



TESE DE DOUTORAMENTO

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**Analysis of the social perception  
of ecosystem services  
on a peri-urban communal forest  
from northwestern Spain:  
a social-ecological approach**

Beatriz Rodríguez-Morales López

ESCOLA DE DOUTORAMENTO INTERNACIONAL

PROGRAMA DE DOUTORAMENTO EN ENXEÑARÍA PARA O DESENVOLVEMENTO RURAL E CIVIL

LUGO

2020





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**Analysis of the social perception of ecosystem services  
on a peri-urban communal forest from northwestern Spain:  
a social-ecological approach**

Dna. Beatriz Rodríguez-Morales López

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**Analysis of the social perception of ecosystem services  
on a peri-urban communal forest from northwestern Spain:  
a social-ecological approach**

D. Emilio Rafael Díaz Varela  
D. José Valentín Rocés Díaz

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*Maquetaxe e ilustracións: Marcos Figueroa*



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*Esta tese está dedicada*

*a Rafa*



*Cando o meu irmán fixo a Primeira Comunión, meu pai díxolle “neste día podemos ir onde queiras” e meu irmán dixo “pois a Santiago”. Entón quedou esa tradición de que cando se fai a Comunión vaise de viaxe a algures. E cando me tocou a min, un par de anos despois, déronme a elixir. E eu toda a vida cando ía á miña aldea vía o Xalo e escoitaba dicir “ai, vén mal tempo, mira como está o Xalo, hai nubes por aí”. E tamén se falaba de que había lobos no Xalo, de que era «O Monte». Era unha cousa que sempre se falaba dela e un sitio misterioso. E eu nunca fora. Entón díxenlle ao meu pai “pois eu na Comunión quero ir ao Xalo!”*



# Table of contents

---

Abstract · 1

Chapter 1. Introduction · 3

1. Ecosystem Services and Social-Ecological Systems
2. Communal Forests as Social-Ecological Units
3. Case study: The Mount Xalo communal forests

Chapter 2. Objectives, Methodological Approach & Thesis Outline · 51

1. Objectives of the PhD Thesis
2. Methodological approaches
3. Thesis outline

Chapter 3. (Dis)similarities among landowners' and visitors' perspectives. Perceptions of ecosystem services and disservices through public questionnaires · 69

Chapter 4. Disentangling common visions. Interviews with representative stakeholders from the social-ecological system · 123

Chapter 5. Looking at the margins. A gender approach to the perception of ecosystem services through geotagged photovoice · 187

Chapter 6. Conclusions · 303

Resumo · 309

List of Publications · 323

PhD Thesis Assessment by International Experts · 325

# Table of contents by chapters

---

Abstract .....	1
Chapter 1. Introduction .....	3
1. Ecosystem Services and Social-Ecological Systems	5
1.1. Ecosystem services: the benefits that people derive from nature .....	5
1.2. The interdependence of nature and humans: social-ecological systems .....	7
1.3. Valuation of ecosystem services. The socio-cultural approach .....	8
2. Communal Forests as Social-Ecological Units	11
3. Case study: The Mount Xalo communal forests	17
3.1. Biophysical characteristics of the social-ecological unit .....	17
3.2. Socio-economic characteristics of the social-ecological unit.....	21
4. References	27
Appendices	40
Chapter 2. Objectives, Methodological Approaches and Thesis Outline .....	51
1. Objectives of the PhD Thesis	53
1.1. General background .....	53
1.2. Research objectives .....	54
2. Methodological approaches	55
2.1. Multidisciplinary socio-cultural valuation of ecosystem services .....	55
3. Thesis outline	58
4. References	64



Chapter 3. (Dis)similarities among landowners' and visitors' perspectives. Perceptions of ecosystem services and disservices through public questionnaires .....	69
1. Introduction	71
2. Methods	73
2.1. Classification of ecosystem services and indicators selection .....	73
2.2. Categorization of survey participants: Geo-profiles .....	74
2.3. Data collection.....	74
2.4. Data analyses .....	78
3. Results	79
3.1. Who is related to the social-ecological unit?.....	79
3.2. Which ES were perceived? .....	80
3.3. Which ES were the most valued? .....	81
3.4. What kind of disservices were perceived? .....	82
3.5. Where were ecosystem services and disservices identified? .....	87
4. Discussion	91
4.1. Ecosystem services and disservices and stakeholder profiles .....	91
4.2. Methodological considerations .....	93
4.3. The recognition of communal forests and policy implications .....	95
5. Conclusions	97
6. References	99
Appendix A	107
Appendix B	116
Appendix C	120

Chapter 4. Disentangling common visions. Interviews with representative stakeholders from the social-ecological system .....	123
1. Introduction	125
2. Methods	130
2.1. Interview design and data gathering .....	130
2.2. Stakeholder analysis .....	132
2.3. Analysis of interviews: transcription, coding and comparison .....	134
3. Results and Discussion	135
3.1. Strategic analysis of visions for the success of communal forest management .....	135
3.2. Social recognition of the communal property .....	136
3.3. Conflicts derived from the process of classifying communal forests	147
3.4. Age as a key factor for involvement in communal management .....	149
3.5. The social capital of the communal forest: young people and the associative fabric. Reassignment of the meaning of the CF .....	153
3.6. The diversity of roles involving governance of communal forests ...	155
3.7. The wildfire threat and the silvopasture alternative .....	159
3.8. The vision of multifunctional forest management and land use planning .....	162
3.9. Implications for ecosystem services and policy directions for the success of communal forests .....	166
4. Conclusions	171
5. References	173
Appendix	183

Chapter 5. Looking at the margins. A gender approach to the perception of ecosystem services through geotagged photovoice.....	187
1. Introduction	193
2. Methods	201
2.1. Background: photovoice, visitor-employed photography and photo-series analysis .....	201
2.2. Process design and data gathering .....	203
2.3. Data analyses .....	209
3. Results	219
3.1. Characterization of participants, teams and transect walks .....	219
3.2. What was photographed? .....	221
3.3. Spatial analysis .....	226
3.4. The role of women in the governance of the communal forests....	234
4. Discussion	237
4.1. How many meanings can a photo reveal? .....	237
4.2. Methodological considerations on the photovoice process .....	248
4.3. The role of women in the governance of the communal forests....	256
5. Conclusions	270
6. References	274
Appendix A	291
Appendix B	295
Appendix C	298
Chapter 6. Conclusions .....	303
Resumo .....	309
List of Publications.....	323



This PhD Thesis analyses the social perception of the ecosystem services (ES) provided by the peri-urban Xalo communal forests (CF) (Culleredo, NW Spain) by using a multidisciplinary socio-cultural approach and implementing a gender perspective. It contains three original research works (Chapters 3, 4 and 5) that develop an increasing gradient of stakeholder participation—from observation, through consultation to engagement. The first work (Chapter 3) aimed to identify the ES and disservices perceived and most valued by the local communities and various types of visitors, according to their geographic profiles. This first approach to the social-ecological unit formed by the two Xalo CF (444 ha) consisted in a public online questionnaire (175 respondents) including a basic participatory geographic information system. The next step (Chapter 4) delved deeper in the plurality of values, perceptions and visions of the representative stakeholders from the social-ecological unit through semis-structured interviews. These were subsequently transcribed, coded and interpreted inductively to detect common ground on future visions and to build a SWOT analysis on the sustainable management of the communal forests. The last stage of the research (Chapter 5) consisted in paying attention to the missing stakeholders in the assessment, i.e. the women, who further constitute an

underrepresented collective in the governance of the communal forests. The deliberative technique of the photovoice was combined with geotagged transect walks and a world café in order to identify the ecosystem services and disservices perceived by an intergenerational group of women, who also explored the reasons for lower involvement in communal land issues. The results obtained from the different chapters point to the Xalo CF as a local-scale hotspot of ecosystem services provision at the regional scale, where the cultural and the regulating ES were the most frequently recognised, being the cultural the richest section with an overwhelming number of 21 different classes of ES identified. This finding underlines the critical importance of taking into account the non-material benefits that communal forests provide to society in the design of rural development policies. Such policies must further promote the social recognition of CF and develop compensation mechanisms for forestry communities that can assist them in the sustainable management of their lands. The PhD Thesis demonstrated that the multidisciplinary intersectional socio-cultural assessment of the actual demand for ES is an effective tool that provides key information for local communities and political actors to promote rural development in the current context of reinvention towards multifunctionality that many forestry communities are heading.

**Keywords:** Ecosystem services; social-ecological systems; communal forests; socio-cultural approach; gender research.

# Chapter 1

---

Introduction:

1. Ecosystem Services and Social-Ecological Systems
2. Communal Forests as Social-Ecological Units
3. Case study: The Mount Xalo communal forests

*Ninguém. Só as plantas estão na casa, que eu vejo completamente branca, com as árvores primitivas da floresta — uma árvore para mesa de trabalho, uma árvore para pôr os pés, uma árvore para fazer a comida, uma árvore para acender, uma árvore para deitar-me, uma árvore para estender a roupa, um eucalipto para sentar-me enquanto entro no seu odor...*

*No meio desta casa recolhida, onde as árvores me esperam con ânimo firme desce-se sem fim para um grande vale...*

**María Gabriela Llansol**

*Toki Alai, 21 de abril de 1986*

*Dossier dactiloscrito DOA05, p. 76*



# 1. Ecosystem Services and Social-Ecological Systems

## 1.1. Ecosystem services: the benefits that people derive from nature

The concept of Ecosystem Services (ES) refers to the direct and indirect contributions of ecosystems to human wellbeing, i.e. the benefits that people derive from nature (Costanza, 2017; MEA, 2005). The term 'ecosystem services' appeared in the scientific literature 40 years ago (Ehrlich and Ehrlich, 1981), but it reached its main landmark around 20 years ago with the publication of two reference works: the book *Nature's Services*, by Daily (1997) and the article *The value of the world's ecosystem services and natural capital*, by Costanza et al. (1997). In these early days, the ES concept was linked to the realm of economics. However, the authors' aim was to show that the contributions of nature to human wellbeing were far more important than traditional economic thinking had previously recognized (Costanza et al., 2017).

At the beginning of the 21<sup>st</sup> century, the ES conceptual framework was definitively consolidated, moving forward from the mainly economic approach to acquire a progressively more open and multidisciplinary character. The scientific program Millennium Ecosystem Assessment promoted by the United Nations (MEA, 2005) was a milestone in the mainstreaming of the ES concept and framework. It brought together 1,360 researchers from the natural and social sciences for four years (2001-2005) to evaluate the conservation conditions and trends of the ecosystems of the planet and the links with human wellbeing. The key message from the MEA report was the interdependence between ecosystem health and human wellbeing, while warning that 60% of the ecosystem services analysed were being exploited in an unsustainable way. The ultimate intention of this project was to impact on the political agenda while establishing direct channels of communication between the scientific, political and social spheres (EME, 2016).

One of the most important contributions of the early studies concerning ES was the development of an ES classification, as classification systems are needed to enable discussions, assessments, modelling and the valuation of ecosystem services (Costanza et al., 2017). Several classification systems have been developed since then, e.g. MEA (2005), The Economics of Ecosystems and Biodiversity project (TEEB, 2010) or the Common International Classification of Ecosystem Services (CICES) (Haines-Young and Potschin, 2018). The three systems are broadly very similar, although CICES is currently the most updated and complete. It followed the approach of MEA (2005) while creating a more rigorous hierarchical structure to the ES classification aimed to improve practical use (Czucz et al., 2018). Besides, CICES was designed as a reference classification that would allow translation between the MEA (2005) and TEEB (2010) standards (Haines-Young and Potschin, 2018) (these equivalences can be found in Haines-Young, R. and M. Potschin, 2014). According to CICES, ES are divided into three main categories or sections:

1. Provisioning services: the material and energetic outputs from ecosystems that derive in goods and products, e.g. food, water, raw materials, medicinal or genetic resources.
2. Regulation services: all the ways in which living organisms can mediate or moderate the environment that affects human health, safety or comfort, together with abiotic equivalents, like climate regulation, air quality maintenance, erosion control, water purification or pollination.
3. Cultural services: all the non-material outputs of ecosystems that affect physical and mental states of people, e.g. aesthetic enjoyment, spiritual feelings, inspiration, environmental education or outdoor recreation.

A parallel notion developed in the last few years after the ES concept are the negative impacts of ecosystems on people, i.e. the Ecosystem Disservices, defined by Shackleton et al. (2016) as ‘the ecosystem-generated functions, processes and attributes that result in perceived or actual negative impacts on human well-being’. Disservices have been claimed a necessary

component to include in ES assessments (Sandbrook and Burgess, 2015), although there is no widely accepted typology for them yet (Shackleton et al., 2016), but a few proposals (e.g. Campagne et al., 2018; Lyytimäki, 2017; Shackleton et al., 2016). These generally include negative impacts that affect health, economical, ecological or cultural dimensions. A few examples of disservices are crop damage from wild animals, floods, poisonous plants, pollen allergies, insect bites or forest fires.

Both ecosystem services and disservices concepts are inherently anthropocentric, as they focus on the valuation by humans of ecosystem properties and functions for their wellbeing (Lyytimäki, 2017), i.e. the relation follows a unidirectional flow. This instrumental view of nature has been a popular criticism for the ES framework since its early days (McCauley, 2006) and it still constitutes an object of impassionate debate in recent years (Barnaud and Antona, 2014; Costanza et al., 2017; Danley and Widmark, 2016; Díaz et al., 2015; Schröter et al., 2014) (see Appendix A1 to find out more information on the terminological controversy about the ES).

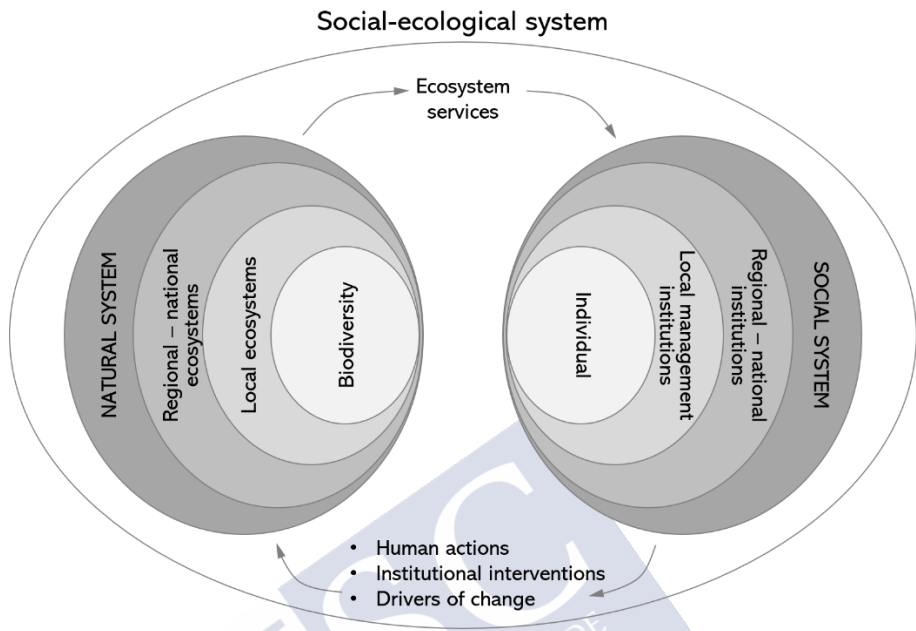
## 1.2. The interdependence of nature and humans: social-ecological systems

Despite the existing debates on the anthropocentric nature of ecosystem services, the reciprocal and interdependent relationship between nature and people is widely recognised by concept theorists (Costanza et al., 2017). It is currently well accepted that nature and societies are the result of a process of co-evolution in which social systems and ecosystems have been moulding and adapting together, becoming parts of a single inextricable system: the 'Social-Ecological System' (SES) or socio-ecosystem (Anderies et al., 2004; Colding and Barthel, 2019; Reyers et al., 2013). Social systems and ecosystems are so closely linked that the exclusive delimitation of any of them is arbitrary and artificial, configuring social-ecological systems as complex, hierarchically structured and self-organized systems with artificial adaptive capacity (Berkes and Folke, 1998) and complex feedback loops (Liu et al., 2007). Accordingly, any decision regarding the management of

ecosystem services affects the structure and functioning of both ecosystems and societies (Mace, 2014) (figure 1.1). Indeed, the major environmental problems of the 21<sup>st</sup> century (e.g. global climate change) are profoundly social-ecological, as they are inextricably intertwined with social dynamics, justice, and political and cultural issues (Waring and Richerson, 2011). Therefore, the study of the relationships between nature and society implies analysing this double path on how humans affect the integrity of ecosystems and how ecosystems affect, in turn, human wellbeing (Álvarez-Uría et al, 2011). To develop such an interdisciplinary approach, the integration of the social sciences with the natural sciences is claimed as a must (Bennett et al., 2017; Mascia, 2003; Redman et al., 2004; Waring and Richerson, 2011). This implies combining multiple disciplines (from both the social and the natural sciences) and methods (qualitative, quantitative, deliberative and spatial) to represent the diverse set of human values towards nature and to integrate nature's diverse values in land management decisions and actions (IPBES, 2016; Jacobs et al., 2016; Martín-López et al., 2014; Scholte et al., 2015).

### 1.3. Valuation of ecosystem services. The socio-cultural approach

The valuation of ecosystem services refers broadly to the assignment of importance, which is an intrinsic part—whether explicitly or implicitly—of any decision-making on natural resources and land use (Jacobs et al., 2016). Within the classic discourse on ecosystem services, ‘value’ was often understood as merely denoting monetary value and, certainly, much of the ES research put the focus on the monetary value dimension since the early days of the ES concept (Gómez-Baggethun et al., 2014). However, multiple value dimensions exist towards nature (Chan et al., 2018; IPBES, 2016; Kenter et al., 2015; Raymond and Kenter, 2016; Schwartz, 2012; Stephenson, 2008) and there is a wide range of methods available for the assessment of ecosystem services nowadays (at least up to 43, according to Harrison et al., 2018) which differ in their aims and the type of information provided. These methods are grouped into three main broad categories: biophysical, monetary and socio-cultural. Biophysical methodologies evaluate the ability



**Figure 1.1.** Conceptual diagram showing the main components of social-ecological systems. The natural system provides ecosystem services to the social system, which, in turn, impacts ecosystems through human activities, influenced by institutional configurations and drivers of change. Source: adapted from [Quintas-Soriano \(2016\)](#).

of ecosystems to provide services based on their structure and functioning, which is mainly done by cartographic methods, indicators or models ([Harrison and Dunford, 2015](#)). On the other hand, economic and socio-cultural assessments reflect the relative importance given to ecosystem services by people, revealing the demand-side of the ES ([Santos-Martín et al., 2018](#)). Socio-cultural methods diverge from monetary, beyond not being expressed in monetary terms, by the fact that they can demonstrate the multi-dimensional nature of human wellbeing through the description of the importance, preferences, needs or demands expressed by people towards nature ([Santos-Martín et al., 2018](#)). The umbrella of socio-cultural

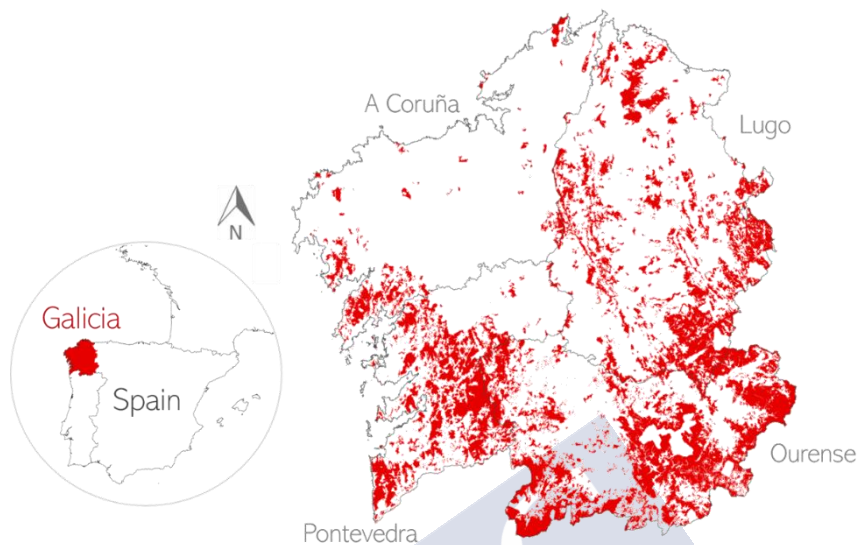
assessment includes various approaches: quantitative techniques (e.g. preference surveys, official statistics), qualitative research (e.g. interviews, participant observation) and deliberative methods (e.g. focus groups, citizen science) (Kelemen et al., 2014).

Because the choice of the valuation method can strongly determine the value dimension elicited (i.e. biophysical, socio-cultural, economic), the assessment of ES should consider diverse and complementary methods that adequately gather people's multiple values and diverse value domains (e.g. non-anthropocentric, relational, instrumental) (Jacobs et al., 2016; Quintas-Soriano et al., 2016b). The socio-cultural methods are more limited in the acknowledgement of the instrumental dimension of values, while monetary and biophysical methods are poorly suitable for non-anthropogenic and relational dimensions (Jacobs et al., 2016). Hence, any ES assessment should include an integrated analysis or, at least, the use of mixed methods (Jacobs et al., 2018). In this context, the socio-cultural dimension of ES was acknowledged to be often missing in ecosystem services assessments and policy making, thus claimed as a research priority (Martín-López et al., 2012). After a large call of attention on the need to use these techniques (Kelemen, 2014; Santos-Martín et al., 2018, 2016) and the elicitation of such values (Chan et al., 2016; Infield et al., 2018; IPBES, 2016; Stålhammar and Pedersen, 2017), socio-cultural approaches are currently gaining more attention in the ES research agenda (Scholte et al., 2015). Specifically, in the Spanish context, a large number of such studies have been carried out in the last few years, e.g. García-Llorente et al. (2016); Garcia-Martin et al. (2017); García-Nieto et al. (2015); Garrido et al. (2017); Iniesta-Arandia et al. (2014); Maestre-Andrés et al. (2016); Martín-López et al. (2012); Oteros-Rozas et al. (2017), (2014); Palacios-Agundez et al. (2014); Palomo et al. (2013); Pérez-Ramírez et al. (2019); Quintas-Soriano et al. (2016a); Torralba et al. (2018).

## 2. Communal Forests as Social-Ecological Units

Communal forests (CF) constitute a singular type of collective land tenure existing in Galicia (northwestern Spain) for centuries which occupies nowadays 22.5% of the total Galician area (Xunta de Galicia, 2019). Their vernacular name is 'Montes Veciñais en Man Común' (MVMC), being the English translation partly misleading as their land cover and land use are not necessarily forest. Nevertheless, forestry is certainly the main use today of these common lands, but it does not correspond in parallel with a high percentage of wooded area (Balboa López et al., 2013). We adopted the English denomination 'communal forests' because it is the most widespread in the scientific literature (e.g. Alló and Loureiro, 2018; Caballero, 2015; Gómez-Vázquez et al., 2009; Marey-Pérez et al., 2014; Meijer et al., 2015; Touza et al., 2010). Other equivalent names that can be found for the Galician CF are 'collective woodlands' (Balsa-Barreiro and Hermosilla, 2013), 'common woodlands'/'communal woodlands' (Cidrás et al., 2018), 'communal monte'/'monte' (Domínguez García et al., 2014; Swagemakers et al., 2014) or just 'common lands' (Copena and Simón, 2018).

Galicia is a region of Spain located in the northwest of the Iberian Peninsula, where woodlands cover 61% of the territory (IGE, 2018). Only 3% of this forest area is public, being the remaining 97% privately owned, both individually (two thirds) or collectively, i.e. communal forests (one third). In the year 2018, there were 3,312 CF registered occupying a total area of 664,229.89 ha, with an average of 200.55 ha per CF (Xunta de Galicia, 2019). In contrast, the average area of the individual private landholdings is around 1.5-2 ha distributed in numerous plots (Balboa López et al., 2013), which confers communal forests on a noticeable comparative size advantage. Within the Galician territory, CF are located mainly in the eastern and southeastern areas of the provinces of Lugo and Ourense and in the Atlantic area of the province of Pontevedra, being the province of A Coruña the one with the least number of CF (Balboa et al., 2013) (figure 1.2).



