ecological prudence’\textsuperscript{31}, and transgress the traditional norms of respectful and reciprocal interaction between man and the rest of ‘nature’ (Berkes 2012; Grebe 1994; Söhn 2012). The Ngen circumscribe their action solely to the wild natural environment inhabited by Mapuches, animals and plants, and generally interact with humans when they try to use the natural element or landscape in their care. The Ngen ko that dominate the water and water bodies (rivers, lakes, spring waters, etc.) are of great importance to the community due to frequent interaction with these natural elements present in their territory. Also important are the Ngen mawida\textsuperscript{32} who command the native forests, especially high Andean forests dominated by monkey-puzzle trees, and the Ngen winkul who own and rule the mountains and volcanoes. In these interactions, when a person enters the domain of a Ngen, he or she needs to engage in a respectful and affectionate dialogue with him. First, you must ask permission to enter the domain and also when using or extracting any element of that domain. To use a natural element under Ngen care, the Mapuche must justify why one needs the item and how much they plan to use for their immediate needs.

Often, people say a prayer, hopefully in Mapuzungun, before entering the forest or a river, light a cigarette, share muday or chicha before taking a drink or commonly leave an offering in the first monkey-puzzle tree before gathering piñones in order to avoid irritating the Ngen (Figure 4).

\textsuperscript{31} The term ‘ecological prudence’, based on Berkes (2012, p.78), is used in reference to the long-term view and contextual understanding of the local ecologies by indigenous people, who will generally act in a way to prevent the depletion of useful resources.

\textsuperscript{32} It was also referred as Ülmen (“noble or rich) by one woman participant as he is the rich and powerful entity of the mountain, or the owner of it.
Figure 4. Piñón gathering trip to Tromen in the high Andes near the limit with Argentina. *Left:* As the sun rises pointing the start of our day, J.H., an elder and Lonko of another community, hugs and makes a prayer to the first kusche pewen (kusche ~ old woman or grandmother, pewen ~ monkey-puzzle tree) we encounter, in order to ask for permission for gathering and also to thank for the food provided for the Mapuche people every year. *Right:* Soon after the prayers and offerings have been completed, J.H. feels safe and allowed to gather piñones, “as much as you need but with respect”

The custom of pouring muday or chicha on the ground, whether in the forests, at home or in the cemetery, not only shows respect for and generosity with the Ngen, but also connects people with the diseased or ancestors as drinks are shared with them and their souls (Gumucio, 1999). The only rule is that it needs to be poured on bare ground. During the research, many stories of disobedience and disrespect towards the mountains or bodies of water were told to me that ended up in punishment (Appendix 1). Therefore, the Ngen’s subsystem generates ethnoecological principles, contributing to an environmental equilibrium, avoiding both over-exploitation and depletion of natural resources, as well as pollution (Grebe 1994).

33[Se puede recoger lo que uno necesite, pero siempre con respeto] (I 8’ 14)
2.2.6 Formal education and labour

In terms of formal education, most of the elders in the community never went to school and the adults attended basic schooling, usually until 4th grade, as they preferred to stay at home and help with agricultural labour (in the case of boys) or household activities (in the case of girls). Today, the local school offers only basic education through sixth grade and, after this, children have to change to a school in the nearby urban centres or, as many do, leave their houses and families to attend boarding schools. Today, parents are very concerned that their children complete their primary and secondary education and encourage them to attend school and do their homework so that they can have a diploma that would afford better opportunities. Adults point out the difference of lifeways between the two generations saying that, “life was tough for us as kids because we were supposed to help our parents very early before going to school and immediately after we came back, so we had very little time for playing or doing schoolwork. Parents were very strict before.”34 As the pieces of land are smaller, children are needed less to help with agricultural labour and also they think that it is more important to have time for studying and doing schoolwork. This means that most men look for full-time jobs on nearby ranches or farms.35 Although most of them are hired full-time, they receive the minimum wage (due to low levels of formal education) or less than that if they do not have a permanent contract. Most women stay at home doing domestic work, but a few seek part-time jobs (once or twice a week), generally in the summer season, cleaning nearby vacation houses or babysitting.

34 [La vida era más difícil para los niños antes porque empezábamos ayudar a los papás muy temprano en la mañana antes de ir a la escuela y también apenas llegábamos de clases. Así que teníamos poco tiempo para jugar o hacer tareas. Los papás de antes eran muy estrictos] (E♀ 6)
35 According to the census conducted in the community, approximately 70% of the heads of the households (male) work full- or part-time outside of their farms.
2.2.7 Summary

Many Mapuche families that inhabit the pre-Andean temperate area of Chile, such as those from the community of Rayen Lelfun, may go unnoticed and cannot be differentiated by the naked eye from a rural non-indigenous family. But a closer look shows us that they are unique and culturally defined. In the times we live in, being Mapuche may not be deciphered from the clothes that they wear, the houses or the language spoken, as indigenous languages are becoming extinct and replaced by “larger” majority languages (Maffi 2005). Rather, as I experienced myself while doing fieldwork, it comes hidden in indigenous ways of thinking and subtle ecologies of the everyday life and interactions with the landscape (Wyndham 2009). These less conspicuous relations can best be approached by qualitative research methods with ethnography at the core, as these subtle ecologies are discernible in the language used to speak of the land, their cosmology, and are manifested in the everyday actions inscribed on the land over time (Wyndham 2009).
3. METHODS AND TECHNIQUES

Comprehending the myriad dimensions of human-landscape relations in any particular context requires the mobilization of diverse methods and perspectives (Wyndham 2009, p. 272). The exploration of these relations through the lens of food, which is at the core of this relation, and more specifically traditional ecological knowledge of wild edible plants, can be addressed through ethnoecology as an interdisciplinary approach or ‘way of looking’ at the human-landscape relationship (Martin 1995; Nazarea 1999; Toledo 2002). Ethnoecology seeks to provide an understanding of the systems of knowledge that local people have about nature, and recognizes the importance of cognition in everyday behaviors (Gragson and Blount 1999; Nazarea 1999; Toledo 2002). Through the focus on the kosmos (cosmovision), corpus (the whole repertory of knowledge) and praxis (set of practices) complex of traditional ecological knowledge, ethnoecology offers an integrative approach to study human-landscape ecologies (Toledo 1994, 2002). Ethnobotany is that part of ethnoecology which concerns plants (Martin 1995), and the domain in which much of this thesis is situated.

Following the ethnoecological approach, three main lines of inquiry were established to answer and fulfill the proposed research questions and objectives. These lines of inquiry were framed by participant observation as the main ethnographic technique and the foundation of the field research. According to Bernard (2011, p. 258), “participant observation involves immersing yourself in a culture and learning to remove yourself every day from that immersion so you can intellectualize what you’ve seen and heard, put it into perspective, and write about it convincingly”. This is why ethnographic fieldwork, conducted for a period of six months, was the core methodological strategy for the present research, complemented by other techniques.

To study wild edible plants knowledge, ethnobotanical data collection techniques were used: i. Freelists; ii. Photo-elicitation interviews; iii. Semi-structured and informal interviews, mostly in situ. In order to have a sense of families’ current eating habits and to gain some insights into how often wild edibles are included in their diets, weekly food diaries were conducted in different households. Additionally, to have a sense of the local economy of wild edible plants, the availability and market value of edible species (price per weight) during the fieldwork season were recorded from the local markets. Finally, to explore local perceptions and individual-plant relations, personal stories and memories of Mapuche people regarding plants and the landscape
were recorded through informal interviews and semi-structured interviews. Because food plays a role above and beyond nourishment to human societies (Pilgrim et al. 2010), memories and stories of local people who have tight connections to their land were unconsciously derived in narratives around food and the acts of food procurement. Therefore, oral history was an essential part of the methods. These techniques were complemented by secondary sources of information available (diagram depicting how objectives, research questions and methods relate to each other are seen in Appendix 2).

3.1 Methodological considerations and constraints

3.1.1 Gender considerations

Most of the research in the community was conducted with the contributions of women participants, although men and children informants were also involved as much as possible. This was for two main reasons. First and foremost, women’s and men’s activities and responsibilities are culturally distinguished in Mapuche communities and women are at the centre of the household’s food sovereignty and health (Egert and Godoy 2008; Gengnagel and Manriquez 2004). Women are responsible for most of the activities related to food production, acquisition and preparation including: the maintenance of home gardens and chacras (potato garden); seed safekeeping and trafkintu (exchange); gathering of wild edibles (not piñones which are in the mountains) and medicinal plants; breeding of small domestic animals such as poultry, pigs and to a lesser extent, sheep; milking and cheese making; canning fruits for winter; grocery shopping in the nearest town; and daily cooking for their families. Therefore, working primarily with the women of the community just occurred naturally due to the subject of my research.

Second, most of the men (and head of households) worked full-time in nearby agricultural or livestock farms (Monday to Saturday and from 8am to 5pm, approximately). Generally they wake up around 5 am to care for their cattle and sheep before leaving for work, and, as soon as they return in the afternoon, they continue working on their own farms, leaving limited opportunities for me to interact with them. Exceptions were the elders who possessed more time to participate in the research because they worked only in their fields. With respect to youngsters (of whom there are only a few in the community), those 10 or 11 years old and older go to boarding schools from Monday to Friday. Therefore, weekends were the only time that I could interact with them.
However, during January and February, most of the children returned home for the summer holiday period, allowing me to mingle more with them.

### 3.1.2 Food system seasonality

When researching dietary patterns, Kuhnlein et al. (2006) and McCune & Kuhnlein (2011), recommend conducting a full year’s assessment, especially in places where there is a marked seasonality throughout the year. There can be a significant dietary variation depending on the time of the year and resource availability, particularly in societies which have subsistence economies. Due to time constraints, a year-long field season was not possible and this can be considered as a limitation. However, the aim of this research is not to provide a detailed nutritional description of familial food patterns, rather, it is to have an overall idea of the community's foodways, including the use of wild edibles, and how these have changed through time from the perspective of the community participants. The data presented here represent the "abundance period", as many informants describe it, comprising late spring and summer (November 2012-April 2013). During this time, there were no unusual conditions mentioned by participants that would bias these data as not being a representative "period of abundance" for the community. The only event that I registered as unusual was the fact that this was the first year for many villagers without sowing wheat. However, this situation was alleviated by consuming purchased wheat grains and flour, so it should not alter the results.

### 3.1.3 Recruiting criteria for research participants

Because my research deals with family-based knowledge and the community population is relatively small (they all know each other or are related in some way), I chose to recruit informants through successive-referral sampling. It has been suggested that studies based on non-probability sampling are highly credible (high external validity) when supported with ethnographic data (Bernard 2011). In this research, successive-referral sampling was an effective technique to build a sampling frame as Mapuche people are usually very distrustful of outsiders, especially winkas (non-Mapuche). In this sense, networks between families became the key for acceptance and the main reason for people’s willingness to participate since they felt confident that their kin or friend was personally introducing me. Because almost everyone is related to one another in the community, I had the chance to meet and interact with almost all of the families of the community.
and also with relatives that live in nearby communities. The use of successive-referral sampling, meant that most community members, but not all, were related to each other and this may have biased the sample as some individuals or families having conflicts with the dominant or bigger kinships were generally not introduced to me, and gaining their trust was consequently more difficult. This manifested in these community members not being included in some parts of the study as they may have thought that I was allied with their "enemies". In particular cases, some members of the community avoided group activities, but they agreed to collaborate on an individual basis with me. Nobody explicitly declined to participate, but recurrent excuses of a few community members, mostly working men, were clear signs of not willing to take part in the study. The diverse methods utilised in this study and the number of participants can be found in Table 2. Thirty-seven different people participated in different aspects of this research, of which eight were members of neighbouring communities. Rayen Lelfun’s participants belonged to 12 different families, which constitutes 80% of the total number of families currently living there.
**Table 2.** Summary of methods used and number of participants who collaborated in the study.

<table>
<thead>
<tr>
<th>Subject of Study</th>
<th>Method</th>
<th># of female participants</th>
<th># of male participants</th>
<th># of participants</th>
<th># of TOTAL participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnobotany of wild edibles and perceived limitations for current use</td>
<td>Freelists</td>
<td>14</td>
<td>8</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Photoelicitation interviews</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td><em>In situ</em> informal interviews</td>
<td>13</td>
<td>7</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Semi-structured interviews</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Household diet assessments and changes in traditional food systems over time</td>
<td>Food diaries*</td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Semi-structured interviews</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Activities</td>
<td>Wild edibles cooking workshop</td>
<td>13</td>
<td>0</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>71</td>
<td>19</td>
<td>37</td>
<td>90</td>
</tr>
</tbody>
</table>

* Account for individuals not previously considered in another method
*Considers only the individuals who carried out the food diaries and not the whole family belonging to the household.

### 3.1.4 Compensation

During the research, no monetary compensation was given to adults; however, I gave bags of *yerba mate* (*Ilex paraguariensis*) from town to participating families when invited to have some food, as a way to offset the additional food expenses that they incurred because of my presence. In this sense, I was very conscious of bringing something that would not alter their food habits. *Mate* is taken with hot water at all times during the day and it is relatively expensive for families.
In the case of children, the ones who participated by making food diaries received a monetary compensation of approximately 20 CAD ($10,000 Chilean pesos) as a way to support the purchase of school supplies for the new school year starting in March.

### 3.2 Educated free prior informed consent and reciprocity

Thanks to the support of the Head of Indigenous Program of the Municipality of Pucón, I was introduced to the authorities of several Mapuche communities that could be potentially interested in participating in research. This gave me the opportunity to evaluate different sites, and later choose a community that was relatively representative of the indigenous reality in the area as well as open and receptive to my research interests to make entry easier (Bernard 2011).

In Menetue, where I ended up conducting my research, I was first introduced to the Lonko, which literally means “head” (= chief), the Mapuche traditional authority and also to the president of the community (basically the legal representative of the community for municipal or governmental matters)\(^{36}\). In this first encounter in his house, I was introduced and then I briefly explained the intention and scope of the study, and how it was related to current ecological and social issues being faced by the community. I solicited and answered questions that they had about the research and I tried to state clearly how my presence and proposed research techniques might affect or alter their day-to-day lives (Alexiades and Peluso 2002). I explained that I wanted to be involved in the community’s daily routines and activities, helping in their agricultural, gathering and cooking activities when possible, in order to better understand Mapuche traditional food system changes over time and gather information on knowledge and use of wild edible plants.

In this first meeting, the Lonko and president of the community verbally granted permission to let me conduct the research, with the condition that every household of the community also agreed. The president gave me the contact information of all of the households that could potentially participate in the study. During the following weeks, I personally visited every household in the community to formally request permission to carry out the study. Once I had everyone’s approval I organized a general meeting that took place on the 19th of November, 2012, where I detailed the objectives and methods of the research and explained ethical issues like

\(^{36}\) This authority comes along with the creation of indigenous communities as a legal Chilean entity through the Indigenous Law (Law 19.253) of 1993 during Patricio Aylwin’s Government and the replacement of the original term “indigenous reducción or reservation”.

33
confidentiality and their rights as participants (International Society of Ethnobiology 2006). We thoroughly read and reviewed the consent form in Spanish and a copy was left with the president of the community in case anyone needed my contact information or that of the University of British Columbia or the Behavioral Research Ethics Board (BREB)\(^\text{37}\) (Appendix 3).

Because of historical relations with Spaniards and Chileans, Mapuche people usually do not trust winkas (non-Mapuche people). Therefore, rapport and willingness to talk were gained only after I started visiting women in their houses and participating in daily working activities and community events. I was able to move into the community on the 1st of December, 2012, in a small rented house.

The quotes used in the manuscript were coded to maintain confidentiality and anonymity of the participants in the study. The following codes were used to categorize the participants by age group and gender:

<table>
<thead>
<tr>
<th>Age group</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 18</td>
<td>A</td>
</tr>
<tr>
<td>18-25</td>
<td>B</td>
</tr>
<tr>
<td>26-30</td>
<td>C</td>
</tr>
<tr>
<td>31-40</td>
<td>D</td>
</tr>
<tr>
<td>41-50</td>
<td>E</td>
</tr>
<tr>
<td>51-60</td>
<td>F</td>
</tr>
<tr>
<td>61-70</td>
<td>G</td>
</tr>
<tr>
<td>71-80</td>
<td>H</td>
</tr>
<tr>
<td>&gt;81</td>
<td>I</td>
</tr>
</tbody>
</table>

The capital letter was followed by a female symbol (♀) for women participants and by a male symbol (♂) for male participants.

Equally important to educated free prior informed consent is the principle of Reciprocity, Mutual Benefit and Equitable Sharing (International Society of Ethnobiology 2006), which I believe encourages healthy and fair relations based on mutual respect and acceptance between

\(^{37}\) The application for the Ethics board was initially submitted on the 27\(^{\text{th}}\) of August, 2012, and, after some provisos were addressed, the final version was submitted on the 11\(^{\text{th}}\) of September, 2012. Approval from the Behavioural Research Ethics Board (BREB) was received on the 12\(^{\text{th}}\) of September, 2012.
researcher and local communities. It arises as an inevitable outcome of collaborative research. Along this line, I was committed to returning the results to the community in a valuable and culturally acceptable form, and the different forms that this could adopt were discussed during meetings with community members. So far, I have organized several gathering field trips and a three-day cooking workshop for indigenous women entitled “From the forest and home gardens: Cooking with wild edibles” in order to encourage the use of wild edibles and revitalize traditional food practices most of them forgotten. This workshop emerged as a shared idea during the early meetings with community members and, according to the post-workshop evaluations, it successfully met the expectations of the participants as it became a collective instance to learn, teach and share experiences and stories with other women in the community (Appendix 4).

Also, as there are important differences in academic standards between the local-rural school and an urban boarding school, the transition from one to another for indigenous children turns out to be very difficult and generally they do not perform well during their first year. Therefore, as requested by some mothers, I offered summer reinforcement classes of English and maths to some youngsters that had just moved to the city to attend boarding schools to try to fill the educational gap. These classes were held once a week with the students who voluntarily wanted to attend and improve before the next academic year that started in March (around six sessions). Even though children were not too enthusiastic about having classes during summer, this became a space for getting to know them and also to gain the trust of their parents who were definitely keener about the reinforcement classes.

In addition, it was agreed collectively that part of the results of the investigation, especially the documentation of the use of wild edible and traditional meals, would be compiled in a guide or a book that could be of everyday use by families. It was decided then that an ethnobotanical illustrated book would be published containing botanical information of species identification, seasonality and harvesting techniques, as well as recipes of wild edible plants present in the area. The objective of the book is to encourage their consumption within Mapuche families and especially by the younger generations. This idea arose as a result of the need to document, collect and disseminate traditional knowledge of biodiversity and its uses especially in the face of cultural erosion and loss of knowledge transmission. The book, which is in progress, is a collaborative effort which includes colorful botanical illustrations by a Chilean artist, Geraldine MacKinnon,
ethnobotanical information, recipes and stories provided by indigenous women that participated in the research. Some finished illustrations which will be included in the book are seen in Appendix 5.

3.3 Wild edible plants ethnobotanical data collection

3.3.1 Participant observation and informal interviews

In order to experience the daily activities of rural Mapuche families, be immersed in the community and comprehend wild edibles-related traditional knowledge and the perceived changes on the Mapuche food system, I used participant observation among the community for a period of six months. During this time, I participated in the community’s everyday events and agricultural activities, furthering informal conversations on the topic of study and developing my personal engagement with community members’ networks and social issues so that they could feel comfortable with my presence (Bernard 2011). On a daily basis, I took part in activities, such as working in home gardens (sowing, weeding and harvesting vegetables), gathering edible and medicinal plants, making bread or *sopaipilla* (fried bread), cooking, caring for cattle, cider and cheese making, and also crafting activities, such as weaving and dying wool. In exceptional cases, I attended religious ceremonies, community meetings and heritage fairs when invited. In addition, as often as I could, I joined walking field trips for gathering plants or firewood, visiting a relative or looking for domestic animals (*campear*) which were immensely rich situations in terms of data collection, species identification, documenting culturally significant places and as a deeper way of unveiling perceptions about human-nature relations and changes through time (Johnson and Davidson-Hunt 2011).

Participant observation allowed me to collect data through field notes, photographs, some videos, but most of all through informal interviews that naturally arose in the sphere of daily activities and conversations. In this sense, much of the research was undertaken opportunistically and, as time passed, these informal interviews were guided not only by me but by many key informants who knew what my research interests were, and therefore were constantly sharing information, pointing out anything relevant or telling stories or anecdotes that they believed were related to my interests. During these conversations, I noted in my pocket note pad points relevant
to the research and, later on, on a daily basis, I sat in my house, freed my memory and developed field notes based on my daily jottings and perceptions (Bernard 2005).

In the community, being a woman made the research on foodways easier as the household’s food security is women’s domain. My women friends were always very open to share their knowledge and culinary secrets with me and seemed very comfortable in doing so, perhaps because traditionally the transmission of knowledge around food has always been oral and from older to younger women of the family. Many of my informants had no daughters left in the community because when daughters are married they move to their husband’s community. Others had sons, so they were very happy and enthusiastic to teach me traditional preparations and handcrafts, how to work in their gardens or how to gather wild foods. I was welcomed in most houses at any time and they would let me know in advance or send a child to fetch me if they were cooking some Mapuche meal or there was something I needed to learn that was pertinent to my research. Because women are always busy with endless domestic work, participant observation and informal interviews worked well and mostly did not interfere with their activities (I usually helped them in any household activity). As they expressed many times, my help or just presence made the work more pleasant and seemed shorter as chatting and laughing was part of it. During weekdays, most women spend the day by themselves because men go out to work and children are in boarding schools, so they appreciated having someone to talk to, having some help and sharing their knowledge and stories.

3.3.2 Freelists

In order to understand the cultural domain of wild edible plants, I started by using the freelist technique with women or sometimes family small groups (n=13) asking them to “list all the wild edible plants they could think of”. For the first interviewees, this question (that was so clear to me) seemed confusing for them, and they included home garden vegetables and fruits from orchards as wild edibles. So after a couple of interviews I added a sentence to explain what I meant by ‘wild’, asking, “list all the wild edible plants you could think of and by wild I mean plants that do not need to be sowed or planted”. Smith’s index of saliency (Smith’s S), which is based on

38 “There is growing evidence to support that 10 - 20 knowledgeable people are enough to uncover and understand the core categories in any well-defined cultural domain” (Bernard 2011).
order and frequency of mention of items on a freelist, was calculated using Anthropac (Borgatti 1992) to measure the perceived relative importance of the plants mentioned and also as a tool to further research on culturally salient items (Smith 1993). This index takes into account the frequency and rank order of items in the lists such that plants mentioned first and most frequently are more salient and, therefore, more important to people in the community as compared to plants mentioned last and least often (Smith and Borgatti 1997; Smith 1993). Smith’s Index formulation is:

\[ S = \frac{\sum (L - R_j + 1)}{L} / n \]

in which, “\( S \) is the average rank of an item across all lists in the sample, weighted by the lengths of the lists in which the item actually occurs; \( L \) = the length of (number of items in) a list; \( R_j \) = the rank of item \( j \) in the list (first = 1); and \( n \) = the number of lists in the sample” (Smith and Borgatti 1997).

Items listed were identified by their scientific names and they were also classified according to origin (native and exotics), the parts used as food (shoots, stems, petioles, roots, tubers, rhizomes, seeds, fruits or arils, leaves, fruiting body in the case of fungi and decayed wood; adapted from Rapoport & Ladio (1999)) and life-form (trees, shrubs, herbs/grasses, vines, ferns and fungi). It is important to note that these categorizations or classifications do not necessarily reflect Mapuche categorization of the edible plant world.

### 3.3.3 Photo-elicitation interviewing

Photo-elicitation uses photographs in an interview, asking participants to comment on them and guiding a semi-structured interview (Bignante 2010; Harper 2002). For ethnobotanical studies, photo-elicitation interviews can be especially useful for wild edibles which have a very marked seasonality, making it hard to use herbarium specimen collections as many species may not be present at the time of research and it is hard to collect and conserve fruits and fungi for further identification. Thus, in order to gather deeper information on wild edible plants’ ethnobotanical knowledge, photo-elicitation interviews were conducted using a set of digital contemporary high quality photographs of edible species (details of edible part of species and overall morphological features were shown) displayed on a 14 inch screen laptop as a digital botanical collection. A scree plot was used to select the set of species to study more in depth (Bernard 2011). Twenty one species were selected based on the freelists results, using only species
that were mentioned by at least 35% of the respondents (it became evident that using the whole species list of 47 plants would be too exhausting and time consuming for participants\textsuperscript{39}).

The species elicitation sequence was ordered based on Smith’s Salience Index such that widely known plants were asked about first in order to ensure an easy start to the interview and to make the informant more confident (Wyndham 2010). Digital images were presented to the interviewees using a Power Point presentation on a laptop and a series of questions about each species were asked. These included the species’ common names (either in Spanish or Mapuzungun), gathering seasons and techniques, ecology, preparations, other uses, abundance and variations in availability based on changes in the landscape. Open-ended responses were encouraged in order to collect personal stories and narratives related to each species under study. Eight such interviews were conducted, each voice recorded for further analysis. Because the interviews were quite extensive (one hour and 43 minutes on average), many were conducted over two days to avoid tiring the respondent and to allow time for their knowledge and memories to be better expressed. For analysis, a proficiency index was created from the interviews, where the following questions and answers per species (n = 21) were taken into account: (1) identification of the species; (2) knowledge of the gathering season; and (3) knowledge of their preparation. A value of one was assigned to a correct answer and zero was assigned to a wrong or an answer that was not given.\textsuperscript{40} The sum of these values was considered as an index of proficiency for each of the eight respondents, 63 being the maximum score possible if all the answers were correct.

\textsuperscript{39}At first, I selected species that were mentioned by at least 20% of the informants, but after some interviews, it became evident that species with a frequency of mentions between 20 - 35 percent were species that people were most of the times only able to identify. The participants were unable to respond the rest of the questions and letting me know that as that species was not found in their community and nearby areas (not being accessible to them), and that they had no personal relation with the plant (they just knew they were edible).

\textsuperscript{40}Answers to the first two questions were based on the information provided by a key informant and by the literature review. For the third question, a value of one was assigned if they knew at least one form of preparation. Some species are consumed only raw, and this was also considered a correct answer if mentioned.
3.3.4 Market surveys

During regular trips to Pucón and Curarrehue, market data of wild edible plants were collected in local marketplaces or informal street sales. Availability and market values of each species (price per weight) were recorded in order to have a sense of the local economy of wild edible plants. Recording this data is important especially for foods likely to be high in nutrients or that are available during seasons of low agriculture yields and, therefore, supporting periods of food scarcity (Kuhnlein et al. 2006; McCune and Kuhnlein 2011). For autumn and winter, marketplace data was collected by research collaborators in the local market of the city of Valdivia\textsuperscript{41}.

3.4 Changes in Mapuche traditional food systems

3.4.1 Participant observation and informal interviews

As mentioned before (point 3.3.a) participant observation was the principal method of research both for the ethnobotanic data collection and also for understanding how traditional food systems change over time. Regular visits with key informants was a perfect opportunity to get into household kitchens, observe how women prepare food, what ingredients they use, help whenever possible in cooking or home garden labours and have extended conversations with women and their families. Additionally, because food plays a role above and beyond nourishment to human societies, memories and life histories of indigenous or rural groups who have tight connections to their territories were unconsciously derived in stories around food and the acts of food procurement, which may contain important information on the dynamics of food systems (Anderson 2010; McCune and Kuhnlein 2011; Pilgrim et al. 2010). Therefore, informal interviews and the collection of personal stories and narratives were crucial for eliciting information on foodways.

For Mapuche families offering food goes together with welcoming someone to your home, so every time I showed up at a house, irrespective of the time of the day, I was immediately offered a meal. As they greeted me, they set the table for sharing some tea, mate, homemade bread,

\textsuperscript{41} Data collected by two UBC graduate students René Reyes and Jennifer Romero, doing fieldwork in the area.
sopaipillas or any meal depending on the time of the day. This gave me the opportunity to observe and taste the same food eaten on a daily basis by families. Consequently, this worked as “ground-truthing” (i.e. the independent verification, by researchers, of data from respondents) of actual facts occurring at the household level and recorded in weekly food diaries (Ibarra 2010, p. 19).