**Figure 1.2.** On the left circle, the autonomous community of Galicia (NW Spain) is represented in red colour within the geographical context. On the right side, the spatial distribution of the Galician communal forests registered in the year 2018 is depicted in red. (Source: own elaboration with data from [Xunta de Galicia, 2009](#)).

Nonetheless, it is essential to acknowledge that communal forests are the sum of two intertwined elements: the land and the community ([Fernández-Leiceaga et al., 2006](#)), which interact reciprocally through complex adaptive dynamics, hence constituting local-scale social-ecological systems or, more precisely, ‘social-ecological units’ (SEU) (according to the definition provided by [Martín-López et al., 2017](#))<sup>1</sup>. CF Communities, or Neighbour Communities, are social groups of people who live in the geographic area associated to the common land (usually the parish) at a specific moment. The legislation in force that regulates CF ([DOG, 1989](#)) establishes that the neighbours with

<sup>1</sup> [Martín-López et al. \(2017\)](#) distinguish between ‘social-ecological systems’ and ‘social-ecological units’ according to the scale: regional or local, respectively. The authors define social-ecological units as the particular configurations of the biophysical and socio-economic sub-systems and their interactions at the local scale.



habitual residence in the parish collectively own the rights of use and management of the communal forest according to a democratic governance system organized in a General Assembly of Neighbours. Each inhabited household of the community is represented by one member at the assembly, which gathers at least once a year and has the power to approve the Statutes and to elect the Management Board every four years. The social importance of communal forests in Galicia nowadays is noticeable, since approximately 20% of the population is involved with them (including the whole family of the representative member of each household) (Caballero, 2015).

CF are established by law (DOG, 1989) as (i) indivisible (they cannot be divided and there are no quotas, each neighbour owns a non-identified part of the land which access is egalitarian and free for them); (ii) inalienable (land rights cannot be inherited or sold, neither a government or any other authority can neglect this ownership); (iii) imprescriptible (CF neighbours never lose their right on the land, only expropriation for public needs can take ownership rights); and (iv) non-seizable (in case of debt, no judge or other competent authority can prevent the free disposal of these lands to their legitimate owners). These characteristics together with the extensive regional area they occupy in the Galician territory, the large average size of CF in comparison with individual private lands, and their governance system: local and democratic, make them an alternative way of social-ecological relationships beyond the dominant logic of capitalism (García-Quiroga, 2015) and an outstanding opportunity for rural development in Galicia (Cabana-Iglesia et al., 2012; Fernández-Leiceaga et al., 2006).

The current land use of communal forests is diverse, depending on the type of land cover, the socioeconomic characteristics of the area where the CF is located and the importance the community attributes to the CF (Caballero, 2015). In general, CF communities dedicate these areas primarily to exclusive forest use (95% of the Galician CF area), although there are also different types of exploitation compatible with forestry, such as pastures, agricultural crops, hunting, quarrying, installation of antennas, power lines, wind farms or leases to companies (Fernández-Leiceaga et al., 2006). The forested area

of the Galician CF is covered by pine trees in nearly 60% of the territory (*Pinus pinaster* Ait., mainly, *P. Sylvestris* L. or *P. radiata* D. Don), around 23% is either covered by pure or mixed *Eucalyptus spp.* stands, while less than 20% accounts for native broadleaved species (mainly *Quercus spp.* and mixtures with other tree species) (Fernández-Leiceaga et al., 2006). From the revenue generated through CF exploitation, at least 40% must be reinvested by the community in forestry improvement and protection (DOG, 2016). The surplus can be destined to acquire additional land; to improve the social, patrimonial, cultural and environmental resources of the CF; to community services; or to the equal distribution of earnings among CF members (DOG, 2016). Although CF are owned and governed by CF communities, the management of CF resources can be partly delegated to the public forest Administration after the formalization of ‘forest agreements’ (*convenios* or *consorcios*). This is the situation in 45% of the Galician CF area (Balboa et al., 2013). Forest agreements are majorly applied for tree reforestation purposes, where the sharing of the benefits from timber auction are distributed between the Administration and CF communities according to the percentages specified in the contract. Nevertheless, the current legislation stipulates the cancellation of all forest agreements in the year 2021 (DOG, 2017).

It is necessary to acknowledge the history of the Galician communal forests to understand the current role of governance institutions in the present (Caballero, 2015). CF are one of the few forms of common land ownership that survived the municipal organization of the 19<sup>th</sup> century and the seizure phenomenon in Europe, but on the way ahead they experienced profound changes concerning their institutional arrangement, their land uses and functions, and the identity characteristics of CF communities. This threefold phenomenon has been baptised by Suárez and Soto (2018) as ‘the triple breakdown’. Let’s find out a little bit more about this breakdown, which original and in-depth description can be found in Suárez and Soto (2018):

I. Institutional breakdown: The stolen communal forests were eventually recovered

The Spanish liberal revolution in the early 19<sup>th</sup> century led to the crisis of the Ancient Regime and the emergence of the capitalist economy. As a consequence, the private collective communal property was denied, with the appropriation of the commons, both individually private and publicly via city councils (Caballero, 2015). This affected customary rights of access to resources, weakening or suppressing the provision of ecosystem services to the legitimate owners of CF (Gómez-Baggethun et al., 2013). But it was under Franco's dictatorship (1939-1975), due to the forcibly CF afforestation process, that the expropriation of CF was effective, depriving for three decades CF communities of common resources and their traditional way of life. The first shift of this situation started after the Forestry Act of 1957 (BOE, 1957), which accepted the existence of communal forests, even when certain powers were still kept by city councils. But it was the Communal Forestry Act of 1968 (BOE, 1968) which gave rise to the effective return of the communal forests to the neighbour communities via official CF classification, mainly between the years 1973 and 1983 (Caballero, 2015). Then, in 1989 the first Galician Act of Communal Forests (DOG, 1989) was established. Its framework has not been fundamentally modified since then to the present, thus maintaining an institutional status quo (Caballero, 2015).

II. Functional breakdown: biophysical and socioeconomic changes

The traditional role of communal forests was not the provision of timber, but the support of the agrarian system, mainly through three uses: the cultivation of the 'roza agriculture', the provision of feed supplement for livestock, and the supply of the essential fertilizer (mainly from gorse) to sustain the intensive agriculture practiced in the region (Bouhier, 1979). Communal forests also provided fuelwood, cattle bed and other traditional uses nowadays missing (Caballero, 2015). This manifold past use of communal forests is known as 'agrosilvopastoral', denoting the intricate entity of woodland, crops and livestock as inseparable components of the

agrosystems (Fernández-Leiceaga et al., 2006). But this balance was broken in the decades between 1960 and 1980 with the industrialization of agriculture. This process resulted in two main functional changes for communal forests. On the one hand, the progressive dependence of agriculture from market inputs rather than from communal forests resources and, on the other hand, the spatial availability for afforestation in the common lands, which was implemented by the Spanish State specially during Franco's dictatorship (Suárez and Soto, 2018). The massive afforestation of the communal forests led to a shift from multifunctionality to forest monoculture, incompatible with agricultural and livestock uses (Soto, 2016). Hence, the return of ownership rights to neighbour communities after 1968 took place at a historic moment when communal forests did not play an important role in the Galician agricultural system anymore (Fernández-Leiceaga et al., 2006). Accordingly, rural development actors were no longer necessarily farmers, who had to find new roles for the CF that met social and market demands, such as forestry, mining, energy markets or other environmental services (Caballero, 2015).

### III. Identity breakdown: the reinvention of CF communities

In the present, communal forests are owned and managed collectively, but the traditional CF were run by the domestic units. The former community used and managed the CF collectively but not equally, i.e. the families having more assets used more intensively the land and had a greater decision power. But the current CF communities are characterized by an egalitarian democratic governance system established by law (Soto, 2016). Thus, the so-called identity breakdown arises from both the shifts in the function and uses of the CF along time as well as from the changes in the governance system. In sum, the former community was conceived as part of the local agroecosystem, being essential for its maintenance, while the today's communities are not necessarily linked to the primary sector. They are mostly understood as service providers for society with economic performance (Suárez and Soto, 2018).

Because governance configurations affect the ecosystem services provision (Farhad et al., 2015), it is important to acknowledge the real social demand for goods and services from the Galician CF to facilitate their transition towards diverse governance models (López-Iglesias, 2017). There is a growing number of examples in the Atlantic edge of Galicia where CF communities are developing new models of socioeconomic activities (Domínguez García et al., 2014; Suárez and Soto, 2018). Many of these communities, most of them peri-urban, have begun a self-reinvention process with new functionalities and meanings for the communal forests, breaking both with the past model of organic agriculture and with the purely rentier forest specialization of the last decades (Suárez and Soto, 2018). The opportunities for rural development in Galicia rely greatly in the emergence of new multifunctional models of communal forests.

### 3. Case study: The Mount Xalo communal forests

The study area of the present PhD thesis is constituted by two adjacent communal forests from northwestern Spain known as Mount Xalo ('Monte Xalo' in vernacular). Each communal forest belongs to and is governed by the parishes of Santa María de Celas and Santiago de Castelo, respectively, in the municipality of Culleredo, province of A Coruña (Galicia, Spain). The ensemble of the two communal forests forms a local-scale social-ecological system, i.e. a social-ecological unit (*sensu* Martín-López et al., 2017) (figure 1.3).

#### 3.1. Biophysical characteristics of the social-ecological unit

The area of the social-ecological unit formed by the two communal forests is 444 hectares, approximately<sup>2</sup>. With an altitude between 137 and 518 meters

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<sup>2</sup> The perimeters of the Mt Xalo communal forests are not officially demarcated yet. The maps included in the files of the Forest Administration are just sketches, hence a combination of those perimeters with the information found in the Cadastre served to outline the borders shown in figure 1.3. The files relating to the classification of the communal forests can be consulted at: <https://ovmediorural.xunta.gal/gl/consultas-publicas/montes-vecinais-en-man-comun>

above the sea level, Mt Xalo constitutes one of the most elevated spots in the surrounding area, gathering an extensive viewshed that includes the Atlantic Ocean by the north. Mt Xalo constitutes, in fact, a geodesic vertex (#4534) since 1981 (IGN, 2019), but its importance as a geographic reference spot dates back to 1816, when it served to elaborate the first scientific map of Galicia (the Geometric Map of Galicia, by Domingo Fontán; La Opinión, 2014). The most well-known outcrop within the CF is the scenic vantage point and climbing zone called O Castelo or O Petón, located in the middle part close to the border between both CF.

The mean annual precipitation of the area is 1091 mm and the current dominant land cover is a forest plantation of pines (*P. pinaster*, *P. radiata*) combined with scattered patches of eucalyptus (*Eucalyptus globulus* L.) and a mixture of non-economically exploited native plant species like chestnut (*Castanea sativa* Mill.), birch (*Betula pubescens* Ehrh.), or oak (*Quercus robur* L.). The Xalo communal forests provide marketable products such as timber and pulpwood, while the Santa María de Celas CF supplies water catchment services to the municipality of Culleredo (Gestagua, 2018), as Mt Xalo is the cradle of several natural springs. Archaeological features (Xunta de Galicia, 2018), traces of past use and mythical stories related to the numerous granitic outcrops are also present in the SEU.

Mt Xalo lays within the SW border of the UNESCO Biosphere Reserve ‘Mariñas Coruñasas e Terras do Mandeo’<sup>3</sup> (constituting both a buffer zone and a transition area, managed by the Rural Development Association GDR-23). The SEU was catalogued as a Landscape of Special Interest by the Galician Institute of Landscape Studies (IET, 2016). However, the relevance of Mt Xalo as a landscape of interest and an inspiring scenery was recorded back in 1919 with the oil on canvas ‘Valle de Peiro’ (Appendix C, figure C1) painted by Francisco Llorens, the first Galician landscape artist and a disciple of Joaquín Sorolla (Fundación Barrié, 2020). Furthermore, the SEU gathers

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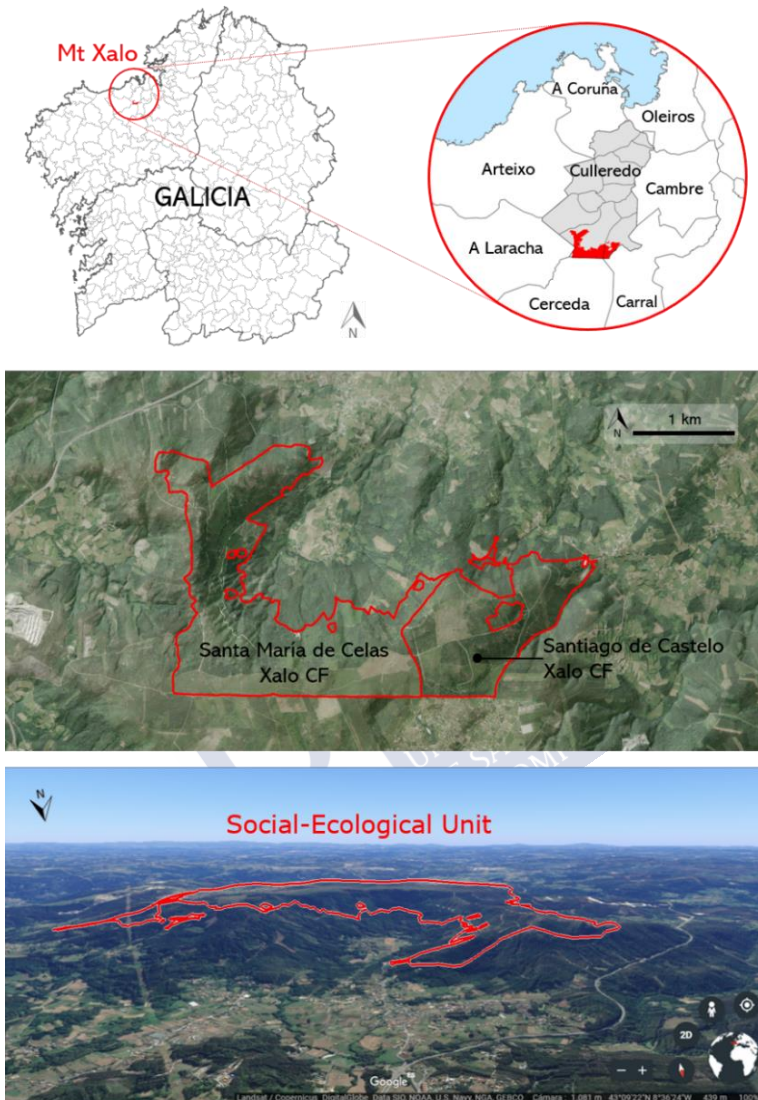
<sup>3</sup> URL of the Biosphere Reserve Mariñas Coruñasas e Terras do Mandeo: <http://marinasbetanzos.gal/es/descricion/>

five Sites of Community Importance from the European Habitats Directive 92/43/EEC, one them being a priority habitat (\*) (MITECO, 2018): European dry heaths (4030), Endemic oro-Mediterranean heaths with gorse (4090), Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix* (4020\*), Siliceous rock with pioneer vegetation of the *Sedo-Scleranthion* or of the *Sedo albi-Veronicion dillenii* (8230) and Galicio-Portuguese oak woods with *Quercus robur* and *Quercus pyrenaica* (9230). The Xalo communal forests are included in the potential distribution area of the endangered bird *Emberiza schoeniclus L. subsp. lusitanica Steinbacher* (DOG, 2013), as well as in zone 3 of the Galician management plan for the wolf (*Canis lupus signatus*), which aim is to guarantee the species viability (DOG, 2009). The SEU counts with three protected endemic species from the Iberian Peninsula<sup>4</sup>: the Iberian triton (*Lissotriton boscai*; CNEA), the Iberian frog (*Rana iberica*; CNEA, CGEA) and the dark-green lizard (*Lacerta schreiberi*; DH, CNEA), as well as with other ten protected amphibian, reptilian and bird species (GNH, 2016): *Lissotriton helveticus* (CNEA), *Triturus marmoratus* (CNEA), *Alytes obstetricans* (CNEA), *Rana temporaria* (CNEA, CGEA), *Hyla molleri* (CNEA, CGEA), *Anguis Fragilis* (CNEA), *Chalcides striatus* (CNEA), *Lacerta schreiberi* (DH, CGEA), *Coronella austriaca* (DH, CNEA), *Circus pygargus* (CGEA) and *Streptopelia turtur* (IUCN).

Mt Xalo accomplishes the requirements stated in the Galician Forest Law to constitute a 'peri-urban forest' (DOG, 2012, art. 8). These conditions are three: (i) Proximity to urban areas. Mt Xalo is 6 km away (Euclidean distance) from the densely populated urban municipality of A Coruña (6495 inhabitants/km<sup>2</sup>) (IGE, 2019). (ii) Accessibility. Access to Mt Xalo is free. The main entrance by car is by the east, through the parish of Santiago de Castelo, which leads to a small public parking lot. (iii) Infrastructures for the use by non-local population. A network of dirt roads for either transit and/or sports connects the whole SEU. The parking lot, two picnic areas and a few information posters complete the public offer. Thus, although private in

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<sup>4</sup>Special protection categories: 'DH' – species listed in Annex IV of the Directive 93/42/EEC; 'CNEA' – species of special interest listed in the Spanish National Catalogue of Threatened Species; 'CGEA' – Vulnerable species listed in the Galician Catalogue of Threatened Species.



**Figure 1.3.** Study area. The Mt Xalo social-ecological unit (SEU) is composed by the two adjacent communal forests (CF) from the parishes of Santa María de Celas and Santiago de Castelo. The upper sketch displays de geographical location of the SEU, with municipalities in white colour and parishes from the Culleredo municipality in grey. Mt Xalo is depicted in red in every box. Source: own elaboration. (Note: the perimeters of the Mt Xalo communal forests are not officially demarcated yet, hence the borders shown in this figure are approximate).



property, the peri-urban condition together with the unique landscape features of Mt Xalo, make this a popular reference spot for public recreation in the region nowadays. The social service of communal lands is actually recorded in the Galician CF law (DOG, 1989), which makes reference to the function of communal forests to meet both the needs of the owner communities as well as for the general interest of society as a whole mainly through environmental and cultural services (Fernández-Leiceaga et al., 2006).

### 3.2. Socio-economic characteristics of the social-ecological unit

The Xalo communal forest belonging to the parish of Santa María de Celas is constituted by one single parcel named Xalo. It was officially classified as a communal forest by the Province Jury of CF of A Coruña in 1985 (Xunta de Galicia, 2020). The Xalo CF that belongs to the parish of Santiago de Castelo is named Castelo and it is formed by a group of three parcels: Monte Xalo, Monte do Vilar and Monte das Cerdeiras. The CF was classified by the Province Jury of CF of A Coruña in the year 2003 (Xunta de Galicia, 2020). Each Xalo CF is managed partially by their respective CF communities and partially by the Regional Forest Administration (Xunta de Galicia) through forest agreements. It is noteworthy the existence of the Xalo communal forests in the region, as the communal proprietorship in the province of Coruña is by far the least relevant in Galicia (7.2% of the total area of Galician CF, Xunta de Galicia, 2019) and attending to the geographical isolation of this CF (see figure 1.2).

In the year 2019, the parish of Santa María de Celas counted with 883 inhabitants (INE, 2020). Since the first available statistics from the year 2000, this population experienced sharp up-and-down shifts, but the general trend is approximately stable (with a light lean towards growth in the future, e.g. in the year 2030 the parish might count with 908 inhabitants, according to the regression model shown in figure 1.4a). The parish of Santiago de Castelo has a smaller population than Celas, with 267 neighbours in the year 2019 (INE, 2020). The population trend of this parish is in clear regression since the first data available—year 2000—when it counted with 339 inhabitants.

According to the regression model shown in figure 1.4b, the forecast for 2030 is a decline in the population down to 256 people.

The population rate by sex and age groups is similar in both parishes (figure 1.5) (IGE, 2020), with constrictive pyramids (i.e. narrowed at the bottom), which indicate that the populations are elderly and shrinking due to a long life expectancy, low death rate and a low birth rate, the typical patterns in developed countries (Korenjak-Černe et al., 2008). In the year 2018, the average age of neighbours from the SEU was 49.6 years, the percentage of population over 64 years old was 29.1%, with 27.6% of the inhabitants being pensioners. The percentage of population younger than 20 years was, in turn, 13.4%. The aging index reaches a conspicuous value of 218<sup>5</sup>. The foreign population represents 2.8%. According to sex, the two parishes are generally balanced, with 50% rates for men and women (IGE, 2020).

The employment activity of the inhabitants from the SEU is mostly concentrated in the services sector (figure 1.6), with no significant differences in the last 20 years (IGE, 2020). This is followed by far by industry and construction, while the agrarian sector is almost non-existent (6%). The latter contrasts with the past subsistence lifestyle practiced in the region until the second half of the 20<sup>th</sup> century (i.e. just a few decades ago), when intensive agriculture was practiced in the region and the Xalo communal forests constituted a basic support through the provision of scrub as agricultural fertilizer and supplementary cattle feeding (Bouhier, 1979). Nowadays, the agricultural activity has completely disappeared in the communal forests area (see land cover shifts by comparing orthophotos from 1956-57 and 2017 in Appendix B, figure B1). There is no livestock grazing within the CF, but for a private horse breeding non-profit initiative in the Castelo CF. It was started by a neighbour of the Castelo parish around 2003, gathering today fifteen feral horses that feed in extensive from the scrub of the CF. The forestry industry and merchant sector are related with the Xalo

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<sup>5</sup> The aging index relates the population aged 65 or over with respect to every 100 persons under the age of 20. While in Spain this indicator stood at around 95 in 2018, in Galicia it increased to 156 (IGE, 2020).

CF, but the awarding of timber to enterprises is generally conducted through public auctions and not as a specific business sector developed around the Xalo CF. The touristic sector is scarce, with just two rural tourism houses in the surroundings of the SEU. There are several easements within the CF for TV, radio and telephone antennas as well as for a gas pipeline, fire watching and an electricity tower. A Ministerial project pending on approval plans the alternative to install a high voltage powerline along the Xalo CF to guarantee the supply of electricity demand in the municipality of A Coruña (MINETUR, 2015). This substation would go through a significant area of the Xalo communal forests, causing landscape changes and environmental impact. In response, the advocacy association 'As Mariñas Sen Alta Tensión' was created.