3.4.2 Household diets assessment

For food intake assessment, the households were considered the sample unit in contrast to the community that was regarded as the study unit for the overall research. To assess current food consumption (diversity and intake frequency of food) and presence of wild edible plants in family diets, seven-day food diaries were conducted by children (between 10 and 18 years) in seven different households. In each household, the method was briefly explained, along with the possible implications in terms of time or inconvenience, especially for mothers who are responsible for preparing meals. After having the consent of children and their parents, each participant was given a small notebook, a pen and a digital photographic camera for recording in written form and also as a photo essay (in order to back up the written information) every meal that was consumed with the date, time and the ingredients of each preparation. They were also asked to freely explore and capture with the camera anything related to the production and preparation of food in their households. Seven food diaries were completed in different families for a total 170 meals and more than 80 different ingredients recorded.

Using a camera became a way to back up the written information (images were date and time stamped to compare with meals recorded in notebook), but also served as an interesting tool to visualize dietary patterns and children’s perception of foodways in their families. In addition, families often invited me to have breakfast, lunch or dinner at their homes, so I had the opportunity to observe and register the preparations that were given to me. Again, these meals were used as “ground-truthing” of actual facts recorded at the household level in diaries (Ibarra 2010). In order to analyse the data, each meal was disaggregated into its ingredients, which were later classified according to their origin: market based or locally produced. The classification of market based products refer to all the food that is not produced and gathered by the families and includes mostly processed, industrialized and refined foodstuffs bought typically in a supermarket and that may be produced regionally or nationally. Additionally they were allocated according to
six main food groups: (1) vegetables; (2) grains; (3) fats, oils & sweets; (4) protein foods including meats and beans; (5) dairy; and (6) fruits. Alcoholic drinks were labelled under (7) alcohol, but since the diaries were conducted by children, this category is poorly represented, as are caffeine-rich drinks like mate (*Ilex paraguariensis*) frequently consumed by adults.

### 3.4.3 Semi-structured interviews

For determining the perceived changes on the Mapuche food systems over time and how this relates to historical processes occurring upon their culture and landscape, a semi-structured interview was designed to complement informal interviews. These interviews were piloted on a subsample of women (n=3) in order to minimize the possibility errors in the information derived from later interviews as a result of ambiguous questions or inappropriate vocabulary (Bernard 2011; Ibarra 2010). I applied this semi-structured interview at the household level to married women (n=11) were a time and place was arranged to conduct the interview and they were voice-recorded (Appendix 6).

### 3.5 Qualitative data analysis

Thematic analysis was the method used to analyse qualitative data of field notes and interviews, both informal and formal. Braun and Clark’s (2006) phases of analysis were followed in order to identify patterns of meaning to answer the research questions. Through this method, implicit and explicit ideas were identified within the data, organized and coded in order to later identify emerging themes (repeated patterns of meaning). Before starting the first phase, interviews were transcribed *verbatim* using Dragon Naturally Speaking, a speech recognition software (Nuance Communications Inc. 2010) and subsequently printed. The same was done with field notebooks, which were also photocopied to manually encode the data. The following phases were followed in the qualitative data analysis: (1) familiarization with data by transcribing verbal data, reading and re-reading the complete data set, and jotting down initial insights; (2) coding and collating data, which was done manually, to organize all the data into meaningful groups; (3) searching for themes among codes and examining how codes combine to form over-reaching themes in the data; and (4) reviewing themes, defining and naming themes.
4. RESULTS AND DISCUSSION

This chapter presents the results and discussion of results under three major headings: (a) ethnobotany of wild edible plants; (b) factors related to the use of wild edible plants and knowledge transmission; and (c) local Mapuche food and health systems.

The first section (a) provides detailed information on traditional ecological knowledge of wild edible plants, and then describes the current uses and commercialization of different species. Finally, it explores the state of knowledge transmission by describing Mapuche pedagogy, sites of knowledge transmission and construction, and the social institutions involved in the continuity of traditional ecological knowledge. The second section offers an in-depth exploration of the main factors related to the gathering and consumption of wild edible plants, and identifies problems in knowledge transmission according to the locals’ perceptions. Key factors like accessibility, availability, the role of children in the procurement of wild foods and the loss of knowledge are analyzed through a relational perspective of time and eco-cultural change. The last section provides an overview of the Mapuche food system through the lens of adaptability and change. The factors, both historical and current, that generate and accelerate changes on these traditional systems of food and health, called nutritional transitions in the literature, are explored. In addition, the family’s’ current diets and changing eating habits and healthcare in relation to ‘how it used to be’ are analyzed. To conclude, a general vision of the community’s health is provided in relation to the prevalence of nutrition-related chronic diseases, the abandonment of traditional foods and medicine, the introduction of industrialized foods and the shifts in peoples’ lifestyles.
4.1 Wild edible plants ethnobotany

4.1.1 Wild edible plant knowledge

For centuries useful plants of the temperate forests have been used for food and medicine by Mapuche families as a complement to their crop-livestock system (Bengoa 2003; Guevara 1908; Montalba and Stephens 2014). In response to the freelist exercises, Menetue inhabitants listed a total of 47 wild edible plants belonging to 45 genera and 34 families. *Rosaceae* was the most represented family with five species, while *Asteraceae* and *Cyttariaceae* were represented by three each. About 60% of families were represented by single species, showing a relatively high taxonomic diversity. By *in situ* observation or identification through images by the participants, especially for those plants or mushrooms that were not available during the fieldwork season, 42 plants were identified to species level, while only four were identified to the genus level and one item was impossible to identify. According to the Smith’s Index of Salience (Smith’s S), *digüeñe* (Smith’s S = 0.82) was the most salient wild edible, followed by *changle* (Smith’s S = 0.68), *maqui* (Smith’s S = 0.67), *murra* (Smith’s S = 0.59) and *piñón* (Smith’s S = 0.56), all with a frequency of mentions of 100% (Figure 5, Table 3).

Figure 5. Most salient wild edible plants according to Smith’s Salience Index. *From left to right and top to bottom: digüeñe, change, maqui and piñones.*
Table 3. List of wild edible plants mentioned on freelists, ordered by Smith’s Salience Index.

1 * = All species have edible fruits. Two species were identified; Berberis darwinii and Berberis microphylla. ** = All species have edible fruits. Ribes valdivianum was the most common in the area. *** = All species are edibles. **** = Rotten wood of other species were also eaten in past days, with Nothofagus dombeyi being the most common.

1 N = native, E = exotic; 2 F = ferns, H = herbs and grasses, M = mushrooms, S = shrubs, T = trees; 3 Edible part [consumption form]: Dw = decayed wood with fungi mycelium, F = fruits, F⁺ = arils, FB = fruiting body, L = leaves, S = seeds, Sh = shoots and stems or petioles, Tu = tubers. [R] = eaten raw, [C] = eaten cooked, [R, C] = both raw and cooked.

<table>
<thead>
<tr>
<th>Spanish name</th>
<th>Mapuche name</th>
<th>Scientific name</th>
<th>Family</th>
<th>Frequency (%)</th>
<th>Salience Index</th>
<th>Origin¹</th>
<th>Life form²</th>
<th>Use form³</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Digüeñe</td>
<td>Dieweñ</td>
<td>Cyttaria espinosa</td>
<td>Cyttariaceae</td>
<td>100</td>
<td>0,82</td>
<td>N</td>
<td>M</td>
<td>FB [R, C]</td>
</tr>
<tr>
<td>2 Changle</td>
<td>Changdi</td>
<td>Ramaria flavã</td>
<td>Ramariaceae</td>
<td>100</td>
<td>0,68</td>
<td>N</td>
<td>M</td>
<td>FB [C]</td>
</tr>
<tr>
<td>3 Maqui</td>
<td>Makí, kélon</td>
<td>Aristotelia chilensis</td>
<td>Elaeocarpaceae</td>
<td>100</td>
<td>0,67</td>
<td>N</td>
<td>T</td>
<td>F [R, C]</td>
</tr>
<tr>
<td>4 Murra</td>
<td>-</td>
<td>Rubus ulmifolius</td>
<td>Rosaceae</td>
<td>100</td>
<td>0,59</td>
<td>E</td>
<td>S</td>
<td>F [R, C]</td>
</tr>
<tr>
<td>5 PilHon</td>
<td>Ngüíliu [Pehuen]</td>
<td>Araucaria araucana</td>
<td>Araucariaceae</td>
<td>100</td>
<td>0,56</td>
<td>N</td>
<td>T</td>
<td>S [R, C]</td>
</tr>
<tr>
<td>6 Nalca</td>
<td>Nalca [Pangue]</td>
<td>Gunnera tinctoria</td>
<td>Gunneraceae</td>
<td>92,3</td>
<td>0,53</td>
<td>N</td>
<td>H</td>
<td>Sh [R]</td>
</tr>
<tr>
<td>7 Nanita</td>
<td>ÚñÚ</td>
<td>Ugni molinae</td>
<td>Myrtaceae</td>
<td>84,6</td>
<td>0,46</td>
<td>N</td>
<td>S</td>
<td>F [R, C]</td>
</tr>
<tr>
<td>8 Coñigue</td>
<td>Coycho colew</td>
<td>Chusquea culeus</td>
<td>Poaceae</td>
<td>92,3</td>
<td>0,45</td>
<td>N</td>
<td>S</td>
<td>Sh [C]</td>
</tr>
<tr>
<td>9 Cophue</td>
<td>Kopiu [Kolkipiwi]</td>
<td>Lapageria rosea</td>
<td>Philesiaceae</td>
<td>69,2</td>
<td>0,44</td>
<td>N</td>
<td>V</td>
<td>F [R]</td>
</tr>
<tr>
<td>10 Mosqueta</td>
<td>-</td>
<td>Rosa rubiginosa</td>
<td>Rosaceae</td>
<td>84,6</td>
<td>0,41</td>
<td>E</td>
<td>S</td>
<td>F [C]</td>
</tr>
<tr>
<td>11 Castilla</td>
<td>-</td>
<td>Castanea sativa</td>
<td>Fagaceae</td>
<td>69,2</td>
<td>0,41</td>
<td>E</td>
<td>T</td>
<td>S [C]</td>
</tr>
<tr>
<td>12 Gargal</td>
<td>Kalgal</td>
<td>Grifola gargal</td>
<td>Meripilaceae</td>
<td>69,2</td>
<td>0,35</td>
<td>N</td>
<td>M</td>
<td>FB [C]</td>
</tr>
<tr>
<td>13 Piko</td>
<td>Pêke</td>
<td>Armillaria mella</td>
<td>Thricolomataceae</td>
<td>61,5</td>
<td>0,33</td>
<td>N</td>
<td>M</td>
<td>FB [C]</td>
</tr>
<tr>
<td>14 Michay</td>
<td>Mêchai</td>
<td>Berberis spp.*</td>
<td>Berberidaceae</td>
<td>76,9</td>
<td>0,31</td>
<td>N</td>
<td>S</td>
<td>F [R]</td>
</tr>
<tr>
<td>15 Avellana</td>
<td>Ngêñú</td>
<td>Gevuina ovalêna</td>
<td>Proteaceae</td>
<td>61,5</td>
<td>0,30</td>
<td>N</td>
<td>T</td>
<td>S [C]</td>
</tr>
<tr>
<td>16 Yuyo</td>
<td>Ngedon</td>
<td>Brassica rapa</td>
<td>Brassicaceae</td>
<td>46,2</td>
<td>0,26</td>
<td>E</td>
<td>H</td>
<td>L [C]</td>
</tr>
<tr>
<td>17 Parrilla</td>
<td>Mulul</td>
<td>Ribes valdivianum**</td>
<td>Grossulariaceae</td>
<td>46,2</td>
<td>0,23</td>
<td>N</td>
<td>S</td>
<td>F [R]</td>
</tr>
<tr>
<td>18 Callampa</td>
<td>Kallampa</td>
<td>Agaricus sp.</td>
<td>Agaricaceae</td>
<td>38,5</td>
<td>0,21</td>
<td>E</td>
<td>M</td>
<td>FB [C]</td>
</tr>
<tr>
<td>19 Pinatra</td>
<td>Pinatra</td>
<td>Cyttaria berteroi</td>
<td>Cyttariaceae</td>
<td>38,5</td>
<td>0,19</td>
<td>N</td>
<td>M</td>
<td>FB [R]</td>
</tr>
<tr>
<td>20 Fruítica</td>
<td>Kelleñ</td>
<td>Fragaria chiloensis</td>
<td>Rosaceae</td>
<td>46,2</td>
<td>0,18</td>
<td>N</td>
<td>H</td>
<td>F [R]</td>
</tr>
<tr>
<td>21 Chilco</td>
<td>Chiliko</td>
<td>Fuchsia magellanicã</td>
<td>Onagraceae</td>
<td>38,5</td>
<td>0,17</td>
<td>N</td>
<td>S</td>
<td>F [R]</td>
</tr>
<tr>
<td>22 Cuye</td>
<td>Kulle</td>
<td>Oxalis spp. ****</td>
<td>Oxalidaceae</td>
<td>23,1</td>
<td>0,14</td>
<td>-</td>
<td>H</td>
<td>L [R]</td>
</tr>
<tr>
<td>23 Arrayan</td>
<td>Kollimamül</td>
<td>Luma apiculata</td>
<td>Myrtaceae</td>
<td>23,1</td>
<td>0,13</td>
<td>N</td>
<td>T</td>
<td>F [R, C]</td>
</tr>
<tr>
<td>24 Sauco</td>
<td>-</td>
<td>Sambucus nigra</td>
<td>Adoxaceae</td>
<td>23,1</td>
<td>0,12</td>
<td>E</td>
<td>T</td>
<td>F [R, C]</td>
</tr>
<tr>
<td>25 Couille,</td>
<td>Kowël</td>
<td>Lardizabala biterñata</td>
<td>Lardizalabaceae</td>
<td>23,1</td>
<td>0,12</td>
<td>N</td>
<td>V</td>
<td>F [R, C]</td>
</tr>
<tr>
<td>26 Boleñu</td>
<td>Foló</td>
<td>Peumus boldus</td>
<td>Monimiaceae</td>
<td>23,1</td>
<td>0,08</td>
<td>N</td>
<td>T</td>
<td>F [R]</td>
</tr>
<tr>
<td>27 Lleuque</td>
<td>Lleuqui</td>
<td>Prumnopitãs andina</td>
<td>Podocarpaceae</td>
<td>30,8</td>
<td>0,07</td>
<td>N</td>
<td>T</td>
<td>F [&quot;C, R]</td>
</tr>
<tr>
<td>28 Ment’a</td>
<td>-</td>
<td>Mentha sp.</td>
<td>Lamiaceae</td>
<td>7,7</td>
<td>0,07</td>
<td>N</td>
<td>H</td>
<td>L [R]</td>
</tr>
<tr>
<td>29 Manzana</td>
<td>Manshana</td>
<td>Malus sp.</td>
<td>Rosaceae</td>
<td>7,7</td>
<td>0,07</td>
<td>E</td>
<td>T</td>
<td>F [R]</td>
</tr>
<tr>
<td>30 Berro</td>
<td>-</td>
<td>Nasturtium officinale</td>
<td>Brassicaceae</td>
<td>30,8</td>
<td>0,06</td>
<td>E</td>
<td>H</td>
<td>L [R]</td>
</tr>
<tr>
<td>31 Peumo</td>
<td>Pengu</td>
<td>Cryptocarya alba</td>
<td>Lauraceae</td>
<td>7,7</td>
<td>0,06</td>
<td>N</td>
<td>T</td>
<td>F [R]</td>
</tr>
<tr>
<td>32 Quillo</td>
<td>Killo</td>
<td>Muehlenbeckia hastulata</td>
<td>Polygonaceae</td>
<td>15,4</td>
<td>0,05</td>
<td>N</td>
<td>V</td>
<td>F [R, C]</td>
</tr>
<tr>
<td>33 Ciuuela</td>
<td>-</td>
<td>Prunus sp.</td>
<td>Rosaceae</td>
<td>7,7</td>
<td>0,05</td>
<td>E</td>
<td>T</td>
<td>F [R, C]</td>
</tr>
<tr>
<td>34 Diente de león</td>
<td>-</td>
<td>Taraxacum officinale</td>
<td>Asteraceae</td>
<td>7,7</td>
<td>0,03</td>
<td>E</td>
<td>H</td>
<td>L [R]</td>
</tr>
<tr>
<td>35 Palo podrido</td>
<td>-</td>
<td>Nothofagus dombeiyi ****</td>
<td>Fagaceae</td>
<td>7,7</td>
<td>0,03</td>
<td>N</td>
<td>T</td>
<td>DW [R]</td>
</tr>
<tr>
<td>37 Grosella del hualle</td>
<td>-</td>
<td>?</td>
<td>?</td>
<td>7,7</td>
<td>0,03</td>
<td>-</td>
<td>M</td>
<td>FB [R]</td>
</tr>
<tr>
<td>38 Chupóñ</td>
<td>Nüyu</td>
<td>Greiga spachelata</td>
<td>Bromeliaceae</td>
<td>15,4</td>
<td>0,03</td>
<td>N</td>
<td>S</td>
<td>F [R]</td>
</tr>
<tr>
<td>39 Digüeñê del coigüe</td>
<td>Llia llia</td>
<td>Cytaria harioti</td>
<td>Cytariaceae</td>
<td>7,7</td>
<td>0,02</td>
<td>N</td>
<td>M</td>
<td>FB [C]</td>
</tr>
<tr>
<td>39 Chicharrón de cerro</td>
<td>-</td>
<td>Gymotria antarctica</td>
<td>Helvellaceae</td>
<td>7,7</td>
<td>0,02</td>
<td>N</td>
<td>M</td>
<td>FB [C]</td>
</tr>
<tr>
<td>40 Lechuga de agua</td>
<td>Quechuiñhuaca</td>
<td>Minulus glabratus</td>
<td>Scrophulariaceae</td>
<td>7,7</td>
<td>0,02</td>
<td>N</td>
<td>H</td>
<td>L [R, C]</td>
</tr>
<tr>
<td>41 Ampe</td>
<td>Añpe</td>
<td>Lophosoria quadripinnata</td>
<td>Dicksoniaceae</td>
<td>7,7</td>
<td>0,02</td>
<td>N</td>
<td>F</td>
<td>Sh [C]</td>
</tr>
<tr>
<td>42 Flor del chandó</td>
<td>-</td>
<td>Hypochneriis radicata</td>
<td>Asteraceae</td>
<td>7,7</td>
<td>0,01</td>
<td>E</td>
<td>H</td>
<td>L [R]</td>
</tr>
<tr>
<td>43 Coral, Quillín</td>
<td>-</td>
<td>Papauhuen</td>
<td>Luzuriaga radiants</td>
<td>Philesiaceae</td>
<td>7,7</td>
<td>0,01</td>
<td>N</td>
<td>V</td>
</tr>
<tr>
<td>44 Papa silvestre</td>
<td>Poñũ</td>
<td>Solarum sp.</td>
<td>Solaraceae</td>
<td>7,7</td>
<td>0,01</td>
<td>N</td>
<td>S</td>
<td>T [C]</td>
</tr>
<tr>
<td>45 Cardo blanco</td>
<td>-</td>
<td>Onopordon acanthum</td>
<td>Asteraceae</td>
<td>7,7</td>
<td>0,01</td>
<td>E</td>
<td>H</td>
<td>Sh [R, C]</td>
</tr>
<tr>
<td>46 Lengua de vaca</td>
<td>-</td>
<td>Fistulina hepatica</td>
<td>Fistulinaceae</td>
<td>7,7</td>
<td>0,01</td>
<td>N</td>
<td>M</td>
<td>FB [C]</td>
</tr>
<tr>
<td>47 Quinwa</td>
<td>Quinwa</td>
<td>Chenopodium quinoa</td>
<td>Amaranthaceae</td>
<td>7,7</td>
<td>0,00</td>
<td>N</td>
<td>H</td>
<td>S [C]</td>
</tr>
</tbody>
</table>
From all the wild edibles mentioned, almost 28% were introduced or exotic and some of them culturally very salient (Figure 6). This reveals the dynamism of the collective memory of plants, which is in tune with the changes of the ecosystem inhabited (Ladio 2011). In Menetue, the collective memory has incorporated numerous exotic plants into its biodiversity over time. For Hernández (2008), exotic plant species are progressively being increasingly incorporated into traditional knowledge, which quickly loses its roots. The most salient introduced species were *murra* or elmleaf blackberry (*Rubus ulmifolius*, Smith’s S = 0.52), *mosqueta* or rosehip (*Rosa rubiginosa*, Smith’s S = 0.41) and *castaña* or chestnut (*Castanea sativa*, Smith’s S = 0.49), which were very common in anthropogenic or disturbed areas. For these species, a Mapuche name seemed nonexistent. Many of these were considered ‘weeds’: an introduced species well adapted to disturbed environments and often associated with human habitation (Turner et al. 2011). A much relished ‘weed’ was *yuyo* (*Brassica rapa*) which grew naturally in home gardens and between wheat plantations.

**Figure 6.** Scree Plot. Frequency of items mentioned in freelist exercises. Black bars show the exotic species. Arrow indicates the elbow chosen to further explore most salient species of the cultural domain.

Trees represented the dominant growth or life-form (12 species), followed by herbs and grasses (11 species), mushrooms (10 species) and shrubs (nine species). Fruits were the most commonly reported edible part with about 43% of species (20 species), followed by fruiting bodies of mushrooms (10 species) and leaves (seven species) (Figure 7).
Figure 7. Edible parts of wild edible plants listed in freelists.

Most salient fruits gathered during summer time, include the highly prized maqui berry (*Aristotelia chilensis*), which was consumed raw and also prepared as a drink called teku; the elmleaf blackberry (*Rubus ulmifolius*) introduced by the Spaniards in the early 1500’s was gathered for preparing jam and also for dying wool; the Chilean guava or murta (*Ugni molinae*), which is a small and perfumed berry preserved which is mixed with quince in cans for the winter and also prepared as chicha (fermented drink); the fruit of the kolkopiw, the Chilean bellflower (*Lapageria rosea*), cherished mostly by children for their sweet taste; and the fruits of the rosehip (*Rosa rubiginosa*), also an invasive species, gathered for making a jam that requires hard work in processing, but sells well in markets. Maqui berries were reported as being increasingly limited as people had cleared the macales to open their farms and prioritize more space for their animals. Macales are patches of forests dominated by maqui. It was very common to describe a certain locality in terms of the dominant species like a quilantal dominated by quila (*Chusquea quila*), a type of bamboo, murral dominated by murra (*Rubus ulmifolius*), pinalada dominated by Pehuen, also referred to as pino (*Araucaria araucana*) and so on. This was also found by Gumucio (1999) in his ethnobotanical research with Mapuche communities. Elmleaf blackberry and rosehip, both introduced species, were probably the most abundant wild edibles in the immediate landscape surrounding people’s houses and transit routes. Introduced wild edible plants have been found
not only to abound in urban and agricultural environments, but also the abundance of introduced wild edibles from the total wild edible plants available has been documented to increase considerably in anthropogenic environments (Díaz-Betancourt et al. 1999; Rapoport and Ladio 1999). Even though these species provide people with ample fruits during summer and a monetary income when jams are sold, the control of blackberry and rosehip invasion to keep their lands ‘clean’ for agriculture or livestock use is a permanent and exhausting task. Men spent considerable time during the day eliminating these bushes with a long-handed sickle called an echona. Although, roadsides, streams and fallow areas were invaded by these plants, they were left purposefully over fences to strengthen them. Rosehip has been considered useful in recent years, as before people in the community were unaware of their medicinal properties, their use for preparing jams and how desirable these were on the market. “There has always been rosehip, but was not used before. My mom barely knew how to prepare jam. Now is taken into account and marketed...”42. For others, their existence is not even a clear memory: “I do not remember if they [rosehip bushes] existed when I was little, but I never ate them”43.

Fruiting bodies of mushrooms, the second most commonly reported edible part, were highly appreciated, particularly during fall and winter as substitutes for beef, lamb and pork that need to be purchased on the market during those seasons44. Spring mushrooms, such as digüeñe and chicharrón de monte, also come out during a time of low food availability when winter supplies have been exhausted and people are waiting for the coming harvest. Edible fungi have contributed over generations to rural family’s subsistence, indigenous and non-indigenous, of southern Chile, and to household economies when traded (Catalán et al. 2005; Smith-Ramírez 1994, 1996). However, patches of native forests have been reduced or simplified in Menetue’s farms over the years, lowering the supply of mushrooms, which need the moisture of the understory, or the presence of decaying wood as substrate. Nowadays it is necessary to travel long distances or trespass on private land, where there are still large remnants of native and more complex forests, to find most species of fungi.

42 [Siempre ha habido mosqueta, pero antes no se usaba. Mi mamá escasamente sabía hacer el dulce. Ahora se toma más en cuenta y se comercializa...] [G♀12]
43 [No me acuerdo si habían cuando yo era chica, pero nunca lo comí] (G♀11)
44 During late fall and winter, animals need to be fed with fodder due to the harsh climatic conditions and the shortage of grasses. Therefore, they are not slaughtered as they are too thin.
The ngülliu or piñon, the seed of the pehuen or monkey puzzle tree (Araucaria araucana), was the most salient seed. In past times, it was considered a staple food, especially for winter, as it was gathered in large quantities in the fall to last until late spring (Coña and de Moesbach 2010; Ladio 2001). Piñones were an important source of carbohydrates and also proteins as 100 g of these seeds provide 179 calories and 4.5 g of protein (Ladio and Lozada 2000; Schmidt et al. 1992). Gathering trips were very important as an instance of social cohesion and knowledge transmission. Although people in the community do not strictly depend on them anymore, families always made the effort to have piñones, at least to try them a handful of times each season. Even when it was not possible to gather them, people bought some kilos in the market when the prices were accessible. Lower prices occur in a good year when trees gave large quantities of seeds or at the middle of the gathering season. Whenever someone in the extended family came back from piñonear (the act of gathering piñones), it is customary to share them with the rest of the kin or close friends. This was especially true with elders as they are the most eager ones to eat wild foods. As one elder expressed while he peeled and savored some boiled piñones his son brought him from the mountains: “When I taste them, I feel that I am back in the mountains”

The naming portion of the freelists exercises, and the subsequent classification of some species as belonging to the ‘wild edibles’ domain, speaks to the relative nature of the term, ‘wild’. Some species considered ‘wild’ could be classified as domesticated (e.g. quinwa, Chenopodium quinwa or chestnuts, Castanea sativa), semi-domesticated (e.g. yuyo, Brassica rapa) or parodomesticated (i.e. caring for and promoting in situ, e.g. copihue, Lapaegeria rosea), following Turner et al. (2011). It has been suggested that there are no easy distinctions between ‘wild’ and ‘cultivated’ foods for many agricultural and hunter-gathered societies as this classification can be unclear (Cruz-García and Price 2011; Harlan 1995; Lévi-Strauss 1950). They may envision plant foods as existing along a continuum ranging from the entirely wild to the domesticated (Bharucha and Pretty 2010; Lévi-Strauss 1950; Mazhar and Buckles 2007; Wyndham 2009). For some participants, the apple, plum and chestnut trees were classified as wild foods. An apple variety was mentioned, which they refer to as the ‘Mapuche apple’, and a plum variety that is thought to be native. Something similar happened to the chestnut tree which was believed to grow naturally, even though it was considered by local people a recent introduction to the landscape. The apple

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45 [Cuando los como, me siento caminando por las montañas] (G♂ 7)
tree, and probably the plum tree, were introduced by the Spaniard conquistadores (Coña and de Moesbach 2010; Montalba and Stephens 2014). As recounted by Lonko Pascual Coña in his autobiography, which describes in great detail the life and Mapuche customs, in the second half of the nineteenth century many varieties of apples already grew wild in southern Chile. “In earlier times there was great abundance [of apples] everywhere. Apple trees were not planted; they spontaneously grew in the fields. ...each variety of apples had its special name” (Coña and de Moesbach 2010). Rosales, a Spanish chronicler who came to Chile in 1629, also described apple forests from which the Mapuche made chicha (Rosales 1674). As apples multiplied rapidly, they displaced many wild fruits from which chicha was made including mulul (Ribes valdivianum), quilo (Muehlenbeckia hastulata), ünü (Ugni molinae), among others (Gumucio 1999; de Mösbach 1992). The Mapuche name for this fruit is manshana, modified from the Spanish name manzana, a clear evidence of its assimilation from the European settlers. Villagrán’s (1998) study on Mapuche ethno-classification of botanical resources of forest ecosystems showed that, out of 352 analyzed plant names, 6.3% were derived from Spanish, generally corresponding to weeds and cultivated plants. The chestnut tree, a recent incorporation as recounted by many participants in the study, was highly valued as a source of food, not only for humans but also for domestic animals, mainly pigs and geese. Some women remembered chestnut trees: “As a child I did not see many of these plants, I did not know them. Now, they are everywhere.” “Before, there were only chestnuts in the fundos, I think to feed their animals. Workers came across a seedling and they took it home...that is how we got them.” Mentioned in almost 70% of the freelists, chestnuts are today an important source of carbohydrates for the local people, with some women comparing it to piñones in terms of nutrition, albeit a sweeter version. “When we were kids, chestnuts were cooked together with piñones...we fought to get chestnuts because they are sweeter.”