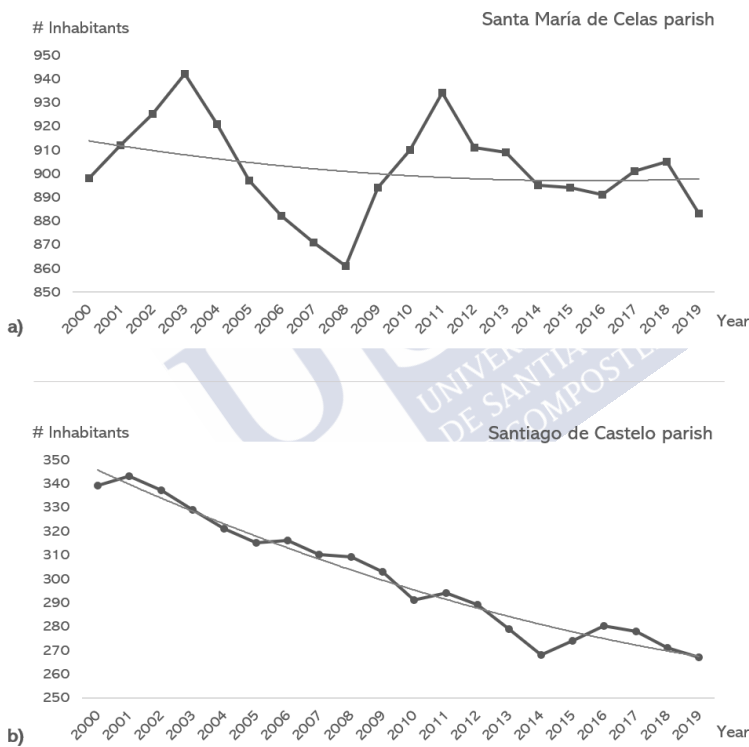
The associative fabric is well developed around the SEU. There are manifold local associations related to sports, environment and culture that conduct their activity within the Xalo CF. There are three main institutions related to the parish of Santa María de Celas: the communal forest community, the festivities committee and the cultural association 'O Cruceiro de Celas'. The latter organizes seasonal family activities and a yearly dog walk the day of the patron saint of Celas. Related to the parish of Santiago de Castelo, there are four institutions: the communal forest community, the festivities committee, the neighbourhood association and the sports and cultural association 'Castelo Deporte'. The latter gathers hundreds of members from Castelo, Celas and abroad and organizes several popular events every year, constituting a relevant ambassador of Mt Xalo which created the brand 'Somos de Monte' ('We belong to the forest'). Some of the events organized by Castelo Deporte are: the 'Travesía do Xalo' march<sup>6</sup>, the 'Marcha BTT Miguel Manteiga' race (a tribute to the well-known local cyclist M. Manteiga) and the recent oral tradition event 'Castelo Conta'<sup>7</sup>, which gathers the local elders and the children from the parish of Castelo to share life lessons. These events are sponsored by the renowned actor, comedian and TV presenter

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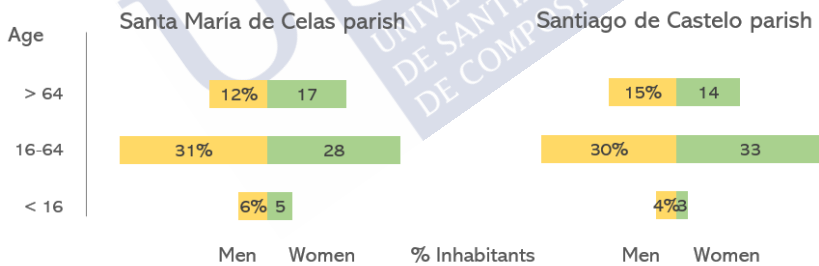
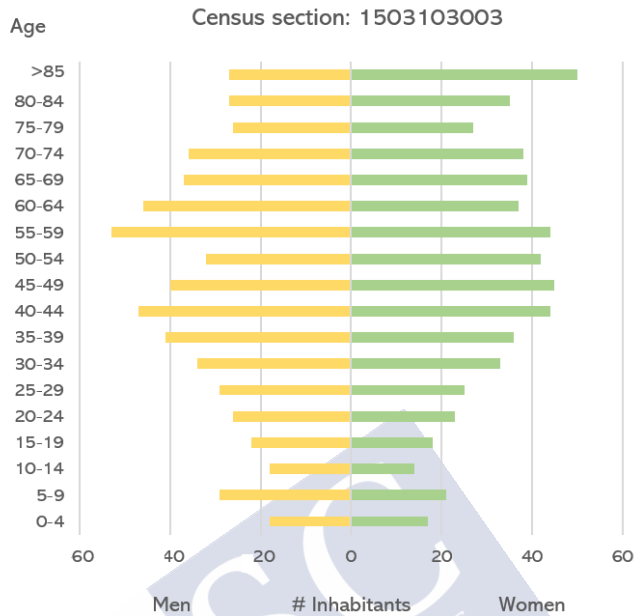
<sup>6</sup> Travesía do Xalo, URL: <https://eventos.emesports.es/inscripcion/xi-travesia-do-xalo/>

<sup>7</sup> Castelo Conta, URL: <http://casteloconta.gal/>

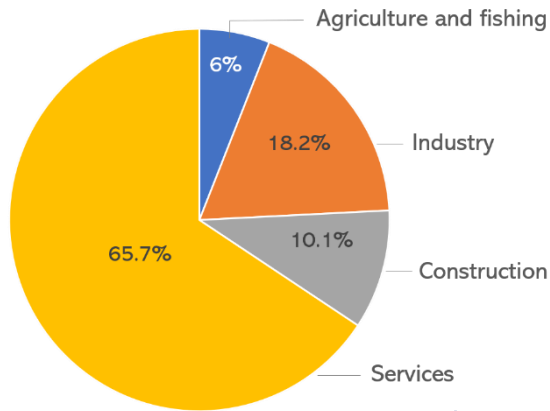
Xosé Antonio Touriñán, a neighbour from the parish of Castelo. There are other sport and cultural events celebrated in the Xalo CF organized by different associations and clubs of the region and abroad, e.g. the cyclist race ‘Descenso do Xalo’, or the cyclist club from a neighbouring municipality called ‘Peña Ciclista Monte Xalo’. Climbing is a popular activity in Mt Xalo, with related clubs such as ‘Sociedad de Montaña Ártabros’ or ‘Agrupación de Montañeros Independientes’.



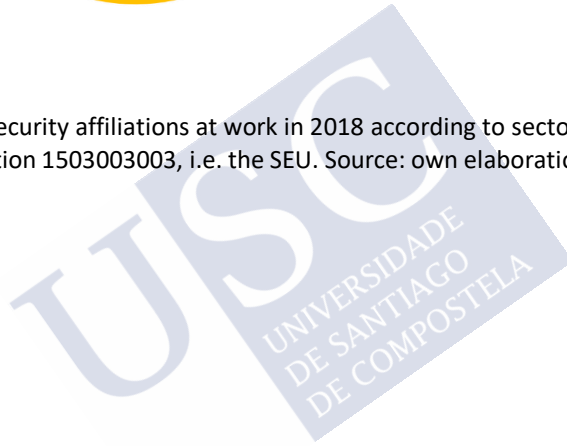
**Figure 1.4.** Evolution of the population in the last 20 years in the parishes of Santa María de Celas (a) and Santiago de Castelo (b). The regression adjustment is polynomial in both graphs. Santa María de Celas:  $y = 0,0702x^2 - 2,3143x + 916,03$  ( $R^2 = 0,0736$ ); Santiago de Castelo:  $y = 0,1018x^2 - 6,2541x + 351,71$  ( $R^2 = 0,9642$ ). Source: own elaboration with data from [INE \(2020\)](#).



**Figure 1.5.** Population by sex and age groups for the year 2018. The upper figure gathers data from the whole SEU (corresponding with the census section 1503003003), while the bottom figure distinguishes between the parishes of Santa M<sup>a</sup> de Celas and Santiago de Castelo, the most detailed level of available data. Source: own elaboration with data from [IGE \(2020\)](#).



**Figure 1.6.** Social Security affiliations at work in 2018 according to sector of activity. Data by census section 1503003003, i.e. the SEU. Source: own elaboration with data from IGE (2020).



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## Terminological controversies on the ES concept

The terminological controversy about the ‘ecosystem services’ concept was mainly focused in the identified necessity of incorporating the social sciences, multidisciplinary approaches, spatial patterns, local stakeholder participation and their multiple values into the ES framework. In this regard, along with the terminological debate, alternative concepts arose, e.g. landscape services (Fagerholm et al., 2012<sup>8</sup>; Termorshuizen and Opdam<sup>9</sup>, 2009; Vallés-Planells et al., 2014<sup>10</sup>), landscape values (Garcia-Martin et al., 2017<sup>11</sup>; Stephenson, 2008<sup>12</sup>), ecosystem values (Brown et al., 2015<sup>13</sup>), or nature’s contributions to people (Pascual et al., 2017), among others (find more terms for value typologies in Brown et al., 2015). Ultimately, these concepts aim to move away from the initial focus of ‘ecosystem services’ on the economic realm, to advance in the integration of multidisciplinary approaches and the recognition of the broad spectrum of human values.

Nevertheless, the main contestation to the ES framework has been driven by the ‘Intergovernmental Science-Policy Platform on Biodiversity and

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<sup>8</sup> Fagerholm et al. (2012) consider that the landscape service concept gives ‘broader room for stakeholder involvement, which must be realised at the local scale, where there is a need to develop spatially explicit assessment methodologies’.

<sup>9</sup> Termorshuizen and Opdam (2009) propose the concept of landscape services as a ‘unifying common ground where scientists from various disciplines are encouraged to cooperate in producing a common knowledge base that can be integrated into multifunctional, actor-led landscape development’. They want to emphasise the connection between physical systems and human values.

<sup>10</sup> Vallés-Planells et al. (2014) state that the concept of landscape services, compared to ecosystem services, ‘involves the social dimension of landscape and the spatial pattern resulting from both natural and human processes in the provision of benefits for human wellbeing’.

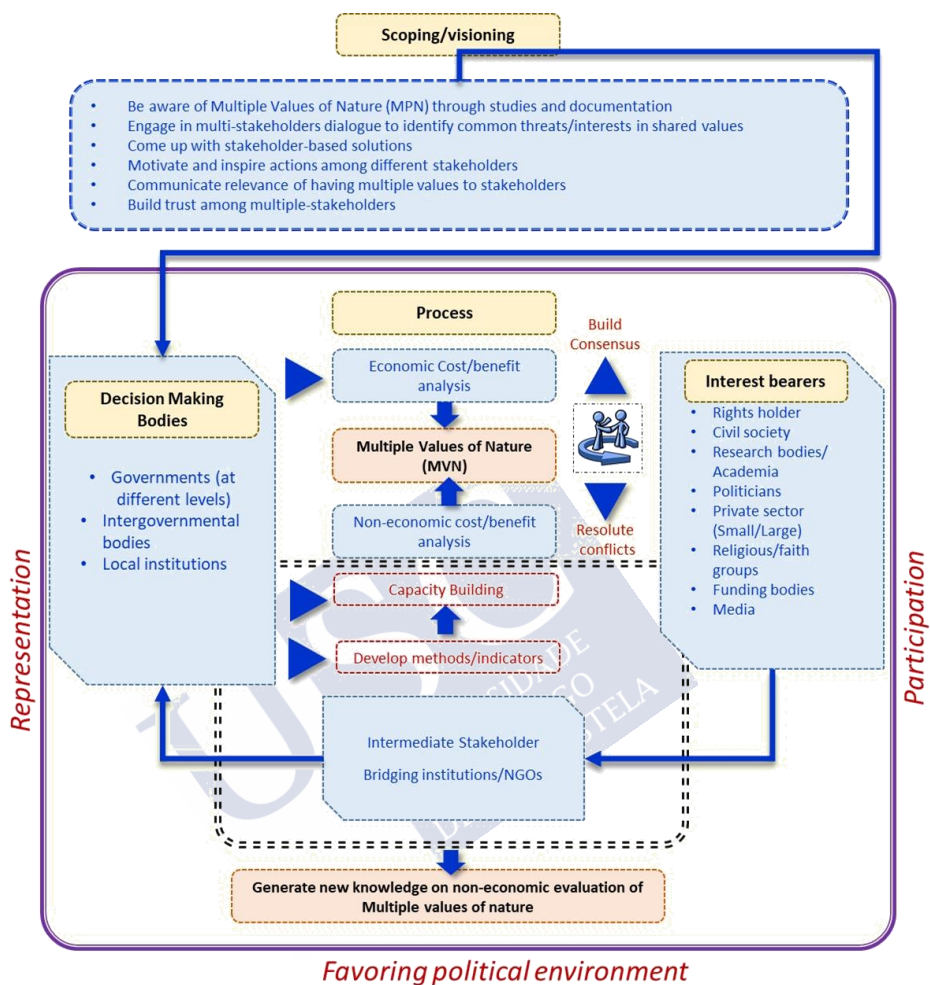
<sup>11</sup> Garcia-Martin et al. (2017) use the term landscape values to describe ‘the socio-cultural perception of landscape functions’.

<sup>12</sup> Stephenson (2008) refers to landscape values through the concept of ‘cultural values’, which are ‘inclusive not only of attributes traditionally considered to be part of culture—such as stories and myths—but also of attributes that might be considered to be part of nature, yet which are valued culturally’.

<sup>13</sup> Brown et al. (2015) define ecosystem values as ‘measures of how important ecosystem services are to people’ and consider they contain both use and non-use values associated with ecosystems.

Ecosystem Services' (IPBES) (Díaz et al., 2015; IPBES, 2016; Pascual et al., 2017), which was adopted by the recent worldwide consortium 'Satoyama Initiative' (UNU-IAS and IGES, 2015), proposed by the United Nations. IPBES presented the alternative term 'Nature Contributions to People' (NCP) and a renewed framework for 'ecosystem services' that better addressed the multiple ways in which people value nature (i.e. putting values in the centre and, specifically, value pluralism) and the recognition of their influence over political and economic decisions (figure A1). After the appearance of the NCP framework, further concerns arose from academics. For instance, Kenter (2018) agreed on acknowledging the importance of values driving decisions, which ultimately affect governance. However, he considers the term NCP did not suppose an advance in the recognition of this value dimension compared to the ES terminology because the new name (Nature Contributions to People) maintained the unidirectional flow (i.e. from nature to people) that was being criticized. Braat (2018) goes further from terminology by arguing that the NCP notion does not provide anything new to the ES conceptual framework or the large body of research that has been generated in the last years. He argues the latter is already founded in the social sciences, that it includes topics such as 'shared values' and 'integrated valuation', as well as the implementation of the outputs into policy and practice.

The debate is still on.



**Figure A1.** Representation of a potential process to integrate multiple values in decision-making related to social-ecological systems, according to the IPBES conceptual framework. Source: Satoyama Initiative (UNU-IAS and IGES, 2019).

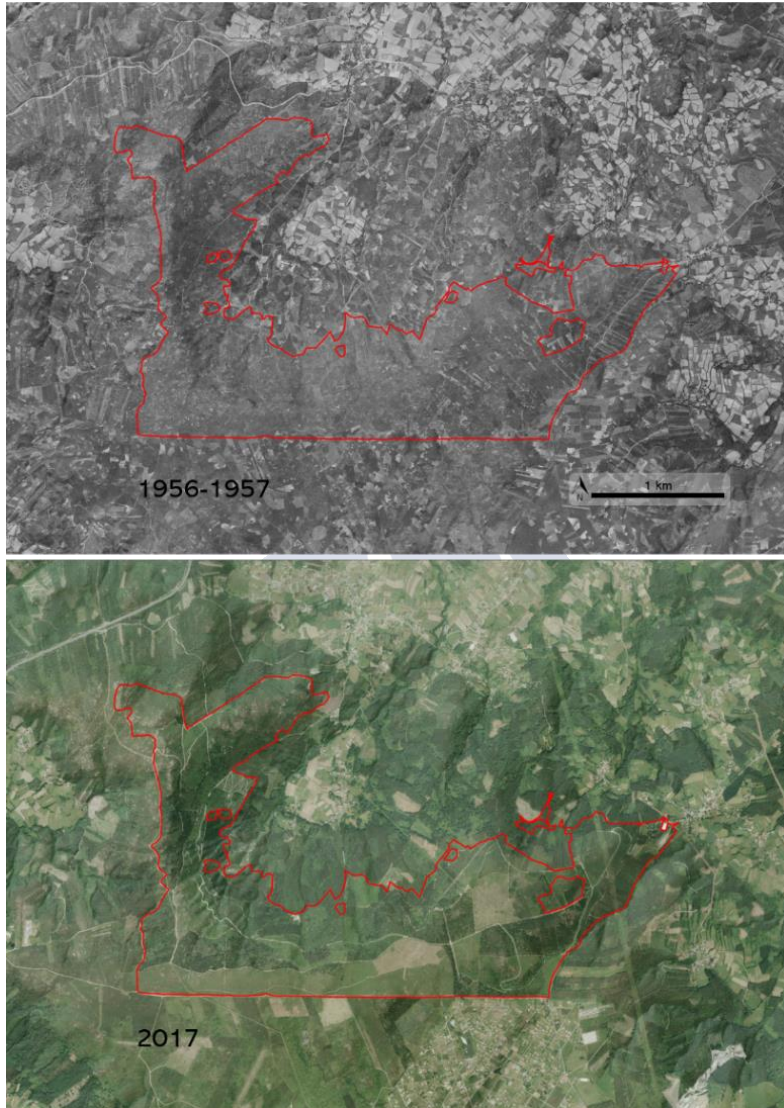
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**Figure B1.** Orthophotos of the social-ecological unit from the 1956-1957 American flight (USA Army Map Service) (upper picture) and the 2017 PNOA (bottom picture). Source: [CNIG \(2020\)](#). The year 1957 corresponds to a period before the structural and productive reforms in agriculture in which traditional agricultural landscapes were dominant ([Calvo-Iglesias et al., 2006](#)). The land use changes operated in the SEU since the second half of the 20<sup>th</sup> century can be appreciated by the shifts in land cover, from agrarian to forest.





**Figure C1.** Valle de Peiro (1919), by Francisco Llorens Díaz. Oil on canvas (1 x 1.25 m). This painting depicts the Peiro Valley at the foot of Mt Costa (on the right front) and Mt Xalo (on the back left) in 1919.



# Chapter 2

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Objectives, methodological approaches  
and Thesis outline





# 1. Objectives of the PhD Thesis

## 1.1. General background

The key role communal forests (CF) play in the current Galician society and the importance of the ecosystem services (ES) they provide is increasingly recognised, mainly in relation to environmental and recreational functions, but also as a fundamental resource for the development of rural areas (Fernández-Leiceaga et al., 2006; ORGACMM, 2018). In this regard, CF communities play a crucial role in the sustainable management of communal forests, as they act as decision makers over CF resources and can thus exert a big influence on the capacity of CF to supply ecosystem services (Delgado-Serrano and Semerena, 2018; Plieninger et al., 2015). Numerous Galician CF communities have recently started facing the challenge of reinvention, separating from the previous models of organic agriculture and the pure rentier forest specialization to move towards multifunctionality (Domínguez et al., 2014; Suárez and Soto, 2018; Swagemakers et al., 2014). One example is the Baroña communal forest, which community manages diverse forest species for timber production and social use, collects fungi and chestnuts, owns horses, organizes multiple events, visits and educational activities, and demarcated a separate motocross circuit (more examples in Suárez and Soto, 2018). In order to facilitate the transition of communal forests towards multifunctionality, it is essential that community members develop a common vision (Valluri-Nitsch et al., 2017) and to acknowledge the real demand for goods and services that society is requesting from them (López-Iglesias, 2017). Despite the increasing attention that CF are awakening, we are not aware of any studies to date that specifically research on the topic of ecosystem services in relation to the Galician communal forests.

The involvement of communities and other local stakeholders in ecosystem services assessments has been recognized as especially relevant at local scales, as academic expert evaluations and proxy data cannot disentangle all the benefits perceived by 'insiders' (Fagerholm et al., 2012; Stephenson, 2008). Nevertheless, it is essential to recognize that individual and collective

perceptions vary across stakeholder types depending on particular sociocultural factors, such as the place of residence, age, education or gender, among others (Garcia-Martin et al., 2017; García-Nieto et al., 2015; Quintas-Soriano et al., 2018; Soini et al., 2012), that should be accordingly taken into account in ES valuations. In this regard, socio-cultural approaches are the most suitable to capture people's multiple values, identify relevant ES for society, preferences, needs or demands as well as potential stakeholder conflicts and trade-offs (Jacobs et al., 2016; Kelemen et al., 2014; Santos-Martín et al., 2018, 2016). But even in participatory processes, the exclusion of groups whose voices are rarely heard can still occur (Agarwal, 2001; Stringer et al., 2006). Thus, to create adequate spaces for representative, democratic and legitimate participation, it is essential to reflect on which social categories are represented in the process, which ones are absent and the existing power relationships between them (Kajiser and Kronsell, 2013). It is only through the recognition and inclusion of the full range of stakeholders that new resilient models of communal forest governance can be developed (Aregu et al., 2016). The present PhD Thesis analyses the case study encompassed by the two adjacent communal forests known as Mt Xalo, located in a peri-urban region of the Atlantic edge of Galicia (NW Spain).

## 1.2. Research objectives

The general objective of the PhD Thesis is the participatory and multidisciplinary analysis of the current social perceptions and demands towards the Xalo communal forests under the ecosystem services framework, distinguishing among the perspectives of the variety of stakeholders related to this social-ecological unit (SEU).

This general objective is divided in the following specific aims:

1. To identify the ecosystem services and disservices perceived by landowners and visitors of the Xalo communal forests through an interdisciplinary spatially explicit assessment, while detecting the

relationships existent between people's perceptions and their geographical profiles.

2. To delve deeper into the multiple values of representative stakeholders of the social-ecological unit towards the Xalo communal forests, in order to detect common visions and potential strategies for the sustainable management of the communal forests and the ecosystem services they provide.
3. To gather women's perspectives on the ecosystem services and disservices provided by the Xalo communal forests through a transdisciplinary research methodology that incentives participation and engagement. The focus on women in this stage is based on the low representativeness and participation of this social category within the SEU.
4. To explore the reasons for lower female participation in the governance of the communal forests.

Recognizing the contributions that the communal forests make to society and identifying the opportunities for the participatory nature of community decisions can lay the foundation for new models of governance for resilient social-ecological systems.

## 2. Methodological approaches

### 2.1. Multidisciplinary socio-cultural valuation of ecosystem services

To acknowledge the social perception and demand of the ES related to the Xalo CF, we conducted a participatory socio-cultural ES assessment. This was divided into three consecutive research stages that provided complementary information, each from a different methodological approach and degree of engagement with participants (figures 2.1 to 2.4).

At the beginning of the PhD process, the socio-cultural techniques were still the less developed category for the assessment of ecosystem services (Scholte et al., 2015) despite a first effort made by Kelemen et al. (2014) to

organize the state of the art. These authors described socio-cultural techniques and grouped them according to methodological similarities in data collection, i.e. predominantly quantitative, qualitative or deliberative (figure 2.1). But this first classification did not include interdisciplinary techniques for the mapping of ecosystem services, an essential component of ES assessments for environmental resource management, landscape planning and the identification of priority areas (Burkhard and Maes, 2017; Maes et al., 2013). To fill this gap, we implemented a methodological approach that combined socio-cultural methods with spatially explicit techniques based on geographic information systems (GIS). A recent comprehensive classification of methods for ecosystem service assessment (Harrison et al., 2018) allowed to situate our methodologies more accurately within the existing body of approaches for ES valuation, while depicting their interdisciplinary<sup>14</sup> character by placing such techniques between the socio-cultural and the biophysical approaches (figures 2.3 and 2.4).

An additional type of classification developed by the ESMERALDA project (Santos-Martín et al., 2018) distinguishes socio-cultural approaches among observation, consultation and engagement methods, in accordance to how they engage participants and collect their preferences, perceptions, motivations and values of ES. The methodological outline of this Thesis follows this rationale according to an increasing gradient of involvement, i.e. starting by observation, following by consultation and finishing with engagement methodologies (figure 2.2). The methodological approaches used in each chapter of the Thesis are subsequently described.

**Chapter 3** started the ES assessment with an observation method (i.e. analysing social perceptions and preferences to understand social demands and priorities) (Santos-Martín et al., 2018) by developing a public online questionnaire that included a basic public participatory GIS exercise (PPGIS)

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<sup>14</sup> The words ‘multidisciplinary’, ‘interdisciplinary’ and ‘transdisciplinary’ used in the text imply additive, interactive, and holistic meanings, respectively (Choi and Pak, 2006).

(Brown and Fagerholm, 2015). The survey presented additional open questions to gather information on the social-ecological unit. Therefore, the data analysis was mostly quantitative, but it also combined qualitative and spatial techniques. Questionnaires are the most frequently socio-cultural method used for the assessment of ES (Scholte et al., 2015) and they present the advantage of allowing the incorporation of other approaches like PPGIS (Fagerholm et al., 2016; Garcia-Martin et al., 2017). Hence, this combination allowed a comprehensive initial approach to the social-ecological unit under the ES framework.

In **Chapter 4** we implemented a consultation method to evaluate social values and motivations of ecosystem services through stakeholders' own stories and direct actions (Santos-Martín et al., 2018). Specifically, we used interviews, a narrative approach well suited to address the intangible aspects of ecosystem services (Santos-Martín et al., 2016), commonly used in the research of communal forests and their communities (Cabana-Iglesia et al., 2011; Copena and Simón, 2018). The interviewing methodology allows to obtain ecological and socioeconomic information, establish stakeholders' knowledge and values, and strengthen research design and output (Young et al., 2018). This methodological stage served us to complete our knowledge on the social-ecological unit and its dynamics from a temporally explicit approach.

**Chapter 5** served to complete the spectrum of stakeholders' perceptions and values by conducting a gender approach through an original transdisciplinary methodology that relies within engagement methods. This was based in the photovoice technique (Wang and Burris, 1997) and incorporated the spatial component by geotagging the photographs to analyse their spatial distribution. The methodology may recall to the photo-series analyses from social media platforms (Oteros-Rozas et al., 2017), but we generated our own photo-database and included authors' perspectives in the analysis. This novel methodology served to explore the reported high potential of the photovoice technique to complement the biophysical assessment of ecosystem services

(Berbés-Blázquez, 2011) and of social-ecological systems (Masterson et al., 2018).

Besides, the last part of Chapter 5 develops the technique known as ‘world café’ (Thunberg, 2011), used to generate critical dialogue among participants in order to analyse the causes of the gendered participatory exclusion given in the governance of the communal forests. Thus, helping advance in the solution of social conflicts and trade-offs (Santos-Martín et al., 2018).

The methodological approaches applied in the Thesis were further completed with additional primary data collected at informal meetings with diverse stakeholders and participant observation in cultural and sport events celebrated in Mt Xalo. Also, secondary information about the social-ecological unit was gathered from literature review, the press and official reports.

### 3. Thesis outline

This thesis contains three original research works organized in three consecutive chapters that follow the layout of a scientific paper (i.e. introduction, methodology, results, discussion, conclusions and references) and a final chapter that gathers the main conclusions (chapter 6). The three original research works are titled:

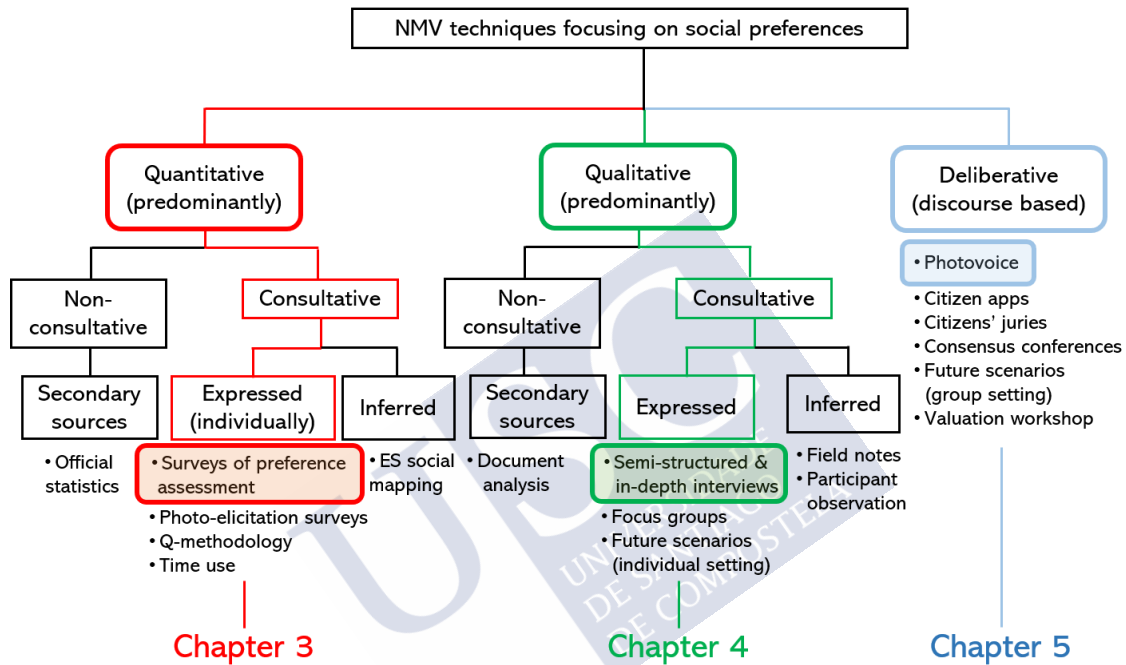
1. **Chapter 3.** (Dis)similarities among landowners’ and visitors’ perspectives. Perceptions of ecosystem services and disservices through public questionnaires.
2. **Chapter 4.** Disentangling common visions. Interviews with representative stakeholders from the social-ecological system.
3. **Chapter 5.** Looking at the margins. A gender approach to the perception of ecosystem services through geotagged photovoice.

**Chapter 3** reports the general socioeconomic profiles of the people that visits the Xalo communal forests and their relationship with the common land. The

perception and valuation of the ecosystem services provided by the CF are explored, as well as the negative aspects. This analysis is conducted for the general sample of survey respondents and by geographic profiles in order to distinguish among landowners' and visitors' perspectives. Finally, a spatially explicit analysis of the intensity and diversity of ecosystem services and disservices served to identify priority areas for trade-offs reduction. Additional information provided by respondents is included as supplementary material.

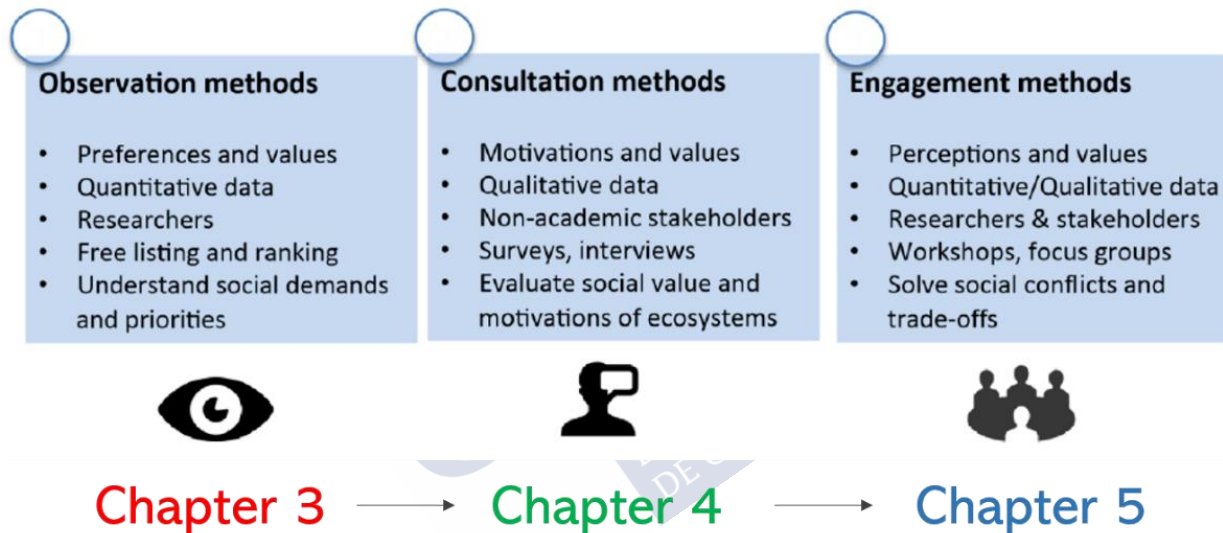
**Chapter 4** provides deeper insights on the multiple values and perspectives held by representative stakeholders from the social-ecological system. We gathered the current perceptions and future visions of the communal forests in relation to the planning and management of their resources and associated ecosystem services. The semi-structured interview process allowed the incorporation of the historical perspective on the evolution of the SEU to better rethink the desired future directions. The results of this chapter include a summary of stakeholders' common visions, a SWOT analysis for an improved CF management and a discussion on the factors influencing the success of CF governance, including possible policy directions for the sustainable supply of ecosystem services.

**Chapter 5** gave a participatory space to women—understood as stakeholders in the margins of the CF governance—in order to complete the whole picture of the ES assessment conducted in the Thesis. In the previous research stages (i.e. Chapters 1 and 2) it was observed a noticeable lower number of women participating in the ES assessment, both as survey respondents and as representative stakeholders of the SEU, i.e. object of interviewing. This chapter gathers the perceptions of the communal forests from an intergenerational sample of women related to the SEU. Through a geotagged photovoice activity, they depict the positive and negative contributions of the CF to their wellbeing and the perceived landscape changes. Also, the reasons for lower female participation around the CF affairs is explored, as well as the positive contributions and implications of the inclusion of women in the governance of the communal forests.



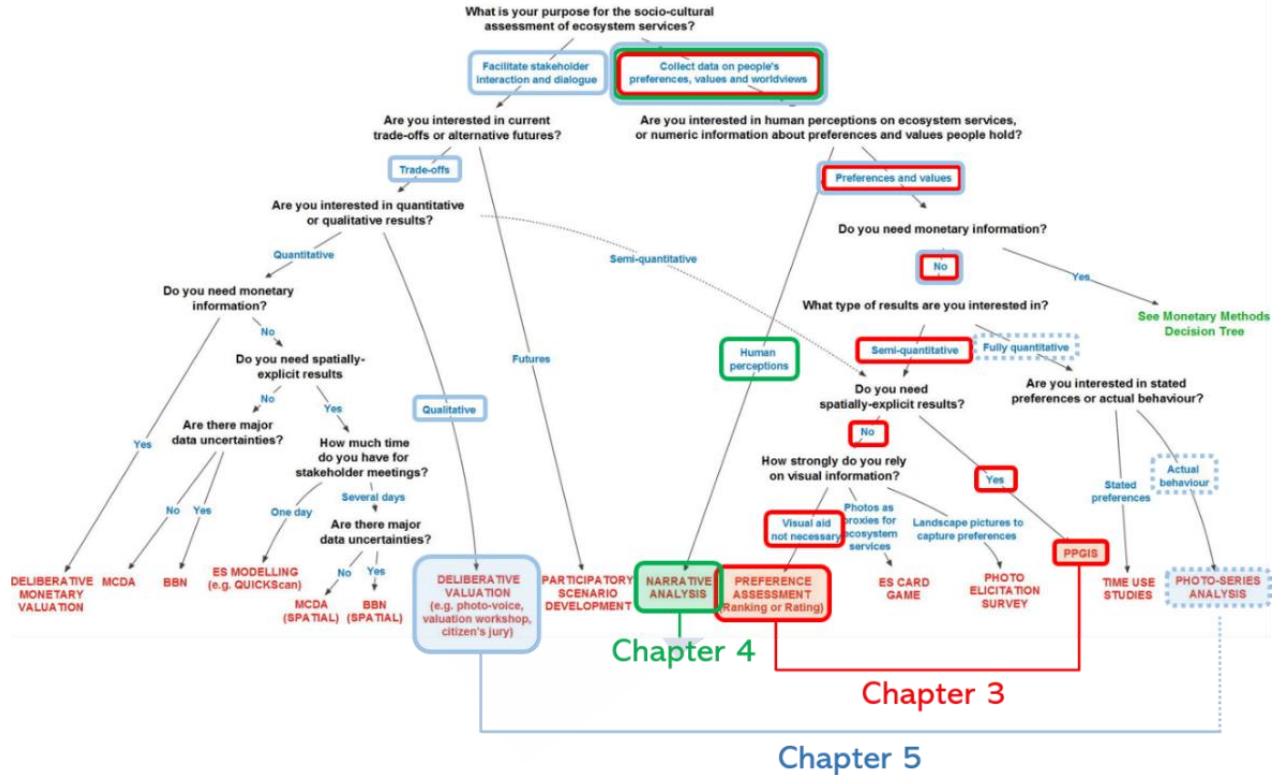
**Figure 2.1.** Socio-cultural approaches and techniques (also known as non-monetary valuation, NMV) initially programmed in the PhD Thesis according to the state of the art at the time. In order to make the research spatially explicit, the surveys developed in chapter 5 included a basic PPGIS, and the photovoice technique was completed with geotagging (similarly to a photo-series analysis). (Compare with an updated classification in figure 2.4). Source: adapted from Kelemen et al. (2014).



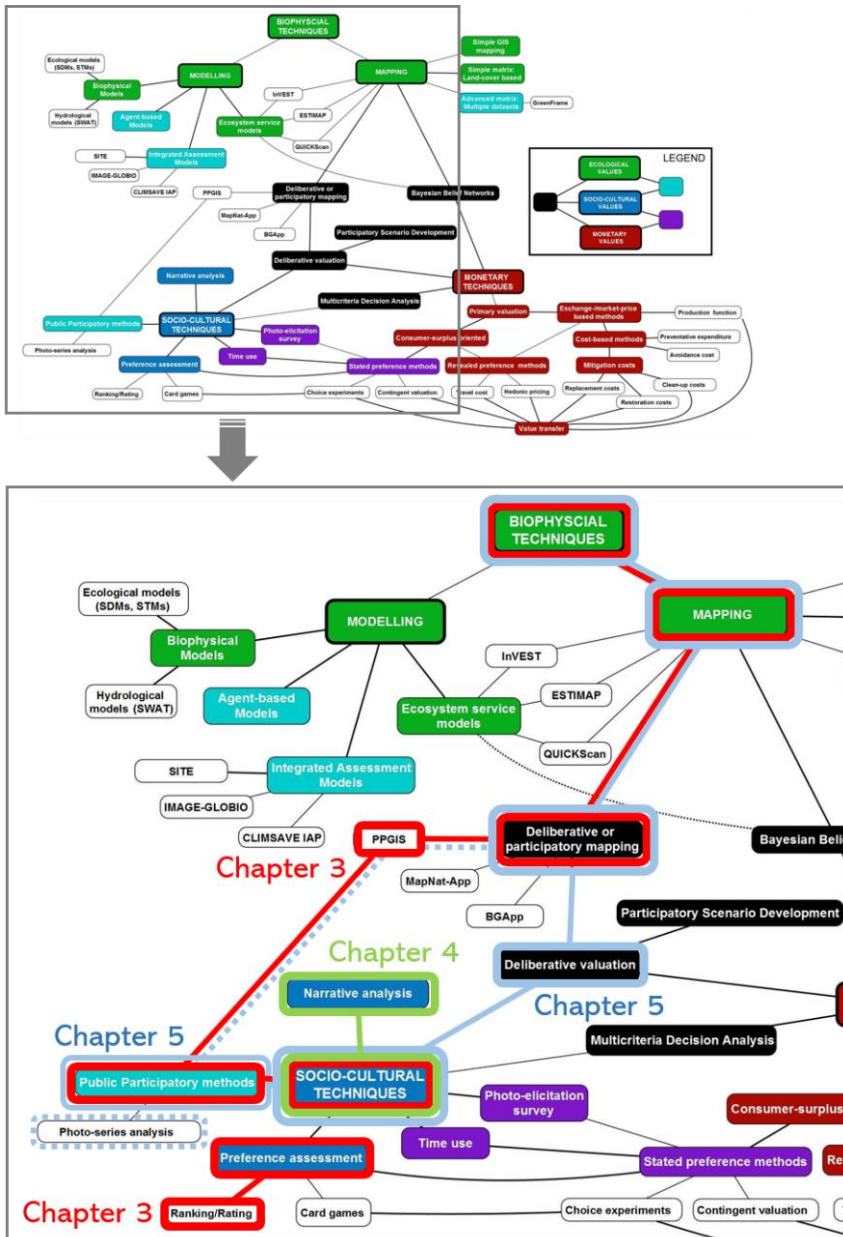


**Figure 2.2.** Socio-cultural methods applied in each research stage of the Thesis. This classification developed by Santos-Martín et al. (2018), classifies socio-cultural approaches in relation to how they engage participants and collect their preferences/perceptions/motivations/values of ecosystem services. Source: adapted from ESERALDA (Santos-Martín et al., 2018).

(b) Socio-cultural methods decision tree<sup>5</sup>:



**Figure 2.3.** Decision tree for socio-cultural methods indicating those selected in each chapter of the Thesis. In chapter 5, the photovoice-technique was implemented by adding the geotagging of the photographs to subsequently analyse the photo-series generated (i.e. elaborating our own database rather than collecting data from social media platforms). The dashed blue borders on the 'photo-series analysis' box indicate similarity with that technique. Source: adapted from Harrison et al. (2018).



**Figure 2.4.** Methodologies developed in the PhD Thesis according to the most updated method groupings for ES assessment to date (Harrison et al., 2018). The figure depicts the existing inter-linkages between different methods and the interdisciplinarity character of the selected techniques, often combining biophysical and socio-cultural elements (e.g. chapters 1 and 3). Source: adapted from Harrison et al. (2018).

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## Chapter 3

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**(Dis)similarities among landowners' and visitors' perspectives. Perceptions of ecosystem services and disservices through public questionnaires**

# Table of contents

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## 1. Introduction · 71

## 2. Methods · 73

2.1. Classification of ecosystem services and indicators selection

2.2. Categorization of survey participants: Geo-profiles

2.3. Data collection

2.4. Data analyses

2.4.1. Quantitative analysis: Statistical analyses

2.4.2. Semi-qualitative analysis: Coding and counting

2.4.3. Spatial analysis: Intensity and diversity

## 3. Results · 79

3.1. Who is related to the social-ecological unit?

3.1.1. Socioeconomic profile of respondents

3.1.2. Visit frequency

3.1.3. Knowledge on the SEU

3.2. Which ecosystem services were perceived?

3.2.1. General perceptions of ecosystem services

3.2.2. Geo-profiles specificities

3.2.3. Additional considerations

3.3. Which ecosystem services were the most valued?

3.3.1. General valuations of ecosystem services

3.3.2. Geo-profiles specificities

3.3.3. Additional considerations

3.4. What kind of disservices were perceived?

3.4.1. Scarciness

3.4.2. Unpleasantness

3.5. Where were ecosystem services and disservices identified?

## 4. Discussion · 91

4.1. Ecosystem services and disservices and stakeholder profiles

4.2. Methodological considerations

4.3. The recognition of communal forests and policy implications

## 5. Conclusions · 97

## 6. References · 99

## Appendices · 107

## 1. Introduction

Communal forests (CF), known in local language as Montes Veciñais en Man Común (MVMC), are collective private lands that have existed for centuries in Galicia (NW Spain) and historically constituted the territorial basis for traditional agrosystems (Fernández-Leiceaga et al., 2006). Their ownership rights correspond to the inhabitants who are effectively living in the rural settlements associated to these lands (DOG, 1989). CF pose nowadays a great opportunity for regional rural development linked to bottom-up initiatives due to their intrinsic characteristics (Cabana et al., 2012; Fernández-Leiceaga et al., 2006), i.e. (i) the significant area they occupy in the territory (37% of the Galician forest landscape) (IGE, 2018; Xunta de Galicia, 2019); (ii) their extensive average area (201 ha per CF) (Xunta de Galicia, 2019), especially when compared to the Galician individual private landholdings (1.5-2 ha, in average), which occupy 60% of the forest territory (IGE, 2018; Xunta de Galicia, 2019); (iii) they are indivisible, inalienable, imprescriptible and non-seizable<sup>15</sup> by law (DOG, 1989), hence they will likely preserve their areal integrity indefinitely; (iv) they are owned and governed by the local Neighbours Communities (a.k.a. CF Communities) through a General Assembly of Neighbours (DOG, 1989) who must take decisions on the CF management democratically, constituting a bottom-up governance alternative; (v) CF have been facing in the last years a generalized challenge of reorganization of their structure and function and even the identity of their Communities due to the dramatic socio-economic, institutional and legislative changes they have experienced throughout history (Caballero, 2015; Soto, 2016). CF shifted from a traditional role of support of the Galician agrarian system to a current situation of huge diversity in the production and management regime of each CF (Soto, 2016) (e.g. abandonment, intensification, multifunctionality). This transitional state constitutes nowadays both a challenge and an interesting opportunity to rethink CF in

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<sup>15</sup> This means that no judge or other competent authority can prevent the free disposal of these lands to their legitimate owners.

order to ensure the sustainable management of their resources and the ecosystem services (ES) they provide.

We conceptualise CF as social-ecological units (SEU), as they constitute complex adaptive systems in which social and biophysical components are interacting at the very local scale [i.e., they are local-scale social-ecological systems (SES), according to the characterization provided by [Martín-López et al. \(2017\)](#)]. In this regard, local communities—CF Communities, in this case—play a crucial role in the sustainable management of the SEU as they act as decision makers over CF resources ([Delgado-Serrano and Semerena, 2018](#)) and can thus exert a big influence on their ecosystem services supply capacity. The involvement of community and local stakeholders in ES assessments is especially relevant at local scales, as academic expert evaluations and proxy data cannot disentangle all the benefits perceived by ‘insiders’ ([Fagerholm et al., 2012](#); [Stephenson, 2008](#)).

Social perceptions and ES demand are influential variables that may differ among types of actors and should be considered in policymaking and landscape management of any specific SES ([Casado-Arzuaga et al., 2013](#); [Delgado-Serrano and Semerena, 2018](#); [García-Nieto et al., 2015](#); [Iniesta-Arandia, 2014](#)). It is currently well established in literature that ES assessments should incorporate socio-cultural approaches to assess the importance, preferences, needs or demands of people towards nature in order to capture their multiple values, address intangible aspects of ES and multifunctionality, identify relevant services for people, potential stakeholder conflicts and ES bundles and trade-offs ([Jacobs et al., 2016](#); [Kelemen et al., 2014](#); [Martín-López et al., 2014, 2012](#); [Oteros-Rozas et al., 2014](#); [Santos-Martín et al., 2018, 2016](#); [Scholte et al., 2015](#)).

Among the various available techniques, questionnaires are the most frequently used for the assessment of socio-cultural values of ES ([Scholte et al., 2015](#)). Besides, they allow for the incorporation of other approaches like participatory mapping through Public Participation Geographic Information System (PPGIS) ([Fagerholm et al., 2016](#); [García-Martín et al., 2017](#)), which provides a comprehensive assessment of ES by linking spatially explicit bio-

physical data to socially constructed information (Brown and Fagerholm, 2015). Local participatory assessments have often been applied to explore the cultural ecosystem services (e.g. Bieling, 2014; Plieninger et al., 2013; van Berkel and Verburg, 2014), but socio-cultural techniques are not exclusive for this type of ES (Santos-Martín et al., 2016). Instead, a broader range of ES (i.e. regulating and provisioning) and disservices can also be participatorily assessed at the local scale, which may furthermore be a useful way to identify bundles and trade-offs between different ES, disservices and stakeholders (Martín-López et al., 2014, 2012).

We are not aware of any studies to date that research on the topic of ES on the Galician CF and, since CF must be managed according to an administratively approved management instrument (DOG, 2012), none of these blueprints are currently considering the actual benefits that CF Communities and other users attach to them.

The main aim of this chapter is to disentangle the current meanings that the Xalo communal forests have for society, distinguishing among the perspectives of landowners and various visitor types. Specifically, we explored: (i) who and how is related to the SEU nowadays (ii) which ES and disservices are perceived and where they are spatially identified; (iii) which ES are the most valued; (iv) how all these variables relate to the geographical profile of CF users; and (v) the resulting trade-offs and derived landscape management implications.

## 2. Methods

### 2.1. Classification of ecosystem services and indicators selection

We studied a total number of 28 ES and 2 disservice categories. Our aim was to assess a broad spectrum of ES according to CICES V5.1 (Haines-Young and Potschin, 2018) with a special emphasis on cultural ES (16 out of 28). Following the findings of Plieninger et al. (2013), we made a distinction among two bundles of cultural ES: recreational ES and cognitive ES. The recreational type was linked to the motivations of respondents to visit the CF

and so it was implemented in the questionnaire (find ES translation into survey questions in Appendix A, table A1). The cognitive ES were related to intrinsic or spiritual values. Disservice categories were also established on the basis of [Plieninger et al. \(2013\)](#). In order to formulate comprehensible questions in the survey, ES were presented through sentences in the form of practices, actions and values following the example of recent works with similar aims ([Fagerholm et al., 2016](#); [Garcia-Martin et al., 2017](#)). ES descriptions and equivalences are shown in table 3.1.

## 2.2. Categorization of survey participants: Geo-profiles

[Scholte et al. \(2015\)](#) state ‘the crux of socio-cultural valuation is to include the values of all relevant stakeholders, including local and distant beneficiaries, and to make explicit who values what’. In this study, we tried to make this geographical distinction explicit by classifying participants into four categories of origin (‘geo-profiles’ from now on). These were: (i) ‘locals’: inhabitants from the parishes that own the CF, i.e. CF landowners; (ii) ‘vicinity’: neighbours from the municipalities that surround the SEU except for the densely populated municipality of A Coruña, whose inhabitants were classified as (iii) ‘urban’; and (iv) ‘others’: visitors from further locations. See figure 3.1 for clarifications. This geo-profile distinction was expected to help us discern (dis)similarities among the ES perceptions of landowners and different types of visitors.