Another interesting finding relates to the consumption of huempe or michahuarro, rotten or decayed wood, mainly of coigüe (Nothofagus dombeyi) prepared in different ways. According to

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46 [Antiguamente había gran abundancia en todas partes. Los manzanos no se plantaban; espontáneamente crecían por los campos. ...Cada variedad de manzana tenía su nombre especial] (Coña and de Moesbach 2010)
47 [Cuando chica no veía muchas de esas plantas, no las conocía. ahora hay por todos lados] (G 7).
48 [Antes había castaños solo en los fundos, creo que para alimentar a sus animales. Los trabajadores pillaban una plantita y se la llevaban para la casa] (E 6)
49 [Cuando éramos chicos, cocían las castañas juntas con los piñones...se peleaban las castañas porque son más dulces] (E 6)
Smith-Ramírez (1994), it is a mixture of wood tissues and mycelia of cellulosic fungi. It was eaten as bread with honey or harina tostada (toasted wheat flour). The juice released by the wood, when pressed, was drunk as chicha. The Lonko of the community told me: “I used to go out with my mom to look for coigüe’s [Nothofagus dombeyi] rotten wood. The shell [meaning bark] was removed and a piece was cut ... it was like cheese, soft and we ate it with toasted flour. Now, there are no such logs.” Another elder remembered that it was also eaten with milk: “Before, it was tossed into boiling milk ... any fallen log served. You have to eat it because it repairs your health, and not despise it”. Nowadays, it is just a memory since no one in the community eats huempe anymore and only elders knew about this food resource.

4.1.2 Current wild edible plants consumption, uses and commercialization

Although wild edible plants were certainly not consumed as much as in the past, we identified species that are currently gathered and eaten by community families between late October and early April. Through participant observation, ten wild edibles were observed being consumed by community members during that period: digüeñe (Cyttaria espinosae), yuyo (Brassica rapa), nalca (Gunnera tinctoria), coligüe (Chusquea coleu), chilco (Fuchsia magellanica), maqui (Aristotelia chilensis), murra (Rubus ulmifolius), mosqueta (Rosa rubiginosa), murta (Ugni molinae) and piñones (Araucaria araucana) (Figure 8).

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50 [Yo salía con mi mamá a buscar palo de coigüe podrido para comer. Se sacaba la cáscara y se cortaba un pedazo...era como queso, blandito y se comía con harina tostada. Ahora ya no quedan de esos palos] (I♂ 5)
51 [Antes lo echaban en leche hirviendo...de cualquier palo botado. Hay que comerlo porque arregla la salud y no despreciarlo] (I♂14)
52 This coincides with the answers given during the semi-structured interviews in which people were asked which wild edibles they still gathered. Answers included all of these species, with the exception of nalca, yuyo and chilco.
In addition, chestnuts (*Castanea sativa*), as homemade canned chestnuts in syrup prepared in the past season, were commonly offered to me as dessert. Due to the length of the field season and species seasonality, findings are incomplete and do not accurately reflect the overall use of wild foods over the course of a year. However, according to people interviewed, community members commonly gathered three species of mushrooms during late fall depending on their availability: *changle*, *gargal* and *pike*. On the other hand, food diaries showed a very low presence of wild foods (only 2.3% of relative frequency of occurrence); only jams made from wild fruits.
(specifically, elmleaf blackberry and rosehips, both introduced species) were recorded. It should be noted that, this method was not optimal for recording the consumption of edible species due to the asynchronicity between availability (seasonality) of many species and the time when food diaries were conducted. This can be evidenced by the fact that only two of the ten species confirmed by participant observation were registered in diaries.

Some wild edibles were also recorded as being used for purposes other than for food (Appendix 8). Numerous species were described as having medicinal properties (more than 50% of the 21 most salient species). For many women interviewed, every plant had a medicinal use, but for many species they simply had not discovered or did not know for what illnesses or conditions they were good for. Natural and wild edibles were considered to be foods that were ‘good for your health’ or medicinal by most women, what in the literature is referred to as ‘functional foods’ (Valussi and Scirè 2012). “Every plant has its use; the thing is that sometimes we just do not know it”53. “Everything on earth is a remedy”54. It has been widely described that the division between food and medicine for many indigenous peoples can be blurred (Etkin 1982, 2006; Johns and Eyzaguirre 2006; Karjalainen et al. 2010); a plant can be either food, or medicine, or both at the same time, depending on the stage of plant development, the method of preparation, and the state of health of the individual (Johns 1994; Kuhnlein and Receveur 1996). This is how exactly plants are perceived by many women in the community.

Most edible-medicinal plants were gathered within close proximity of people’s houses, and often planted in the household’s home garden called huertas or arranged in flower beds if the species were also considered ornamental. In these instances, women took care of their vegetables and also of wild plants considered indispensable. Huertas then functioned as sources of food, medicines, vegetable dyes and also as warehouses of traditional crop varieties and their seeds. This reaffirms why home gardens have been acknowledged as repositories of biocultural diversity (Birol et al. 2005; Galluzzi et al. 2010). According to the literature, home gardens are often structurally complex, and also multifunctional, enabling the provision of different benefits to ecosystems and people (Birol et al. 2005; Finerman and Sackett 2003; Galluzzi et al. 2010; Watson and Eyzaguirre 2002). Some women in the community were called huerteras, which meant being

53 [Toda planta tiene su uso, la cosa es que a veces no lo conocemos] (G ♂7)
54 [Todo en la tierra es remedio] (G ♂ 10). These also include veterinary remedies made with medicinal plants.
very skilled in the cultivation of vegetables and plants in their home gardens, therefore, they successfully provided for their families. These women not only had the most diverse and beautiful community gardens, they also were of the few that still had some traditional varieties of crops (Figure 9). It is no coincidence that these same women had a deep ethnobotanical knowledge, compared with other women, remaining key informants during the research.

Figure 9. Home garden in Menetue. Mapuche women harvesting chard in her home garden; trees, bushes, herbs, ornamental flowers and vegetables are organized in a small, multifunctional piece of land.

Although huertas are a women’s domain, men, sometimes by mistake, cut some of these plants believing that they were not useful. In these cases, women would get very upset because they often had brought them from another farm, the forest or was given to them by a girlfriend. A woman, annoyed about a lost plant, expressed: “I tell my dad not to remove the plants that are medicine…he sometimes does not pay attention.”55 According to Finerman & Sacket (2003), home gardens ‘embody a family's health needs, and stands as a perceptible and conspicuous signal of a

55 [Yo le digo a mi papá que no me saque las plantas que son medicina…pero a veces anda despistado] (E 9 6)
woman’s identity as family health’, that is why most women took so much care of their home gardens as they symbolizes health and abundance.

Some other species were used as natural dyes. In Menetue, berries like elmleaf blackberries, elderberries (*Sambucus nigra*) and *maqui* berries were used for dying wool, in addition to roots of the *michay* (*Berberis spp.*), *nalca*’s rhizomes, *chilco*’s twigs and the hard coats or episperms of the *piñones* (Figure 10). Many plant species of the temperate forests, as well as minerals present in the area, have historically been used as a natural dyes by indigenous communities to give color to sheep’s wool (Baixas 1983; Coña and de Moesbach 2010; Joseph 1929). This is a very important functional use of plants as handicrafts in wool are still a very important skill for Mapuche women who knit and weave objects with remarkable designs.

**Figure 10.** Natural dyes. White wool is dyed at home using traditional methods. Plants, vegetables discards and lichens are collected from the landscape to dye wool. A great variety of hues are obtained with natural dyes, many of them from wild edible species. Hand spun and dyed wool is knitted and more traditionally woven in the *witral*, the Mapuche loom.
Other uses for wild edible plants include materials for handicrafts, toys, construction and tools, and rituals or magical. A very versatile wild edible is the Chilean bamboo or *coligüe* which was described as having multiple uses: food; handicrafts; construction and tools; magic; animal fodder; and toys (Figure 11). The same multifunctionality was described for *maqui*.

![Figure 11. Some uses of *coligüe* (*Chusquea culeou*). From left to right and top to bottom: llepü, a flat basket for winnowing grains; Mapuche loom with Chilean bamboo stalks on the horizontal; greenhouse built with bamboo stalks; bamboo sticks to support vertical cultivation in home gardens; *zaranda*, a slatted shelf used to dry or mature homemade cheese hanging from a tree;]
pollera, which only allows chicks to go inside to feed on grains (this is also the origin for the word pollera, meaning a women’s skirt).

When women were asked whether they sold wild edibles or their preparations, it seemed almost to offend them. Most female participants preferred not to sell the wild edibles that they gathered, as they believed these foods were left by Chau Dios, the Supreme God, for people from rural areas to enjoy, respect and not to be sold. This belief system, as an essential part of practical knowledge, often place humans within (rather than superior to) other species and, therefore, fosters greater care for other species (Turner et al. 2011, p. 213). This belief was especially the case with the ngüilliu, the Pehuen’s seeds (Araucaria araucana), as these are thought to have a spirit which must be guarded by the owner or nguén of the mountains; the trees are considered sacred (for a thorough understanding of the mechanism of the Nguen, see Grebe 1994). These beliefs can also be considered taboos which are one form of a larger set of social and religious sanctions, and may serve to support conservation and resource management (Berkes et al. 2000; Colding and Folke 2001). For some community members, the fact that ‘ignorant and greedy’ people gather as many ngüilliu as they can to sell and make money offends the spirit of Pehuen. Through the lens of Berkes’ ‘ecological prudence’, non-Mapuche people may not act in a way that prevents the depletion of resources needed for subsistence (Berkes 2012, p. 78). As a result, they are blamed for being responsible for the shortage of seeds some years and for the sudden bad weather during a gathering day. For the interviewees, it was mandatory to ask for permission and to act with respect on gathering days. “You have to ask permission and throw away cigarette smoke before entering the forest not to get lost because the mountains do make people get lost. If you walk messing around or swearing, being disrespectful with the nature that is a virgin, because those parts are where the pines (monkey-puzzle trees) are virgins, then all those bad things happen”56. After some hours gathering near the border with Argentina, a community member reflected: “I think we have gathered enough…you need to leave for the rest”57, showing his respect for the Pehuen. That same day, when the sky suddenly clouded over, they blamed the non-Mapuche gatherers who, without knowing that it was offensive, shouted at each other and

56 [Si po, hay que pedir permiso y botar humito de cigarro antes de entrar al bosque para no perdernos porque los cerros hacen perderse a las personas. Si usted anda con mucho desorden o hablando insolencias, faltando el respeto a la misma naturaleza que es virgen, porque esas partes donde están los pinos son virgenes, entonces pasan todas esas cosas malas] (E ♀ 4)
57 [Ya hemos recogido harto…hay que dejarle a los demás] (F♂ 3)
laughed very loudly while gathering in the *pinaladas*\(^{58}\). However, many of these participants had no problem in buying *ngüilliu* and other wild edibles in the local market. They also had less of an issue selling preparations made with introduced species like blackberry jam, rosehip jam and preserved chestnuts, compared to native wild edibles. But even if they wanted to go out to sell their products or preparations, it is problematic because they do not have an easy access and transportation to town, and the foodstuffs are heavy. “*Chestnuts are sold a lot ... the problem is how to get out to town, the same thing happens with the digüeñes*”\(^{59}\). During summer, some women partake in folk fairs organized by the municipality or by a neighboring community to sell their handicrafts and foodstuffs like jams and some Mapuche traditional food. These events happen only two or three weekends per year and women get organized and most of the times pay for a vehicle to transport them and their goods.

From regular visits to the local market and temporary market stalls installed on the roadsides during summertime, prices and trends along the season of many products were recorded (Appendix 8). Usually sellers in established local markets were only intermediaries. Therefore, their values were higher in comparison to direct vendors of wild edibles, who had lower prices and were able to give more accurate information on availability and seasonality (Figure 12).

\(^{58}\) *Pinalada* is the local word used to refer to a monkey puzzle tree forest. This is derived from the Spanish word *pino* which means pine, as many people term the monkey puzzle tree.

\(^{59}\) [Se venden harto las castañas...el problema es cómo salir para el pueblo, pasa lo mismo con los digüeñes] (G ♀ 12)
Figure 12. Wild edibles sold in local markets. From top to bottom and left to right: [1] murta (Ugni molinae); [2] piñon (Araucaria araucana); [3] castañas (Castanea sativa); [4] jams and preserves of mosqueta (Rosa rubiginosa); elmleaf blackberry (Rubus ulmifolius) and murta (Ugni molinae); [5] digüeñe (Cyttaria espinosae); [6] change (Ramaria flava); [7] chupón (Greigia sphacelata); [8] gargal (Grifola gargal); [9] canned nalca (Gunnera tinctoria) and [10] canned coyacho de coligüe (Chusquea culeou).
4.1.3 Transmission of plant knowledge: sites of construction and social institutions

Traditional ecological knowledge is defined as “a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment” (Berkes 2012, p.7). Cultural transmission of traditional ecological knowledge in Mapuche pedagogy is oral and, importantly, in situ, which is to say through the lived experience. “We do not learn by reading, we are taught by doing”\(^\text{60}\) (Figure 13).

![Figure 13. Intergenerational knowledge transmission. Aunt teaching her niece how to gather hoja del paño (Verhascum thapsus) to dye wool. She was showing her that she had to take just some leaves from the base and leave the rest, so the plant would not die.](Image)

As in other cultures, ecological knowledge transmission occurs through different channels, particularly parents, grandparents and peers (Setalaphruk and Price 2007; Somnasang and

\(^{60}\) [Nosotros no aprendemos leyendo, sino que haciendo las cosas] (E♀6)
Moreno-Black 2000). Accompanying parents, grandparents and older siblings to gather firewood, useful plants or looking for lost animals in the woods, were seen as times of learning plant knowledge and environmental skills. Not only the collection, but also the preparation and consumption of wild edible plants are considered learning events (Cruz-García 2006). This vertical transmission of knowledge within genealogies was also complemented by horizontal transmission occurring between individuals of the same generation (Eyssartier et al. 2008). Gathering for consumption on the way to school, for example, was an essential instance of horizontal learning, also reported by Cruz García for children in India (2006). In Menetue, morning and evening walks to and from school with cousins, friends and siblings were described by adult informants as instances of peer-to-peer learning, but also of self-learning as the natural environment was explored. The latter creates the time and space for knowledge construction which feeds and recreates traditional ecological knowledge as a dynamic and cumulative body of knowledge (Berkes 2012; Turner et al. 2011). “We also ate copihues (Lapaegeria rosea) coming out from school. We passed through so much forest and now they are all gone...there are no forests as before⁶¹. As remembered by many adults, during school breaks, children looked for wild foods in the surroundings to eat as snacks. Sometimes, a piece of bread was sent from home, but usually they would look for something to eat on the way to school or during recesses. “At school, girls always ate nalca (Gunnera tinctoria) because there is a mallin [marshland] nearby. When they were going out to playtime, they went out to fetch nalca around there”⁶². “We ate murtas right there and when we had time, sometimes we threw some to our school bags ... all our notebooks were stained and we went to school just like that”⁶³.

According to the results of the photo-elicitation interviews on the 21 most salient species (Smith’s S index), most adult women had a comprehensive ethno-botanical knowledge of wild edibles available in the area (Appendices 9 and 10). Participants were able to name and easily identify most species, and generally provide detailed information on species seasonality, ecological characteristics, such as habitat, water and light requirements, abundance and changes

⁶¹ [Los copihues los comíamos saliendo de la escuela también. Ahí pasábamos por todo el bosque y ahora está todo pelado...ya no hay bosque como antes] (G ♀ 11)
⁶² [En el colegio las niñas siempre comían porque hay un mallín [marshland] cerca. Cuando salían a recreo, salían buscar nalcas por ahí] (F ♀ 2).
⁶³ [Ahí no más nos comíamos las murtas, y a veces cuando alcanzábamos nos echábamos un poquito a la bolsa...se manchaban todo los cuadernos y así no más íbamos a la escuela] (F ♀ 11)
on availability over time. Forms of preparations, consumption habits (cultural meanings around preparation, consumption and sharing of food) and alternative uses, were also documented (Appendix 8). This ethno-botanical knowledge was not given as isolated information, but rather was elaborated within stories and memories of their individual-plant-landscape relations through life. This also provided a richer body of data for documentation and a further contextual understanding of wild edible plants use and foodways through time. This unveiled the ‘ecological’ part of traditional ecological knowledge, where relations were far stronger than a specific information or factual data. Sometimes an exact seasonality for a wild edible plant did not come to their minds immediately (like specific months), but as other concurrent socio-ecological processes taking course at the same time were remembered (e.g. an agricultural task to a ceremony), they were able to provide that knowledge in a more integral or holistic way. This is consistent with what was observed by Gumucio (1999), who found that Mapuche time-reckoning was explained by seasonal changes in vegetation (vegetal time) along an annual cycle of natural, social and ritual events. The perception of time differs across cultures (Janca and Bullen 2003; Killsback 2013). Therefore, asking about specific calendar months in order to identify species’ seasonality is a western conception of time that, in this case, was not consistent with Mapuche indigenous perspectives.

As expected, the most salient species were identified more easily and the ethnobotanical information provided was often fuller. The proficiency index showed small differences between interviewees with the highest score being 59 and the lowest being 48 ($\bar{x} = 53$). Women participants ranged between 38 and 68 years ($\bar{x} = 51$ years) and had spent different number of years working outside the community in an urban center (some left for 35 years, while others have never lived outside of Menetue). However, differences corresponded more to participants’ personal histories, rather than to factors such as age or years outside of the community. Due to the complex nature of how knowledge is generated, accumulated and passed between generations, an individual’s ecological knowledge expertise can be better interpreted using the ethnographic knowledge of the individual (Wyndham 2010). Crucial factors in an individual’s

\[64 \text{ The maximum score possible if all the answers were correct was 63.}\]
proficiency can include how knowledgeable or eager an individual’s parents or grandparents were to teach, and how interested in useful plants were the kin and the individual.

Informal interviews and participant observation were not only key to identify community members with an outstanding overall ecological knowledge (key informants), but they also pointed to differences in knowledge competence between age groups. Throughout the field season, the ethno-botanical knowledge of children and youngsters was often and informally put to a test, not only by me, but also by parents and grandparents who tested the children’s knowledge and skills to identify useful species and know their uses. These attitudes towards children began to be more frequent as the field work progressed, probably as a response to the growing interest of adults on the topic of research, to our recurrent conversations around useful plants and to their generous attempts to convey their plant knowledge to me.

Walks in the surroundings of the community and outings to gather wild edible plants turned into ideal instances for assessing the state of plant knowledge among children as they commonly were enquired about the plants that we encountered. The limited ethnobotanical knowledge on forest wild edibles and other useful plants became evident when compared to adults and elders. At times, just trying to identify a relatively common species seemed like a challenging task, and for most species, knowledge about the when and where to gather them or forms of preparation was lacking. The latter shows how detached children’s plant knowledge is from actual practices, as this hands-on knowledge requires a higher degree of involvement in order to learn (Setalaphruk and Price 2007). For some teenagers, outings to gather piñones were the first time that they had seen a Pehuen (Araucaria araucana) (Figure 14). This contrasts with Wyndham’s (2010) study on plant knowledge among Rarámuri children in which overall use-knowledge scores were almost twice as high as naming scores. This loss of plant knowledge was an impression also perceived and supported by adults in the community. “When talking with other indigenous community’s presidents, they told me that their children don’t know how to go to the mountains. They haven’t had the opportunity to go to look for piñones, to gather and to know the tree from close... imagine!”⁶⁵ This hand-on experiential element is very crucial for local people in that it is necessary for acquiring wild foods from nature.

⁶⁵ [Si me conversaban los presidentes de las otras comunidades indígenas, que sus hijos no saben ir a la cordillera. No han tenido la oportunidad de ir a buscar un piñón, a recoger y conocer la mata de cerca a ver como es... ¡Imagínese!] (E 96)
Figure 14. Araucaria trees in Santuario El Cañí. This picture was taken during a trip to the mountains I did with two teenagers from the community (me in the middle). This was the first time they had seen a Pehuen. Their parents in contrast, especially their mother, went almost every year to gather piñones during their childhoods.

The obstruction of the transmission of ethnobotanical knowledge, according to adult participants, was related primarily to limited access to forests and, therefore, a lack of daily interaction with plant species. Because tasks like gathering wild edibles are site specific, they are taught within the locations where they are to be performed (Ruddle 1993). “...how can we teach our children if we cannot access the woods?”66, a woman expressed when asked about her thoughts on ethnobotanical knowledge loss. This mirrors how important forests are for intergenerational environmental learning since they have been, for centuries, a physical learning place for children to gain ecological knowledge and environmental skills (Ibarra et al. 2011). Therefore, the body of knowledge and the social mechanisms or institutions that guarantee its

66 [...como vamos a enseñarle a nuestro hijos si no podemos ir al monte] (E♀ 8)
continuity (transmission), cannot be dissociated from the practice (Berkes 2012; Ibarra 2010; Toledo 2002). Corpus (body of knowledge or or cognitive systems), praxis (the set of practices) and cosmos (belief system) are all part of a unit (Toledo 1994, 2002).

The school regime and educational system were also mentioned as causes resulting in children’s lack of interest in wild edibles and traditional cuisine, as well as the limited time that they had for engaging in traditional pedagogies and learning environmental skills. Since most children passing onto 7th grade need to attend a boarding school in the nearest city, there is a gradual change in their interests and habits, usually away from the rural lifestyle. Past generations attended the local school until 6th grade, at most. Today, as children leave the communities at a very young age, they become increasingly disconnected from their families, traditional practices and land. Despite the fact that families integrate children during weekends and holidays into daily farm activities, many parents try to make them happy by preparing meals that they enjoy. Most of the times, this means buying food that they would not normally purchase or consume. Some parents call it ‘city type food’. As a result, entire families gradually adopt a more modern or urban lifestyle in food habits, so ecological knowledge on wild edibles and traditional foods is being lost, either as it is supplanted by modern knowledge or is no longer transmitted (Pilgrim & Cullen, 2008). Likely both situations are happening at the same time, as there is a clear change in the tastes of younger generations towards market foods as new status symbols (Cruz-García, 2006) and also an increasingly disconnection with the landscape where they grew up as they spend more time at school in a urban setting (Krohn and Segrest 2010). According to Cruz- García (Cruz-García 2006), knowledge erosion of wild edible plants can be explained by how formal education ignores local resources, knowledge and culture.

Home gardens are particularly important for many rural smallholders, and are notably diverse, sometimes containing more than 200 useful species (Eyzaguirre & Linares 2004). Farmers widely transplant species from the wild to their home gardens (Bharucha and Pretty 2010; Cruz-García and Price 2011; Eyzaguirre and Linares 2004; Harlan 1995), and Mapuche farmers are not the exception. Because access to forest ecosystems is very much restricted to Menetue’s families nowadays, home gardens and the houses’ immediate surroundings have been, in some ways, spaces for rebuilding this lost connection. Home gardens were not the only sites enhanced with wild species; small patches of forests were also enriched or recovered with species of shrubs, vines and trees brought in by family members from the forests. Useful or just ornamental forest trees
and plants were found, even if in small quantities within the families’ household. Many tree species were planted to be used as firewood in the near future. For Harlan (1995), the household can include the home garden, orchard, barnyard, field and any space that includes useful species, both animal and plant, brought in to be served to those who live there. As useful plants are brought to the household, the immediate landscape has an important role for knowledge continuity for those species that are difficult to find or with restricted access, but that can be also easily transplanted. This strategy also reflects how resilient indigenous communities can be in terms of thriving after adverse situations or events. Specifically, historical land grabbing has limited their actions within the extended landscape that was once theirs. While the possibility of interacting with forest wild edible plants was restricted, home gardens and small forest patches became, for many children, windows to the forests' plant world. Home gardens have been suggested to be the refuge for wild species threatened by deforestation and urbanization (Bharucha and Pretty 2010). In Menetue, they provide access to some forest elements that would otherwise be out of reach.

4.2 Factors influencing the use of wild edible plants and knowledge transmission: Locals’ perceptions

Traditional ecological knowledge is practical and embodied knowledge rooted in the landscape (Ingold 2001). Thus, the loss of this knowledge is an indication of how people’s interactions and ways of dwelling within the landscape have changed. For many Mapuche communities living near forest ecosystems, making use of forest products, such as wild edible plants, has been part of their foodways for centuries, supporting their food diversity and health (Bengoa 2003; Clark 2011; Coña and de Moesbach 2010; Ladio and Lozada 2000; Ladio 2001, 2011; de Mösbach 1992; Smith-Ramírez 1996). As described by Lonko Pascual Coña (2010), people looked in the fields and forests for what was needed to maintain their families as a complement to their home gardens and crops. Different herbs and greens were gathered during the year, together with different kinds of mushrooms that appeared in early winter, fruits and berries during summer and, very importantly, piñones gathered from the high Andes during fall (Bengoa 2000; Coña and de Moesbach 2010; Montalba and Stephens 2014).
Although a comprehensive ethno-botanical body of knowledge of wild edibles was recorded, this body of knowledge is certainly facing a process of erosion. When considering traditional ecological knowledge as a package including what people know (cognized knowledge), what they do (environmental practices and management systems) and their cosmovision or world view (Berkes 2012; Toledo 2002; Zarger 2011), the erosion of ethnobotanical knowledge on wild edibles invariably implies a loss in the consumption of these foods, and *vice versa*. From a larger perspective, the loss of land and the practices of extensive forestry and agriculture have caused significant ecosystemic losses in the area and this process influences the erosion of traditional ecological knowledge, which is participatory, site specific and ecosystemically based. Today, fewer wild edible plants are gathered and consumed by people in Menetue in contrast to the number of wild edibles known by the local people. This situation was also been reported in Mapuche families of the Patagonian steppes of Argentina (Ladio, 2001).

According to both formal and informal interviews and to participant observation, the most frequent gathered wild edible plants nowadays are *digüeñas* (*Cyttaria espinosa*), *piñones* (*Araucaria araucana*), *changles* (*Ramaria flava*), *moras* (*Rubus ulmifolius*), *maqui* (*Aristotelia chilensis*) and *mosqueta* (*Rosa moschata*). Conversely, *nalca* (*Gunnera tinctoria*), *maqui*, *piñones*, *pike* (*Armillaria mellea*) and *yuyo* (*Brassica rapa*) were reported as gathered less than before or not gathered at all by some participants who thought they were important sources of food in past times.

Factors or limitations to access and consume these wild foods were explored in interviews and narratives in order to understand what interferes with the use of wild edible plants and leads to the obstruction of transmission of ecological knowledge.
4.2.1 Accessibility: The forest’s traditional gathering sites

When looking at the landscape in Menetue, one appreciates the large native forests surrounding the community, especially at the higher altitudes. Most of these forests are in hands of winkas (non-Mapuche) or outsiders to the community. “Now you need to ask for permission because they [outsiders] bought them, but I don’t know what they plan to do... they just bought to grab hold of those virgin mountains. Because God left them for everyone...he left them public, but now the money gets them [the mountains]”\(^67\). Specifically, high mountain forests were thought to be owned by their Ngen, thus allowing free access for local people to forest products like the seeds of the monkey puzzle tree. In their belief system, families ‘owned’ the piñones of some pinaladas as that was the family’s gathering spot for many generations, but the forest did not belong to them. Nowadays things have changed.

The lands used to be open for access, even though every piece of agricultural land had its owner. “Before everything was open, no one had their land closed”\(^68\). “Before, it was freer; you could pass straight through any piece of land. And now you cannot, because if you go through the property of a rich, it is forbidden because it is private. There [pointing to the neighboring farm owned by a winka] are the nalcas, sometimes you can find also murtas, but we haven’t gone over there because we prefer to seek for those foods always in our land”\(^69\). Today, even though families have fenced in parts of their farms, it is socially accepted to use your neighbors’ lands as a public path. The only rule is to keep gates closed to keep the animals from running away. If someone needed a useful plant for medicine or to dye wool, and he or she knew someone in the community or another community who had some on their farm, it was customary to call by phone and ask permission to get some. Neighbors were often happy to share leaves, barks or whatever was needed, but it was believed that only the owner was supposed to harvest or collect what was requested so that the plant or tree would not be annoyed and stop producing or possibly die.

\(^{67}\) [Ahora hay que pedir permiso porque compraron, pero no sé qué estarán haciendo... compraron para apoderarse de esas montañas vírgenes porque eso dios lo dejó para todos, lo dejó público...pero ahora la plata se lo queda](G 9 7)

\(^{68}\) [Y antes todo era abierto no más, nadie tenía cerrado] (G 9 11).

\(^{69}\) [Antes era más libre uno podía pasar por cualquier parte a lo derecho. Y ahora no, porque si usted pasa por un campo de un rico ya no dejan porque es privado. ... Ahí están las nalcas, de repente hay murtas también pero nosotros no hemos salido para allá porque nosotros preferimos buscar siempre cositas en los campos de nosotros] (E 9 4).
Additionally, this restricted access to the surrounding forests has created a sort of fear of the unknown. For many women, forests were perceived as a dangerous place and most of them expressed fear of entering or exploring the forests alone. Some fear mountain lions (*Puma concolor*), even when they did not fear them during childhood. “I like to go out to gather changle (*Ramaria flava*), but I have to go with my husband because I am afraid of going by myself. It is too much wilderness”70. “Now, I do not go out not even to find nalca (*Gunnera tinctoria*), I fear the mountain lion and there is no nalca either… I know that below the nalcadero they always hide, with leaves as large, and then the lion lurks in there, especially if it’s hot. They get under the leaves to sleep and if something comes, he catches it”71.

The abundance of some wild edibles has been affected by the limited access that people have to them: “…people would collect enough piñones and other natural foods for their seasonal storage needs. Not anymore, now the land is all private, foreign people bought in the higher areas already and closed. Then the local people cannot go. Then that’s why the monkey puzzle trees are giving less piñones, so that the people do not despair… Because my generation, when we were kids, I didn’t hear anyone saying: ‘this year there will be no piñones’. Every year there was a lot because my dad was always going to look for them and came with lots…and as the years passed people started to bring less each time. …we need to know how to take care of nature so that we she gives back. Imagine those people that cannot go to gather piñones being so close when they have always used to go…they sure get desperate because they have to go to the supermarket to buy a kilo that is above $2500 or $3000 pesos.”72 This means understanding the human-wild edible plant relationship as a symbiosis between people and the landscape, were the land is an animated and sentient natural element that provides and cares for local people. Berkes et al. (2000) has

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70 [Me gusta salir a buscar el changle pero tengo que salir con mi viejo porque a mí sola me da miedo, es mucho monte] (G ♀ 7).
71 [Si ya ahora ya no salgo ni a buscar nalca, me da miedo el león y no hay nalca tampoco… yo se que debajo del nalcadero siempre se esconden, con las hojas tan amplias po, entonces ahí se esconde el león, sobre todo si hace calor. Se ganan debajo de las hojas a dormir y si llega algo y lo atrapa] (G ♀ 7).
72 [Los piñones y todo lo natural la gente podía sacar hasta abastecerse. Ahora no, ahora los campos están todos privados, ya compraron gente extranjera en las partes de más arriba y cerraron. Entonces la gente de acá mismo no puede ir. Entonces por eso mismo los pinos dan pocos piñones, para que no se desespere la gente. Porque la generación de nosotros, cuando éramos chicos no escuché nadie diciendo: ‘este año no va a haber’ Todos los años había harto porque el papa siempre iba a buscar y llegaba con hartos y después empezaron a traer menos cada vez. …la naturaleza igual hay que saberla cuidar para que nos esté dando….Imagínese esa gente que no puede ir a los piñones estando cerca cuando todo un tiempo ha ido…igual se desespera porque tiene que ir al supermercado a compra run kilo de piñones que está arriba de los $2500 o $3000 pesos] (E ♀ 6)
described how the use and management of wild resources by indigenous people enhances both the quality and the abundance of the resources of interest.

The buying power of outsiders, which out-competes Mapuche families’ increasing needs as farms get smaller, was perceived as the engine of the contemporary land acquisition by non-Mapuche. Most of the time, this happens in bits and pieces as small plots are purchased one after the other. “They own a lot of land and they have kept buying. They buy very cheap because they surround you and then you have no choice but to sell. They take advantage.”73 A woman reflected: “also because people who have money arrived here to buy land near the mountains and those people close ... then there is no place for us. As the Mapuche’s are giving away [”desajenar”] as we call it, their lands; desajenar means they already sold and gave up their land, and another person comes in, closes and says it is private and no one can pass. Then, there is a problem ... I think this also helped a lot in retaining people from gathering these foods because they are afraid of the private land.”74 This is, in part, happening because young adults do not see a future in such small farms and, as a result, many migrate to urban centers (Schnettler et al. 2013). The willingness to sell their inherited piece of land is influenced by the pressure of realizing that the land is not enough to subsist on, coupled with the desire for an urban life and modernity. This strong migration to urban centers throughout the 20th century has become, according to some authors, the main demographic dynamic that characterizes the Mapuche people (Castillo 2008; Egert and Godoy 2008; Saavedra 2002).

Private lands have fragmented the community and disrupted their interconnections, as fences have been installed by non-Mapuche owners. This has also had impacts on their social lives, as people complained that community members do not visit each other as much as they used to in the past. The sale of Mapuche land, as a consequence of Law Decree 2.568 in 1979, has had also devastating effects on the community’s spirituality and practice of traditional rituals. According to Toledo Llancaqueo (2006, p. 72), through the process of individual land ownership, sacred places as a nguillatue were inevitably distributed on individual properties, allowing the owner to decide

73 [Tienen harta tierra y han seguido comprando. Compran a precio chiquitito porque a uno la rodean y ya no tiene más opción que venderles. Se aprovechan] (E♀6)
74 [También porque ya llegaron a comprar cerca de las montañas la gente que tiene plata y esos cierran...entonces ya no hay lugar. Como el mapuche va desajenando sus tierras decimos nosotros, desajenar [enajenar] es que ya vendió y ya se desampará su tierra, llega otra persona, cierra y dice esto es privado y no pasa nadie. Entonces también ahí hay un problema...creo que también eso ayudó mucho a que la gente se retuviera a ir a buscar esos alimentos porque tiene miedo al terreno privado] (E♀6).
unilaterally whether sell, lease, swap or give another use to that sacred piece of land, affecting the entire community. In Menetue, during the past decade, the community has had to legally fight for their pampa or nguillatwe, the sacred place where the Nguillatun was celebrated for generations. Lately they have also been struggling to keep their traditional cemetery and access to it. In the first case, the Chilean court denied their right to keep their sacred place, even though they offered to collectively pay for the piece of land (approximately one hectare). In the case of the cemetery, they were granted the right of access it only after more than three years of bureaucracy and paperwork. Both sacred places are in hands of one non-Mapuche landowner who lives in the capital city and whose fundo divides the community into three sectors.

4.2.2 Availability of wild edible plant populations

Scarcity was the second most frequent reason mentioned for not gathering many wild edible species. This can be attributed mainly to the decrease of forest areas on people’s farms. Today, forests or patches of forests are almost gone or are degraded in most land owned by local people. As space has become the limiting factor for subsistence, open fields have been prioritized for agriculture or livestock farming at the expense of the forest area. “Before there was more forest because the elders had more land I think, then they just cleared where they were growing crops and the rest remained”75. Fragments of forests still remain on steep land not suitable for agriculture or surrounding streams to conserve the water supply; however, they are not very common. As a consequence, species like maqui (Aristotelia chilensis), avellana (Gevuina avellana), arrayán (Luma apiculata), mulul (Ribes sp.) and boldo (Peumus boldus) are less abundant, together with vines that depend on them like copihue (Lapageria rosea) and coulle (Lardizabala biternata). “There are no macales (patches of maqui trees) left ... they are logged to open fields as people no longer want its fruits and the wood is not good for fire either”76. Ironically, maqui is becoming another ‘superfood’ and trendy ‘super wild berry’ in the northern markets due to its high contents of antioxidants, and cardioprotective and antiviral effects (Céspedes et al. 2008; Schreckinger and Lotton 2010). In fact, it has been referred to as an antioxidant ‘gem’ (Healthwithfood.org 2014).

75 [Había más monte porque los antiguos tenían más tierra yo creo, entonces limpiaban donde iban a sembrar no más y el resto quedaba] (D♂1).
76 [Ya no quedan macales...para limpiar el campo lo botan porque ya no quieren su fruto y la leña no es buena tampoco] (G♀12).
Furthermore, old fences dividing pastures and plantations, which were made from fragments of stumps or whole logs lying horizontally, have disappeared as the pressure for firewood has also increased. Of course this also impacts forests on their farms as firewood is used extensively for cooking and heating. Mushrooms were reported to be affected, especially some lignicolous fungi that use wood as its substrate (e.g. gargal, pike, lengua de vaca) and terrestrial fungi that usually need the micro-environment for growth that the under-forest offers (changle). “Those gargales grew on coigües (Nothofagus dombeyi) and pellines (Nothofagus obliqua) and now you cannot find those kinds of wood...”77. “They [in reference to gargales] come out on fallen logs...that one is hard to find because old fences made out of fallen logs have disappeared, they have been burned and now you only find wired fences instead” 78.

Additionally, the use of plastic bags for gathering in place of the traditional baskets made out of vegetable fibres was also mentioned as a possible cause of the disappearance of fungi. In past times, the same act of gathering and walking around with a basket helped dispersed the fungi spores, increasing their abundance along paths commonly transited and collecting areas. Today, baskets are hard to find because basket-makers in the area have almost disappeared, and also most people have found it more convenient to walk with a plastic bag than to carry a rigid container like a basket. “In past times, mushrooms were collected with baskets and now people use nylon bags ... that is a big mistake”79.

Deforestation has also affected water resources and some species that are dependent of these humid environments, such as the nalca, which was described by most people as frequently consumed in the past, but today very scarce. Because nalcas are sold in the market, there was a shared notion that people from town had overharvested the nalcaderos as they did not have an 'ecological awareness' and knowledge of appropriate harvesting techniques, both of which have affected the nalca’s abundance and reproduction. “The only thing is that you cannot cut it with a machete, because they ruined completely our nalcadero [where nalcas grow together]. As people from town came up with their machetes and cut everything with it to take just the good part...now

77 [Esos gargales salían en los coigües y pellines y ahora ese tipo de madera no hay... ] (G ♂ 7).
78 [Salen (en referencia a los gargales) en los palos botados...ese si es raro de encontrar porque ya no hay cercos de palos botados, se han quemado y ahora hay puro cerco de alambre no más] (G ♂ 11).
79 [Antes se recolectaban hongos con canastos y ahora se recoge con bolsas de nylon...ese es un error muy grande] (H ♀ 15).
there is nothing there. "There are no longer nalcas around here. I used to take from a marshland that it is there, but it is now dry." Consequently, people’s consumption of nalca has also adapted to this scarcity: "Now, there isn’t much nalca as before...nowadays blessed is the one who finds a nalca plant out there. And who finds one, takes it and eats a little bit, and the rest is taken back home to share. For example, when my brothers go to the mountains and find, they bring me even if it’s a little piece. It is for sharing only, not any more for filling out our bellies as before."

The presence of exotic conifer plantations, mainly *Pseudotsuga menziesii* and *Pinus radiata*, replacing the native forest was also mentioned as contributing to the scarcity of some forest foods. "That was pure native forest; they cleared everything and planted pine...in pine plantations nothing grows, not even the wild blackberry (*Rubus ulmifolius*) that is so stubborn. Everything is dry and birds do not come, because birds seek for what is native. "Here you used to find a lot of natural remedies, but pines were planted and everything dried. Remedies are gone. Pines have been here for fifteen or twenty years...you can’t find even blackberry. People came from Villarrica looking for their medicines, but now...there is no point in coming." Most plantations belong to non-Mapuche farmers, but many small plantations were established in indigenous farms to replace native forests encouraged by governmental mechanisms that subsidized the plantation of exotic conifers and eucalyptus species. "Yes, it [the landscape] has changed, because of the native plants as I was telling you, there is less native forests. ...the gringa [meaning female foreigner] put the pine trees, and that gringa is silly because she doesn’t know that it frightens the birds,"
medicinal plants and those things... her only interest is money.”

This has not only drastically transformed the landscape, but it has also created water scarcity for some families:

“Unfortunately, at the time of January and February, just a thread of water runs... but I think that it’s because of the same, as we are surrounded by pine and eucalyptus, then is too much the damage... I say that man makes too much damage to the earth. The Government now says: the eucalyptus is bad, that pine is bad. A year ago they paid to the people to put in those plants!”

Another woman expected this to happen soon: “I see it [the landscape] different, very different and I feel sad because they brought some plants up there that are going to eliminate the spring... each time we are going to have less water.”

Some wild edibles like yuyo, quilo and maqui, and many medicinal herbs that, because of their light requirements, often grow in open areas and along roadsides, were described as being scarce as a consequence of the herbicides used by large farms or fundo owners. For them, these plants are unwanted weeds. This practice has changed hedgerows from a source of food and medicines, into simple barbed wired fences, and this has impacted people’s health. “There were fewer diseases and every time they felt aches they drank their herbal infusions. They never stopped taking them. And now, I realized as I walked that the farm owner pours liquid [herbicides] to everything along roadsides and stuff. There is where we picked up our remedies.”

A lesser abundance of some wild edibles was also linked with actions of or punishments from supernatural entities. “…as a child, I ate a lot more because the monkey-puzzle trees gave piñones every year, but not now. As people do not want to gather them, it seems that the trees are making less. They say: ‘what is the point in putting the effort year after year if...’, because before

86 [Sí, ha cambiado (el paisaje) por las plantas nativas como le decía, hay menos nativo. ...la gringa puso los pinos, y es lesa la gringa porque no sabe que eso espanta los pajaritos, las plantas que son remedio y esas cosas lo único que le interesa es la plata] (G♀ 10).

87 [Lamentablemente, en el tiempo de enero y febrero, nos corre un hilito de agua... pero yo creo que será debido a lo mismo porque como estamos rodeados de pino y de eucalipto, entonces igual es mucho el daño, el hombre le hace mucho daño a la tierra, yo digo. El gobierno ahora dice: que el eucalipto es malo, que la piña es mala. ¡Hace un año atrás le pagaban a la gente pa’ que pusieran esas plantas!] (E♀ 8).

88 [Lo veo distinto, muy distinto y pena siento porque pusieron unas plantas arriba que esas van a quitar la vertiente, cada vez vamos a tener menos agua] (E♀ 6).

89 [Se veían menos enfermedades y cada vez que ellos sentían dolores tomaban sus aguas de hierbas. Nunca las dejaban. Y ahora, yo también me venía fijando al caminar, el hombre del fundo le echo liquido a todo lo que son las orillas del camino y eso. Ahí uno pasaba a buscar sus remedios] (E♀ 6).
everyone ate piñones and went out to fetch them." Wild edibles were considered food created by the superior entity (Chaw Dios or God) for rural or “poor” people to utilize at no cost. “Chau Dios leaves so much food for his children ... so we should not waste it.”

For many, the fact that people are not interested in gathering wild edibles anymore has caused the anger of the superior entity and, as a consequence, he has taken away these foods that are being wasted. “I was taught to ask permission to nature before taking anything. Now people do not have much respect and that is how God gets angry...I believe that God is annoyed and he is taking those foods from us. Because before there were many more mushrooms than now.

The same supernatural punishments were also described as happening because of people who have overharvested wild edible plants for business purposes. “Not every year there are piñones because they depend on God and on how people behave in the mountains.”

Many community members believed that wild edibles should not be sold; they should only be gathered for personal consumption and for sharing with kin and neighbors. Underground wild edible plants like wild potatoes (Dioscorea sp.) are owned by entities or people that live in ‘the underground’ as another level of existence. Encountering a wild potato plant was a sign of good luck, but they were not supposed to be bothered. You could take the potato if you needed it, but you should never take the plant home. That is why wild potatoes are not found in the households’ domains like home gardens. “What happens is that my dad taught us that we had to leave them alone. They should not be disturbed because underneath there are people like us and that these are their crops.”

It was explained that taking the whole plant or all the potatoes was like stealing someone else’s crops.

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90 [...cuando era chica se comían mucho más, porque los pinos como que daban piñones todos los años y ahora no. Como ya no los quieren recolectan la gente, los árboles como que hacen menos. Dicen: ‘para qué hacer un esfuerzo de año a año si...’ porque antes todo el mundo comía piñones y salían a buscar] (E ♀ 6).
91 [Dios deja tanto alimento para sus hijos...asi que no hay que desperdicarlo] (I ♂14).
92 [A mí me enseñaron a pedir permiso a la naturaleza antes de sacar cualquier cosa. Ahora la gente no tiene tanto respeto y ahí es donde Chaw Dios se enoja...yo creo que Dios está enojado y nos está quitando esos alimentos. Porque antes habían muchos más hongos que ahora] (E ♀ 16).
93 [Los piñones son añeros porque dependen de Dios y de cómo se porta la gente en la cordillera] (G ♀ 7).
94 [Lo que pasa es que mi papa nos decía que había que dejarlas tranquilas. No hay que molestarlas porque abajo hay personas como nosotros y que éstos son sus cultivos.] (F ♂ 3).
4.2.3 Gathering piñones: A matter of accessibility and social cohesion

“...because before, everyone ate piñones and went out to fetch them. People after the 20th of March began well in advance the preparations. Some traveled with carts to live for four days in the mountains to gather their piñones, and the whole family was there. It was a very nice life!”

*Araucaria araucana*, monkey puzzle trees, are the only trees capable of growing at high altitudes with harsh winter and volcanic conditions; they survive in the higher peaks forming the tree line. Mapuche people that lived relatively close to *araucaria* forests have, for centuries, temporarily moved to these forests during the fall with enough provisions to stay a week or more. Many families even traveled great distances by foot to reach the *pinaladas*. Early April was the time when families got ready to take a trip to the mountains looking for *piñones* or *ngüilliu*, the relished and highly nutritional monkey puzzle tree (*Araucaria araucana*) seeds.

Gathering *piñones* used to be a not-to-miss social event that lasted for days and, for some, weeks. These were also instances for collecting other useful plants only found in the high Andean forests. An example is the *paramela*, *Adesmia emarginata*, which was highly valued in the community for medicinal purposes.

People living within a walking distance used to wake up before dawn to reach a *pinalada* as early as possible to take advantage of the entire day and return before dark. This journey was repeated several times before the gathering season was over. Most families would prepare their wooden carts pulled by a pair of oxen and saddle horses (if available) to get to the nearest *pinalada*. They would travel for a couple of days to reach a good gathering spot, and would camp until they had gathered enough *piñones* for the winter. Some families preferred to travel longer distances to reach a more favourable or preferred gathering spots. “They (grandfather and uncles) liked going to the Küra küra because the piñones were bigger and it was cleaner (meaning open vegetation) to gather or to collect. In the Cañi, there is a lot of kind of small plants with which it’s hard to see the piñones”.

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94 [...]porque antes todos comían piñones y los iban a buscar. La gente con tiempo se preparaba ya después del 20 de marzo. Algunos iban con carros a vivir sus cuatro días en la cordillera para sacar sus piñones y la familia entera. ¡Esa era una vida muy bonita! [E 96].

96 Only the *Pehuenche* (meaning people of the *pewen*) live in-between the araucaria trees as they have historically depended on these seeds for subsistence, as their main staple food.

97 [A ellos (abuelos y tios) les gustaba ir al Küra küra porque eran más grandes los piñones y era más limpio para recolectar o recoger. En el Cañí hay mucha de esa planta chica que no deja ver los piñones] [D 9 1].
These gathering trips were also instances for learning and interacting with each other. “Piñonear (the act of gathering piñones) was a social act because there you met other neighbors who were also hanging around with their families, and they made a fire and elders would sit up most of the night chatting among themselves.” Some community members remembered that elders would tell stories (epew) or historic narratives (ngūtram) as a way of teaching children about life and especially how to behave in these forests, teaching philosophies of respect and values for other life-forms (Castillo 2008; Söhn 2012; Turner et al. 2011). Community gatherings, such as trips to gather piñones were seen as times to reinforce these values (Berkes 2012). “Elders were brilliant at telling their stories; because they had a life, they passed youth and then old-age, so many stories...nowadays children do not know a single story. They don’t even know their grandpa’s stories, not even what their dads tell them.” Storytelling is also a central aspect of indigenous pedagogies (Iseke 2014). Stories, often interlaced with personal experiences, all impart ecological knowledge, as well as cultural perceptions of resources for the benefit of people to appreciate and avoid over-extraction (Berkes 2012; Cruikshank 1990; Turner et al. 2003). These traditional modes of communicating, teaching and learning are tremendously valuable in learning about and practicing sustainable harvesting of wild edible plants (Turner 2000; Turner et al. 2011). They are also instances of nurturing relations (human and non-humans), validating indigenous epistemologies and sharing knowledge (Iseke 2014, p. 559). Therefore, the loss of piñonear should be read beyond the mere fact of not eating piñones, as it may also deeply affect social cohesion and the maintenance of traditional ecological knowledge through generations.

In some cases, children, often with an older sibling in charge, were left for weeks to gather piñones. Their parents would meet them in the mountains every now and then to bring down what they have gathered and leave more food for them to extend their stay. Usually two big sacks were transported downhill on top of a horse. Cutama is the name given to the position of two sacks, one on each side, fastened on top of a horse. As described, knowing how to arrange a cutama was a vital skill to safely guard what was harvested. During this time, the children mainly ate raw and cooked piñones, either boiled or roasted, and whatever was sent from home (usually

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98 [Piñonear era un acto social porque allá se encontraba con otro vecino que también andaba con toda su familia y ahí hacían fogata y se amanecían conversando los viejitos] (E♀ 6).
99 [Los viejitos eran muy diantres para conversar lo que les pasó porque hubo una vida, hubo juventud y después la vejez. Tantas historias...ahora los niños no se saben ninguna historia, ino se saben ni las del tata, ni lo que les va diciendo el papá!] (E♀ 6).
toasted flour and tortillas, a sort of bread baked on embers). A pot or big can to boil water for tea or mate\textsuperscript{100} and cook the *piñones* was the only cooking utensil needed. Children used to light a fire for cooking and heating themselves (and also to keep away the mountain lion), and very often they improvised a shelter (triangular-shaped) with sticks found in the forests for refuge from possible rain or snow (Figure 15). These same shelters were used during summer transhumance or cattle herding.

\textbf{Figure 15.} A mountain shelter for gathering *piñones* and resting during Mapuche summer transhumance (migratory cattle herding).

At home, the araucaria seeds were stored in a dug hole on the ground covered with turf which kept the *piñones* moist and fresh for months. "When I was 10 years old, my [older] brother and I were sent to the mountains to gather *piñones*. We walked the entire day to get there and we stayed for a week. We took blankets, leathers and a pot to boil *piñones*. At night, we took turns guarding since we were afraid the mountain lion. ...gathering with both hands I filled a basket and

\textsuperscript{100} Mate, also known as yerba mate (*Ilex paraguariensis*) is a typical caffeine-rich infused drink originally from the north of Argentina and southern Paraguay. It is drunk with hot water during the day and year round by most Mapuche families of southern Chile. It is a social act as the same gourd, used as a cup or container, and straw are used by everyone drinking in any social gathering.
then a bag... I was fast. My stepfather went up horse riding to fetch the bags and he left bread and toasted flour. A hole [on the ground] was made back home and we couldn’t come down from the mountains until it was full... it had to last all winter”

Stories and memories that participants recounted reflected how important these gathering expeditions used to be for the family and community as a whole. They expressed how significant were these expeditions, not only for social cohesion and knowledge transmission, but also for securing families with a food of high nutritional value for the winter when provisions were scarcer. Participants had vivid childhood memories in the pinaladas, even though it was only once-a-year. “When I was little, my brothers always went to gather piñones. Boys were the ones who always went because it is not trouble-free... you have to walk long. They went on foot, sometimes on horseback”

Even though most adults of the community used to participate in these gathering expeditions without fail, today it just seems like a collective memory that it is, from time to time, revived only by the most motivated people who organize day trips when a vehicle is available. Transportation was expressed by participants as being the main limiting factor as most people felt physically unable to reach the pinaladas by foot. “...this [practice] has been somewhat lost because people are not going out. Only few people go to [gather] piñones because it is tough to go just walking, also to return loaded, and the fact that it is far away and you need to stay overnight”

Horses and oxen used to be the main means of transportation to get to the mountains. But today, oxen and especially horses are less common in most households. Horses were not only used for agriculture, traveling and wandering, but they were also a very important source of meat. This was more evident in ceremonies and rituals, such as the Nguillatun, where horse meat was the only meat allowed. “Before, beef was not allowed in the Nguillatun, but as now people hardly breed

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101 [Cuando tenía 10 años nos mandaban con mi hermano a la cordillera a buscar piñones. Caminábamos todo el día para llegar y nos quedábamos una semana. Llevábamos mantas, cueros y una olla donde cocíamos los piñones. En la noche nos turnábamos para hacer guardia, porque le teníamos miedo al león. Llenaba rápido los sacos... mi padrastro subía a buscar los sacos a caballo y nos dejaba pancito y harina tostada. En la casa se hacía un hoyo y no nos bajaban de la cordillera hasta que se llenara... tenía que alcanzar para todo el invierno] (G ♀ 7).

102 [Cuando yo era chica, mis hermanos siempre salían a recoger piñones. Siempre iban los hombres porque es complicado... hay que caminar harto. Iban de a pie, a veces de a caballo] (G ♀ 11)

103 [... esto se ha perdido un poco porque la gente ya no sale. Son poca la gente que van a los piñones porque cuesta igual para irse caminando, de repente volver cargado, de repente que están lejos y tienen que alojarse] (E ♀ 4).
horses, all kinds of meat are allowed except pork ... that one is prohibited”\textsuperscript{104}. “Horse meat was very desired ... and is very tasty because the horse does not even drink dirty water. Before, horse meat was eaten more often, but now they are scarce”\textsuperscript{105}.

People blamed lack of space for not having horses. As farms are smaller than before, people have had to choose between breeding horses and having cattle, and also between sowing crops and having domestic animals. The Lonko explained: “in one hectare you can have a horse or a pair of bovines. Horses eat more, then as farms are smaller, cattle is preferred”\textsuperscript{106}. Also, as community members are not sowing wheat anymore, horses are not needed for plowing the fields. The lack of horses mostly affects transportation, especially where there is no public transportation between faraway neighbors or for long trips like traveling to gather piñones in the mountains. Horses also have a very important role in the celebration of the Nguillatun. During the Nguillatun, a large group of horsemen performs the awūn, where they gallop (counter-clock wise direction) around the ngillatuwe to delineate the sacred place and keep free of the evil forces. One participant expressed: “it is not well seen for men to arrive to the Nguillatun’s pampa without their horses. Some communities do not have horses anymore, so they need to borrow horses from acquaintances so they can perform... that’s not right”\textsuperscript{107}. Also, not any horse can take part in the awūn as they have to have bay or sorrel (alazán) coats to be accepted.