## 2.3. Data collection

In order to answer our research questions, we developed a semi-quantitative survey of ES perception. Two questionnaire models were explored. The first one was implemented as a pilot survey during the celebration of a popular cycling contest (‘VI Descenso do Xalo’) that took place on the first weekend of March 2017 at the Santa María de Celas CF. It consisted on a paper leaflet divided into four sections which requested information in Galician language<sup>16</sup>

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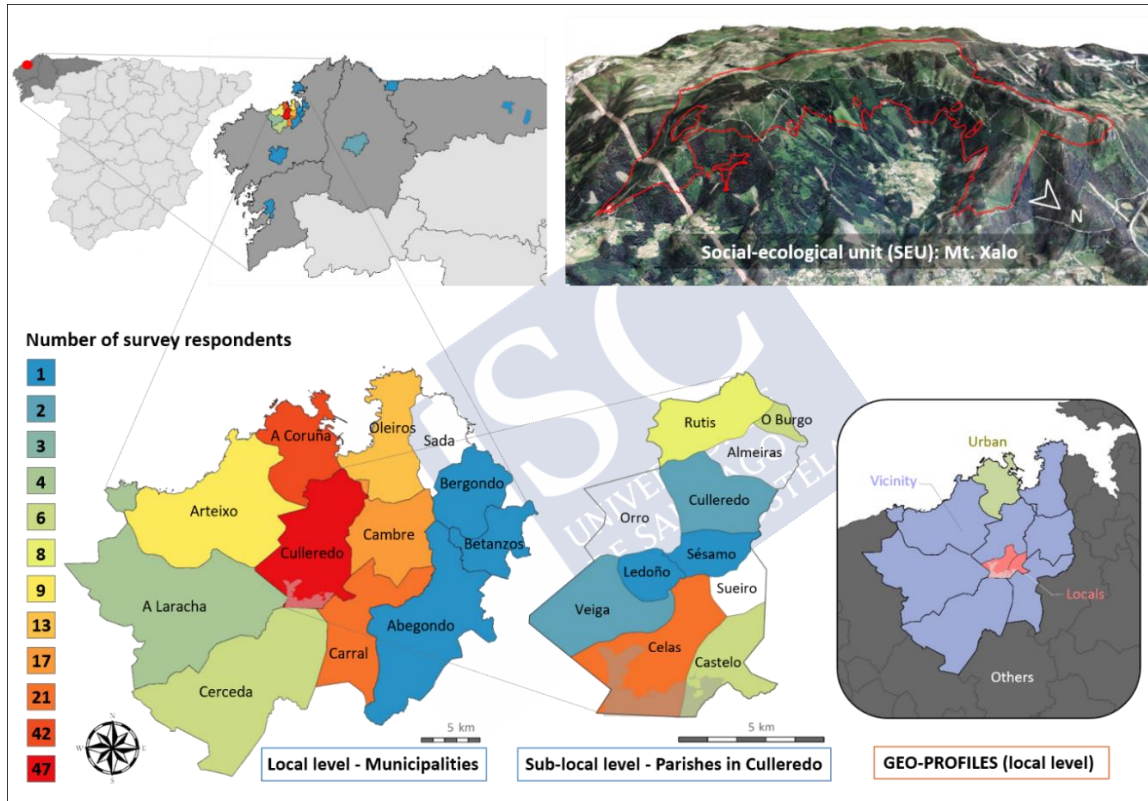
<sup>16</sup> Both Galician and Spanish are co-official languages in the autonomous region of Galicia and can be spoken by any Galician inhabitant. However, Galician is the most spoken language in the rural areas and the law encourages public authorities to

on the relationship of respondents with Mt Xalo and the ES and disservices they acknowledged and appreciated, together with a basic PPGIS exercise. Survey questions were presented in the form of multiple answers, simple choice, open answers and 1 to 5 ordinal scale (find an English translation of the complete survey in Appendix A). Information about the research project and team contact details were added to a removable page that was given to participants. Five survey takers identified with presentation cards and team t-shirts surveyed and assisted respondents, who were chosen by convenient sampling, reaching a total number of 69 people during the two days. After revision of this pilot survey, a slightly modified second model was developed online via Googleforms® in order to reduce surveying efforts. This second survey was open online for three weeks during May 2017 and reached 175 answers. It asked similar questions in Galician language and in an identical structure than the pilot but included a few more answer options according to the previous results. It was advertised through presentation cards delivered during the celebration of a hiking and food festival at the Santiago de Castelo CF and after the Sunday mass in Santa María de Celas. Besides, it was spread by purposive stakeholder emailing and through a public Facebook® page<sup>17</sup> that is still active to ensure research transparency and people engagement in subsequent stages. Data from the pilot survey were not incorporated in this study due to incompatible differences with the final online version.

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promote the use of Galician language in all levels of public, cultural and informative life (Galician Statute of Autonomy, in BOE, 1981). Our questionnaires were written in Galician language, but respondents could -and did- answered either in Galician or Spanish languages.

<sup>17</sup> The Facebook® page created to advertise this research is Opina do Xalo. You can visit it in the following URL: <https://www.facebook.com/opinadoxalo/>



**Figure 3.1.** Location of the study area, SEU delimitation, number of survey respondents and geo-profiles classification. One survey respondent from Germany is not represented in the figure, but he is included in the geo-profile 'others'. Note that the colours of the local and sub-local level figures refer to the number of survey respondents according to the same legend, differently to the geo-profiles box. The 3D representation of the SEU is vertically exaggerated x2 (own elaboration).



ES abbreviation		ES description	Correspondence in CICES v5.1	CICES Section	ES/Disserv.	
1	Events	Attendance to sport or cultural events celebrated in the SEU	3.1.1.1 & 6.1.1.1	(Recreational bundle) Cultural	Ecosystem Services	
2	Walks	Walking or dog walking	3.1.1.1 & 6.1.1.1			
3	Sports	Practicing sports (hiking, trail running, 4x4 driving, recreational hunting, etc.)	3.1.1.1 & 6.1.1.1			
4	Aesthetic	Enjoyment of scenery	3.1.2.4 & 6.1.2.1			
5	Inspiration	Stimulation of new thoughts, ideas or creative expressions	3.2.1.3			
6	Relax	Physical and mental relaxation	3.1.1.2			
7	Educational	Achieving knowledge through the observation of nature	3.1.2.2			
8	Harvesting	Harvesting mushrooms, forest fruits, berries or flowers	1.1.5.1 & 3.1.1.1			
9	Mythical	Geomorphological features with a cultural meaning (toponymy and legends)	6.2.1.1 & 6.2.2.1			
10	Heritage	In-situ heritage, archaeological features	3.1.2.3			(Cognitive bundle) Cultural
11	Culture	Acknowledgement of the local culture and history of the area	3.1.2.3			
12	Sense of place	People's identification with the landscape	3.1.2.3 & 6.3.1.1			
13	Spiritual	Site of spiritual or religious meaning	3.2.1.2 & 6.2.1.1			
14	Scientific	The scientific research of a landscape	3.1.1.2 & 6.1.2.1			
15	Socializing	Sites serving for social relations	3.2.1.1 & 6.1.1.1			
16	Personal	Individual personal fulfilment through the enjoyment of nature	3.1.1.1 & 6.2.1.1			
8	Wild food	Harvesting mushrooms, berries or forest fruits as a source of food	1.1.5.1	Provisioning		
17	Game	Game hunting	1.1.6.1			
18	Livestock	Livestock grazed outdoors	1.1.3.1			
19	Drinking water	Drinking water supplied by the ecosystem	4.2.1.1 & 4.2.2.1			
20	Other water	Water for other purposes (energy production in watermills, etc.)	4.2.1.2			
21	Firewood	Plant materials used as a source of energy (fuel wood)	1.1.1.3			
22	Saw wood	Timber used as a material for carpentry or the saw industry	1.1.1.2			
23	Pulpwood	Timber used as a source for pulp production	1.1.1.2			
24	Water cleaning	Filtration of water pollutants	2.2.4.1			Regulating
25	Climate	Regulating global climate (CO <sub>2</sub> absorption)	2.2.6.1			
26	Erosion	Controlling or preventing soil loss	2.2.1.1			
27	Water cycle	Regulation of the water cycle (rain, streams, etc.)	2.2.1.3			
28	Habitat	Providing habitats for wild plants and animals	2.2.2.3			
1	Scariness	Disservice related to sites or features that feel dangerous or threatening	-	-	Disservices	
2	Unpleasantness	Disservice related to sites or features that are neglected, damaged or unpleasant	-	-		

**Table 3.1.** Classification, description and CICES v5.1 equivalences of the ES explored in the survey. (Translation of ES to survey questions can be found in appendix A, table A1).

## 2.4. Data analyses

### 2.4.1. Quantitative analysis: Statistical analyses

Descriptive statistics were used to explore the socio-economic characteristics of respondents, their relation to the SEU and the relative frequency of ES and disservices perception and stated preferences. The relation between respondents' geo-profiles and the variables of study was analysed through contingency tables and graphics, searching for statistically significant relations with the  $\chi^2$  test and the likelihood function. Microsoft Excel 2016® and IBM SPSS Statistics® were used for these means.

### 2.4.2. Semi-qualitative analysis: Coding and counting

Disservices were explored in the survey through open questions that urged respondents to identify the causes of unpleasantness and scariness in the SEU. Answers were coded into different categories in the style of summative content analysis (Hsieh and Shannon, 2005). Code frequencies were then counted and graphically represented by a word cloud with Wordle™<sup>18</sup>. The size of the words in the cloud indicates the relative frequency of occurrence of each word (Paudyal et al., 2015), therefore, indicating the global social concern for each disservice cause.

### 2.4.3. Spatial analysis: Intensity and diversity

The spatial distribution of the ES and disservices recorded in the PPGIS exercise was analysed with ArcMap™ 10.1. Due to the lack of resources for developing an interactive map in the digital survey we overlapped a 12 x 7 alphanumerical grid of 500 m x 500 m cell size to the study area (see figure A1 in Appendix A). Respondents could record as many ES and disservices as they wished by open-listing them together with an alphanumerical grid code. Those data were exported to Microsoft Excel® and assigned (x, y) coordinates according to the centroid of each grid cell.

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<sup>18</sup> Wordle™ website: <http://www.wordle.net>

From these data, and in order to detect patterns in the perception of the spatial arrangement of the ES and disservices, metrics for intensity and diversity were computed. Intensity for both ES and disservices was calculated by counting separately the total number of ES and disservices registered in each grid cell. To calculate diversity, we applied the Shannon-Wiener index ( $H'$ ) (Shannon and Weaver, 1949) on each grid cell using the expression:

$$H' = - \sum p_i * \ln p_i$$

Where  $p_i$  is the proportion of each of the ecosystem services and disservices reported in the cell, with respect to the total number of ecosystem services and disservices reported.

### 3. Results

#### 3.1. Who is related to the social-ecological unit?

##### 3.1.1. Socioeconomic profile of respondents

The total number of respondents from the final version of the survey was 175. According to geo-profiles, 15% were locals, 51% were from the vicinity, 24% were living in the close dense urban settlement and 8% lived in further locations. Two people did not specify their place of origin. The gender and the age of respondents were highly unbalanced: only 30.3% were women; 81.7% were between 31 and 65 years old, with a general average of 40 years old. Attending to their education, 51.4% completed university studies, while only 0.6% had no access to any kind of formal education. The majority were employed at that moment (78.3%), 2.9% were retired and 6.9% were students. Many respondents (66.3%) declared to be members of an association or NGO, often related to local sports organizations (e.g. climbing, trail running, cycling and hiking).

##### 3.1.2. Visit frequency

Most of respondents affirmed they visit the SEU often (53.8%) or occasionally (34.7%). There was a significant positive correlation between visit frequency and geo-profiles: the farther from the SEU, the

less frequently they visit it. (See figure C1 in Appendix C and table 3.2 for statistical findings).

### 3.1.3. Knowledge on the SEU

On a 1 to 5 ordinal scale, respondents' self-perceived knowledge on the SEU was 3.2, on average. The geo-profiles positive correlation was present again, being locals the most confident. We also checked their acknowledgement on the ownership regime of the SEU. Only 26% of total respondents knew it is a communal forest, being urbans significantly the less aware (14%), while locals the most (48%) (See figures B2 and B3 in Appendix B depicting respondents' knowledge on the SEU).

## 3.2. Which ES were perceived?

### 3.2.1. General ES perceptions

According to figure 3.2a, from all the ES offered in the survey, the practice of sports in the SEU was found the most frequently acknowledged, indicated by 76% of respondents and at a big distance ( $\geq 25\%$ ) of the other recreational activities. Regulating ES were the next more frequently identified ES: 75% for climate change followed closely by the rest. Among the cognitive cultural ES, the perception of the mythical ES was referred at most (60%) and the cultivation of social relations at the CF appeared very relevant for users (55%). Concerning provisioning ES, the supply of drinking water by the SEU was well acknowledged by respondents (59%) and wild food showed up as an important perceived by product from the forest (51%), well above any wood-related ES (i.e. firewood, saw wood, or pulpwood (see figure 3.2a).

### 3.2.2. Geo-profiles specificities

Differences on the perception of ES among geo-profiles were statistically significant in a few instances (see figure 3.2b and table 3.2 for details). In almost every case, locals were the ones who recognized the different ES with the highest frequency, while urban did significantly less. Going for a walk was the most popular recreational ES for locals (81%), followed by the enjoyment of aesthetics (74%), while those from the vicinity visited the SEU in search for

relax (60%) significantly more than the rest. Locals had an enormous consensus appreciating the supply of drinking water (89%), while urban respondents—although still at a great proportion, 40%—were those who referred to it to a significantly lesser extent. The identification of provisioning ES in the CF was easy for locals: none of them chose the no response/don't know (NR/DK) option (0%), while urban showed significant troubles (29%). Finally, locals appreciated their own culture (48%) significantly more than the rest. The perception of regulating services showed no statistically significant differences among respondent groups.

### 3.2.3. Additional considerations

We further explored respondents' answers attending to gender, finding that statistically significant differences exist in the gendered perception of some ES. Walks, wild food and socializing were more often acknowledged by women, opposite to sports, that were more frequently referred by men. Find more details in figure C1 and table C1 in Appendix C.

## 3.3. Which ES were the most valued?

### 3.3.1. General ES valuations

According to figure 3.3a, the most valued ES of any class in the survey was the supply of drinking water.

It was chosen by one of every two respondents as the most important provisioning ES given by the SEU. The recreational use of the CF for practicing sports was next in the ranking (41%), followed by the recognition of the CF capacity to regulate climate change (39%). Concerning the non-recreational cultural ES, we did not find a clear trend for a favourite one like in the other ES classes, but a group of three of them: sense of place (22%), social relations (21%) and mythical (20%).

### 3.3.2. Geo-profiles specificities

When paying attention to the ES valuation of geo-profiles (see figure 3.3b and table 3.2), statistically significant differences were found for a variety of ES. The geo-profile others performed a singular profile by giving a high

importance to events (29%), scientific (29%), culture (21%) and water filtration (29%), opposite to the rest of respondents, and highlighting their lack of knowledge about the important goods that the SEU provides (43% NR/DK) and a null favouritism for the sense of place (0%). Urban respondents stood out for their sports fondness (64%), the relevance given to livestock in the area (14%) and their lower preference for drinking water compared to the rest of the polled (31%). Respondents from the vicinity were differentiated by their valuation of the local heritage (10%), while locals had no comparison on their consensus to value drinking water as the most important provisioning ES in the SEU (89%, the same rate they reached for ES perception).

### 3.3.3. Additional considerations

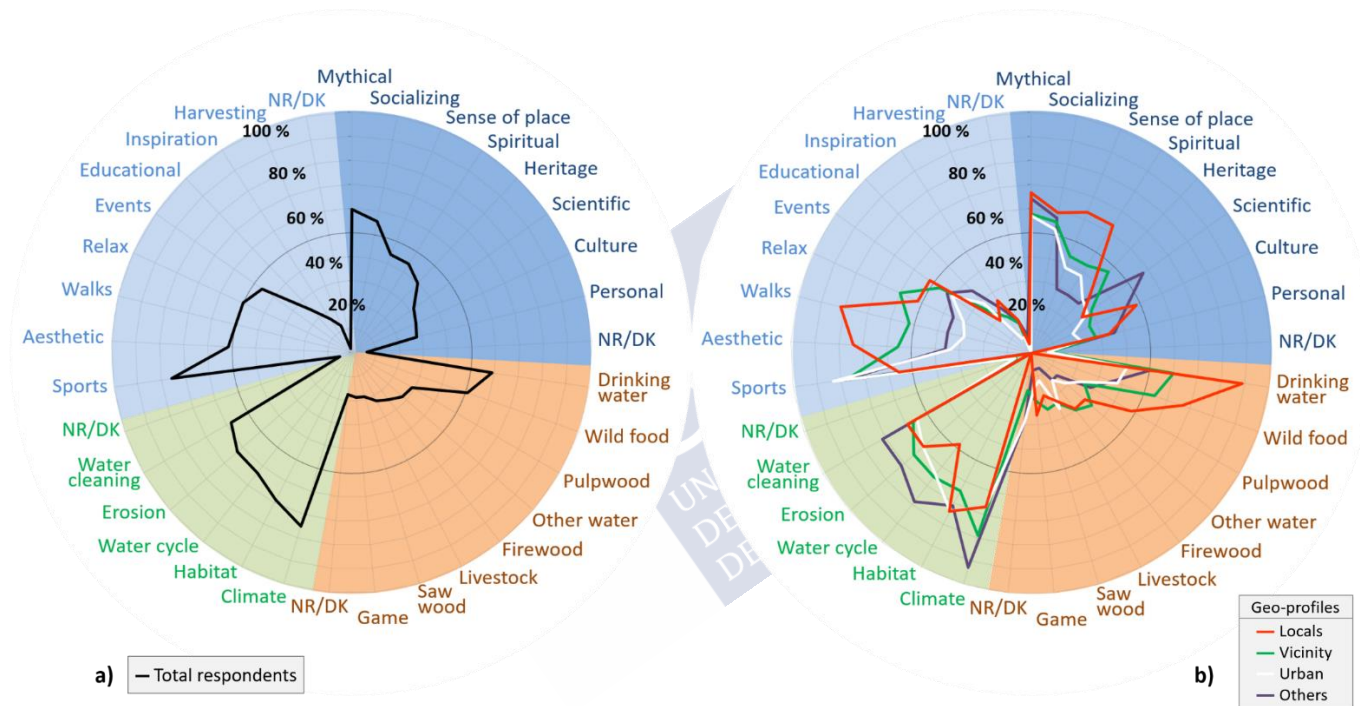
Attending to the gender of respondents, we also found a few statistically significant differences in their ES valuation. Sports and livestock were more valued by men, while walks were significantly more appreciated by women (see more details in figure C1 and table C1 in Appendix C).

## 3.4. What kind of disservices were perceived?

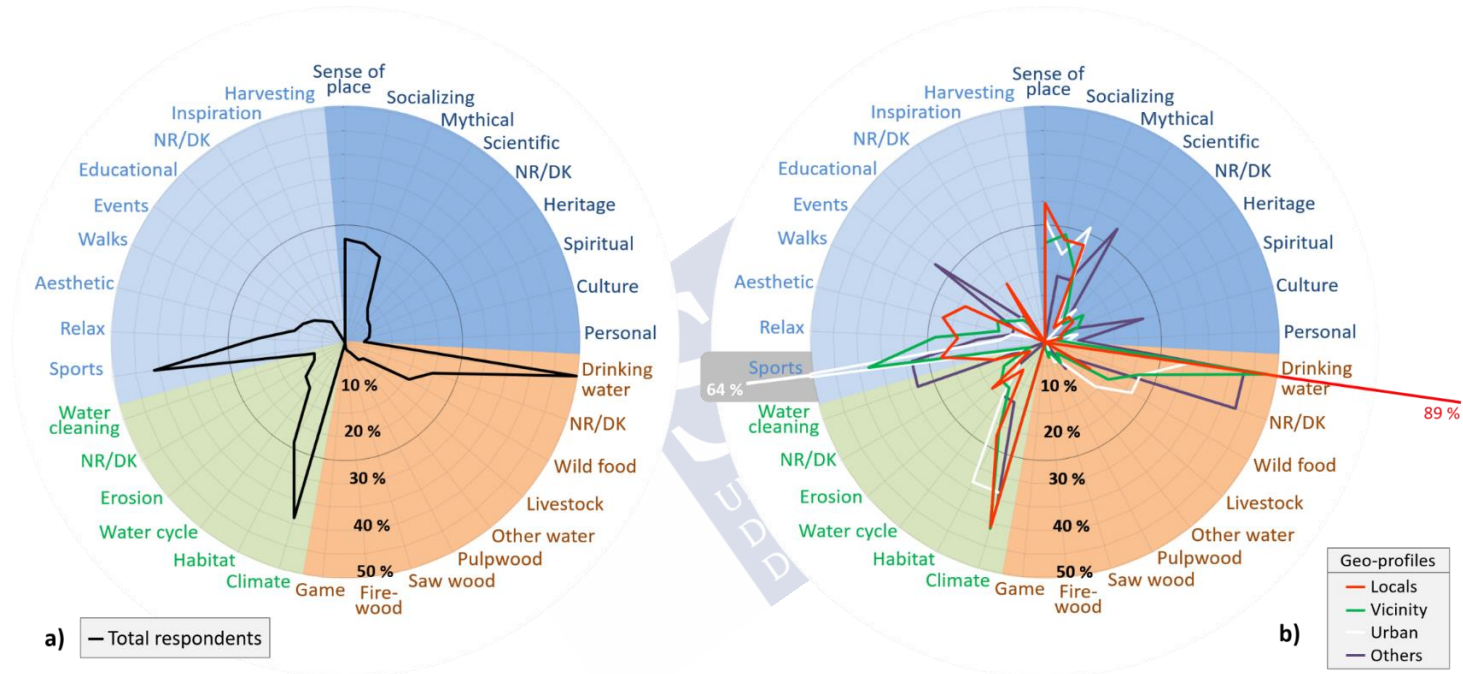
Attending to disservices, 19% of respondents recognised some kind of scariness feature in the area, while 51% did for unpleasantness. Figure 3.4 depicts the word clouds for each disservice code, where the size of each word in the cloud indicates the relative frequency of its occurrence.

### 3.4.1. Scariness

Seven categories of dangerous or threatening sites were straightforward coded according to respondents' open answers (see figure 3.4a). A great majority referred to elevated stone locations (48%), identifying them usually with drop risk as those are popular scenic viewpoints in the SEU. Other answers referred to the presence of quarries in the surroundings (12%); a nearby residential area which is perceived as inhospitable and negatively related to the Romany ethnic minority (9%); spoilt access roads (9%); the technical difficulty of cycling trails (6%); hunting activities (3%); and the



**Figure 3.2.** Frequency of perceived ES by (a) total respondents and (b) each geo-profile. Note that respondents could choose more than one option (i.e. ES) within every ES section. Each ES section is represented in the charts by a colour: light blue for cultural-recreational ES (i.e. motivations to visit the SEU); dark blue for cultural-cognitive ES; orange for provisioning ES; and green for regulating ES. ES classes are sorted on the four sections of the spider charts following a decreasing gradient according to the frequency of the total responses [i.e. graph a)].



**Figure 3.3.** Frequency of the most valued ES by (a) total respondents and (b) each geo-profile. Note that respondents could choose only one single option (i.e. the most valued) within every ES section, and that the % scale is set from 0% to 50%, with sports and drinking water standing out of the box on d). Each ES section is represented in the charts by a colour: light blue for cultural-recreational ES (i.e. motivations to visit the SEU); dark blue for cultural-cognitive ES; orange for provisioning ES; and green for regulating ES. ES classes are sorted on every section of the charts following a decreasing gradient according to the frequency of the total responses [i.e. graph a)].