Something similar has happened with the oxen, which are not as frequent in today’s households. In Menetue, only two families owned a pair. The rest chose to sell them for cash or exchange them for a second-hand car influenced by a younger family member (who was the only one who knew how to drive). Most vehicles did not work properly and people could not afford fixing them, in which cases they expressed being profoundly repentant of losing their oxen. The fact that the main road that goes from Pucón to Argentina was paved, forbidding the transit of animal-powered vehicles, adds difficulty for reaching car-accessible monkey puzzle tree forests by horse or cart. Given the previous facts, their only chance to get to faraway pinaladas is by

\textsuperscript{104} [Antes no estaba permitida la carne de vacuno en el Nguillatun, pero como ahora la gente ya casi ni cria caballos, se permite todo tipo de carnes menos la de cerdo... esa está prohibida] (I♂ 14)
\textsuperscript{105} [La carne de caballo era muy apetecida... y es bien rica porque el caballo no toma nunca agua sucia. Antes, se comía más la carne de caballo pero ahora están más escasos] (F♂ 3)
\textsuperscript{106} [En una hectárea se puede tener un par de animales vacunos o un caballo. El caballo tala más, entonces como los campos están chicos, se prefiere el vacuno] (I♂5)
\textsuperscript{107} [No es bien visto que los hombres lleguen a la pampa del Nguillatun sin sus caballos. Algunas comunidades ya no tienen caballos, entonces tienen que pedirle los caballos a conocidos para poder aunar... eso no está bien] (D♀ 1).
organizing with a relative who owns a car, pay for the ride or sometimes register in the gathering trips that the municipality organizes a few times per year. As a result, community families do not go often to gather piñones, and in many cases they prefer to buy them at the market as it can be cheaper than paying for a vehicle to take them to the pinaladas. Fall of 2013 was meant to be a good gathering year for piñones. Thanks to this, I took part in two gathering trips to the mountains (Figure 16). Although for most people it has been several years since they last traveled to the mountains to gather piñones, I observed how cultural traditions related to respecting the araucarias and the mountains were still practiced. Some of them left offerings to the mother tree, while others prayed before gathering to acknowledge the piñones as a gift from ‘God’. Importantly, they only gathered an amount which seemed prudent to them in order to avoid offending nature.
Figure 16. Gathering piñones. Pictures were taken in El Tromen, in the boundary with Argentina, and in the private conservation park Santuario El Cañi.
4.2.4 Wild edibles: A children´s domain

The absence of children during most of the time in the community was another factor mentioned for not gathering wild edibles as often as before. Many expressed being too old or not physically fit enough to go out and gather wild edibles, especially forest foods which seem too much of an effort. Because gathering requires time, especially for species that have to be searched for in the mountains, gathering for most people seemed like a difficult task, especially in light of current lifestyles (Krohn and Segrest 2010). Most men had full time jobs on nearby farms, leaving most of the household duties for the women alone. This left almost no spare time left for women to go gathering. Gathering was considered partly a child’s chore. Therefore, their absence affected people’s consumption of these foods. “[Regarding why people do not gather wild edibles as often as before] I think it must be because it is far away and there are no children to send. Because of that more than anything, I think, because before children were sent to gather and they sprint, but now there are gone, there are only oldies left”\(^{108}\).

Personal stories of childhood reflected a close relationship with the surrounding forests and its elements. “The nalca, I used to eat a lot as a child. We used to go out a lot and we were scolded because we were going to look for nalcas ... we went secretly so that no one would tell us anything and we ate them hidden...[they scolded us] because they didn’t want us there [in the marshlands] as those that crawl, the snakes, were there\(^{109}\). As in many other parts of the world, children used to walk in the woods looking for wild foods and medicinal plants at the request of their parents and sometimes just for fun and exploration (Setalaphruk and Price 2007; Stross 1973). “When we were sent to watch for the sheep, or horses or cows, then we stopped because seeing a copihue flower was a sign of the presence of copihue (the fruit). Then we stopped in the forests to seek for copihues...we climbed the trees to get them”\(^{110}\). Another female friend said: “As a girl, I used to...

\(^{108}\) [Yo creo que eso debe ser porque queda muy lejos y no hay niños que mandar. Por eso más que nada, yo creo, porque ante los cabros chicos los mandaban y iban corriendo, pero ahora no, hay puros viejitos] (G ♀ 11).

\(^{109}\) [La nalca, eso sí que comía cuando niña. Harto salíamos a andar y nos retaban porque íbamos a buscar nalcas...íbamos escondidas igual para que nadie nos dijera nada y comíamos por ahi... para que no fuéramos a metermos ahí porque solían andar esas que se arrastran, las culebras] (G ♀ 11)

\(^{110}\) [Cuando nos mandaban a ver las ovejas, o el caballo o las vacas, entonces pasábamos nosotros porque habiendo una flor de copihue era señal de que había copihue. Entonces pasábamos al monte a buscar los copihues...nos trepábamos a los árboles] (E ♀ 6)
walk around the forest looking for everything [edible]. Children were mostly sent to the forest with specific tasks on their own, if they were not too young, or accompanied by siblings to: bring back light firewood for use as splinters or to look for edible or medicinal plants. Most of the times mothers would stay at home while children were sent to fetch these supplies for preparing a meal or a remedy as they had more time and energy. While working, children nurture personal relations with the landscape and its constituents (Wyndham 2009, p. 280). “As a child it was my task to fetch the digüéñes before they were over. It was great fun to go out and look, it was like that they were giving us a playtime.”

Forests were frequently described by many as a place of entertainment and discovery as they used to eat wild plants that they encountered and mischievously play around out of the sight of their parents. Several studies have showed that gathering and hunting activities are often combined with play and wandering around in the surroundings with other children (Cruz-García 2006; Rogoff 1981; Setalaphruk and Price 2007). Throughout the year, children walked to school through paths crossing fields, streams and patches of forests. Eating wild edible plants picked on the way to school was a common behavior. “As a child, we ate them [referring to copihue]. On the way to school, we always found them out there and stopped to take some.” They also gathered some wild edibles during school breaks near the school’s surroundings. As noted while conducting the photo-elicitation interviews, edible species that were not found in big quantities or that were considered small bites or snacks like copihue (Lapageria rosea), parrilla (Ribes sp.), michay (Berberis sp.) and chilco (Fuchsia magellanica), were mostly eaten by children as they roamed through the landscape (as opposed to being gathered and taken home for preparation). “We went out to eat michay (Berberis sp.) directly from the plant. As a child, one wants to try everything ... now, even though I find it, I walk by its side without paying attention to it.” For children, walking to school, fetching water in the nearby rivers or herding animals were times for foraging on wild edibles that they sporadically came across along the way. “When we were kids, we climbed that hill over there; we climbed clawed until we reached the top. When walking to school we stopped.

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111 [Cuando chica, solía andar en el monte buscando de todo] (G♀11)
112 [De niña era mi tarea ir a buscar los digüéñes antes que se terminen. Era muy entretenido ir a buscar, era como que nos dieran un recreo] (E♀6)
113 [De niña los comíamos igual. Cuando íbamos al colegio siempre encontrábamos por ahí y pasábamos a sacar] (G♀11)
114 [Salíamos a comer michay de la misma mata. Es que cuando chico, uno todo lo quiere probar...ahora por más que lo vea, paso por el lado y no le pongo atención] (G♀12).
Do not stop anywhere! - They said. OK - we replied ... go straight home ... yes – we said. So the boys turned this way, and I followed them. I was a little girl, you see, so I was helped. Do not fall! - They told me. Before there was a lot of a forest, now is clean. We grabbed some murtas and stopped to pinch cherries, having so many cherries at home! The oldies would chase us and we would run (laughing). There was a lot of murta up there, but in the cliff as you climb up. I don’t know if you can find them anymore, because they have taken out many plants and it is full with houses now…”

Additionally, and as described above, when autumn arrived, some children were sent for a couple of weeks to camp in the higher Andes to gather piñones, and parents would visit them every now and then to bring down a load with horses. During those days, they fed mostly on piñones, mostly cooked but also raw. Because piñones need to be gathered in the higher altitudes and consisted of multi-day trips, boys were usually taken by their fathers, while girls stayed at home helping their mothers. “Those piñones were fetched, boiled and that was the food for everyone, very nutritious. My dad went to the Mocho (volcano) to look for them. He never invited us...my dad used to go with my older brother”

“At home we always, always had piñones. My father went to gather them with my older brothers, if not, as when they were still too little, he went with his friends”.

4.2.5 Lack of knowledge

Some adults also expressed that a lack of knowledge about some wild edible plants, especially in their preparation, limited their consumption. For some, part of their knowledge has been forgotten after spending many years of working outside of their community, mostly in urban

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115 [Cuando éramos chicas nos subíamos a ese cerro que está allí, íbamos agarraditas y llegábamos hasta arriba. Cuando íbamos al colegio pasábamos por ahí. No pasen por para ninguna parte, nos decíamos...ya decíamos nosotros...vayanse derechito para la casa...si. Y los cabros daban la vuelta para acá, y yo andaba a la siga de ellos, no ve que yo era chica, entonces agarradita iba. ¡No te vayas a caer! -me decían. Antes sí que había montaña ahí, ahora está limpio. Sacábamos murta y pasábamos a robar cerezas, habiendo tantas cerezas en la casa. Nos seguían los viejitos y nosotros arrancábamos (se ríe). Ahí hay mucha murta, pero en el risco mientras se va subiendo. Ahora no se si habrán porque han sacado hartas plantas y no ve que está lleno de casas ahora] (G ♀ 11)

116 [Esos piñoncitos se iban a buscar y se echaban a cocer y ese era el alimento para todos...es alimentoso. Mi papa iba para el mocho a buscar. Nunca nos invitaban. Iba mi papa y mi hermano mayor] (E ♀ 4)

117 [En mi casa siempre hubieron piñones, siempre, siempre. Salía mi papa con mis hermanos más grandes o sino cuando estaban chiquititos sus hijos, iba con sus amigos] (E ♀ 6)
centres. For others, this knowledge was never transmitted to them, and they just have the memories of consuming some edible plant species when they were kids, but never really learned how or when to gather them, or very importantly, how to prepare them. This was especially important in the case of mushrooms as several species are poisonous and/or need a specific cooking process in order to eliminate the toxicity. Some people were afraid of not being able to distinguish between the poisonous mushrooms and the ones that are safe to eat.

4.3 Local Mapuche food and health systems

4.3.1 Mapuche nutritional transition

“A lot, a lot has been lost because now we are very very few of us who cook this stuff [referring to Mapuche preparations]…because the new generations do not like these things, they do not eat even vegetables. Many of my sisters do not prepare them anymore because most are married to Chileans. And the other thing is that because now people are very laid-back or it can also be the life in town as they do not have the ease of a fogón [traditional cooking space], because for cooking mote, one must have a fogón and water that has to be bought.”

Indigenous food systems provide significant information for understanding the functional aspects of culture, the natural environment, and the health of the people nourished by them (McCune and Kuhnlein 2011, p. 249). According to all of the adult community members interviewed formally and informally, the Mapuche food system has drastically changed since their childhoods. Not only has what is eaten changed, but the way that food is procured and prepared has also been altered. Around the world, many indigenous groups are increasingly dissociated from self-sufficiency as they leave behind traditional foods and foodways, increasing their dependence on industrialized foods high in fats and sweeteners (Damman et al. 2008; Ibarra et al. 2011; Kuhnlein et al. 2004; Uauy et al. 2001). Even though food systems, as part of a culture, evolve and adapt to new realities constantly, the factors driving these transitions can be very diverse, complex and may or may not be interrelated (Kuhnlein et al. 2004, Uauy et al. 2001, 2003, 2009).

118 [Mucho, se ha perdido mucho porque ahora somos muy muy pocas las que cocinamos esas cosas. Porque las generaciones nuevas ya no le gustan esas cosas, ellos ya no le comen ya ni la verdura. Muchas de mis hermanas ya no las preparan porque la mayoría están casadas con chileno. Y lo otro es que ya ahora la gente está muy cómoda o también puede ser la vida del pueblo porque ya no tienen la facilidad de un fogón, porque para el mote cocerlo, uno tiene que tener fogón y el agua tienen que pagarla] (E♀ 8)
Pilgrim et al. 2010, Pyle 2003). The factors (or sub-themes) reported here are presented in terms of space of presence (explicit or implicit) within each data item and across the data set, more than at the frequency at which they occurred within the data (Braun and Clarke 2006)\(^{119}\).

### 4.3.1.i Youngster’s and children’s food preferences

“Children today eat pure junk; that is why there are so many sick children. Besides, they see some crap in town and they want to eat it, want to try it. They try it, liked it and they [parents] keep buying those things to them...like sweets that are sold and the children go nuts about them”\(^{120}\).

Today, children’s food tastes widely differ from their parents’ tastes, and seem to be one of the most important reasons for this food system transition. “Well, for the bread now children don’t eat jam, very little they eat jam, they prefer to put pate, cream cheese, cheese, mortadella, sausages...those things”\(^{121}\). “Much of our foods have been lost, because today if you prepare a meal with cochayuyo [seaweed, Durvillea antarctica], they do not eat it! ...the cochayuyo is a good food and they brought it from the coast, as well as the lua [seaweed, Ulva lactuca]. I remember that before, anyone going to town went to buy some lua and they would prepare it with yuyo [Brassica rapa], they added some cochayuyo minced as vegetables and a bit of locro. Now, you cannot find this lua, the same happens with the cochayuyo”\(^{122}\). This has happened primarily because of the schooling system and the National School Food Program (Programa de Alimentación Escolar, PAE) of 1964, which has not been culturally sensitive. Food attitudes are shaped early in childhood and are reinforced by a combination of family, social and cultural

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\(^{119}\) According to Braun and Clarke, “the ‘keyness’ of a theme or subtheme is not necessarily dependent on quantifiable measures [e.g. frequency, number of mentions across the data set], but in terms of whether it captures something important in relation to the overall research question” (Braun and Clarke 2006, p.10). Therefore, is up to the researcher’s judgement to interpret and determine the ‘keyness’ of themes.

\(^{120}\) [Los niños hoy en día comen pura chatarra por eso hay tantos niños enfermos, aparte que ellos ven una porquería que venden en el pueblo y lo quieren comer, quieren probarlo. La probaron, les gustó y le siguieron comprando...unos dulces que venden y eso los niños se lo pelean] (G ? 7).

\(^{121}\) [Bueno, ahora para el pan los niños ya no comen la mermelada, bien poco la comen, ellos prefieren el paté, la crema de queso, el queso, la mortadela, vienesas, esas cosas] (G ? 10)

\(^{122}\) [Es que se han perdido harto de nuestra comida, porque ahora a los niños se les prepara un plato de cochayuyo y íno se lo comen! Porque el cochayuyo es un alimento bueno y lo traían de la costa, igual que el lua. Yo me acuerdo que antes, el que iba el pueblo iba comprar un poco de lua y lo preparaban con yuyo, le echaban cochayuyo picadito como verdura y un poco de locro. Ahora este lua ya no se encuentran y el cochayuyo es poco lo que se encuentra igual] (G ? 10)
influences, which makes food habits one of the most resilient of all habits (Rozin 1990; Schnettler et al. 2013). Therefore, acculturation contexts can trigger changes in children’s food preferences which can be very dissimilar from what is offered at home. As Mapuche children in Menetue spend most of the day at a school, a schooling program which lacks a cultural dimension and curricula related to the food provided may have important impacts on children’s constructions of identities and attitudes towards their own ethnicity. PAE provides complimentary meals for students, including breakfast, lunch, and tea or mid-afternoon meal. Sometimes dinner is provided to those attending boarding schools (usually after finishing 6th grade), or in ‘vulnerable’ situations where attendance need to be improved and dropping out needs to be prevented. Ironically, even though children in rural areas are more used to natural and locally produced foods, they receive more processed foods than students in urban areas due to difficulties in accessibility for food PAE providers who deliver the foodstuffs that will be given to children. This program was centrally designed and planned by the National Board of Student Aid and Scholarships (Junta Nacional de Auxilio Escolar y Becas, JUNAEB) under the Ministry of Education of Chile, and applied to the entire country as a global solution without considering regional and cultural differences and customs. Although the program tries to ensure children have the minimum nutritional requirements during the school day (freeing parents of this concern), it has generated changes in children’s food preferences, therefore accelerating the transition towards a diet based in modern foods. This change of tastes and acculturation happens more aggressively in youngsters moving to urban centres for continuing studies in boarding schools after 6th grade. This ongoing process of ‘changing tastes’ in younger generations towards market foods as new status symbols have been widely reported (Cruz-García 2006). It has also been called ‘gustatory subversion’, referring to the process of introducing exotic foods which subvert the local cuisine and result in a poor quality diet and economic dependence (Lewis 1988). “In the countryside, the change in the diet is felt as well, because now children leave at a very early age then they take those customs of that place and lose the ones of this place. And it is because of studies, it is something obligatory, is not something

123“123To date, this program [PAE] still attempts to deliver natural food to the urban area, giving some canned products, such as meat or vegetables, for rural areas. In areas of difficult access, some dehydrated products are also delivered” (Aburto and Taibo 2010).
voluntary... and from there they bring many things, even the bad habits”\textsuperscript{124}. As reported by most mothers, children become used to modern foods that differ from what is offered at homes and start refusing traditional preparations which are made from local, healthier and fresher ingredients. Because mothers try to please their children, they generally prepare fewer traditional foods, leaving younger siblings with not even the chance to try traditional foods and assimilate their tastes. “I don’t know, children now do not want to eat that kind of food because they are not accustomed to it... because they never grew up eating those meals”\textsuperscript{125}. As a consequence, adults have become accustomed to this type of diet as well and, in some cases, women expressed that they have almost forgotten to how prepare some traditional dishes. The fact that today children do not like many Mapuche preparations has accelerated the loss of traditional cuisine as mothers are not cooking them anymore and children do not receive them at school.

### 4.3.1.ii Cooking space and utensils have disappeared

The lack of traditional culinary utensils was also repeatedly mentioned as an important reason for changes in their food system. As I learned through the field season, the presence of a fogón or kütralwe, the traditional cooking space, and some key cooking utensils, tells a lot about how attached a family is to the traditional Mapuche cuisine (Figure 17). According to some elders, in past times, the fogón was not only the place where food was cooked and stored, but also where social life happened within a family (Caro 1990). Many remembered that the family would gather around every meal to chat, tell stories, eat and drink mate. In early times, the fogón used to be a big roofed room without windows where an iron pot would hang over a central fire. Everyone would sleep inside on top of animal skins surrounding this always-burning fire that both cooked and smoked food and also kept everyone warm, especially during the cold winters. Then, for the subsequent generation, the role of the fogón changed to become primarily a cooking space. Today’s adults described growing up living in a house separated from the fogón, were depending on the economic situation, many of them would also had a small kitchen with a cast iron firewood stove for everyday cooking. All of the families would still have a smaller fogón near the house just

\textsuperscript{124} [En el campo el cambio en la alimentación se siente igual porque ya los niños salen muy a temprana edad entonces toman esas costumbres de allá y pierden la de acá. Y ya es por el estudio, es algo obligado no es algo voluntario...obligado que tienen que salir y de allá traen de todo, hasta la mala maña] (E ♀ 6)

\textsuperscript{125} [No sé, como que los niños de ahora no quieren comer esa clase de comida porque no están acostumbrados...porque ellos nunca se criaron con esas comidas] (F ♀ 2)
for cooking traditional preparations that needed long hours of direct fire or smoke. Fire was also ‘stored’ in the fogón; “when there were no matches, the fire was buried with ashes to be used the next morning”\(^{126}\). Today, very few families have a fogón due to restrictions of space, or it has been turned into storage as it was not used as often as before. Women who married a winka or non-Mapuche man were commonly the ones who did not have a fogón anymore.

**Figure 17.** A Mapuche women preparing mote (wheat peeled with ashes) in her fogón.

Nowadays, handmade Mapuche cooking utensils are hard to find as there are very few artisans who make them, and those that can be found are expensive. “*There are no basket weavers anymore. Before, the old ladies even to gather matchwoods carried their baskets because there were people who make them*”\(^{127}\). Examples of this cooking utensils are: the llepü or balay which is a flat round basket (about 46 cms in circumference) without handles, woven in natural fibers for winnowing grains; the chaigüe, a woven basket, a sort of strainer, for cleansing grains; the batea a wooden container made from a piece of hollowed log (about a meter long or circular-
shaped) where grains are peeled when stepped on repeatedly with barefeet; the *kudi*, a flat grinding stone with its complimentary *ñumkudi* or grinding stone; a rectangular brass roaster for grains; and the *challa*, which is the main cooking pot made out of iron, among other materials (Figure 18). Even in past days, crafts like baskets were expensive for some families: “I went out with my brother to look for all those wild things with a bag. We had no baskets because we were poor...we went out with this sacks for salt or rice.” The ash made out of *hualle* (*Nothofagus obliqua*) green wood was also mentioned as important as it is used to peel cereals while they are cooking. It is also short supply, as one needs to have those *hualle* trees nearby and a space to prepare them.

![Traditional Mapuche cooking artifacts or utensils](image)

**Figure 18.** Traditional Mapuche cooking artifacts or utensils. *From top to bottom and left to right:* [1] women winnowing wheat using a *llepü*; [2] a *chaigüe* full with recently cooked *mote* in an iron *challa* sitting beside; [3] a round wooden *batea*; and [4] *kudi* and *ñumkudi* for preparing wheat *catutos*.

### 4.3.1.iii Lack of time

Nowadays, women are less willing to prepare Mapuche foods as they feel that they take too long to prepare and require more physical effort. As described by female participants, their

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128 *Challas* can be found in the market but for most families are unaffordable as they cost almost 80 CAD each.

129 [Yo salía con mi hermano a buscar todas esas cosas silvestres con una bolsita. No teníamos canastos porque éramos pobres...saliamos con esas bolsitas de sal o arroz] (E 94).
mothers used to begin preparing lunch very early in the morning and, immediately after lunch, they kept cooking to prepare for supper. Every meal was prepared from scratch with homemade ingredients. It seems that today, women are not willing to make such an effort everyday as there are other market foods available that require less time and effort to prepare. Fry (2000) in her study reported that the perception that traditional foods are inconvenient and time-consuming are the main reasons for a shift in diets in Mapuche families. Lack of time was also reported by Native Indian people from different communities of the Puget Sound in the Pacific Northwest as a barrier for accessing traditional foods (Krohn and Segrest 2010). Traditional preparations are, currently, restricted to special events. A special guest, date, heritage fair or a ceremony, such as the Nguillatun, were events worthy of preparing traditional meals.

One might think that because land size have been reduced, women would have fewer tasks on a daily basis. But the reality is that there are less extensive crop plantations and cattle, which were usually men’s chores, but home gardens, chacras and small animal husbandry, which are women’s responsibilities have been maintained over time and are the main source of food\textsuperscript{130}. Children, mainly daughters, who used to help mothers in household chores, were sent to schools for entire days and, depending on their age, some were sent to boarding schools. Therefore, women are in charge of most of the household chores with very little in the way of help. Some women had inclusively crossed the gender boundary of responsibilities; they were in charge of some of the ‘male’ tasks as their husbands had to take full-time jobs outside the community. Therefore, they feel that they do not have time to gather wild edibles or to cook as their mothers did in the past. Today, as they often travel to the nearby town, industrialized foods are bought and cooked, increasingly replacing traditional preparations.

It is important to note that responsibilities are perceived as being less gendered as some men help women in many tasks after work since ‘male’ duties have decreased due to the reduced sizes of farms which no longer support large-scale crops or large numbers of cattle. Also, since it was common for young single men to leave the community to work as labourers, they were taught ‘female’ household duties as they have to take care of themselves whilst away. “Before the Mapuche family was much more macho. It was not seen as good for a man to pick up his own

\textsuperscript{130} Together with household duties and wool handcrafts which are also women’s domains. In contrast, men whose tasks have been reduced can look for external jobs in nearby farms and still attend to their farm duties.
plate...mom and sisters did everything. Today things are different because men are taught to cook.”

An adult male participant reflected: “my mom would not let us do anything in the kitchen because sisters did that. I sorely needed when I went to work just because it went very badly for me, I didn’t even know how to wash the dishes. So I tell my wife that our son should be taught about everything, so that he will never be in need.”

4.3.1.iv Production of grains and vegetables

“Before people sowed much wheat and went to the mill in Huepil. People went in oxcarts. That [harvest] lasted for the year. Neither did we use fertilizers, we just used sheep manure.”

Wheat was and still is one of Mapuche’s staple foods, and is present in most of what is considered a Mapuche preparation. Although this cereal was brought by the Spaniard conquistadors and can be considered one of the first signs of acculturation, it was rapidly assimilated and came to form an important constituent of Mapuche their daily diets (Bengoa 2000; Guevara 1908; Montalba and Stephens 2014; Toledo Llancaqueo 2006; Torrejón and Cisternas 2002). This of course, had significant repercussion on the ecological landscape of the region (Rozzi 2003; Torrejón and Cisternas 2002). Wheat is present, from the basic flour for homemade bread to more sophisticated dishes. Wheat after the arrival of the Spaniards, quickly replaced maize in most locations as the staple grain of the Mapuche. It has been suggested that it was rapidly adopted because it was less sensitive to frost and could be cultivated in more marginal and acidic lands earlier in the year compared to maize (Montalba and Stephens 2014). It has also been suggested that the ability of wheat to grow and ripen faster than other cereals was an important asset, particularly in locations exposed to raids from Spaniards (Gumucio 1999). Other traditional crops and wild grains that were cultivated before the Spanish arrived, such as quinwa, mangu, teka, madi, potatoes, pumpkins, peppers and green beans, started to disappear as they were replaced by exotic species such as barley, wheat and oats (Coña and de Moesbach 2010;...
Eyssartier et al. 2011b; Gumucio 1999; Pardo and Pizarro 2005; Torrejón and Cisternas 2002). Gumucio (1999), reported that, in the beginning of the 1980’s, the cultivation of quinwa was already on the verge of extinction.

Today, families in Menetue still depend on wheat, but as with many other grains and cereals, people have stopped growing it. For most families, 2012 was the last year that they sowed wheat. During fieldwork, families were using the remains of the last harvest together with bought wheat (because of the cost, it’s usually bought from other regions where wheat production is extensive and industrialized). Women frequently complained that bought wheat was lower in quality compared to home grown wheat; they described the grain’s quality as softer and watery.

Most adults recalled growing up and helping their parents to sow wheat, maize, oats, rye, flaxseed and barley in large quantities, interspaced with patches of long rows of peas, beans, different varieties of potatoes, beans and broad beans. Most grains started slowly disappearing from the landscape as farms became smaller, but wheat remained for longer as the most precious of all. Legumes, maize (mostly one variety as the Mapuche maize, called mapunhua, has mostly disappeared) and potatoes have today been relegated to a few rows in the home garden (except one variety of potato which is still planted in the chacra). As one Lonko remembered, “Before, there was a lot of Mapuche maize, the one with different colors. It had blue, red and yellow kernels all mixed in the same cob. Now those are hard to see, almost no one grows them”134.