Variable of study	Respondent geo-profile				$\chi^2$ test
	Locals	Vicinity	Urban	Others	$\chi^2$ (df 3)
	Frequency (%)				
<b>ES PERCEIVED</b>					
Culture	48	27	19	43	8.273*
Walks	81	52	29	36	19.734***
Aesthetic	74	56	33	36	13.046**
Relax	52	60	31	36	10.870*
Drinking water	89	60	40	50	16.430***
NR/DK provisioning	0	16	29	29	10.792*
<b>MOST VALUED ES</b>					
Culture	4	2	7	21	9.539*
Scientific	4	9	5	29	8.659*
Sense of place <sup>lf</sup>	30	21	26	0	8.263*
Heritage <sup>lf</sup>	7	10	0	0	9.130*
Events	0	8	7	29	10.335*
Sports	22	38	64	29	14.626**
Drinking water	89	48	31	43	22.887***
Livestock	0	3	14	0	9.914*
NR/DK provisioning	0	21	21	43	11.583*
Water filtration	11	3	5	29	12.998**
<b>VISIT FREQUENCY</b>					
First time	0	1	5	21	16.163***
Occasionally	19	31	43	64	10.276*
Often	63	58	52	14	10.312*
Everyday	19	10	0	0	9.317*

**Table 3.2.** Statistically significant relationships among respondents' geo-profiles and the analysed variables (ES perceived, most valued ES and visit frequency to the SEU). P value represented as \*  $P \leq 0.05$ ; \*\*  $P \leq 0.005$ ; \*\*\*  $P \leq 0.001$ . The superscript <sup>lf</sup> is indicated beside the variable name when the values of the likelihood function were used instead of the  $\chi^2$  test in order to reject the null hypothesis. Light grey shading indicates the strongest positive dependences (corrected residues  $> 2$ ) between the geo-profile and the variable of study; dark grey shading indicates the strongest negative dependences (corrected residues  $< -2$ ).

reckless driving of 4x4 vehicles (3%). The rate of response was similar among geo-profiles and no significant differences were found among them.

#### 3.4.2. Unpleasantness

Based on answers concerning neglected, damaged or unpleasant sites, 52 different keywords were identified and subsequently coded in ten categories that gather the most repeated topics (see figure 3.4b). These were: (i) roads (22%), referred to the bad conservation state of access roads, dirt-roads, paths and signalling; (ii) eucalyptus (18%), related to the widespread presence of non-native plantations and the scarceness of native tree species; (iii) forest management (13%), which makes reference to the careless practices attributed to the companies that harvest timber, the existence of forest clear woods and the lack of an appropriate forestry planning and management; (iv) residential area (11%) close to the SEU, referred to its neglected appearance; (v) waste and weeding (11%), which has to do with abandonment due both to the presence of weeds and fly-tipping on the forest<sup>19</sup>; (vi) vehicles (10%) were seen as a cause of erosion and road deterioration; (vii) service infrastructures (5%) like quarries, powerlines and gas pipes; (viii) damaged cultural heritage (4%) due to forest management activities; (ix) fauna (3%), which merges concerns about their wellbeing due to forest use and management; and (x) forest fires (3%), mentioned specifically or through spoilt fire-breaks. The rate of response was similar among geo-profiles (slightly higher in locals) and no significant differences were found among them.

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<sup>19</sup> Note that in respondents' languages -Galician or Spanish-, there are polysemic words that refer both to rubbish and weeding, making it difficult to distinguish respondents' specific meaning in the questionnaire.



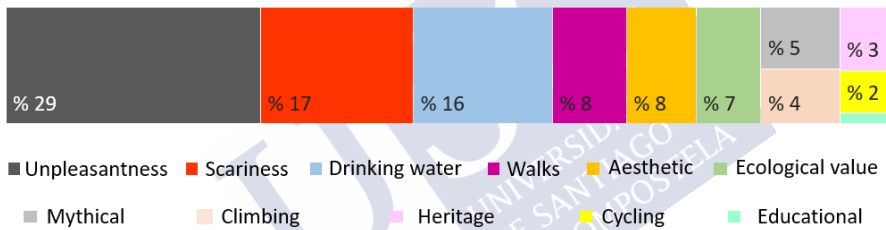
**Figure 3.4.** Word clouds for the disservices identified by total respondents: (a) scariness; (b) unpleasantness. Note that scariness is at a 200% scale with respect to unpleasantness for correct visualization.

### 3.5. Where were ecosystem services and disservices identified?

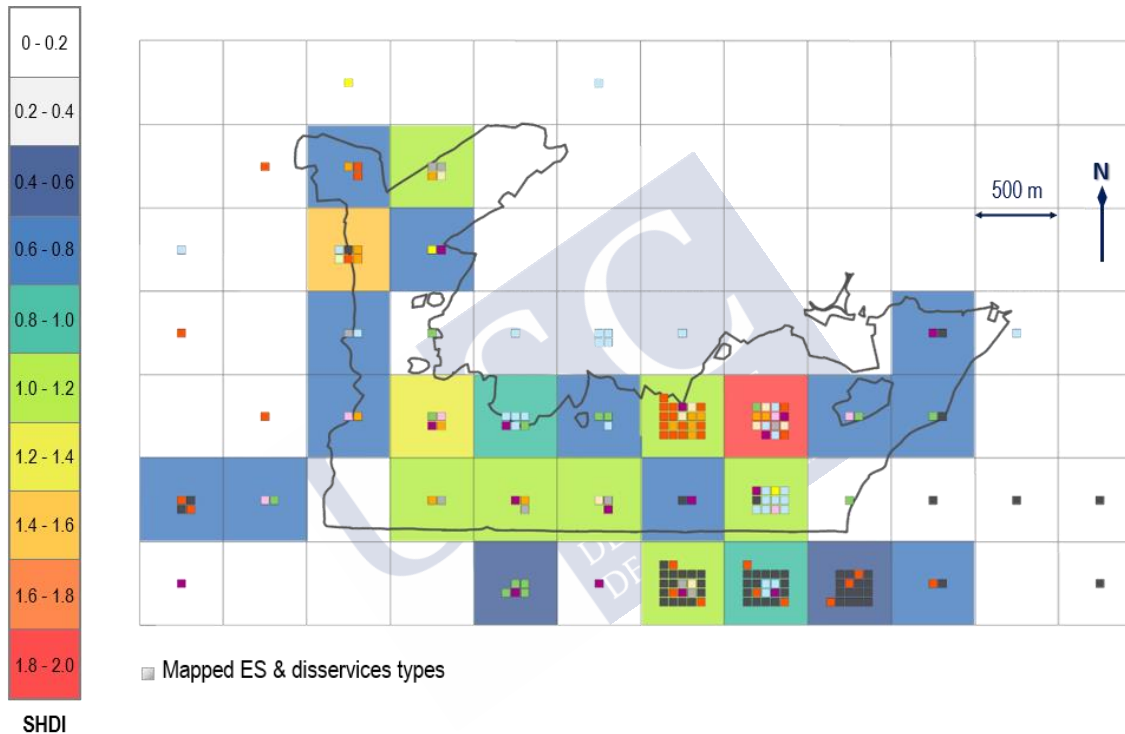
Figures 3.5, 3.6 and 3.7 show the results from this section. A number of 56 respondents participated in the PPGIS exercise (32% from the total), locating an average of 3.4 ecosystem services or disservices each. Their socioeconomic profiles were in a similar proportion to those from the total survey. Two types of disservices and 8 different ES (1 provisioning, 1 regulating and 6 cultural ES) were spatially identified (see figures 3.5 and 3.6). We found among respondents' open answers one ES type that was not present in the previous survey questions/answers. It was coded as 'ecological value' (regulating) and alluded mainly to spring areas.

Ecosystem services were primarily mapped throughout the whole SEU and close to the perimeter area (see figures 3.6 and 3.7). The most frequently mapped ES was drinking water (16%), followed by walks and aesthetic (8% both, Figure 3.5). We found an ES hotspot on the central-eastern part of the SEU, at the most popular scenic site—known as O Castelo or O Petón—which is a massive granite formation also equipped for climbing.

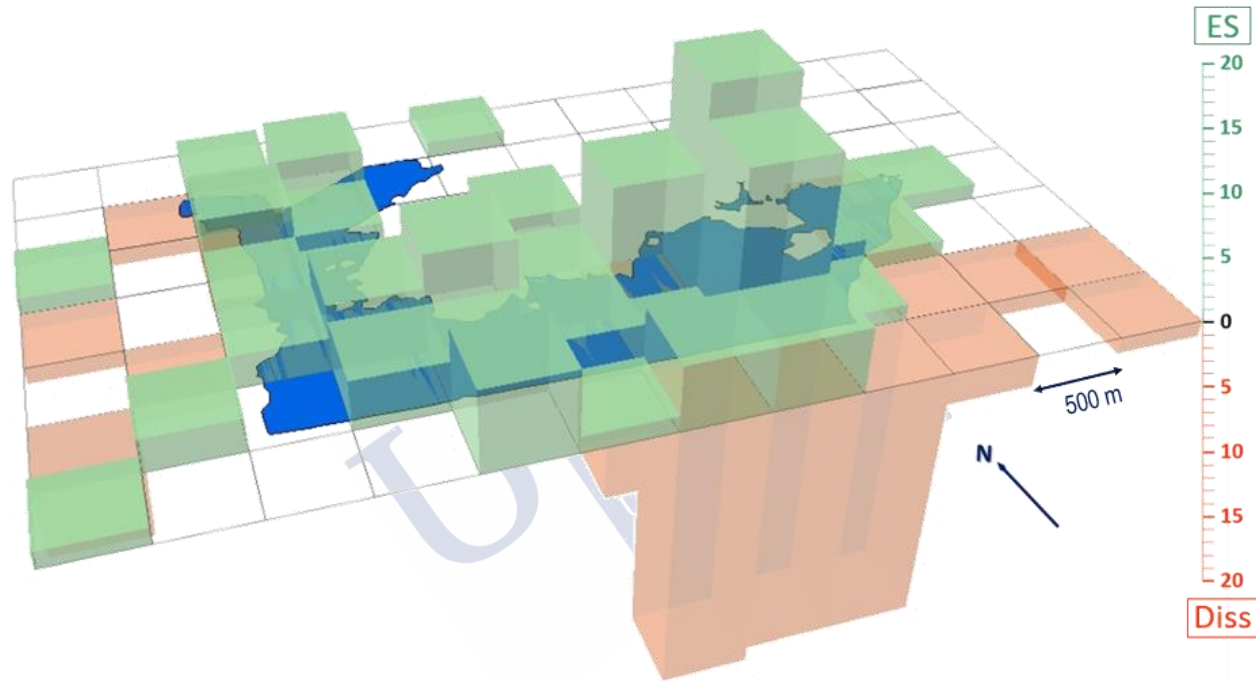
Disservices on the PPGIS were numerous (46% out of the total number of dots, see the frequency of disservices on figure 3.5 and their intensity on figure 3.7), partly because we used open answers from previous sections (i.e. disservices identification) when spatially explicit. They were mainly mapped on the perimeter or outside the SEU, as they referred to the nearby residential area, quarries, or panoramic viewsheds on cliff edges located on the NW area of the SEU and on the central-eastern part. The latter was the biggest scariness hotspot, which coincides precisely with the greatest ES hotspot, thus defining a trade-off area. This grid cell resulted with the highest diversity index for ES and disservices, as well (see figure 3.6). However, the main disservices hotspot was located on the residential area, being mainly associated to unpleasantness.



**Figure 3.5.** Types and relative frequency of the ES and disservices mapped by respondents in the participatory mapping exercise.



**Figure 3.6.** Diversity of ecosystem services and disservices on each grid cell according to the Shannon-Wiener index. The limits of the study area and the points showing the type of mapped ES and disservices in each cell are superimposed. For correct visualizing purposes, (x, y) coordinates were reassigned on each cell grid following a clockwise spatial arrangement separated 56 m on each axis.



**Figure 3.7.** 3D graphical representation of the intensity level of ES (green) and disservices (red) for each of the grid cells superimposed to the study area (blue). While some cells can be identified as specific ES or disservice providers, some others provide both, thus defining trade-off areas. A scale with the number of ES and disservices computed is shown for comparison.

## 4. Discussion

### 4.1. Ecosystem services and disservices and stakeholder profiles

This study allowed for a comprehensive socio-cultural characterization of the ecosystem services and disservices that are recognized and valued by locals and visitors in the SEU of Mt Xalo. We found that all the 28 ES offered in the survey were acknowledged by participants at some extent, with 13 ES over a 50% rate (mostly regulating and recreational ES, although two of them provisioning: drinking water and wild food). These findings depict the importance of this common land as an ES provider for society and its multifunctional role (Manning et al., 2018). Indeed, Mt Xalo gathers many landscape features generally related to the potential provision of ES, e.g. it is a forest ecosystem (Fernandez-Campo et al., 2017; van Berkel and Verburg, 2014) with various tree species, slope ranges, scenery (Fernandez-Campo et al., 2017), wildlife (van Berkel and Verburg, 2014), water sources (Fernandez-Campo et al., 2017; Garcia-Martin et al., 2017; Plieninger et al., 2013; van Berkel and Verburg, 2014), cultural heritage, closeness to settlements (Garcia-Martin et al., 2017), to cultural buildings (van Berkel and Verburg, 2014) and public accessibility (Fagerholm et al., 2016). This turns Mt Xalo into a local ES hotspot at higher scales, as validated by research participants from diverse locations.

It is noteworthy, however, to reflect on the shift in the type of ES provided by this common land along time. From immemorial time until the second half of the past century (i.e. just a few decades ago), these CF constituted a basic support for the neighbours' subsistence through the provision of food, mainly by supplementary crops, cattle feeding and scrub gathering as fertilizer for the intensive agriculture practiced in the region (Bouhier, 1979). The provision of fuelwood and other traditional uses complemented the former roles of the CF. These functions, with feeding as the primary, shifted to the current multifunctionality where the cultural and the environmental services are prevalent, but where the provision of nourishment is still present in the form of drinking water supply (the most recognised ES), the acknowledged potential for wild food production (mushrooms, nuts and

berries), game hunting and particular bottom-up initiatives related with alternative cattle raising in the forest.

This study also revealed that the geographic profile of stakeholders determines the type of relation they have with the SEU and the extent to which they perceive and value different ecosystem services. The biggest contrast was found on the degree of ES perception between locals and urban visitors from the closer densely-populated municipality: (i) local landowners had the widest range and frequency of ES acknowledgement, which is in accordance with findings from other studies ([Garcia-Martin et al., 2017](#); [Martín-López et al., 2012](#)); and (ii) both geo-profiles presented opposite trends on the valuation of their most outstanding ES preferences (drinking water for locals, sports for urban) and the perception of some ES. The geo-profile 'others' corresponds to non-local visitors, and consistently with [Plieninger et al. \(2013\)](#)'s assumptions, they appreciate cultural ES differently to local respondents (in this case, locals, vicinity and urban). The vicinity of the SEU constituted the most numerous group of participants—in accordance with the geographical extent—and their answers set the global trends observed in the survey. However, subtleties among geo-profiles' ES perceptions would not necessarily pose stakeholder trade-offs as long as they use the SEU respectfully and according to the CF rules (see section 4.3 for further discussion). In this regard, multifunctional landscape managements may facilitate the coexistence of stakeholders while enhancing synergies among ES ([Torralba et al., 2018](#)). An additional preliminary exploration of stakeholder profiles revealed gendered perceptions and valuations of ES that are worthy to be further explored. The detected nuances point mainly to recreational activities, being sports more practiced and valued by men, while women tend to use more the CF to walk and socialize. Provisioning ES also presented significant differences among genders, though difficult to interpret, with wild food being better acknowledged by women and livestock more valued by men. Attending to disservices, unpleasantness was the most frequently identified and it was specially related to the participants' wish of improvement of the preservation state of the area. This reinforces the idea that Mt Xalo is important for people. Overall, the reported disservices were mainly related



to anthropogenic areas and activities, not to the intrinsic characteristics of the ecosystem itself, similarly to findings from [Plieninger et al. \(2013\)](#) and [Agbenyega et al. \(2009\)](#). Alike the former authors described, some ES and disservices had common spatial hotspots. In our study these trade-offs occurred mainly between aesthetic and scariness (i.e. the fear of drop from a scenic spot) and between unpleasantness and several ES types (mainly due to the presence of neglected residential areas that are supplying various ES). The spatial identification of these trade-offs was often located outside the CF borders, which indicates that their amelioration is difficult without cross-scale management cooperation. Consequently, attention should be paid from regional scale landscape planners to this local ES hotspot in order to reduce trade-offs among ES and disservices and to foster rural development.

#### 4.2. Methodological considerations

The participatory methodology applied proved to be useful and appropriate to conduct the analysis of the current social demand for a broad range of ES types and disservices, the acknowledgement of the different relations stakeholders have towards the SEU and the identification of stakeholders and spatial trade-offs. However, several methodological difficulties are subsequently addressed. Firstly, although the most common approach for PPGIS data collection is self-administered surveys ([Brown and Fagerholm, 2015](#)), our mapping exercise was complex to be self-conducted due to the fixed scale and low resolution of the offered map. Likely consequently, we obtained a low rate of responses in this section and detected a few errors on the location of some ES and disservices. Besides, the most intangible cultural ES, like scientific, spiritual, culture, socializing, relax and inspiration, were often well acknowledged in the questionnaire but difficult to map on the landscape ([Brown, 2005](#); [Plieninger et al., 2013](#); [Garcia-Martin et al., 2017](#)). Only two cognitive ES were spatially addressed, mythical and heritage, which are bio-physically related. The same logic is applied for regulating ES ([Garcia-Martin et al., 2017](#)). This relation between the intangibility of some ES and their mapping limitation may be further enlarged by the very local scale of this SEU, which, rather than allowing for the detection of spatial ES hotspots within its area, constitutes a *service provision hotspot* ([Palomo et al., 2013](#)) itself at higher scales. Additional difficulties with other ES which

are considered easier to map (e.g. aesthetic, mythical) pinpointed to one more constrain: the need for spatial familiarity with the area (van Berkel and Verburg, 2014). But this familiarity requisite may also lead to a bias, as places that are best known often receive the highest valuations (Scholte et al., 2015). Accordingly, in our study, the highest ES and disservices intensities were located on the most popular or humanized areas, leaving some other potential ES supplier sites underrepresented. Fagerholm et al. (2016) already reported that spatial familiarity is linked with accessibility, being the less accessible places less renowned and, therefore, less frequently mapped. Similarly, Torralba et al. (2018) found accessibility the most important factor influencing people's use of the landscape.

All these mapping difficulties highlight the importance of providing adequate resources to participants as well as triangulating with different methods on ES assessments (Plieninger et al., 2013; Bieling, 2014). In this study, the geographical information on ES perception was complemented by the questionnaire, but its design had a few limitations as well. For instance, we asked about ES by separating them according to classes (i.e. provisioning, regulating, cultural recreational and cultural cognitive). This did not allow for straightforward comparisons among ES classes when referred to the most valued ES. Also, some of the presented ES are difficult to tackle through surveys, because being highly personal, not so easy to express in words and oftentimes difficult to name in closed format questions. One of such examples is inspiration, which was rated practically in last place in our survey, but we agree other methodologies would better elicit this kind of ES, e.g. creativity-stimulating techniques (Bieling, 2014). Furthermore, our geo-profiles distinction to determine respondents' relations with Mt Xalo could be biased, since participants may have different bonds to the SEU, e.g. a respondent from the category *other* may have previously been a *local* or may have close family being such; and a *local* respondent may be a recent newcomer in the area who is not familiar with it yet (Soini et al., 2012).

In the following chapters of the Thesis, an effort was made to overcome additional gaps, such as getting deeper meanings in people's values, achieving age and gender balance, or the acknowledgement of different

stakeholders' views (e.g. manager institutions, experts, underrepresented collectives, etc.).

### 4.3. The recognition of communal forests and policy implications

Many authors have emphasized the importance of not leaving aside local stakeholder knowledge in ES assessments (Fagerholm et al., 2012; García-Nieto et al., 2015; Palacios-Agundez et al., 2014) or the cultural ES (Chan et al., 2012a; Plieninger et al., 2015; Oteros-Rozas et al., 2017). Also, social-ecological (Balvanera et al., 2015; Opdam et al., 2013) and spatially explicit ES approaches are recommended (Burkhard and Maes, 2017; Fernandez-Campo et al., 2017; Maes et al., 2013; Palomo et al., 2013; Roces-Díaz et al., 2018) in ES assessments. We think these are major contributions of this comprehensive study that may be, ultimately, useful for policy and management. While participatory approaches are acknowledged as essential for the success of environmental policies at different levels (Jones-Walters & Çil, 2011; Jones et al., 2017), real integration of stakeholders opinions and visions are still considered a pending task (Blicharska et al., 2016; Simoncini et al., 2019). To secure CF sustainability and resilience, new forms of collaborative and responsive governance that provide space for understanding and including the perceptions and values regarding ES from both the local communities and the external beneficiaries will be essential (Schultz et al., 2011; Müller & Maes, 2015; Vainio et al., 2019). In this regard, Alló and Loureiro (2016) indicated that following Ostrom's principles of collective action (Ostrom, 1990), and specifically the minimal recognition of ownership rights, would derive in better forest management practices in the communal forests. Consequently, awareness on the special typology of ownership rights and access to land conferred by the CF Communities reveals as an important issue in the local territorial governance. Concerning this, we found startling results reflecting that most participants (74%) were not aware of the collective private ownership of Mt Xalo (i.e. that this is a common land owned by the neighbours of the parishes of Sta. María de Celas and Santiago de Castelo). This might easily derive in tensions between land owners spending resources on CF preservation and other users taking for grant their right to enjoy various activities in the area with no further responsibilities. This lack of public information contrasts with the applicable forest law, which

encourages both Education and Forest Councils to facilitate the inclusion in academic programs of the figure of CF and the benefits they provide to society (DOG, 2012, art. 106). The involvement of the Forest Administration in the governance system of some CF is besides mandatory when consortiums or agreements were signed with CF Communities to conduct the total or partial management of those CF (Fernández-Leiceaga et al., 2006). In these cases, public managers might have different ES perceptions or priorities than landowners, hence, in order to avoid common conflicts (Marey-Pérez et al., 2010), they should promote knowledge sharing and be aware of the multiple values and demands of those affected by their planning decisions (Kovács et al., 2015). The social-ecological relationships identified through our work reveal the strong association between the multifunctional management decisions taken in the communities and the ES supply capacity of the CF. Consequently, the acknowledgement and granting of management practices leading to an improvement in ES provision should take part in rural policies from the local to the European levels. In this sense, socio-cultural approaches in ES assessments are useful tools for these means and can further contribute to economic accounting (Petheram and Campbell, 2010; Santos-Martín et al., 2016) by linking the revealed ES demand to the establishment of compensation payments to communities facing opportunity costs for ecosystem conservation (Hein et al., 2006). For instance, payment for conservation objectives has been pointed out as an effective approach in the design of future agricultural policies for Europe (Navarro & López-Bao, 2018; 2019). An opportunity for the rural areas would extend such an approach to the accomplishment of objectives regarding ES provision, including the often neglected cultural ES (Chan et al., 2012b). Nevertheless, mainstreaming ES into policies at different levels is currently considered as a pending task in European agricultural policy (Hauck et al., 2014; Simoncini et al., 2019). While some initiatives were put in practice through agri-environmental schemes and similar approaches from the EU agricultural policy's Second Pillar, the results are still far from satisfactory (Pe'er et al., 2019). Specifically, Galician CF have already been a target for public incentives, although of low effect (Fernández-Leiceaga et al., 2006; García-Arias, 2008), hence some experts claim CF shall obtain additional public value transfers in order to receive some compensation back for what

they are delivering to society (Díaz-Varela et al., 2019; López Iglesias, 2017). Redesigning schemes focusing on ecological results rather than management prescriptions could be a better solution (Marie, 2014). Effective policies designed to shape the agro-futures should include mechanisms to integrate the perceptions of the ES beneficiaries as well as the opinions of the local communities in a way which gives justice to the lived experiences of local communities while acknowledging potential divergences and disagreements.