The low productivity of the soil and the lack of a threshing machine are the main reasons for ending the local production of wheat. Smaller yields, due to the low productivity of soils were related to: (a) restricted space for agriculture that prevents rotations between crops and pastures for livestock, which also pushed farmers to leave the pastures for livestock fodder during winter; “we no longer sow wheat because we breed animals...farms are too small”135; (b) soil weakness, therefore lower yields, due to the absence of fallows or resting periods and the excessive use of chemicals, such as pesticides and artificial fertilizers, at the expense of the natural fertilizers; and (c) higher presence of agricultural pests, including insects and birds136; “Potatoes no longer come

134 [Antes había mucho maíz mapuche, ese de colores. Tenía granos azules, rojos y amarillos, todos mezclados en la misma coronta. Ahora pocazo se ven, ya casi nadie tiene] (I dd5)
135 [Ya no sombramos porque criamos animalitos...hay muy poco campo] (E 96)
136 As mentioned, because the soil is weak in nutrients, there is a higher incidence of plagues as crops or plants are not strong enough to resist and as a consequence they become ill or die. Also, some native birds are feeding on crops. Years ago this happened less often as described, and people relate this to the lack of their natural habitat and therefore their food.
out because of the pilmes [Epicauta pilme]. Although the plant looks nice, underneath there are no potatoes\(^{137}\); and for fruits; “before cherries were harvested and saved dry for winter to add to the muday [fermented drink made out of grains]. This is not done anymore because of yellow jacket wasp eats them that is why this has been lost”. “Now, I’ll not even have maize because they are all eaten by birds. I did not think in advance to put those bags to shoo the birds. I had not realized that they were taking advantage of me as they were eating them all... they didn’t even come to help me sow (laughs)! Well, there is nothing I can do.\(^{138}\)

The use of chemicals and practices consistent with extensive agriculture have been techniques incorporated by Mapuche communities as a result of governmental indigenous policies, subsidies and external agents’ interventions (regional programs and initiatives) designed to convert indigenous peasant producers into capitalist farmers (Clark 2011, p. 155). This not only has washed-out the soils, but more deeply has disrupted local livelihood strategies and food systems and, consequently, eroded traditional ecological knowledge (Clark 2011; Eyssartier et al. 2011b). In Menetue, the use of pesticides and artificial fertilizers was introduced by national and municipal programs to support small farmers. Rather than supporting local agricultural methods (such as field rotations, animal manure, the protection of local seeds), these programs have pushed families to incorporate concepts and techniques used for extensive agriculture into their subsistence farms with negative consequences. On the other hand, the need to buy fertilizers to improve yields, which are expensive, has had such an impact on the family economy that it has become less expensive to buy wheat than to produce it. This is a common situation in many Mapuche small farms in the Araucania region (Clark 2011; Montalba and Stephens 2014).

Lower yields of crops were also related to the gregarious flowering of quila, the Chilean bamboo, which happens at intervals that can be decades long. The quila flowering is a symbol of a year of misery and scarcity in the area, as well as in the rest of southern Chile (González Cangas and González 2006; Gumucio 1999). “The maize didn’t come out nicely, neither my potatoes. If

\(^{137}\) [Las papas ya no se dan por culpa de los pilmes. Aunque se vea la planta bonita, abajo no hay papas] (G♀11)

\(^{138}\) [Ahora ni choclos voy a tener porque están todos comidos de pájaros. No se me ocurrió nunca antes ponerle las bolsitas de esos para que se me espanten los pájaros. Yo no había dado cuenta que estaban ganando ya que ellos se lo estaban comiendo, ¡no me vinieron y ayudar a sembrar siquiera (se ríe)! Bueno que le voy a hacer] (G♀7)
when the quila blooms, it is known that there is misery”\textsuperscript{139}. It was explained that, when the quila blooms, there is an emergence of ‘ratadas’ (outbreaks of rats) which, after exhausting the quila’s seeds, feed on crops, small domestic animals and stored food. They not only affect food supplies, they also gnaw on everything found, including clothes, cables and pipes, and will even bite people when sleeping. Also after blooming, the quila dies and cattle can no longer feed on its leaves during the winter when the snow arrives. Finally, the great expanses of dried quila, constitutes a source of fuel that triggers uncontrollable fires in the area during summer.

Families used to travel with their harvest in wooden open wagons pulled by a yunta (pair) of oxen or by horses carrying two sacks each, to the nearest farm that possessed a threshing machine. There was no money involved in the deal, as the owner of the machine would keep ten percent of the harvest for himself as payment\textsuperscript{140}. Today, there are no threshing machines to use and they are too expensive for anyone to buy. In the past, grains were threshed using horses, which is called trilla a yegua suelta (something like ‘threshing with loose mares’), but nowadays, it is considered very inefficient, laborious and difficult to undertake as not many people own several horses. Together, with the end of wheat production comes the disappearance of the yuyo or ngchon (\textit{Brassica rapa}), a relished wild green, that comes out together with wheat and is present in many Mapuche preparations. “The yuyo (\textit{Brassica rapa}) has also disappeared, because it grows more in the fields ... and no one is sowing anymore. First the wheat came out, and then the yuyo”\textsuperscript{141}. Yuyo is a very nutritious food due to the high contents of fibre, iron, ascorbic acid (Vitamin C) and protein (Urrutia 1998). It has been suggested that yuyo should be considered an important source of protein, enriching many food preparations when used (Urrutia 1998).

Similarly, agricultural duties that needed extra hands (usually due to weather conditions, the economic situation or any other reason), such as sowing or harvesting, used to be a collaborative activity based on reciprocity rather than remuneration. Families used to turn to their kin, neighbors and friends for help in what is called a mingako. In the mingako, the family who was being helped shared large amounts of food and drinks in order to fairly compensate their guests

\textsuperscript{139} [No se me dieron bonitos los choclos y tampoco salieron mis papas. Si cuando florece la quila, es sabido que hay desgracia] (G ¥7)

\textsuperscript{140} It was the 10% of the wheat grounded. Equally, the one who possesses a machine for making chicha (apple cider), also charges the 10% of the cider produced.

\textsuperscript{141} [El yuyo igual se ha perdido, porque como sale más en los sembrados...y ya nadie siembra. Primero salía el trigo, y después el yuyo] (G ¥12).
for the labour offered. After work, lunch or dinner (sometimes both) was served at home together with homemade chicha as a symbol of gratitude. Therefore, the mingaco was a space for collective work with festivity elements in which the family is, as a consequence, the unit of production and subsistence economy. Not only men and women, but also children participated in the productive tasks, sharing the role of family provider (Caro 1990). “When there was heavy work, neighbors and relatives were invited to help and they were offered lunch”\textsuperscript{142}. Nowadays, people seem to be more individualistic as agricultural activities are more of a personal matter and not thought of collectively anymore (Figure 19).

Figure 19. Mapuche family harvesting potatoes. An elder (third from left to right), the owner of the harvest, is helped by his kin to alleviate his labour.

What still remains is another mechanism of reciprocity called kelluwen, which means ‘a collaborator’ or ‘to give back (vuelta de mano)’ (Caro 1990). As I usually helped many women in their chacras and home gardens, I was often told to come back when it was ready for harvest to take my portion of the yield as I served as a kelluwen for preparing the soil or sowing. If I did not

\textsuperscript{142} [Cuando había trabajo pesado, se invitaba a los vecinos y parientes a ayudar y se les invitaba almuerzo] (E 96)
show up during the harvest, they would bring me the portion of the vegetables that I had earned. This shift from a more collective agriculture was also mentioned as a difficulty or disincentive to keep producing cereals or grains as they require a lot of labour and families today are less numerous than before.

4.3.1. Temporary migration and now-how

“What happens is that many women in my community left at a very young age to Santiago to work, and when they returned they had forgotten to do many Mapuche meals.”

Migration was also mentioned as a determining factor in the decline of the preparation of traditional meals. After finishing primary school, most women in this study migrated to a city to work as housekeepers. While working, they had to learn to cook what the winka family was used to eating, finally getting used to this new diet. For the ones who spent several years away from home, it was hard to go back to traditional ways of cooking and preparations as their preferences and food habits had changed. “Those [the milcaos], I haven’t ate them for many many years. As a child, I used to eat a great deal of them but now people do not eat them. I left my house when I was very young; I was 10 years when I was out with a godmother. ...then when I was around 12 years I started to work seriously and then I knew nothing more of anything [anything Mapuche]. I stopped doing all those things. I think if I had not gone that far, I would have continued with the same [type of food].” Similarly, when a Mapuche women married a winka man, she changed her cooking habits to suit what the husband was used to.

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143 [Lo que pasa es que muchas mujeres de mi comunidad, se fueron de muy niñas a Santiago a trabajar y cuando volvieron se habían olvidado de hacer muchas comidas mapuche] (E 96)
144 [Eso no lo como yo después de buuuuu años. Cuando chica comía mucho de eso pero ahora no se come. De chica me salí de mi casa, de 10 años andaba afuera con una madrina. ...y después de ahí ya a los 12 años sería, empecé a salir a trabajar y de ahí no supe nada más de ninguna cosa. Dejé de hacer todas esas cosas. Yo creo que si no me hubiese ido tan lejos, yo habría seguido con lo mismo] (G ♀11).
4.3.2 Modern foods versus traditional foods

“I believe that as people changed, so too changed the whole Mapuche food. Now people no longer know how to cook if it’s not noodles, pasta, all those bought stuff. But I don’t like too much all those noodles and rice, I am tired of them”

The food diaries conducted in seven households between the end of January and the first weeks of March, allowed me to record 170 meals, which represented an overview of a summer diet. This distinction is important to emphasize, because the warm season is considered a time of great abundance in terms of locally produced food. The home gardens, orchards and chacras provide abundant vegetables and fruits, the animals are in optimal condition to be butchered and consumed, and they also provide families with eggs and milk products. Wild fruits, like berries, have ripened and orchard fruits are ready for preparing chicha de manzana or apple cider. According to the Mapuche worldview, the walüng is the summer or sun’s time, which brings the harvest, abundance and benefits of the work carried out. Furthermore, as the weather is favourable and the road access is good, it becomes easier for women to go into town to buy food supplies. In other words, almost any food is possible during walüng.

The calculated relative frequency of occurrence of different food items indicated that locally produced ingredients comprised 55.4% of the total family intake, compare to market-based foods at 44.6%. Wheat and wheat-based preparations, like bread, even though they were locally prepared, were classified as market-based as wheat flour was bought, not sown. If food diaries would have been conducted a year before, when wheat and a few other grains were still produced in people’s farms, whole-wheat flour would have been categorized as local, and the scenario would probably have been less worrisome, with local foods comprising 71.2% of the intakes.

Full year food diaries are ideal for having a more accurate understanding of the dependence of market foods by indigenous families. Nevertheless, it is likely that the proportion of market-based foods during the shortage period (usually winter and spring) would be greater than 44.6% of the food intake as they become more reliant on industrialized food. Families during fall (rimü) buy most of the food that they need for winter (pukem) as it is very difficult to go shopping and the

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145 [Yo creo que así como cambió la gente, así también cambió todo lo que es la alimentación mapuche. Ahora ya no sabe la gente cocinar sino es tallarines, fideos, todos esas cosas compradas, pero yo poco me gusta lo que es el fideo y el arroz por qué me tienen ya aburrida] (G 97).
local production of food is dormant. For some women interviewed, fall is the most expensive season as they need to get ready for winter when the routes to buy groceries become impassable. Dried legumes, potatoes and maize were stored for consumption; however, current agricultural yields are not enough for sustaining families for the entire winter period. As I helped with the harvest of dried maize, peas and broad beans, women complained that what was left to dry and store was not enough. “Almost everything is eaten green now and just a handful is left to dry and save for the winter. Before even we filled our stomachs during summer, and here was still enough to store. We stored dried maize, road beans, peas and beans”\(^{146}\). “Before, everyone harvested peas and planted their small plots and harvested one or two sacks for the winter. And now no, a little bit in the garden just for the taste and that’s all...the same with beans”\(^{147}\). Spring (pewü) was also mentioned as a difficult month as food reserves are insufficient and it is time for sowing and working the land\(^{148}\). Luckily, the weather is good enough to travel to the nearest town to buy commodity foods.

The relative frequency of occurrence of food groups in the diaries showed a high intake of vegetables (38.4%) and grains (24.6%) (Figure 20). Most vegetables came from the households’ production of home gardens, vegetable plots and chacras. Grains were overrepresented with homemade bread and sopaipillas (fry bread), both made with white flour, and rice, comprising 73% of all the grains consumed. White flour and white rice are refined and processed carbohydrates that, through time, have replaced other traditional grains like quinwa, lokro, whole-wheat flour and rye flour. As told by an elder, in the past, bread was made from a diversity of wholegrain flours, many of them hand-milled. Today, because people are not growing most grains and commercial wholegrain flours are hard to find and cost much more than their processed, less nutritious counterparts, people just bought what they can afford (Fry 2000). As one participant

\(^{146}\) [Ahora casi todo lo comemos verde y queda un puñadito para guardar para el invierno. Antes, podíamos comer hasta llenarnos durante el verano y igual quedaba para guardar para el invierno. Se guardaba maíz, habas, arvejas y porotos] (I \(\delta\)5)

\(^{147}\) [Antes todos cosechaban arvejas y sembraban sus porterito y cosechaban un saco o dos sacos para el invierno. Y ahora no, un poquito en la huerta nomás para el gustito y eso...el poroto igual] (G \(\delta\)10)

\(^{148}\) This is why the Mapuche New Year’s celebration, called *We Tri pantü* (meaning new sunrise), takes place in the austral winter solstice (the shortest day of the year in the Southern Hemisphere) between 21 and 24 of June. After this day, the earth is ready for a new cycle. It is a festival of thanks for the life on earth that is renewed. This ceremony has not been celebrated in Menetue for many years.
remembered, rye bread was very common in the past, but was set aside by most people because the bread was dark and people wanted to eat white bread.

Homemade bread was recorded by children in only 45.9% of all the meals which, compared to my own observations, seemed underrepresented. This underrepresentation is similar to what Ibarra et al. (2011) recorded in their research conducted in the Sierra Chinanteca, Mexico, were homemade tortillas were not salient in freelists of the most common foodstuffs, but were present in 99% of 87 meals recorded by researchers. Bread, like maize tortillas for many Mexican groups, is present in every single meal of a Mapuche family and probably any rural family in Chile, regardless of the time of day, type of food and the willingness to consume it. In Menetue, bread was prepared every morning and sometimes twice a day and it was always placed at the center of the table. Therefore, it can easily be precluded from being recorded as it is permanently present on the table, like a plate or a glass of water. Mate (*Ilex paraguariensis*) was another essential drink after every meal and in between meals which was not registered in food diaries. Because it is a hot, bitter drink and it is usually shared among adults during after-meal table-talk, children did not consume it and, therefore, did not record it.

![Figure 20. Relative frequency of occurrence of food groups in meals recorded in food diaries during the ‘abundance period’ (n = 170).](image)
Fats, oils and sweets represented 15.5% of all the food items recorded, consisting mainly of butter, instant coffee, jams and honey. Foodstuffs classified under fats, oils and sweets were very much related to industrialized drinks with high contents of sugar like sodas, powdered juices, instant coffee and tea, in which refined sugar is added. Butter and margarine, both purchased nowadays, were the most frequent food items in this classification, probably because they were the ever present when eating bread and cooking. The small consumption of dairies (5.20%), mostly cheese, can be related to the small number of milking cows owned per family and to the high price of processed milk and dairies available in the market. Having to walk up the hill with groceries, limits a woman from buying shelf-life milk and any liquid in town; “it is a matter of weight”.

Although during the spring and summertime, there is a great variety of fruits from the orchards, families prepare jams, conserves and chicha that were stored for the rest of the year, instead of consuming them fresh. This is why fruits are only represented by 2.33% of all the foodstuffs recorded. It is important to note that the consumption of vegetables and fruits diminishes during the cold season, as reported by many participants, as they need to buy them. Also, during the cold season, the intake of dairies becomes almost nonexistent, with the exception of families with small children who try to buy milk or yogurt. These foods, which are difficult to obtain during the cold period, were replaced with meals with higher caloric value like rice, potatoes and noodles.

When participants were asked to name which preparations are becoming forgotten over time, the most frequently mentioned were:

- **Mültrún or catuto**: a kind of bread made from boiled wheat, peeled by stomping or ‘dancing’ barefoot the grains in a wooden batea. “Who doesn’t stomp wheat, does not eat catutos”\(^{149}\). Therefore, the ability to peel the wheat grains barefoot is a sort of measurement of how Mapuche a woman is. “She would always get blisters in her feet and her mother-in-law would put her to peel wheat to see how Mapuche she was. I, instead, have Indian feet”\(^{150}\). This activity is now increasingly difficult because not many people

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\(^{149}\) *El que no pisa trigo no come catuto* (E♀6)\(^{150}\) *A ella siempre le salen ampollas en los pies y la suegra la ponía a pisar trigo para ver si era Mapuche. En cambio yo tengo pata de indio* (E♀4)
have a *batea*; “who is going to step on [to peel with feet] wheat now if there is no *batea*”¹⁵¹

- *Apol*: boiled lamb lung stuffed with blood and spices
- *Comida de mote or kaku*: wheat or corn peeled when cooked with ashes
- *Trigo pisado*: boiled and peeled wheat
- *Locro o chükül*: grinded raw grains or cereals
- *Muday*: fermented wheat, maize, *quinwa* or *piñón* drink
- *Cochayuyo and luna*: seaweeds brought from coast
- *Milcao*: a sort of potato pancake
- *Café de trigo*: roasted wheat drink with boiled water, like coffee
- *Soplillo*: wheat harvested green when the grain still has some moisture. Used to enrich *cazuelas* (traditional soup) and give them more consistency¹⁵²
- *Füna poñi*: potatoes that rot inside a sack under running water left in a hole dug in the ground. They were left during winter and eaten in spring.

On the other hand, foods like tomato sauce, mortadella, sausages, margarine and children’s cereals (processed cereals for breakfast) were considered ‘new foods’ by participants, being incorporated into family’s diets in recent years. Rice and noodles, despite being long known, were classified as ‘recently incorporated food’, as they were too expensive for many families to buy in the past and, therefore, were rarely consumed. With time, they have replaced traditional foods like *locro*, *soplillo* and *quinwa* as they are cheap and cook faster. According to Schnettler *et al.* (2013, p.251) “the multiplication of means of transport and road construction during the 1980s and 1990s allowed foodstuffs and related products (mate, sugar, oil, pasta, rice, etc.) to be brought from the cities and introduced into the communities, and these have now become essential in every family’s diet”. Caro (1990) described how the use of introduced foods like rice and noodles gave Mapuche people a certain prestige as they were perceived as *winka* food and a symbol of modernity. Fry (2000) described that for the Mapuche population of Maquewe, the perception that traditional foods were ‘old-fashioned’ was a factor in determining their replacement with modern foods. Drinks like instant coffee (coffee and barley-based), tea,

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¹⁵¹ *¡Quien va a pisar trigo ahora si no hay ni batea!* (G♀10)
¹⁵² As the wheat is harvested early there is a saying that refers to men who marry a young girl: ‘that men ate *soplillo*’ (*Ese hombre comió soplillo*).
powdered juices, long-life milk and carbonated beverages were also mentioned as newly incorporated foods. Nowadays, carbonated beverages are purchased for special occasions like celebrations or when receiving a visit. “I was not familiar with those soft drinks, those are new chemicals, the same as the Yupi (brand name of a far from natural powdered juice), but I say that all those things spoil our stomachs...they are pure paint [colourants]”. For some women, it took them months to understand that I preferred water, after being offered soft drinks as a gesture of hospitality most of the times that I was invited in. This might be related to the way they conceive urban-tastes. “Everywhere you went they offered muday ... solely muday and water, and now anywhere you go they offer you a glass with soft drinks instead of a glass of muday”. The muday also has symbolic meaning in magic and religious ceremonies (Caro 1986).

These ‘new foods’ were rarely consumed or even known for most adults during their childhood and most of them were rejected by the elders of the community who request traditional preparations. “I am bored of noodles and rice that is why I wanted to make pantrucas. Before, more locro and toasted flour were made for adding to soups ... that is what I miss”. For them, the new foods are not even considered food. As the local chief told me: “my grandchildren eat those things called sausages ... I do not eat that stuff. For me, [real] food is prepared.” This is a common trend among indigenous groups in the world (Fry 2000; Krohn and Segrest 2010; Kuhnlein and Receveur 1996; Kuhnlein et al. 2004; McCune and Kuhnlein 2011).

4.3.3 Prevalence of chronic diseases

Shifts in local foodways are inevitably linked to changes in people’s health. When community members talked about these changes and especially about the loss of natural foods, the commonness of chronic diseases in family members as topic of discussion naturally emerged.

Prevalence of chronic diseases among indigenous groups has been widely studied and reported (Damman et al. 2008; Kuhnlein 1995; Kuhnlein et al. 2004; Myers et al. 2004; Powell et al. 2011).
As an example, Type 2 diabetes has been considered to have reached epidemic proportions in indigenous populations like the Inuit (Myers et al. 2004), Australian aboriginals (Burns and Thomson 2006), Mapuche (Pérez-Bravo et al. 2001), Northwest Coastal Indians (Krohn and Segrest 2010), among others (Diamond 1992; McCune and Kuhnlein 2011). Obesity, as one of the major contributors to Type 2 diabetes, is often concurrently present in these groups as they are more susceptible than non-indigenous populations (Burns and Thomson 2006).

Through a census conducted during fieldwork, community members were asked if they suffered from a chronic disease or medical conditions including overweight, obesity, diabetes (mostly Type 2), hypertension, hypercholesterolemia or any cardiovascular disease, and whether they had any medication prescribed. From 38 people surveyed, almost 50% reported being diagnosed as overweight or obese, predominantly women, which coincides with the findings of Uauy (2001) and Pérez-Bravo et al. (2001) among Mapuche people; 10.5% were diagnosed with Type 2 diabetes with a prevalence in men, contrasting what was found by Pérez-Bravo et al. (2001) among rural Mapuche that showed a higher prevalence in women; almost 16% were hypertensive, with more than half of them being women and 13.2% diagnosed with high levels of cholesterol in the blood (Table 4). Although the numbers for some conditions may not be alarming, the high prevalence of overweight and obese people in the community is a matter of concern because of their contributions to a variety of adverse health outcomes (Burns and Thomson 2006; Uauy et al. 2001). Most of these chronic conditions are, in some way, related as they have similar modifiable risk factors including diets high in saturated fats, cholesterol, salt and alcohol, and low in fibre, fruits and vegetables, as well as sedentary lifestyles. Some chronic conditions are risk factors for other diseases. For example, obesity is a major risk factor for hypertension, hypercholesterolemia and the main risk factor for Type 2 diabetes. At the same time, hypertension is one of the most important risk factors for cardiovascular diseases (Fry 2000). This is why they are all categorized as nutrition-related diseases.

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157 For a good literature reviews in some case studies, see McCune & Kuhnlein (2011).
158 Although not everyone was obese, many were diagnosed as overweight.
The stories and perceptions of how things were in the past can tell a lot about what foodways have been lost and what is happening today. In the past, people were generally healthier because they used to die of old age instead of from disease. “No, I never saw that blood pressure, gallbladder, that diabetes, cholesterol...never! And now, yes. I say that it must be the food, the flour...because the flour is mixed now, it isn't pure as before. That must be and eating things like noodles and rice, because before people made locro instead and noodles or rice were not eaten. People used locro a lot because that was the wheat grown just like that without any fertilizer, nothing, pure wheat and that did no wrong, that is why people lasted so long. My dad died at the age of 115, my old man was so old and he never went to the hospital”\textsuperscript{159}. In Menetue, everyone had story about relatives who lived for more than 100 years without ever visiting a doctor or hospital. This perception was also reported by Jelvès & Ñanco (2002) and Fry (2000) for Mapuche people in Makewe, southern Chile. This is consistent with what was described by different chroniclers like Bibar (1558), Nuñez de Pineda y Bascuñán (1673), González de Nájera (1889), among others, about Mapuche people being very healthy and strong looking, with long life expectancies in contrast to Europeans and demonstrating a very rich and diversified nutrition. Contemporary chronic diseases or conditions, such as hypercholesterolemia, diabetes, overweight or obesity and cardiovascular diseases (especially hypertension), commonly suffered today among adults, were quite uncommon, if not nonexistent in past times, as described by everyone

\textsuperscript{159} [No, yo nunca vi que la presión, que la vesícula, que la diabetes, el colesterol...nunca! Y ahora sí. Yo digo que en los alimentos debe ir eso, en la harina porque la harina viene bien mezclada ahora no viene pura como antes. Eso debe ser y las cosas que uno come como fideos y el arroz, porque antes se hacía locro y nos usaba el fideo ni el arroz. Se usaba mucho el locro porque eso era el trigo que sembraban así sin ningún abono, nada así purito y eso no hacía mal por eso que la gente duraba tanto. Si mi papá falleció a los 115 años, hartos años tenía mi viejito que nunca estuvo en el hospital] (G♀11)
interviewed. When questioned about the possibility of people in the old days not being diagnosed due to a lack of access to ‘western’ medical care; some participants agreed, but most of them negated this possibility. They thought that as people never complained of having poor health and worked on their farms until the last days of his life, they had long and healthy lives free of those diseases. As described by a couple of women, people even had better teeth than today: “Also, now I pay attention to people’s teeth, now young people and children with decayed teeth already...my grandfather died with very healthy teeth at over 90 years”\(^{160}\). An elder observed that, the overweight conditions you can see today in women were never seen in past times. “The Mapuche woman has never been too slim, but before you never saw the fatness that you see nowadays. Today, they are in excess”\(^{161}\). There was a common perception that the high prevalence of these diseases in the community were greatly associated to a diet with a high presence of processed market foods containing too much sugar, fat and ‘chemicals’ at the expense of natural foods, and as a result of the disappearance of natural remedies. The latter includes traditional foods since they are considered to be intrinsically medicinal. “Our food has changed a lot, because we used to eat everything natural and now everything is full with chemicals”\(^{162}\). “Before, everything people ate was natural that is why the ancient lived for a century. Now, everything is artificial and so people die soon”\(^{163}\).

The disappearance of traditional plant-based remedies and their replacement with drugs and pills was also mentioned as an important factor influencing people’s health. In past times, food and medicinal plants were the base of Mapuche’s good health and people had a wealth of knowledge about their uses. Wild foods were considered to be medicinal and that was the reason Chau Dios left them for people to use them. “An old man told me that eating piñones toasted on the stove and drunk as an infusion with hot water was a remedy for the body. He never said for what was good for, but what he did tell me was that looking for these natural foods was very good

\(^{160}\) [Igual que yo me fijo ahora en la dentadura, ahora la gente joven y los niños con su dentadura picada...y mi abuelo se murió con sus dientes sanito con más de 90 años] (G ♀12)

\(^{161}\) [La mujer mapuche nunca ha sido tan flaca, pero antes no se veían esas gorduras que se ven ahora. Ahora están sopladas] (G♀10)

\(^{162}\) [La alimentación ha cambiado harto porque antes se comía puro natural que ahora ya todo puros químicos] (G♀10).

\(^{163}\) [Antes todo se comía natural, por eso vivían los antiguos un siglo. Ahora todo es artificial y por eso se termina luego la gente] (I♂14)
because, in that way, one is deprived of many diseases. People were cured by those foods.  

"[About wild edibles] ...I believe that all of that served for self-medication because the belly was cleaned. All those things are natural, without chemicals. The fertilizer was not coming yet, the saltpeter and all those things that only serve to weaken the soil... that’s why the people lasted more years and never went to the hospital, Antonia! If they felt a pain and went to the forest to look for the things that they said that they were good, and for generations they transferred to children what was good for a thing [condition or illness] and what was good for another one. Where they were feeling the pain, they knew where to fetch and those remedies showed up.  

Because now, many are lost. It is difficult to find them and it is necessary to get into someone else’s farm and sometimes you can come across the owner."  

Today, many people still use natural remedies to treat mild health conditions, but they receive drugs and non-traditional medical care for more serious conditions or chronic illnesses. “I never felt sick until after the age of 50. I never took any drug, nor even for headaches, nothing. Now I do. Now, if I am not carrying a sack of drugs, I cannot walk.”  