## 5. Conclusions

The peri-urban CF of Mt Xalo are considered important ES providers for society and can be understood as a local ES hotspot at the regional scale. The well-known recreational public role of this area in the present was confirmed by our socio-cultural assessment, though it revealed a much broader and varied set of ES types recognised by users. General common trends exist in the way that people use, appreciate and value nowadays the ES provided by this SEU, but also nuanced patterns that relate to their geographic and gender profiles. The most contrasted geo-profiles were CF landowners and urban visitors from the close densely-populated municipality of A Coruña. The reported disservices were majorly related to anthropogenic activities, not from the ecosystem itself, and their spatial identification was often located outside the CF borders. This makes their amelioration difficult without cross-scale management cooperation. While the environmental quality and social demand of the area has previously drawn attention from the regional scale landscape planning bodies, its character as a local ES hotspot as well as its actual capacity to deliver important ES to society remains unrecognised. Such recognition would be essential to foster initiatives for rural development beyond productive functions. Our work demonstrated that the cultural ES could play an essential social role contributing to the cohesion of the community and its relationship with the society abroad. This, in turn, may create new social, cultural and economic opportunities for the local inhabitants. Additionally, public institutions should foster collaboration with CF landowners to facilitate information and resources that contribute on the sustainable management of this SEU, starting by (i) mainstreaming the recognition of communities' ownership

rights, (ii) the increase of public managers' awareness on the multiple values and demands from landowners and visitors, (iii) the promotion of knowledge sharing among all of them and (iv) the exploration of alternative economic value transfers in order to recognise the social and ecological role these communities are playing for nowadays society.



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## Online questionnaire

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1a. How often do you visit Mt Xalo?

- I was only once/This is the first time
- Occasionally
- Often
- Everyday

1b. Which is your relationship with Mt Xalo?

- I am a neighbour
- I work here
- I am a visitor

2a. You use Mt Xalo for...:

- I attend cultural or sport events (as a participant or spectator)
- I come to go for a walk
- I practice sports: hiking
- I practice sports: biking
- I practice sports: horse ridding
- I practice sports: climbing
- I practice sports: paragliding
- I practice sports: motorcycling
- I practice sports: 4x4 driving
- I practice sports: hunting
- I come to enjoy the views
- I come to get inspired
- I come in search for relax
- I come to learn from nature (birdwatching, flowers, insects, etc.)
- I harvest mushrooms, wild berries or flowers



- Other answer:
- NR/DK

2b. From the answers you chose in the previous question, which is the most important for you?

3a. Regarding your cultural relationship with Mt Xalo...

- I appreciate the stones, legends and stories of Mt Xalo
- I am aware of the existence of archaeological remains (petroglyphs, tombs)
- I appreciate the local culture and history of this area
- I feel attached to Mt Xalo
- It instils profound, spiritual or religious feelings to me
- I think this place is worthy of scientific research
- I like coming here with family or friends
- I like coming here on my own
- Other answer:
- NR/DK

3b. From the answers you chose in the previous question, which is the most important for you?

4a. Which economical goods do you think Mt Xalo is delivering to society?

- Wild food, like mushrooms and chestnuts
- Game
- Livestock
- Drinking water
- Water for other uses (watermills, etc.)
- Firewood
- Saw wood

- Pulpwood
- Other answer:
- NR/DK

4b. From the answers you chose in the previous question, which is the most important for you?

5a. What would you say the living beings of Mt Xalo are doing for the environment?

- They filter water from pollutants
- They fight climate change (they store CO<sub>2</sub> in the soil and plants)
- They avoid soil erosion
- They regulate the water cycle (they form the mist, rain and water streams)
- Interesting animals and plants inhabit Mt Xalo
- Other answer:
- NR/DK

5b. From the answers you chose in the previous question, which is the most important for you?

6. Please, answer the next questions:

6a. Is there any place in Mt Xalo you consider scary or dangerous?

- Yes
- No
- NR/DK

6b. If you answered 'yes' say which and why:

6c. Do you think Mt Xalo presents sites or features that are abandoned, neglected, damaged or unpleasant?

6d. If you answered 'yes' say which and why:

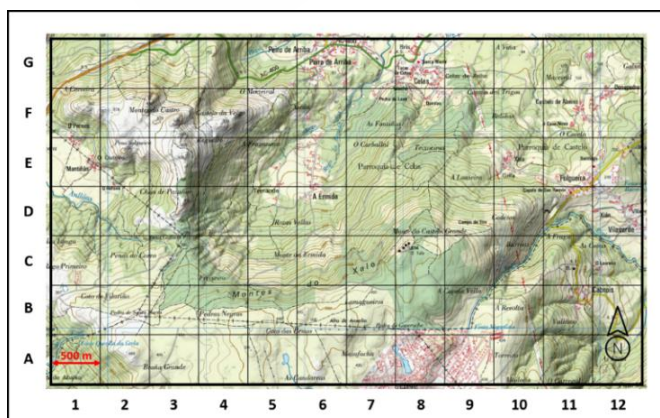
6e. If you had unlimited money, which actions would you develop in Mt Xalo to improve it or make it more to your liking?

6f. Do you know whom does Mt Xalo legally belong to?

- Yes
- No
- NR/DK

6g. If you answered 'yes' say whom:

7. If you are able to locate in the map any of the previously named characteristics, indicate the corresponding square. For instance, 3F: dog walking; 7C: dangerous site; 12A: drinking water supply.



**Figure A1.** Map of the SEU and surroundings (1:25.000) shown in the PPGIS exercise.

8. To finish, a few questions for statistics:

8a. You are:

- Woman
- Man
- Gender non-binary

8b. Your age is:

8c. Which municipality do you live in?

8d. If you live in the municipality of Culleredo, indicate the parish, please:

8e. How many years have you been living in this parish in Culleredo?

- < 1 year
- 1 – 5 years
- > 6 years
- All my life

8f. Do you own any individual private land in Mt Xalo?

- Yes
- No
- Other answer:

8g. Your studies reach:

- I have no studies
- Basic school
- Highschool
- Vocational Education

- University
- Other answer:

8h. Your current job occupation is:

- Public worker
- Entrepreneur
- Operator worker
- Student
- Retired
- Unemployed
- Other answer:

8i. Do you belong to any association, club or NGO?

- Sports
- Cultural
- Nature/Ecologist
- Heritage
- Leisure and free time
- Humanitarian
- No
- NR/DK
- Other answer:

8j. If you answered 'yes', may you indicate which?

8k. Which weight do you think your opinion has on this study?

Low weight    1    2    3    4    5    High weight

8l. How much would you say is your knowledge about Mt Xalo?

Low weight    1    2    3    4    5    High weight

8m. Would you like to participate in the next steps of this research?  
(Interviews, focus groups, etc.)

- Yes
- No
- Maybe

8n. If you leave us any contact detail, we will keep you updated about our research:

- a) Email      b) Telephone number      c) Postal address

8o. Would you like to add anything else?

*Thank you so much for your collaboration!*

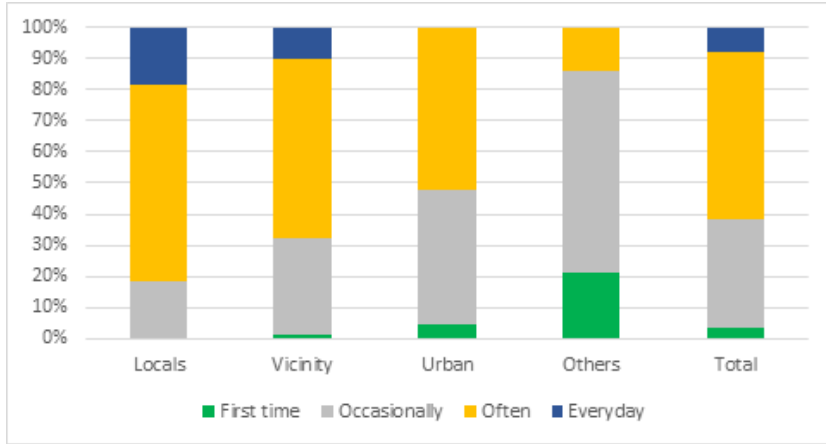
*This questionnaire is only for scientific research. All the data collected will be treated anonymously, according to the law (Lei Orgánica de Protección de Datos de Carácter Personal (LOPD), Lei 15/1999 de 13 de Decembro. Boletín Oficial do Estado, BOE, España).*

ES abbreviation	Translation into survey questions
<b>Cultural - Recreational</b>	<b>You use Mt Xalo for...</b>
1 Events	I attend cultural or sport events (as a participant or spectator)
2 Walks	I come to go for a walk
3 Sports	I practice sports
4 Aesthetic	I come to enjoy the views
5 Inspiration	I come to get inspired
6 Relax	I come in search for relax
7 Educational	I come to learn from nature (birdwatching, flowers, insects, etc.)
8 Harvesting	I harvest mushrooms, wild berries or flowers
<b>Cultural - Cognitive</b>	<b>Regarding your cultural relationship with Mt Xalo...</b>
9 Mythical	I appreciate the stones, legends and stories of Mt Xalo
10 Heritage	I am aware of the existence of archaeological remains (petroglyphs, tombs)
11 Culture	I appreciate the local culture and history of this are
12 Sense of place	I feel attached to Mt Xalo
13 Spiritual	It instils profound, spiritual or religious feelings to me
14 Scientific	I think this place is worthy of scientific research
15 Socializing	I like coming here with family or friends
16 Personal	I like coming here on my own
<b>Provisioning</b>	<b>Which economical goods do you think Mt Xalo is delivering to society?</b>
8 Wild food	Wild food, like mushrooms and chestnuts
17 Game	Game
18 Livestock	Livestock
19 Drinking water	Drinking water
20 Other water	Water for other uses (watermills, etc.)
21 Firewood	Firewood
22 Saw wood	Saw wood
23 Pulpwood	Pulpwood
<b>Regulating</b>	<b>What would you say the living beings of Mt Xalo are doing for the environment?</b>
24 Water cleaning	They filter water from pollutants
25 Climate	They fight climate change (they store CO2 in the soil and plants)
26 Erosion	The avoid soil erosion
27 Water cycle	They regulate the water cycle (they form the mist, rain and water streams)
28 Habitat	Interesting animals and plants inhabit Mt Xalo
<b>Disservices</b>	
1 Scariness	Is there any place in Mt Xalo you consider scary or dangerous?
2 Unpleasantness	Do you think Mt Xalo presents sites or features that are abandoned, neglected, damaged or unpleasant?

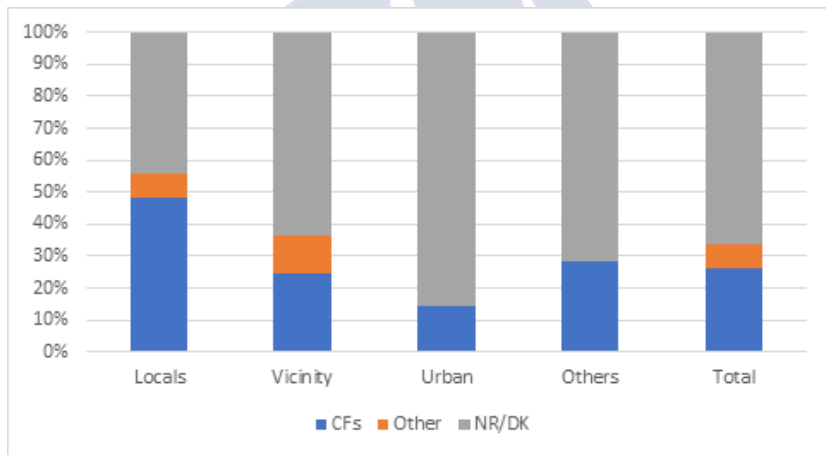
**Table A1.** Translation of the analysed ES to survey questions.



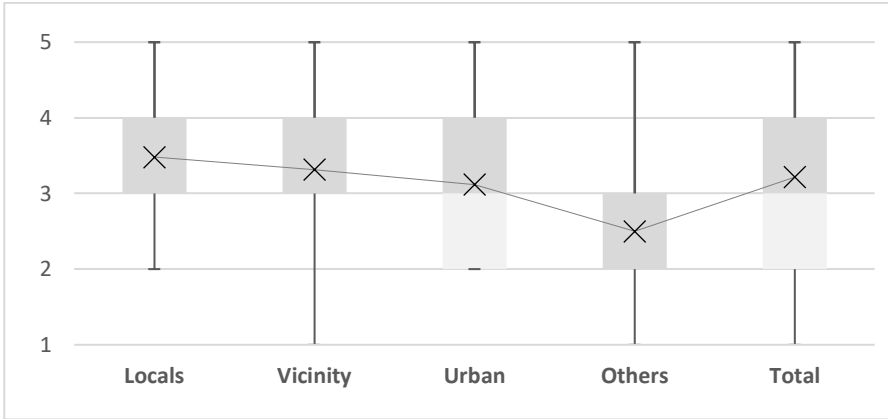




**Figure B1.** Visit frequency to the SEU by geo-profiles and total respondents. This graph relates to survey question 1a (appendix A).



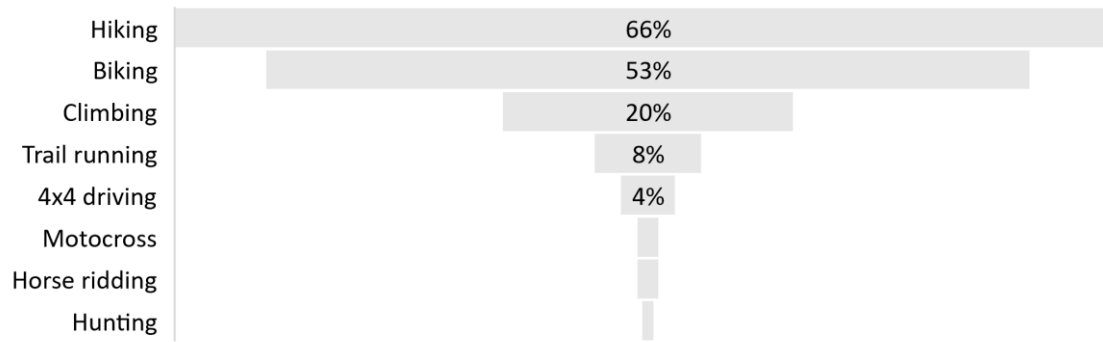
**Figure B2.** Knowledge on the collective private ownership regime of the SEU by geo-profiles and total respondents. This graph relates to survey questions 6f and 6g (appendix A). The blue percentage equals with those ‘yes’ responses where the detailed answer was correct (i.e. it acknowledged somehow the common ownership regime of the area); while orange corresponds to those respondents who affirmed to know the ownership regime of the forest, but whose detailed answer was incorrect (e.g. attributing the property to the public administrations or individual owners only). Respondents who answered ‘no’ are included in the NR/DK category. When summing altogether the orange and the grey colours, we find the percentage of respondents who were not aware of the common ownership of the SEU.



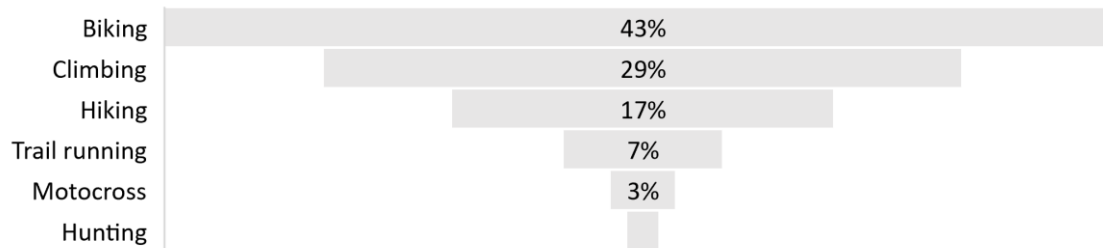
**Figure B3.** Self-perceived knowledge on the SEU on a 1 to 5 ordinal scale by geo-profiles and total respondents. The 'x' in each box plot indicates the mean value, while the whiskers show the minimum and maximum values. This graph relates to survey question 8I (appendix A).



**Figure B4.** Word cloud gathering the main topics that were coded after the open answers from survey question 6e (appendix A): 'If you had unlimited money, which actions would you develop in Mt Xalo to improve it or make it more to your liking?'

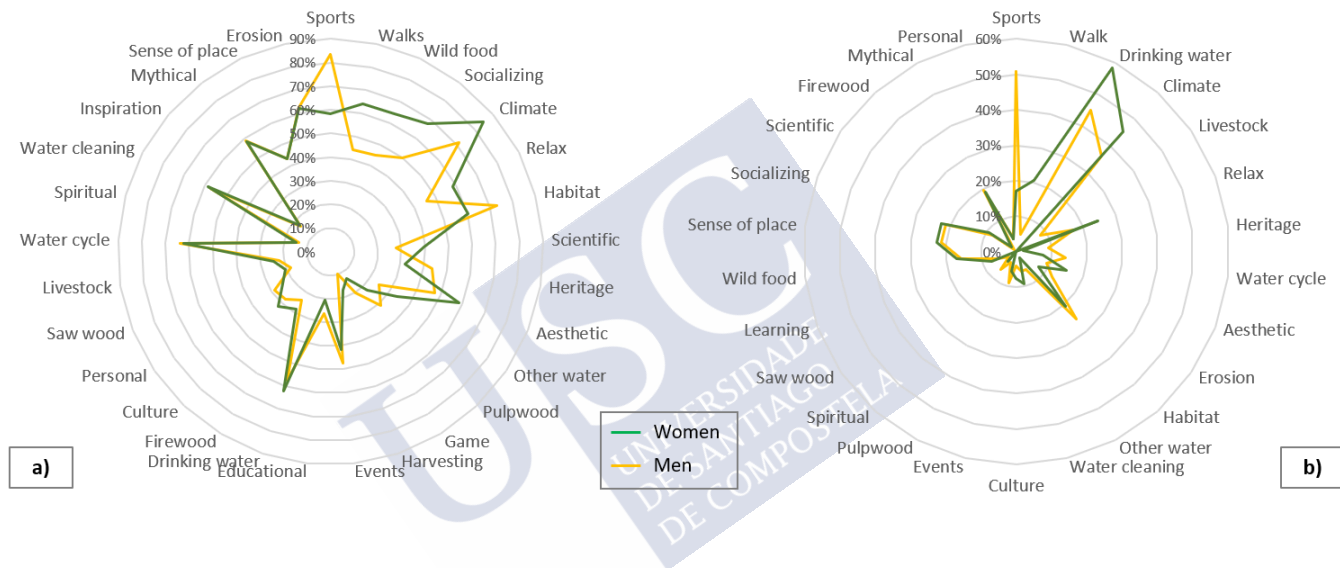


**Figure B5.** Most practiced sport activities in the SEU. This graph relates to those respondents who stated that they practice any sport in the SEU, in survey question 2a (appendix A).



**Figure B6.** Favourite sport activities practiced in the SEU. This graph relates to those respondents who stated that practicing any kind of sport in the SEU was their favourite activity, in survey question 2b (appendix A).





**Figure C1.** Spider charts showing the frequency of (a) perceived ES and the (b) relative valuation of ES within ES classes, distinguishing between women's and men's perspectives. ES are sorted on each chart following a decreasing gradient according to the difference in the frequency between women's and men's responses. This graph is similar to figure 2 but attending to gender rather than geo-profiles.

Variable of study	Respondents' gender		$\chi^2$ test
	Women	Men	YCC
	Frequency (%)		$\chi^2$ (df 1)
<b>ES PERCEIVED</b>			
Sports	59	84	11.438***
Walks	64	44	5.078*
Wild food	64	45	4.640*
Socializing	68	50	4.107*
<b>MOST VALUED ES</b>			
Sports	9	62	16.172***
Walks	11	6	8.837**
Livestock <sup>F</sup>	0	10	4.608*

**Table C1.** Statistically significant relationships among respondents' gender and the analysed variables (ES perceived, most valued ES). P value represented as \*  $P \leq 0.05$ ; \*\*  $P \leq 0.005$ ; \*\*\*  $P \leq 0.001$ . In order to be more accurate, we indicated the values of the Yates's correction for continuity (YCC) instead of the  $\chi^2$  due to 2 x 2 dimension of the contingency tables. The value of the Fisher exact statistic was used when the expected frequencies were  $< 5$ , indicated with the superscript <sup>F</sup> beside the variable name.



## Chapter 4

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Disentangling common visions. Interviews with representative stakeholders from the social-ecological system

## Table of contents

---

1. Introduction	125
2. Methods	130
2.1. Interview design and data gathering	
2.2. Stakeholder analysis	
2.3. Analysis of interviews: transcription, coding and comparison	
3. Results and Discussion	135
3.1. Strategic analysis of visions for the success of CF management	
3.2. Social recognition of the communal property	
3.3. Conflicts derived from the process of classifying CF	
3.3.1. Intra-community conflicts	
3.3.2. Inter-community conflicts: absence of official demarcation	
3.4. Age as a key factor for involvement in communal management	
3.5. The social capital of the CF: young people and the associative fabric. Reassignment of the meaning of the communal land	
3.6. The diversity of roles involving governance of communal forests	
3.7. The wildfire threat and the silvopasture alternative	
3.8. The vision of multifunctional forest management & land use planning	
3.9. Implications for ES and policy directions for the success of CF	
4. Conclusions	171
5. References	173
Appendix	183



## 1. Introduction

As mentioned in previous sections, the concept of communal forests (CF) is aligned with that of social-ecological units (SEU) (*sensu* [Martín-López et al., 2017](#)), i.e. CF consist of two inseparable components intertwined at the local scale: (i) the biophysical ecosystem, which has a specific dimension, location and ecological characteristics and is subject to certain types of use and transformations; and (ii) the community, which has the rights of collective use and landscape management and which encompasses individuals of diverse personal characteristics with a set of interests that do not necessarily coincide ([Fernández-Leiceaga et al., 2006](#)). Both the social and the ecological components—together with the external limiting agents (e.g. markets, supra-institutions, technology, etc.)—determine the decisions that can be taken for the planning and management of CF resources and the ecosystem services (ES) supplied by the SEU ([Torralba et al., 2018](#)).

In this regard, the governance of common lands has, for millennia, played a major role in the sustainable preservation of all types of ecosystem services ([Gómez-Baggethun et al., 2013](#)). At present, common lands worldwide continue to provide multiple and varied ES and are essential for the socio-economic development of rural areas ([Gomes et al., 2015](#); [Rönnbäck et al., 2007](#)). However, a history of conflicts due to dispossession and recovery led the communities who own and use CF in Galicia to a process of reinvention that is still under way. The process of transition of common lands in Europe began at the end of the *Ancien Régime*, with the temporary collapse of communities' rights of access to the land and its resources ([Federici, 2004](#); [Manning, 1988](#)), which became either council or private properties. Accordingly, the ecosystem services provided to local communities by these lands were reduced or even suppressed at that time ([Gómez-Baggethun et al., 2013](#)). The deprivation process was materialized in the Galician CF from the early 19th century, but the peak conflict was reached during the 1950s to 1980s due to the intense intervention of Franco's dictatorship in the shape of forced afforestation ([Soto, 2016](#)). During these three decades, CF

underwent what [Suárez and Soto \(2018\)](#) named the ‘triple breakdown’. This rupture refers to the (i) institutional, (ii) functional and the often forgotten (iii) identity shifts experienced by CF and the community groups.

After the triple breakdown and with the publication in 1968 of the first specific law concerning Galician communal forests ([BOE, 1968](#)), CF neighbours began an administrative process of recovery of the communal forests that is still ongoing, although at a very slow rate today ([Suárez and Soto, 2018](#)). Nowadays, common lands are characterized by the following ([Suárez and Soto, 2018](#)): (i) Specific CF legislation ([DOG, 1989](#))<sup>20</sup> that preserves the communities’ rights through an egalitarian and democratic governance structure. (ii) The absence of links between the functionality of CF and maintenance of the agricultural cycle for the survival of the CF communities. Instead, CF may constitute providers of industrial pulp and timber and of environmental and leisure functions for society as a whole or, on the contrary, may present a marginal or completely abandoned productive state ([Soto, 2016](#)). (iii) The identity of the CF communities shifted from the conception of being a necessary part in the equilibrium of the local agroecosystems to become service suppliers. Accordingly, the image that the community groups have is generally that CF are forestlands that may provide them with a source of extra income ([Suárez and Soto, 2018](#)). (See section 2 in Chapter 1 for further details on the ‘triple breakdown’).