Twice a month, the indigenous community receives municipal medical visits in their communal house in which prescription drugs and food aids for vulnerable groups (infants and elders) like powdered milk and powdered purees (usually legumes) are given. The latter are often given to feed their animals as they are not considered real food by most community members, especially elders to whom the food aid is directed. Although most people with a chronic condition take the prescribed drugs, some just receive them and accumulate them at home. This behaviour was common among elders who believed that not taking the prescribed drugs home could result in being denied medical care by the medical team as a sort of punishment. They are often more wary about non-traditional medicine: “I try not to take these pills. Note that in the hospital they found a bale of pills inside an

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164 [Un viejito me dijo que comer piñones tostados sobre la cocina con un chorrito de agua caliente, es un remedio para el cuerpo. Nunca me dijo para qué, pero si me dijo que buscar esas comidas naturales era muy bueno porque así uno se privaba de muchas enfermedades. La gente se curaba con eso] (E ♀ 6)  

165 [Yo creo que todo eso servía para medicinarse porque se limpiaba la guatita. Todas esas cosas son naturales, sin químicos. Todavía no llegaba el abono, el salitre y todas esas cosas que sirven para puro debilitar la tierra...por eso la gente duraba más años y nunca iba al hospital poh Antonia. Sentían un dolor y ellos recurrían al bosque a buscar sus cosas que decían que eran buenas, y ellos por generaciones le iban traspasando a los niños lo que era bueno para una cosa y lo que era bueno para la otra. Donde sintieran el dolor, ellos sabían donde buscar y aparecían esos remedios. Porque ahora muchos se han perdido. Difícil encontrar y hay que meterse a campos ajenos y de repente por ahí se encuentra al privado] (E ♀ 6)  

166 [Nunca me enferme hasta después de los 50 años. Yo no tomaba nunca ningún remedio, ni para el dolor de cabeza, ninguna cosa. Ahora sí. Ahora sí no ando con un saco de remedios no ando] (G ♀ 11)
old man from around here, when they opened him to see of what he had died”. Although the medical teams tried to educate people about healthy eating habits with educational pamphlets and suggestions on low fat and salt restricted diets, they were uninformed about the nutritional benefits of traditional foods, including forest wild edible plants, and did not promote their consumption.

The existence of a fogón or kütralwe, instead of a firewood cook stove, was also believed to have an impact on their health. The permanent use of the fogón as the main social space was thought to be curative and healthy as it would keep the whole body dry and warm and the bones strong through winter. “People are disarmed [or disassembled] because they do not warm up on the fogón. Because wood stoves heat only the head, in contrast, the fogón warms the whole body. That is why there is so much bone pain, the cold”167. “...that’s another about health: the cold. Because before they got less knees and bones diseases since people lived in their fogón fully heated. And that heat is absent nowadays; we lack that fire warmth that protected all the bones during winter”168. Additionally, smoked meat and vegetables were also mentioned as an important mineral that is lacking nowadays169. It is also believed that the tortillas al rescoldo (bread baked in embers) that are made on the fogón are good for health as they contain important mineral elements from ashes. “Ashes are very good to cleanse the digestive system”170. Cooking in a challa, the iron pot, has been described to contribute to iron intake (Urrutia 1998).

Many indigenous societies recognize the central contribution that food and food procurement makes to mental, physical and spiritual health (McCune and Kuhnlein 2011, p. 249). The same has been said for forest environments which when visited may enhance physiological health and reduce stress (Karjalainen et al. 2010; Li et al. 2008). For Mapuche families, the gathering of wild edibles, especially in the mountains, was also considered a healthy practice not only for the corporeal body, but for the spirit and mind. One participant explained: “We looked for them (copihues) a lot when we were kids because according to our grandparents it was very healthy for

167 [La gente está destroncada porque no se calientan en el fogón. Porque la cocina a leña calienta solo la cabeza, en cambio el fogón calienta todo el cuerpo. Por eso hay tanto dolor de huesos, por el hielo] (I ♂ 5)
168 [Esa es otra cosa de la salud: el frio. Porque antes no se enfermaban tanto de las rodillas y de los huesos porque la gente vivía en su fogón calentado a mil. Y ese calor no está ahora, no está ese calorcito de fuego que le tomaba todos sus huesos en el invierno] (E ♀ 6).
169 In contrast to what has been published about the negative effects of smoked meat for health due to the high contents of sodium and carcinogenic substances, and high risks of bacterial contamination.
170 [La ceniza es muy buena para limpiar el sistema digestivo] (E ♀ 6)
children." For some participants, these trips to the Andes where times of freedom, enjoyment and happiness. "Going to the mountains serves as a tremendous exercise. I, born and raised in the farm, going to the mountains where there is nothing, no dogs barking, it’s like feeling completely free. It is an air that is breathed in a different way. It felt so nice when I went and so happy; jumping in the forest, running, walking and falling... I don’t know, I felt so great."
5. GENERAL DISCUSSION AND CONCLUSIONS

The Ethnoecological Imperative refers to the urgent need to document and conserve traditional ecological knowledge systems before they permanently disappear (Zent 1999). But, how best we can accomplish this imperative and what is the best strategy? “...it makes little sense to attempt to conserve traditional knowledge without first attempting to understand the actual process of knowledge loss” (Zent 1999, p.91). The present research puts forth a case study of Mapuche ethnobotanical knowledge of wild edible plants and its manifestations, as well as the shifts seen in the broader traditional food system. Indigenous ecological knowledge and food systems are constantly evolving within communities due to the influences of both external and internal factors. However, the origin (external or internal) of these factors is hard to define as most have similar historical roots. Understanding the state and expressions of people-plant relations, and community-landscape relations, needs a myriad of lenses through which these multiple factors can be identified.

5.1. Thesis summary

“Only as [knowledge] is manifested can it be considered knowledge in a real sense” (Haig-Brown and Dannenmann 2002, p. 453).

The use of wild edible plants is a living connection between the landscape and its dwellers, not just a source of food or income (ATree 2010; Berkes 2012). In Menetue, knowledge of wild edible plants is still alive among most adults and elders. Some species are still gathered and prepared but, for most wild edible plants, individual-plant relations built during childhood remain as living memories, even for species that are no longer widely used. As livelihoods and traditional ecological knowledge are reconstructed, some species have been partly forgotten and new species, mostly exotic, are increasingly being integrated into the system as they begin to gradually dominate the immediate landscape. Despite the wealth of knowledge held by most adults and elders, knowledge transmission is being interrupted as younger generations are failing to learn what the elders once learned. According to Zent (2009, p. 48), this ‘delearning’ trend is expected under rapid change conditions in a wider social and environmental context.
These dynamics unveil how essential the set of practices for the maintenance and transmission of traditional ecological knowledge are (Toledo 2002). The direct interaction with a wild edible plant, from gathering to consuming it, is what differentiates traditional ecological knowledge from merely isolated information; this knowledge becomes rooted in the landscape where the human-plant relation takes place. Materializing this set of practices is subjugated first to the availability of a given wild food resource, second to the access of this available resource, third to the cultural acceptability of that given food resource by the community (willingness to consume it) and finally to the hold of specific knowledge to successfully make use of the resource. Results of this study were considered in the context of broader literature, and summarized in the form of a graphic model (Figure 21).

**Figure 21.** Graphic model: key dimensions for successfully making use of a wild edible plant. Hierarchy was established in the model, where the availability of a wild edible plant in a natural environment determines the real possibility of consuming it. Accessibility is subjugated by the existence or abundance of a resource. Cultural acceptability plays a major role in choosing to consume a wild edible plant which is available and accessible, and the hold of traditional
ecological knowledge determines whether one has the knowledge and skills to successfully make use of a wild food that is already available, accessible and culturally accepted. The availability or abundance of species is also influenced by the sustainable manifestations of traditional ecological knowledge and people’s ‘ecological prudence’, providing feedback to the system, many times through supernatural entities. The dotted lines indicate the restrictions or conditions that local people need to sequentially overcome or that need to be present (as traditional ecological knowledge) for them to consume wild edible plants.

Mapuche people negotiate these dimensions differently for numerous wild edible plants depending on the species’ ecological requirements, availability and people’s eagerness to consume it. However, land tenure also plays a major role in all of the dimensions previously described in the graphic model. The history of land grabbing, by both legal and illegal means, has deeply impacted the Mapuche society socially, ecologically, economically and spiritually (Toledo Llancaqueo 2006). According to Armesto et al. (2001, p. 870), “the history of land tenure of indigenous lands can be summarized as a gradual process of seizure by the Government and by private investors”. The abuse of indigenous land rights, ignored by the Chilean State and society for centuries, is still being overlooked, while the conflict between the Mapuche nation and the State escalates. Currently, the Mapuche people are reclaiming their rights to their ancestral territory more than ever in what the governments and the media have dubbed, the ‘Mapuche conflict’; an attempt to criminalize their struggle.

In Menetue, land tenure regimes are key to understanding current scenarios for traditional knowledge transmission and food systems. As food acquisition is at the center of human interaction with the land, studying traditional knowledge of wild edibles and traditional food systems offer a direct way of understanding the implications of the land conflict, not only in regards to subsistence, but on the many dimensions of culture like identity, social dynamics, institutions, health and cosmology. According to Inge (1922, p. 56), “the whole of nature, has been said, is a conjugation of the verb to eat, in the active and passive”. For example, native forests, once owned by Mapuche families, surround Menetue. However, land grabbing has made forests inaccessible and indigenous farms increasingly smaller. There is consequently a general fear that Mapuche people have of trespassing private property to gather useful plants. Even though some wild edible plants are still gathered and consumed by adults, most of them are no longer widely used. Today, forests have been relegated to small patches and streamside protection in Mapuche farms as families must negotiate the limited space between forests, crop fields, orchards, chacras
and pastures. For most families, making a living on a few hectares becomes increasingly a difficult task. The decreasing land per household has been a driving force in changing social dynamics; increasingly small farms have left an uncertain future for young people. The growing tendency of youngsters migrating to urban centers has also had consequences on traditional food systems. As the population ages, the absence of young people and children is manifested in a lower consumption of wild edible plants and the disruption of knowledge systems between generations. Finally, large expanses of land owned by non-Mapuche have not only reduced the availability and accessibility of wild edibles, but have also physically, and consequently socially, fragmented the community and dispossessed people of sacred places, such as burial sites and the arena for celebrating the *Nguillatun*.

The cultural acceptability and knowledge transmission of wild edible plants has also been impacted by the formal school system. School attendance has resulted in limited knowledge of wild edible plants and native flora, as traditional pedagogies are deemphasized and children do not have time to engage in traditional forms of learning. In addition, the National School Food Program has changed the acceptability and interest in traditional foods as children receive daily meals which are not culturally appropriate. Children’s changing tastes are spreading to the whole family, as mothers, trying to please them, often adjust the entire family’s eating habits.

Because Mapuche pedagogy is oral and in situ, tasks and skills are taught in the places where they are to be undertaken (Ruddle 1993). For Mapuche families, intergenerational gathering trips and storytelling were essential for knowledge transmission and social cohesion. Land loss and the school regime have left younger generations without the opportunity to engage in these forms of indigenous pedagogy. Private property has limited their access to many gathering sites which used to be spaces of teaching and self-learning environmental skills and cultural values. This knowledge erosion was also explained by the decreased time that children and youngsters engage in outdoor activities with elders and peers as a result of time spent at school. This has led to younger generations becoming increasingly disconnected with the landscape and distanced from the food system that the past generations were familiar with. Furthermore, shifts in traditional food systems have led to chronic health conditions, largely due to changes in food habits towards a western diet and increasingly sedentary lifestyles. In the Mapuche case, there is a clear link between land dispossession, the loss of food sovereignty and the prevalence of nutrition-related chronic diseases. In the view of Clark (2011, p.169), “a key outcome of the past thirty years with
respect to the food system has been the near-complete loss of food sovereignty and the expanded intervention of markets in the rural Mapuche food system”.

Home gardens, on the contrary, have been ‘islands of biocultural diversity’, where some wild edibles and medicinal plants are transplanted at the household level, allowing people-plant interactions to persist. The same has happened with forests which are ‘ornamented’ or restored as species are brought in. These spaces are ‘windows’ to the forests, as many species, mostly vines, bushes and herbs, are brought closer to home. However, many species that used to be important sources of food and are often culturally relevant, like the pehuen (Araucaria araucana), cannot be found in these limited spaces. These constructed spaces are remarkable examples of indigenous resilience to broader adverse historical and political contexts.

5.2. Research limitations, future directions and contributions

Research limitations. Although the multiple methods approach that I used - framed by ethnography - provided important data for understanding the subject matter, there are some limitations to the study. First, despite the fact that I attempted to include the largest number of participants regardless of gender or age, it is possible that the present work reflects a greater proportion of the perceptions of adult women. This is mainly due to: (a) the restricted time available from the male population to participate in the study due to full-time jobs outside of the community; and (b) the formal school system which limited the presence of children and youngsters in the community during school year. However, while the availability of data can be seen as biased, the topic of the research is conducive to an over-sampling of women’s voices, as they are responsible for most of the activities related to food production, acquisition and preparation.

Second, because I spent six months (November 2012 to April 2013) in the community, my understanding of human activities in the landscape, the current use of wild edible plants and dietary patterns is somewhat limited considering the significant seasonal variability throughout the year. However, as explained in Chapter 3.1.a, my aim was to have an overall idea of the community’s foodways, rather than to provide an exhaustive nutritional description of family food patterns. The data presented here should be considered a description of the ‘abundance period’, which takes place in late spring and summer (November to early April). Along the same lines,
although weekly food diaries conducted by children were done accurately, they placed a lens of dietary patterns through the children’s views. As a consequence, certain foods and drinks considered adult foods (e.g. spicy food, alcoholic and caffeine drinks) were often not registered, and modern foods bought to be consumed only by children (e.g. yogurts, sausages, breakfast cereals) do not fully represent food intakes for adults. However, because children's changing tastes affect the rest of their family members, these results can be considered representative of the households that have children (food diaries were done in seven out of eight total such households). For further research, it would be important to ask children to register, not only the food that they consume at each meal, but also the food and beverages consumed only by adults and the elderly.

Third, wild edible plants are just one domain within the complex of traditional ecological knowledge. It would give the study further dimensionality to explore the state and loss of traditional knowledge through an analysis of other domains, like medicinal plants, wildlife, natural dyes and crop varieties. Finally, understanding the complexity of eco-cultural processes needs to incorporate the perceptions and insights from the diversity of social actors involved. To that end, it would be important to also include the perceptions of other Mapuche communities, non-Mapuche peasants and neighbours, owners of the surrounding fundos and regional authorities on indigenous affairs, in order to better understand the larger context. The input of other professionals like nutrition and public-health specialists, anthropologists and agriculturalists would also enrich the analysis and interpretation of the data.

**Future directions.** Today, South American temperate forests are at risk, with around 70% having been replaced by agricultural crops and exotic pine plantations (Armesto et al. 1998; Echeverria et al. 2006; Myers and Mittermeier 2000). Mapuche knowledge regarding these vital ecosystems is also threatened as it can be only be conserved within its cultural context; where it is situated and having a life and voice (Berkes 2012; Shackeroff and Campbell 2007). These research findings open new lines of inquiry on how to approach cultural and biodiversity conservation when land tenure disrupts this link.

Conservation areas around the globe provide environmental services and harbour biological organisms important to local communities (Martin 1995). In Chile, conservation areas were created on indigenous lands following the US model in which local communities were excluded
from the ‘pristine ecosystems’ that needed to be conserved, local communities were considered the cause of ecosystem degradation. Restricted access to forests, not only has reduced the consumption of wild edible and medicinal plants and undermined food sovereignty and traditional healthcare for communities, it has affected the continuity of belief and knowledge systems as intergenerational environmental learning is interrupted. This speaks to the need to reconsider the role of protected areas for neighbouring rural communities’ wellbeing, while ancestral land claims remain unresolved. Because in situ conservation by indigenous peoples is one of the best methods to safeguard biological diversity and indigenous knowledge, protected areas should consider the implementation of mixed-use areas, in which the gathering of non-timber forest products coexists with biodiversity protection (Armesto et al. 2001). In the face of traditional ecological knowledge erosion, it is necessary to promote the local valuation of forests and to recognize the importance of traditional practices as grassroots factors for achieving biocultural conservation outcomes. Humans need to develop a more caring relationship with the environment that supports them, and learn from indigenous perspectives as they bring lessons, not in resource management (as this is a western-centric concept), but in dealing with human-nature relationships in a more respectful manner (Berkes 2012, p. 19).

“The contribution of wild edible plants and forest foods to dietary diversity may support local community’s’ nutritional resilience in the face of socio-cultural, economic and environmental change” (Powell et al. 2011, p. 315). In order to sustain the gathering of wild edible plants, further research and application need to develop strategies to enhance traditional ecological knowledge transmission between generations within local schools and community spaces (Turner et al. 2011). This relates to the need for formal education to consider local resources and foodways in their curricula and to incorporate indigenous pedagogies and social institutions, such as elders, for these purposes. Revitalization projects should aim to develop strategies to enhance knowledge transmission between elders and younger generations within local schools, perhaps diminishing the knowledge gap between generations (Turner et al. 2011). Something similar could also be proposed to rethink and restructure the National School Food Program (PAE) to better serve local and cultural particularities in different parts of Chile. Such a project would not only develop a new

173 The first conservation area was created in 1907 in the La Araucanía Region, and later several public and privately owned protected areas have been established in the area. A notable exception is the Santuario El Cañí, a private initiative, where local communities are allowed to make use of non-timber resources.
framework for culturally appropriate and healthy eating habits at school, but could also bring children closer to traditional foods, thus, strengthening the continuity of traditional knowledge.

In a similar vein, home gardens and ‘ornamented’ forest fragments are examples of resilience where families try to rebuild their connections with useful plants, and make up for the inability to access forests as they once did. How much can home gardens contribute to wild edible and medicinal plant use and conservation? How good or effective are these spaces for knowledge transmission and the maintenance of traditional ecological knowledge? Similar questions emerge for local markets where wild useful plants are traded. Markets provide access to a variety of wild edible plants for people who, given a multiplicity of factors, have difficulty gathering them directly from the forest. What makes local markets an interesting subject of research is the conflict of worldviews between the commoditization of wild plants and the Mapuche people’s belief system, which states that most wild foods should not be sold. How do people negotiate their needs with their beliefs? And how do the individual-plant relations change when there is an intermediary or vendor?

Another potential area of research revolves around the recent phenomenon of explosive demand from Northern markets for ‘superfoods’ such as quinoa, different kinds of berries (such as maqui), nuts and leaf extracts. Interestingly, this in contrast to the decreasing use of the same edible wild plants in their territories of origin. The impacts of converting these traditional plants and products into agribusinesses is that, despite the intention of promoting good health elsewhere, they often displace indigenous peasantry and traditional farming techniques, when submitting these species to an extensive type of production. Is it possible to encourage the use and benefits of these local foods in external markets without endangering local systems? Also, how can local biocultural diversity be protected from biopiracy and patenting by foreign companies?

**Contributions.** The decreased use of wild edible plants and declines of traditional ways of living are interlinked (ATree 2010). For Mapuche people, the documentation of ethnobotanical knowledge and the reconstruction of local memories and stories in relation to past foodways through oral histories can be a starting point for acknowledging how food and knowledge systems have changed over time and what can be done in the near future to conserve their food culture as a whole. Projects aiming to revitalize traditional food systems can be initially formulated with the
goal of re-rooting indigenous foodways and reviving traditional food collection and preparation practices. However, the long-term goal should include the enhancement of people’s health and the reclamation of food sovereignty as a right. This understanding may serve to inform more integrative policies related to the conservation of the inextricably linked forest and cultural heritages.

Traditional ecological knowledge, as situated knowledge, embodies claims of authority over land and natural resources, especially in the face of ancestral land claims and counter-claims from outsiders (Berkes 2012, p. 13). The documentation of local botanical and ecological knowledge can, therefore, have long-standing benefits as they can be used to inform and enrich baselines for communities’ interests (Wyndham 1993, p. 13). In-depth ethnobotanical documentation can also reinforce communities’ land and resource claims, struggles against development projects, usufruct rights on public properties, conservation and revitalization projects of indigenous cultures, local youths’ education, and intellectual property claims (Berkes 2012; Wyndham 1993). This research attempts to contribute to these diverse issues, objectives even if only in a small way.
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Appendix 1. Stories told by community members about the Ngen or owners of the natural domains.

I. “One does not see them but they are there. You have to have them much respect. If you find a wild potato plant you do not have to pull up the plant because it is their food. He who finds a potato is lucky, but you can only get the potato without uprooting the plant. You were treated nicely in the mountain because you have a good heart, but if they do not like you, you will stumble while walking. The owners are not ancestors, but beings as us living there but unseen. Those who live out there know. Only a doctor can take that plant but first asks for permission and says prayers. The same happens when you will find piñones, you must leave an offering to the first tree you encounter so that everything goes smoothly. But when walking in the mountains one cannot laugh or scream loud because the weather gets bad and may even snow.”

II. “So the matter of tourism is difficult because despite it can be a very good person, the gringo (meaning foreigner) who walks taking pictures, cannot understand and explaining these things is difficult and he/she may offend the owners. So concerned was a lady who has a mountain very important to them that they want to introduce tourism. It is sacred to them, but how do you explain this to the tourist. They can break branches, disturb or do something that annoys the owners. It is like someone walking into your house and mess up everything or take
your stuff. This, the Mapuche teaches their children because when people get lost or cannot find the path is because of the owners.”

[Por eso esa cuestión del turismo es complicado porque por muy buena persona que sea el gringo que anda sacando fotos, no puede entender y es difícil de explicar esas cosas y pueden ofender a los dueños. Así estaba de preocupada una señora que tiene un cerro muy importante para ellos en que quieren meter turismo. Es sagrado para ellos, pero como se lo explica uno al turista. Pueden romper ramas, desordenar o hacer algo que moleste a los dueños. Es como si alguien entrara a tu casa y te desordenara todo o se llevara tus cosas. Eso, el mapuche lo enseña a sus hijos porque cuando la gente se pierde o no encuentra el camino es por los dueños.]

III. “In the Kürra kürra (name of a mountain) we had to stop and pray on the first monkey-puzzle tree we encountered, for that the mountain would not think of us as strangers. Before, they left an offering on that first pine located in the only entry, but apparently fell down. We called it Kusche pewen (Kusche ~ old woman or grandmother, pewen ~ monkey-puzzle tree). People also smoked before entering the forest to ask for permission. My grandfather was the only who did that.”

[En el Kürra kürra había que para y rogar en el primer pino que se encontraba ara que no nos desconociera la cordillera. Antes se dejaba una ofrenda en ese primer pino que estaba por la única entrada, pero parece que cayó. Le decimos kushe pewen (kushe ~ anciana, pewen ~ araucaria). También se fumaba al entrar al bosque para pedir permiso. Mi abuelo solamente era el que lo hacía.]

IV. “The owners of the water can be animals such as horses or pigs. The water must be respected and you should not to play with her. The ancients had by law to be washed with water as soon as they woke up early in the morning, because the water is sacred.”

[Los dueños del agua pueden ser animales como caballos o chanchos. Al agua hay que tenerle respeto y no hay que jugar con ella. Los antiguos tenían como ley de apenas se levantaban temprano se tenían que lavar con agua porque es sagrada.]

V. “The rivers also have owners as the forest. When you enter a forest you ask for permission. That is why Juan lit a cigarette and Juanito offered a little bit of juice to the ground. Every time we take a plant we ask for permission, so does Juan when he is logging. If they are not respected, people get lost in the mountains. Rivers are also misleading and if you do not bathe
with respect you can drown. On the mountains there are ash colored animals but are hard to see. In this way the owners can be shown.”

[Los ríos también tienen dueños como los bosques. Cuando se entra a un bosque se pide permiso. Por eso Juan prendió un cigarro y Juanito le dio un poco de jugo a la tierra. Cada vez que sacamos una planta pedimos permiso, igual lo hace Juan cuando maderea. Si no se respeta, la gente se pierde en la montaña. Los ríos igual son engañosos y si no se baña con respeto se puede ahogar. En el monte hay animales color ceniza pero son difíciles de ver. Así, se pueden mostrar los dueños.]

VI. “In my land up in the mountain there are two lagoons, one large and one small. The small lagoon enchanted a girl and she fell (in the lagoon). The father went to work with the girl and sent her to fetch water for drinking mate. She took some small jars and the second time he sent her, she did not come back. Their jars stood there on the shore of the lake. When riding up, the water moves strongly. It is dangerous to swim there because the lake can enchant you.”

[En mi campo arriba hay dos lagunas, una grande y una chica. El lago chico encantó a una niña que cayó. El papá iba a trabajar con la niña y la mandó a buscar agua para tomar mate. Ella fue con sus tarritos y la segunda vez que la mandó, ella no apareció. Quedaron ahí sus tarritos en la orilla del lago. Cuando se sube a caballo, el agua se mueve fuerte. Es peligroso bañarse ahí porque el lago encanta.]

VII. “For the owners, you should make a prayer and if one can speak in Mapuche, then the prayer is done in Mapuche. And there you are not supposed to yell, set fires anywhere, do no evil, because the same power of the mountain makes you drunk (alluding to being confused) and make you get lost.”

[Para los dueños, hay que hacer una oración y si uno sabe hablar en mapuche, la oración la hace en mapuche. Y allá no se grita, no se hace fuego en cualquier parte, no se hace ninguna maldad, porque el mismo poder de la montaña la emborracha y la pierde.]

VIII. “When we got there, to the entrance of the piñones, in the first monkey-puzzle tree we prayed, hopefully kneel and pray. When there was a mother female tree, we left some coins there, you leave an offering and if someone takes this offering he or she will be sorry for it. They will pay dearly for it because that is not supposed to be taken by anyone.”
[Cuando llegábamos allá, a la entrada de los piñones, en el primer árbol de piñones hay que hacer una oración, ojala arrodillarse y orar. Cuando había una pino hembra madre ahí se dejan una monedas, se le deja una ofrenda y pobre del que le vaya a sacar esa ofrenda, ese la paga caro porque esa no tiene que sacarla nadie.]

IX. “Ülmen was called, is the rich, the powerful, the owner of the mountain. Because he can suddenly be presented as an animal that one has never seen, may occur unexpectedly as a person too. In dreams people see him, the owner of the cliffs, to the owners of the lakes and the mountain’s owners. Because in a dream, my brother Pascual saw an old man when two of his cows died on the cliff near our house. The cows fell down the cliff and when they tried to take them out, they had not a drop of blood ... something sucked their blood, the cows just had meat but no blood! And a few days later in the night he dreamed that he saw an old man, "not big" he said “his hair was long like this hanging down, it reached down here all whitey and nicely combed" he said "and two women and those women laughed a lot at me, he told me and the old man spoke to him. He said: “because you have behaved very badly, that is why I took your cows ”, because he had done wrong. And then he recognized that he had made mistakes and the cute cows, I used to milk those cows, died falling to the cliff by going to eat from the branches that were in the abyss. When they leaned over they fell down the ridge ... he had to go there to get them.”

[Ülmen le decían, es el rico, el poderoso, el dueño de la montaña. Porque de repente se pueden presentar como un animal que uno nunca jamás ha visto, de repente se pueden presentar como una persona también. En sueños las personas lo ven, a los dueños de los riscos, a los dueños de los lagos y a los dueños de la montaña. Porque mi hermano, ese pascual, en sueño vio a un viejito cuando se le murieron dos vacas en el risco ahí cerca de la casa, se le arriscaron las vacas y cuando las fueron a sacar no tenían ni una gota de sangre...hay algo que les chupó la sangre, tenían la pura carne si no tenían nada de sangre las vacas! Y unos días después en la noche soñó que vio a un viejito, “no era grande” dijo “tenía el pelo así largo pa’ bajo po, le llegaba por aquí todo peinadito y bien blanquito su pelo” dijo “y dos mujeres y las mujeres se reían mucho de mí” dijo y el viejito le hablo a él. Le dijo: “porque tú te has portado muy mal, por eso yo te quité las vacas”, porque él había hecho cosas malas. Y ahí él reconoció que él había cometido errores y las vacas más linda, a esas vacas yo le sacaba leche, se murieron ahí se arriscaron por ir a comer de las ramas que estaban en el
abismo y donde se agacharon así se le fue el cuerpo, se cayeron pa’ bajo en el risco...ahí las tuvo que ir a sacar.]

X. “Ko Ngen is the owner of the water. One does not see him, and I do not know why my brother saw such things, or felt many strange things. Because once in the same cliff, he went to work down where it was full of chilcos (fuchsias) and there was a kind of mud and grasses, but these grasses lived on the water. Then my brother for cutting these seedlings, because that part was useless, it was there as an ornament and my mom had told him: ‘do not go to work there because you can’t sow there, it is always filled with water’. But he was stubborn and went to cut the fuchsias. He went and cut all the little bushes that where there, when he tells that suddenly he felt that the waters began to boil up, out, sputtered up without touching him. ‘It started like boiling!’ he said, sounding like when boiling a pot, and he said he ignored this, kept working, kept cutting. Suddenly, he said, in that same part where the small puddles were boiling, a pig started snoring so loudly, he said, that it really frightened him, and he ripped out of there. He had not reached the house, when he felt a headache, felt cold. He go to the house like fire, my mother said, with a burning fever, but it was because he was working where he was not supposed to work ... there was no reason for him to do that because that part was not good for working (meaning for growing) and with pig snoring he became sick. He almost died, he said, and then she asked him why he did that when she had told him not to. Why doing it!

The owners of the water had their trees for them and he went to cut them.”

[Ngen ko es el dueño del agua. Uno no lo ve, y yo no sé porque mi hermano veía tantas cosas, o sentía tantas cosas extrañas. Porque una vez en ese mismo risco, se fue a trabajar abajo donde estaba lleno de chilcos y habían uno barrito y así, champita pero la champita vivía sobre las aguas. Entonces él para cortar esas plantitas, porque no servía para nada esa parte, era pa’ que estuviera como adorno ahí y mi mama le había dicho: “no vaya a trabajar ahí porque no podí sembrar ahí, vive lleno de agua siempre”. Pero él era porfiado y fue a cortar los chilcos. Fue a cortar todas las matitas que habían ahí, cuando dice que de repente sintió que las agüitas se empezaron a hervir pa’ arriba, salían, chisporroteaban pa’ arriba sin tocarlo. ‘Empezó como a hervir’ dijo, a sonar como cuando hiere una olla, y él dice que no le hizo caso, siguió trabajando, siguió cortando. De repente, dijo, en esa misma parte ahí donde estaban hirviendo las positas de agua, empieza un ronquido de chancho tan fuerte, dice, que eso sí que le dio susto, salió arrancando de ahí. No alcanzó a llegar a la casa cuando ya sentía
dolor de cabeza, sintió frio. Llegó como fuego a la casa dijo mi mama, con una fiebre que ardía, pero fue por haber estado trabajando ahí donde no debía trabajar... no tenía para que hacerlo porque esa parte no servía para trabajar y con ese ronquido de chancho se enfermó. Casi se murió, dijo, y ahí le dijo ella que pa’ que había ido si ella le había dicho que no lo hiciera ¡pa’ que lo hizo! Los dueños del agua tenían a sus arbolitos para ellos y él se lo fue a cortar.
Appendix 2. Research diagram depicting the relation between objectives, research questions and methods.

(*depending on the answers to the previous questions)

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>RESEARCH QUESTIONS</th>
<th>METHODS</th>
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| 1) Document ethnobotanical knowledge and current consumption of wild edible plants in a Mapuche community inhabiting the Andean temperate forests of southern Chile | What knowledge do Mapuche people have on forest wild edibles of the Andean Temperate Forests? Is this knowledge being transmitted? How is this knowledge applied: is it translated into gathering and consumption, monetary income or both? | B) Ethnobotanical data collection:  
 a) Freelists  
 b) Photo-elicitation interviews  
 c) Informal interviews (preferably in situ)  
 d) Semi-structured interviews |
| 2) Explore local perceptions of current and past people-edible plant relations, foodways, knowledge systems and landscape change. | How do people perceive has been the evolution of traditional knowledge on edible plants and food practices in their life and communities? What are the restrictions / difficulties for consuming or reasons for deciding not to include wild edibles in their food systems? | C) Food systems assessment:  
 h) Weekly food diaries  
 i) Local market surveys |
| 3) Investigate factors and historical eco-cultural processes influencing today’s use of wild edible plants, food choices and management decisions. | According to their perceptions, in what way are these changes and/or restrictions related to historical eco-social processes in the region? | D) Oral history:  
 e) Collecting local narratives and stories related to foodways and the landscape (audio recorded)  
 f) *In situ* informal interviews  
 g) Semi-structured interviews |

A) & E) are methods that overlap with all the others which serve to contextualize and provide background and additional information to answer the research questions and facilitate analyzing and interpreting the research findings.
Appendix 3. Copy of consent form [English version] given to research participants.

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THE UNIVERSITY OF BRITISH COLUMBIA

[ UB logo]

Date

[Faculty of Forestry Information]

[UBC Information]

[Note: will be translated into Spanish and will be presented orally to subjects. A copy will be left with them.]

Consent Form

Project on wild edible plants, food choices and foodscape storytelling / Food Sovereignty

Principal Investigator:
Dr. Robert Kozak, Department of Wood Sciences, Faculty of Forestry, University of British Columbia. Any questions please call 1-604-822-2402 in Canada or email rob.kozak@ubc.ca

Co-investigator:
University of British Columbia, MSc graduate student Antonia Barreau. Any questions please call 1-604-367-7631 in Canada (will add number in Chile), or email antonia.barreau@alumni.ubc.ca.

Purpose:
The purpose of this project is to record your ideas, memories and perceptions about forest edible plants and the ways landscape changes and historical processes over indigenous communities, has or has not changed your way of living, foodways, traditional practices, hunt or gather, and any other topics you would like to have recorded for others to see and hear. We may additionally ask you about your knowledge of local landscapes, plants and animals.

Interviews:
If you agree to participate in these interviews, you may expect to spend between 1-10 hours talking about the subject. If you like, the interviews may be completed over the next few months, depending on how much you would like to say. Your responses will be written on paper and/or taped with a tape recorder as to your preference and permission. As materials are processed for publication in various forms, we will provide two opportunities for you to review the material and comment on it, and adjust your level of participation if you so desire.

Confidentiality:
Your identity will likely be available to people who hear the interview tapes. These people will be members of the research team, if audiotapes are to be accessible to the public, we will ask you for your permission for that particular
use. At any time during the interviews, you may let us know if there is something you would like to be kept confidential or destroyed so no one can see or hear it. The materials created by this project will be kept indefinitely. Before aspects of this study are published, you will be asked whether you give permission for your name to be associated with the material or not.

Remuneration/Compensation:
[to be determined]

Contact for information about the study:
If you have any questions or desire further information with respect to this study, please contact Dr. Robert Kozak in Canada at 1-604-822-2402 or rob.kozak@ubc.ca.

Contact for concerns about the rights of research subjects:
If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services in Canada at 1-604-822-8596.

Consent:
Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without needing to explain why. As stated above, you may also request to withdraw your interview materials in their entirety or a portion thereof, in which case they will be erased.

A copy of this letter will be left with you for you to keep.

Do you consent to participate in this study?

Investigator will check No or Yes and record the participant’s name and date:

___ No
___ Yes

If yes, do you consent to:
___ audiotaping of the interviews
___ note-taking during the interviews
___ photographs
___ videotape

Name of participant: __________________________ (no signature required)

Date: ________________

Place: ____________
Appendix 4. Three-day cooking workshop: “From the forest and home gardens: Cooking with wild edibles”

The workshop was guided by a local Mapuche cook, Sonia Aliante, who for the last years, has been collecting traditional recipes, and also creating new ones, to encourage the use of wild edible plants. Although the overall structure of the workshop was planned with Sonia in advance, she was encouraged to freely guide the workshop as she would like and as the Mapuche teaching tradition would. The result was a very participative cooking workshop, in which the women of the community would bring vegetables from their gardens and wild edibles they would collect and everyone would participate in the cooking. Classes started early in the morning and finished with a tasty lunch full of stories and narratives about Mapuche foodways that were shared.

Some preparations included:

- Tortillas of bamboo shoots, *Chusquea culeou (Tortilla de coyochos de coligüe)*
- Puree of *ngüilliu*, monkey puzzle-tree (*Araucaria araucana*) seeds, accompanied with wild mushrooms called *chicharrón de campo* (*Gyromitra antarctica*)
- Empanadas of *pike* (*Armillaria sp.*), a wild mushroom
- Natural juices with wild berries and fruits mixed with aromatic herbs
- Soup of *ngüilliu*, monkey puzzle-tree seeds
- *Quinwa* bread or *sopaipillas* (*Chenopodium quinoa*)
- *Lleuque* jam made out of fruits of the conifer tree *Prumnopitys andina*
[Photographic credits: Tomas Ibarra except pictures on the right]
Appendix 5. Some Botanical illustrations by the Chilean artist Geraldine MacKinnon created to be included for the ethno-botanical book.

In order of appearance: (1) Chilco or hummingbird fuchsia, *Fuchsia magellanica*; (2) Copihue or Chilean bellflower, *Lapageria rosea*; (3) Frutilla silvestre or Chilean strawberry, *Fragaria chiloensis*. 
Appendix 6. Series of questions used to guide semi-structured interviews.

This questionnaire was set up in order to explore perceptions of the changes in the traditional food systems, accessibility of wild edibles and the landscape.

<table>
<thead>
<tr>
<th>Mapuche food system change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In relation to Mapuche food, do you think it has changed? How?</td>
</tr>
<tr>
<td>2. Why do you think Mapuche traditional food has changed?</td>
</tr>
<tr>
<td>3. What foods or preparations have been lost or are disappearing? Do you still sow grains or cereals?</td>
</tr>
<tr>
<td>4. What kind of foods would you consider as new or that have been incorporated lately?</td>
</tr>
<tr>
<td>5. What do you think about nowadays diseases? Were common in the past?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The consumption of wild edibles as part of the nutritional transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nowadays do you gather wild edibles? Which ones?</td>
</tr>
<tr>
<td>2. Have you stopped gathering some wild edibles that you commonly ate as a child? Like which ones?</td>
</tr>
<tr>
<td>3. Why have you stopped gathering them?</td>
</tr>
<tr>
<td>4. What are the difficulties or restrictions for you to gather and consume these foods nowadays?</td>
</tr>
<tr>
<td>5. Do you sell any food that you gather or any preparation you make? If yes, where and when?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Landscape general information and perception of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Has the landscape changed in this area?</td>
</tr>
<tr>
<td>2. How has it changed? Please describe</td>
</tr>
<tr>
<td>3. About the forest: the amount of forest has changed?</td>
</tr>
<tr>
<td>4. In your family, they owned more or less land than today? How it was lost?</td>
</tr>
<tr>
<td>5. The land that you own today, is it enough for your family needs?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Household economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What kinds of food do you normally buy?</td>
</tr>
<tr>
<td>2. Is there a period of time in the year that you spend more on buying food?</td>
</tr>
<tr>
<td>3. How much, approximately, do you spend during this time?</td>
</tr>
<tr>
<td>4. Do you have an idea of how many kilos of sugar, vegetable oil, salt and yerba mate do you consume monthly?</td>
</tr>
</tbody>
</table>
Appendix 7. Values of wild edibles available in the local market between October and April.

Values [in Canadian Dollars (CAD) and Chilean Pesos (CLP)] varied throughout the season; the lower value corresponds to mid-season price and higher value corresponds to the price established at beginning and end of each gathering season when there is less availability. (Exchange rate on the 12/05/2014: 1 CLP = 0.00197635 CAD)

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>EDIBLE PART</th>
<th>VALUE (CAD)</th>
<th>VALUE (CLP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nalca</td>
<td>Petiole</td>
<td>0.9 / petiole</td>
<td>500 / petiole</td>
</tr>
<tr>
<td>Castaña</td>
<td>Seed</td>
<td>1.4 – 4.0 / kg</td>
<td>700 - 2000 / kg</td>
</tr>
<tr>
<td>Piñón</td>
<td>Seed</td>
<td>1.8 – 5.9 / kg</td>
<td>900 - 3000 / kg</td>
</tr>
<tr>
<td>Murta</td>
<td>Fruit</td>
<td>4.9 – 5.9 / kg</td>
<td>2500 - 3000 / kg</td>
</tr>
<tr>
<td>Murra</td>
<td>Fruit</td>
<td>4.0 – 4.9 / kg</td>
<td>2000 - 2500 / kg</td>
</tr>
<tr>
<td>Mosqueta</td>
<td>Fruit</td>
<td>5.9 – 7.9 / L</td>
<td>3000 - 4000 / L</td>
</tr>
<tr>
<td>Mosqueta</td>
<td>Fruit</td>
<td>3.0 / 250 ml jar - 11.9 / 1L jar</td>
<td>1500 / 250 ml jar - 6000 / 1L jar</td>
</tr>
<tr>
<td>Changle</td>
<td>Mushroom</td>
<td>4.9 – 7.9 / kg</td>
<td>2500 - 4000 / kg</td>
</tr>
<tr>
<td>Digüeñe</td>
<td>Mushroom</td>
<td>4.0 – 5.9 / kg</td>
<td>2000 - 3000 / kg</td>
</tr>
<tr>
<td>Gargal</td>
<td>Mushroom</td>
<td>4.0 – 5.9 / kg</td>
<td>2000 - 3000 / kg</td>
</tr>
</tbody>
</table>
Appendix 8. List of the 21 most salient wild edibles.

Details of medicinal knowledge of these plants are not detailed here to protect the Mapuche indigenous cultural and intellectual property from unwanted appropriation by others. (* = name of edible part [name of whole plant], ** = introduced species with Spanish name).

<table>
<thead>
<tr>
<th>Mapuche name</th>
<th>Scientific name</th>
<th>Habitat</th>
<th>Other uses</th>
<th>Preparations or ways of consumption</th>
<th>Additional information</th>
</tr>
</thead>
</table>
| 1 Diweñ      | Cyttaria espinosae | Branches and trunks of the genus *Nothofagus*, especially in medium-size *Nothofagus obliqua* trees. | **Toy**: children used to play with them blowing through the *digüeñe* to see ‘smoke’ coming out from the other side | → Salad with onion and coriander  
→ Soup  
→ Fried with eggs served with boiled potatoes or bread  
→ Empanadas | Once gathered, *digüeñes* need to be consumed during the day or the next day, storing them in a cool place because they spoil quickly. |
| 2 Changdi    | Ramaria flavida | Nothofagus forests understory, especially underneath bamboo patches. | Not reported | → Fried with eggs and served with boiled potatoes  
→ Empanadas | Only those who have a pale yellow color are gathered. Dark yellow or brownish colors, means they are no longer good. After gathered, consume them soon as they remain fresh only for a couple of days. |
<table>
<thead>
<tr>
<th>Mapuche name</th>
<th>Scientific name</th>
<th>Habitat</th>
<th>Other uses</th>
<th>Preparations or ways of consumption</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Maki [këlon]</td>
<td>Aristotelia chilensis</td>
<td>Open areas with high sun exposition, in either flat or sloping surfaces. <em>Maqui</em> can grow under some shade or non-dense canopy vegetation.</td>
<td>➔ Medicinal ➔ Natural dye: Almost every structure of the plant is used to dye wool. Berries give tones between violet and dark purple and the leaves a light green. The bark, roots and twigs give dark brown tones. ➔ Ritual: Branches of maqui are placed beside the rewe or central altar forming the sacred tree in different ceremonies and rituals, like the <em>Nguillatun</em>. ➔ Toy: the fruits were used as paints, either for children’s faces or for rocks.</td>
<td>➔ Eaten raw ➔ Jam ➔ <em>Teku</em> or <em>maqui</em> chicha: a fermented drink</td>
<td>Summer rains make the elmleaf blackberry rot in the plant. Blackberries are left in a bowl covered with water for the insects come to the surface. Insects are removed and then they are clean and ready to prepare.</td>
</tr>
<tr>
<td>4 Murra **</td>
<td>Rubus ulmifolius</td>
<td>Roadsides and open areas. Common in degraded zones.</td>
<td>➔ Medicinal ➔ Natural dye: berries are used for dyeing wool, but it is a recent practice. They give violet and purple tones depending on the amount used. The roots tend to dye in brown tones.</td>
<td>➔ Berries are eaten raw ➔ Natural juice ➔ Jam ➔ Red or unripe berries are used instead of lemon, for example to dress a salad.</td>
<td></td>
</tr>
<tr>
<td>Mapuche name</td>
<td>Scientific name</td>
<td>Habitat</td>
<td>Other uses</td>
<td>Preparations or ways of consumption</td>
<td>Additional information</td>
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</table>
| Ngüilliu [Pehuen]* | *Araucaria araucana* | Andes mountains above 900 m.a.s.l. up to the tree limit | → **Medicinal**: the sap is used to treat wounds and ulcers  
→ **Natural dye**: the same water used for cooking the piñones, is used to dye wool. The tone is similar to the color of the seeds coat  
→ **Ritual or magical** | → Cooked or roasted (they need to be cooked in cold water from the beginning because with hot water they end hard)  
→ Raw while gathering  
→ Flour  
→ Mudai (fermented drink) | They have to be cooked for at least two hours because they have a very hard coat. When gathering, remove the 'tails' of the piñón so that your load is lighter. For keeping them fresh, save the piñones in a whole dug on the ground, and cover them with sods. Sprinkle water every now and then so that they don't dry. |
<table>
<thead>
<tr>
<th>Mapuche name</th>
<th>Scientific name</th>
<th>Habitat</th>
<th>Other uses</th>
<th>Preparations or ways of consumption</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Nalca [Pangue]*</td>
<td>Gunnera tinctoria</td>
<td>Humid areas in constant contact with water. It is found in low altitude <em>mallines</em> or marshlands, but also in steep rocky-mountain streams and waterfalls in higher altitudes. The latter, are the most desired by people.</td>
<td>→ <strong>Medicinal</strong>&lt;br&gt;→ <strong>Natural dye</strong>: the roots are used for dyeing wool in grayish tones</td>
<td>→ Petioles are eaten raw with salt&lt;br&gt;→ Salad&lt;br&gt;→ Tart or <em>kuchen</em> (used as rhubarb)</td>
<td><em>Nalca</em> found in steep rocky-mountain streams and waterfalls are the most desired by people. Marshland <em>nalcas</em> were described as being bland and having a bitter taste. Petioles should not be cut with a machete to avoid drying the whole <em>nalcadero</em>. The petioles have to be pulled with the hands.</td>
</tr>
<tr>
<td>7 Ünü</td>
<td>Ugni molinae</td>
<td>Open sunny areas in low altitude, stony and marginal soils. Common in riverbanks in the pre-Andean zone.</td>
<td>→ <strong>Medicinal</strong></td>
<td>→ Liquor made with <em>aguardiente</em> or hard liquor called <em>enmurtado</em>&lt;br&gt;→ Canned together with quince&lt;br&gt;→ Dulce de <em>murtilla</em> or jam</td>
<td></td>
</tr>
<tr>
<td>Mapuche name</td>
<td>Scientific name</td>
<td>Habitat</td>
<td>Other uses</td>
<td>Preparations or ways of consumption</td>
<td>Additional information</td>
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</tr>
</tbody>
</table>
| Coycho colew | Chusquea culeou  | Varied ecosystems. Common in habitats with high sun exposition, but very abundant in temperate forests as part of the understory | → **Construction & tools:** coligüe stalks are widely used as building material for fences, rucas (traditional houses), doors, greenhouses, polleras (cone-shaped construction for feeding chicks), furniture, zarandas (slatted shelf for drying or maturing cheese), for gathering out-of-reach digüeñas and pinatras, and as walking sticks.  
→ **Handicraft:** used for making balay or llepü, a trutruca the musical instrument and stalks are used as for weaving in the Mapuche loom.  
→ **Ritual or magical:** The wisdom for the Mapuche comes through dreams. Burning a coligüe in the morning and putting the coals under a pillow helps to remember dreams. Thus, that wisdom doesn’t get lost.  
→ **Toy:** stalks are used as by kids as hobbyhorse and shoots simulating bulls horns. | → Cooked in embers and boiled  
→ Salad  
→ Canned | It is necessary to harvest when they spring, because in January they have already risen and those are not good to eat. |
<table>
<thead>
<tr>
<th>Mapuche name</th>
<th>Scientific name</th>
<th>Habitat</th>
<th>Other uses</th>
<th>Preparations or ways of consumption</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Kopiu [kolkopiw]*</td>
<td>Lapageria rosea</td>
<td>Low altitude native forests, always under the trees’ shade and where there is a permanent source of water.</td>
<td>Handicraft: Vines are used for weaving baskets like the chaigüe</td>
<td>Fruits are eaten raw</td>
<td>The flower and fruits can be seen at the same time. That is why when you see the flower is because there is fruit, which is why it is easy to find.</td>
</tr>
<tr>
<td>10 Mosqueta**</td>
<td>Rosa rubiginosa</td>
<td>Roadsides and open areas. Common in degraded zones.</td>
<td>Medicinal: the roots, leaves, petioles and fruits are taken in infusions for treating kidney ailments. Fruit infusions are taken during winter for preventing colds. The infusion is also taken for healing wounds.</td>
<td>Jam</td>
<td></td>
</tr>
<tr>
<td>11 Castañita**</td>
<td>Castanea sativa</td>
<td>Planted in open areas. Common in grasslands.</td>
<td>Fodder: chestnuts are given to pigs, cattle and geese. Natural dye: the seeds tegument and leaves are used for dyeing wool in light brown tones</td>
<td>Boiled and roasted on top of the firewood stove. Canned in syrup. Jam.</td>
<td></td>
</tr>
<tr>
<td>Mapuche name</td>
<td>Scientific name</td>
<td>Habitat</td>
<td>Other uses</td>
<td>Preparations or ways of consumption</td>
<td>Additional information</td>
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</tbody>
</table>
| **12 Kalgal** | *Grifola gargal* | Stumps, snags and woody debris in forests. As a wood-decayed fungus, it springs in dead wood of *Nothofagus* species, mainly in *coigüe* (*Nothofagus dombeyii*) and *pellín* (*Nothofagus obliqua*). | Not reported | → Parboiled (*sancochado*) with onion, garlic and boiled potatoes  
→ Prepared like meat with salt grilled on top of the cooking stove  
→ Smoked and dried in the *fogón*  
→ Empanadas | When *gargales* spring, there are also *changales* because they are relatives. |
| **13 Pëke** | *Armillaria mellea* | Springs in stumps, snags and woody debris, under them or on their roots, both in forests and grasslands. Mainly in *pellín* (*Nothofagus obliqua*). | Not reported | → Parboiled with onion and sided with boiled potatoes  
→ With egg in a tortilla or omelet  
→ Beans or *porotos* with pike | The cap and part of the stem is what is consumed. When the head is completely closed down and yellowish in color, is ready to gather and prepare it. |
<table>
<thead>
<tr>
<th>14</th>
<th>Mëchai</th>
<th>Berberis spp.*</th>
<th>Somber areas in slopes of southern exposure or deep ravines, and under dense layer of vegetation.</th>
<th>Other uses</th>
<th>Preparations or ways of consumption</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>→ <strong>Handicraft:</strong> leather lassos once twisted, are passed through michay shrubs to give them greater firmness.</td>
<td></td>
<td>→ Fruits are eaten raw</td>
<td>The michay with small fruit and rounder leaves (<em>Berberis buxifolia</em>) is gathered more because it is tastier. The plant dies when the roots are extracted for dyeing wool, so it has to be used with restraint.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15</th>
<th>Ngëfü</th>
<th>Gevuina avellana</th>
<th>Andean foothills in varied soil and light conditions. Commonly found in stony soils near watercourses</th>
<th>Other uses</th>
<th>Preparations or ways of consumption</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>→ <strong>Fodder:</strong> fruits were collected for feeding pigs</td>
<td></td>
<td>→ Toasted flour</td>
<td>It is not necessary to beat the tree or shake the branches to get avellanas, because they fall by themselves when ripe. When they turn black, they are ripe and will soon fall.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>→ <strong>Handicraft:</strong> the wood has a beautiful grain. It is used for furniture and handicrafts like wooden bowls</td>
<td></td>
<td>→ Roasted or boiled</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>→ <strong>Medicinal</strong></td>
<td></td>
<td>→ Raw</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>→ <strong>Toy:</strong> the fruits are used by children to play marbles, and also thrown as bullets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mapuche name</td>
<td>Scientific name</td>
<td>Habitat</td>
<td>Other uses</td>
<td>Preparations or ways of consumption</td>
<td>Additional information</td>
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</tr>
</tbody>
</table>
| **16** Ngedon | *Brassica rapa* | Open and disturbed areas. It is common in *chacras*, home gardens, and grain plantations like wheat and oats. | → **Medicinal**: drinking the water remaining after boiling the *yuyo* is good for improving one’s eyesight | → Parboiled or fried together with wheat (*trigo mote*) and boiled potatoes  
  → Added to soups  
  → Raw in salad  
  → Omelet | The leaves must be harvested before the plant blooms because then they become bitter. When the leaves are a bit old, but the plant has not flourished yet, you can still eat them, but you need to throw away the water of the first boil to eliminate the bitterness. |
| **17** Mulul | *Ribes valdavianum*** | Native forests | → **Medicinal**  
  → **Veterinary medicine**: together with wild strawberries are used for helping the cows to discharge the placenta | → Eaten raw  
  → Jam  
  → Liquor | |
<p>| <strong>18</strong> Kallampa | <em>Agaricus sp.</em> | Soils under forests exposed to lots of sunlight and also in open pastures | Not reported | → Roasted to the embers with salt | There are species of similar appearance that are poisonous, therefore, one needs to be very careful in collecting them for consumption |</p>
<table>
<thead>
<tr>
<th>Mapuche name</th>
<th>Scientific name</th>
<th>Habitat</th>
<th>Other uses</th>
<th>Preparations or ways of consumption</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 Pinatra</td>
<td><em>Cyttaria</em> berteroi</td>
<td>Branches of <em>hualle</em> (<em>Nothofagus obliqua</em>) trees called ‘<em>pinatreros</em>’ as they only have <em>pinatras</em> as parasitic fungi (not <em>digüeñas</em>).</td>
<td>→ <strong>Toy</strong>: once old, children used to play by blowing air through the <em>pinatra</em> to see ‘smoke’ coming out from the other side. They were called <em>chicharras</em> when old.</td>
<td>→ Eaten Raw</td>
<td>Even though <em>pinatras</em> can look very similar to <em>digüeñas</em>, the <em>pinatras</em> can be differentiated because of the orange colour, the bigger size, the shape of the holes in the fruiting body and because they usually ‘spring’ in older <em>hualle</em> trees</td>
</tr>
<tr>
<td>20 Kelleñ</td>
<td><em>Fragaria chiloensis</em></td>
<td>Cosmopolitan. Common in natural clearings in forests and prairies</td>
<td>→ <strong>Veterinary medicine</strong>: together with <em>parrilla</em> (<em>Ribes sp.</em>), the plant and roots of the strawberries are used for helping the cows to discharge the placenta. Cows are given to drink.</td>
<td>→ Eaten raw → Jam</td>
<td></td>
</tr>
<tr>
<td>21 Chillko</td>
<td><em>Fuchsia magellanica</em></td>
<td>Near water sources</td>
<td>→ <strong>Medicinal</strong> → <strong>Natural dye</strong>: the flowers are used for dyeing wool in violet and pink hues. The twigs and leaves give a blue-grayish hue. → <strong>Toy</strong>: girls hanged <em>chilco</em> flowers in their ears pretending to have earrings</td>
<td>→ Eaten raw</td>
<td>It is said that where there is <em>chilco</em>, there is water.</td>
</tr>
</tbody>
</table>
Appendix 9. Gathering calendar of wild edible used in photo-elicitation interview.

Information provided here represents the local calendar, which may not be representative for other eco-regions where these species are also present. Light colour cells indicate the beginning or ending of a gathering time for a species, which vary depending on yearly climate. Note that for piñones (*Araucaria araucana*), November was also marked as part of the gathering season because, as reported, seeds un-gathered in early fall (time of seed shed between April and May) that are covered in snow during the winter, can be gathered in spring once the snow has melted. For reference fieldwork was conducted between November 2012 and April 2013).  

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Fragaria chiloensis</em></td>
<td></td>
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<tr>
<td><em>Fuchsia magellanica</em></td>
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<tr>
<td><em>Aristotelia chilensis</em></td>
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