The profound changes in Galician common lands has led to a variety of situations that range from abandonment (e.g. [Cabana et al., 2012](#)) to an

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<sup>20</sup> The complete legislative framework that currently governs the action of communal forest communities is:

- Law 13/1989, of 10 October, on communal forests.
- Law 7/2012, of June 28, on the forests of Galicia (DOG 140 of July 23, 2012).
- Decree 23/2016, of February 25, regulating the reinvestment of the income obtained by the communal forests.
- Law 9/2017, of December 26, on tax and administrative measures (DOG 245 of December 28, 2017).
- Law 3/2018, of December 26, on tax and administrative measures (DOG 247 of December 28, 2018).

increasing set of examples of active CF community groups that are struggling to reinvent themselves (e.g. Domínguez et al., 2014; Suárez and Soto, 2018; Swagemakers et al., 2014). The trend for depopulation and abandonment of rural areas of Galicia (Toxo and García, 2019) hinders the existence of dynamic CF communities. However, a number of examples of active, often peri-urban CF community groups, can be found in the more active Atlantic area, where other socioeconomic activities are as strong as the forestry sector. Suárez and Soto (2018) have described several such case studies. In these CF, the communities are discovering new functionalities and meanings apart from the previous model of organic agriculture or the pure rentier state of forest specialization. Similarly, Mount Xalo is a peri-urban CF that lies within the Atlantic area and, as we will discuss later, the two CF communities in the SEU have already started leading a process of reorganization.

The collective management of the Galician communal forests can be improved by implementing Ostrom (1990)'s Principles of Collective Action (PCA)<sup>21</sup> (Alló and Loureiro, 2018, 2016). Opposing to Hardin (1968)'s prediction of 'the tragedy of the commons', Ostrom (1990) pointed out that communities can govern their own natural resources without overharvesting, while the true tragedy of the commons lies in the stereotypical view that individuals are unable to cooperate for collective welfare (García-Quiroga, 2013). Nevertheless, community planning of CF in Galicia has a long tradition. It is based on networks of trust, unwritten laws and ad hoc coordination (Meijer et al., 2015). Nonetheless, collective decision-making, often involving hundreds of neighbours (Fernández-Leiceaga et al., 2006), constitutes a challenging task for CF communities. One of the reasons is the fact that CF communities have not preserved this customary practice after three decades of interruption of the communal regime and within the present socioeconomic context. In sum: the

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<sup>21</sup> Ostrom (1990)'s Principles of Collective Action are: (i) clearly defined boundaries, (ii) congruence between appropriation and provision and local conditions, (iii) collective choice arrangements, (iv) monitoring, (v) graduated sanctions, (vi) conflict-resolution mechanisms, (vii) minimal recognition of rights, and (viii) nested enterprises.

communities are no longer dependent on CF resources to make a living; they are not used to this kind of citizen power where decision making is collective, democratic and regular (not only every four years); and the CF social capital is often undermined due to depopulation and ageing (Toxo and García, 2019), a common phenomenon also observed in other European common lands (Gomes et al., 2015; Pereira et al., 2005). When forest agreements exist with the Regional Administration—as in the case of the Xalo CF—, the nested institutional framework must be coordinated to achieve sustainable management of the CF and the ES they provide (Farhad et al., 2015; Gómez-Baggethun et al., 2013; Ostrom et al. 1999). Hence, although the governance of CF constitutes an opportunity for community development and sovereignty, it may also be a difficult task that requires coordination and the investment of personal resources (e.g. time, energy and human capital).

In this process of collective decision-making and planning, the importance of visions is widely recognised for achieving long-term successful outcomes, as understanding the perspectives of different stakeholders is necessary for subsequent identification of common ground in participatory governance (Pérez-Soba et al., 2015; Valluri-Nitsch et al., 2017). In this study, we do not aim to develop visions as an exercise of scenario analysis with predesigned alternatives, but rather to carry out an analysis (via interview) of stakeholders' values and future wishes regarding CF governance. By recognizing what values are shared within communities—i.e. communal values<sup>22</sup>—it is possible to make these values explicit and incorporate them in ecosystem services valuation and decision making to improve cooperative planning and manage conflicts (Kenter et al., 2016, 2015). Accordingly, the community groups associated with CF—and other actors who may play a key role in CF management, such as the Regional Forestry Administration—constitute key stakeholders in relation to achieving sustainable multifunctional landscapes (Gomes et al., 2015; O'Farrell and Anderson,

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<sup>22</sup> According to Kenter et al. (2015), 'communal values' are 'values held in common by members of community, including shared principles and virtues as well as a shared sense of what is worthwhile and meaningful.

2010). Understanding and drawing attention to the plurality of perspectives, values and visions of these stakeholders regarding communal forests today is a necessary task in CF research (García-Quiroga, 2013), especially in the current context of reinvention led by active communities. But acknowledging, assessing and explicitly including the diversity of values of biodiversity and ecosystem services into policy design is a methodologically challenging task (IPBES, 2016). Iniesta-Arandia et al. (2014) highlighted the importance of using methodologies that enable the study of ES values and the inference of the consequences that stakeholder decisions may have in enhancing or reducing ES. In this regard, interviews constitute a method that can elicit communal values (Kenter et al., 2015) and are widely used in the research on CF communities' perceptions and decision-making processes in Galicia (Aparecida et al., 2015; Cabana et al., 2011, 2012; Copena and Simón, 2018; Domínguez et al., 2012, 2014; Marey-Pérez et al., 2014; Meijer et al., 2015; Simón et al., 2019; Suárez and Soto, 2018; Swagemakers, 2014) and Portugal (Gomes et al., 2015; Pereira et al., 2005)—a neighbouring country that preserves communal forests today too, there called 'baldíos' (Fernández-Leiceaga et al., 2006). Furthermore, a review by Young et al. (2018) indicates that interviewing is a popular practice in environmental science research because it is flexible and enables in-depth analysis with a moderately small sample of informants. Interviews rely on an interactive method that provides opportunities for the respondents to bring up issues that are relevant to and important for them, change the course of the conversation and introduce new issues not previously considered by the researcher. The following are the most common reasons for environmental researchers to use interviews: to obtain ecological and/or socioeconomic information about specific issues, to establish the stakeholders' knowledge, values, beliefs and decision-making processes used and to strengthen research design and output (Young et al., 2018).

The present chapter follows this rationale, indeed, being the specific objectives of the study the following: (i) to delve deeper into the meanings and values the Xalo CF has for stakeholders and how these relate to ES; (ii)

to explore the acknowledged changes in the SEU in the last few decades; (iii) to identify the main perceived threats that CF face nowadays; and (iv) to investigate stakeholders' desired management visions and strategic analysis of the CF.

## 2. Methods

In order to fully comprehend the range of stakeholders' values, perceptions and visions for the SEU, we conducted semi-structured interviews that were subsequently transcribed, coded and interpreted by drawing upon grounded theory (Glaser and Strauss, 1967), i.e. deriving insights from data in an inductive approach. To complete the picture of the SEU, other primary data were collected at informal meetings with additional stakeholders and participant observation. Secondary information was gathered from the press, reports on CF classification and biodiversity reports from NGOs.

The methodological approach described in this chapter is purely qualitative and inductive. Insights emerge from the data itself, in contrast to prevailing deductive methods that test data against predetermined hypotheses based on previous literature review (Domínguez and Shannon, 2011).

### 2.1. Interview design and data gathering

According to the specified research aims, four main research questions were formed in order to guide the interviews: (i) what does Mount Xalo signify to the representative stakeholders of the SEU?, (ii) what changes and (iii) current threats do they recognise? and (iv) what would they like Mount Xalo to look like in the near future (e.g. by 2040)?

Interviews were designed in a semi-structured way with a specific question guide, although most interviews were finally unstructured, as interviewees usually took lead of the conversation even before introductions were completed. Therefore, the interview guide was implemented as an *aide-memoire* rather than being strictly adhered to (Young et al., 2018) (see interview guide in Appendix, figure A1). No pilot study was conducted. To

gather a representative range of viewpoints, the sampling methodology was a mixture of key informant sampling (i.e. of people who are knowledgeable about the issue), representative sampling (i.e. the sample is representative of the CF environment) and snowball sampling (informants were asked to recommend additional interviewees). Ten in-depth interviews of nine men and one woman were conducted between November 2017 and February 2018. The interviews were recorded (audio). On average, the interviews lasted one hour and a half. When informants agreed (6 out of 10 cases), the interviews were conducted along transect walks through Mt Xalo, in which case the informants led the walk. This technique allows on-site mention of landscape features, practices and relationships (Bieling et al., 2014), facilitating evocation of memories and the recording of spatially explicit observations. The other interviews (4 out of 10 cases) were conducted in the informers' homes. Although a few other key stakeholders were recommended by the informants, a saturation effect was reached regarding the topics discussed in all interviews. The interviews, which were conducted in the Galician language, began with an introduction from the researcher with team details, research aims and the reason why the informant was selected. The interviewees were given an information leaflet with the researchers' contact details and they were asked to sign a consent form allowing the sessions to be recorded (see Appendix, figures A2, A3).

Additional informal conversations and email exchanging were held with NGOs, local associations, researchers, protected area managers and other stakeholders in the Xalo CF. Participant observation was conducted during various cultural and sporting events celebrated at the communal forests (e.g. VI Descenso do Xalo, March 2017; Travesía do Xalo, April 2017 and 2018; Castelo Conta, August 2018). These contributions helped in obtaining further ecological and socioeconomic information about the SEU.

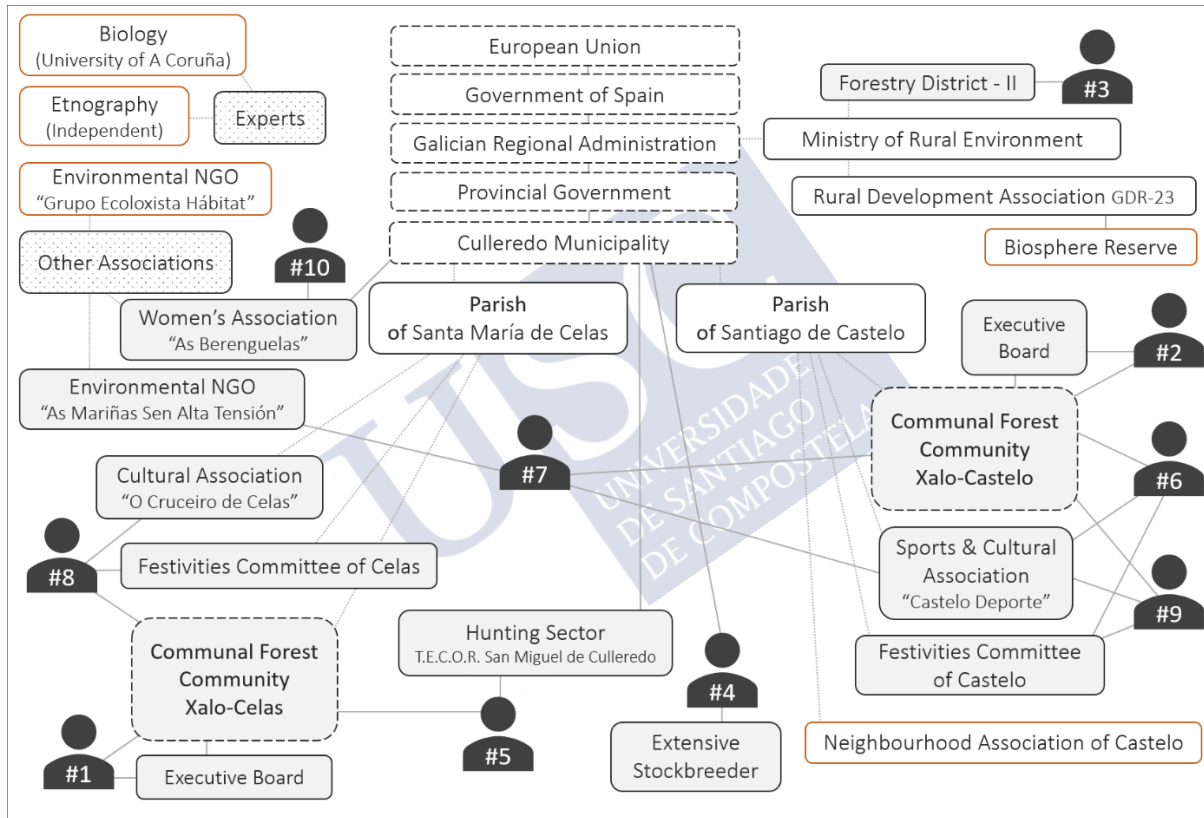
## 2.2. Stakeholder analysis

When selecting the interviewees, we tried to gather a diverse set of key stakeholders who were representatives of the two communal forests under study (Celas and Castelo) and the SEU environment. Accordingly, we invited acquaintance informants, members of the executive board of each CF and of the Forestry District which co-manages the CF through forest agreements. Protocols for stakeholder analysis reported by e.g. [Lovens et al. \(2014\)](#), [De Groot et al. \(2006\)](#) or [Reed et al. \(2009\)](#) were of great help at this stage, giving instructions on how to identify and differentiate stakeholders and investigate their relationships. The profiles of the selected interviewees and the main criteria used to select representatives are shown in table 4.1. This information is complemented in figure 4.1 showing a more complete profile of the stakeholders within the institutional and social network. Additional stakeholders who were contacted or met are also included in figure 4.1.

Code	Interview location	Gender	Age	Parish	Selection criterion
#1	CF	M	50-60	Celas	Communal Forest Executive Board
#2	H	M	70-80	Castelo	Communal Forest Executive Board
#3	CF	M	40-50	Urban	Forestry District (Regional Administration)
#4	H	M	70-80	Vicinity	Extensive Stockbreeding Sector
#5	CF	M	40-50	Celas	Hunting Sector
#6	H	M	30-40	Castelo	Cultural and Sports Promoter
#7	CF	M	40-50	Castelo	Environmental Advocate
#8	CF	M	50-60	Celas	Parish Festivities Committee
#9	CF	M	40-50	Castelo	Altruistic Behaviour CF Member
#10	H	W	70-80	Celas	Women's Association

**Table 4.1.** Profiles of the selected interviewees and main criterion for selection. CF when interviews were conducted in the communal forests; H when at home. M: man; W: woman. Age group in years.





**Figure 4.1.** Stakeholder map of the social-ecological unit nested within the multilevel institutional context (governing institutions are depicted with a dashed border). Grey boxes and person icons represent selected interviewees, while boxes with an orange border indicate informal meetings with additional stakeholders.

### 2.3. Analysis of interviews: transcription, coding and comparison

The interviews were transcribed, generating more than 200 pages of text. This information was thematically analysed with an open coding approach, following the grounded theory proposed by [Glaser and Strauss \(1967\)](#). Thus, themes and patterns emerge from the data and are refined through an iterative process without trying to fit the data into a pre-existing model or frame but identifying ‘anything and everything of interest’ in answer to the research questions ([Raymond et al., 2016](#)).

The coded themes were then graphically represented in the form of concept maps (one for each interviewee) with CmapTools software ([Cañas et al., 2005](#)). The tool allowed hierarchies and relationships among codes to be disentangled and organised into broader categories. This visual method proved useful for obtaining an overall view of each interviewee’s conception of the CF and facilitated the next step of the thematic analysis.

The coded content of each picture was then organized between two tables: (i) one listing the informants’ visions of the CF, with the codes of the perceived SEU changes in one column and the wishes for the future in another; and (ii) a second thematic table summarizing the detected strengths, weaknesses, opportunities and threats (i.e. SWOT analysis) in relation to improving management of the communal forests. This second table can be understood as a strategic analysis to approach the future visions included in the first table.

Finally, a comparison was made among the tables of each interviewee and a synthesis of them into two final tables (tables 4.2 and 4.3), in order to find a condensed comprehensive analysis of the whole SEU. These findings were then discussed within the context of existing literature on communal lands, rather than pre-establishing a defined theoretical approach, according to the principles of grounded theory.

## 3. Results and Discussion

### 3.1. Strategic analysis of visions for the success of communal forest management

An exhaustive analysis of the opinions of key stakeholders about the current state of the Xalo CF and their potential drift according to their visions are included in tables 4.2 and 4.3.

Table 4.2 lists the common views of the interviewed stakeholders about the CF, from the past to present and also from the present to the desired future. The key topics listed represent the general feeling of most of the interviewees and a saturation effect was reached. [Soto \(2016\)](#) stated that survival of Galician CF was characterized by interwoven productive, institutional and identity factors. According to our inductive analysis, these three factors were recognized by interviewees in their views about the changes from past to present (see column on the left in table 4.2). Regarding their visions for the future (column on the right in table 4.2), we also found strong consensus regarding the key features in the short to medium term changes in the state of Mt Xalo: demarcation of perimeters; understanding between CF managers; recognition of communal property; attraction for visitors; regulation of uses, forestry planning; provision of new ES; and recovery of natural and cultural heritage. This list of common topics can be understood as a 'check list' for advancing towards better management of the communal land. However, we also observed differences in opinion, e.g. regarding ideal forest management (aimed either towards productivism or multifunctionality) ([F5 in table 4.2](#)). In this regard, gathering the different opinions about the future of communal land is an essential stage regarding the understanding between key actors as well as for discovering shared viewpoints ([Valluri-Nitsch et al., 2017](#)).

The findings of the SWOT analysis of the interviews are shown in table 4.3. We include common points of view in this table, but also some individual opinions, thus adding all viewpoints to obtain the most detailed level in the SWOT analysis. This type of approach has been used in previous studies on

landscape sustainability and ecosystem services: e.g. [Bürigi et al. \(2015\)](#) focused on collecting the ES considered more important in a certain period of time rather than counting the number of times the ES were mentioned. SWOT analysis based on the actual opinions of the members of the social network of the forest community (table 4.3) may help to determine the most appropriate strategy for transforming the CF from its current state to the desired state (i.e. column on the right in table 4.2) based on organisation of knowledge of the recent history of the CF (i.e. column on the left in table 4.2).

Thus, it was possible to carry out an overall diagnostic analysis of the case study using the testimonies compiled. This exhaustive analysis enabled comparison with other case studies. In this regard, the meta-analysis conducted by [Pagdee et al. \(2006\)](#) considered the empirical results of 69 cases studies from the Asian, African and American continents and identified 43 factors that should be considered in order to ensure the success of communal forest management (see table 4.4). We found these results interesting and readily comparable with the findings of the SWOT analysis and the viewpoints expressed in our case study, identifying numerous points in common, as regards factors considered satisfactory at the moment and also deficiencies or desires, in accordance with the analysis of the interviews with stakeholders. In addition, the variables identified as important by [Pagdee et al. \(2006\)](#) are consistent with the eight Principles of Collective Action (PCA) developed by [Ostrom \(1990\)](#), mainly centred on the institutional framework and on the structure of property rights (see table 4.4 for analysis of the observed consistencies).

We will discuss some of the factors highlighted by the SWOT and visions analyses, including numerous quotations extracted from the interviews, which is possibly the best way of demonstrating rigour in qualitative research ([Aster and Lentsch, 2017](#)).

### 3.2. Social recognition of the communal property

One of the outcomes derived from the interviews is the feeling of pride that the community members have towards the communal forest and the

manifest desire for public recognition (F3 in table 4.2). This contrasts with the lack of knowledge and information that visitors have about the CF, as perceived by the interviewees (T8 in table 4.3) and previously documented in Chapter 3 (figure B2). The Xalo community members know that their CF is used and appreciated by many visitors and comment that it is even used more by visitors than by the locals themselves (as is habitual in other regions, e.g. Bieling et al., 2014). This high level of public use is understood by the landowners as a positive factor that strengthens their desire to share the CF and improve the provision of services and infrastructures.

'I'd like everyone to know about Xalo (...). People from here don't go up there. More outsiders than people from the village come... We're used to it just being there and don't visit it' (#8).

'We want people to come. We want to push what we have, what makes the CF valuable' (#1).

'I'd like it to be a point of attraction for Culleredo and the whole region' (#6).

'I'd like people to know that this is owned and who it's owned by, that they can use it and everything, but that it belongs to some people' (#7).

'People should realise that they are at Mount Xalo, that this belongs to some place. I'd like them to know about it and even to identify with the place, and to realise that it's good for their wellbeing. But neither us have any information. (...) The people from here associate the woodland with misery and so outsiders value it more than local people do.' (#2).

However, the proprietors recognise that the inappropriate use by some users may lead to trade-offs between ecosystem services (e.g. practice of motocross vs. soil erosion<sup>23</sup>), as well as between users (e.g. trade-offs between motorcyclists and hunters with walkers and cyclists<sup>24</sup>) (T9 in table 4.3). 'I like showing people what we have here, because when you're happy

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<sup>23</sup> Soil erosion is referring to both the damage of dirt roads and the soil.

<sup>24</sup> Specifically, trade-offs were referred between motorcyclists with hunters, walkers and cyclists, and between hunters with walkers and cyclists.

Perceived Changes (Past → Present)	Wishes (Present → Future)
<p><b>P1. Demographics in decline.</b> Reduced birth rate, youth emigration, increased life expectancy. Aged community, passive economy.</p> <p><b>P2. Shift in use and management of CF resources.</b> From agrosilvopastoral use, whereby all resources from the CF were used for subsistence, to ‘silvo-recreational’ use, with no dependence on CF resources for living, only as an extra income.</p> <p><b>P3. Source of landscape protection: from human to financial capital.</b> Due to past uses, the landscape was ‘clean’ and preserved by the labour force (human capital). Today, it is protected through economic investment. Tractor drivers and fire watchmen are hired to prevent abandonment and fire risk, entailing high fixed costs.</p> <p><b>P4. Loss of ecosystem services.</b> Traditional paths and heritage assets were erased or hidden (with associated loss of ties and local identity); autochthonous fauna and flora are scarcer, also cattle (hence, biodiversity and fire prevention diminished); organic fertilizers are no longer produced (e.g. gorse); drinking water declines due to climatic drought, lack of springs preservation and presence of eucalyptus; provision of food ceases due to agricultural and livestock disuse; fuelwood is no longer collected; traditional ecological knowledge is threatened and social relations disrupted.</p> <p><b>P5. Institutional change.</b> Shifts in the ownership of the CF (i) from neighbours to the municipality (ii) to recognition of the CF communities with forest agreements with the Regional Administration. Emergence of bureaucracies and need for economic management. The community must invest personal time and efforts to manage the CF.</p> <p><b>P6. Re-conceptualisation of communal forest and the identity of the community.</b> The CF shifts from being a place of work for people’s survival to becoming a place for leisure and connection with nature for neighbours and visitors, as well as an object of commercialization for CF owners, which may be further understood as a ‘burden’.</p>	<p><b>F1. Official demarcation of property boundaries:</b> well-defined perimeters between adjoining CF.</p> <p><b>F2. More implication in CF management and mutual understanding</b> between CF owners and with the Regional Administration. Possible cancellation of forest agreements to enable autonomous governance of the CF by the community.</p> <p><b>F3. Recognition by visitors</b> of the CF proprietorship combined with <b>visitor attraction</b> projects.</p> <p><b>F4. Spatial planning for delimitation of uses:</b> signalling routes for biking, trekking, etc.</p> <p><b>F5. Expert forest management.</b> Trust in forestry technicians for efficient planning of forest resources. <b>Two visions</b> of what is ‘good forest management’ exist: (1) forest production is the main purpose; (2) multifunctional purpose: diversified forest products and social vocation, i.e. ‘silvo-pasto-recreational’. The latter is further proposed as an alternative to current fire prevention that would reduce external economic dependence.</p> <p><b>F6. Additional CF uses and generation of associated jobs,</b> e.g. production of honey, fungi, chestnuts and drinking water, development of cultural industry and, especially, livestock breeding.</p> <p><b>F7. Restoration and recovery of the natural and cultural CF heritage,</b> e.g. pathways, mythical stones, archaeological assets, springs, etc.</p>

**Table 4.2.** Common visions held by stakeholders of the perceived changes and desired future for the Mt Xalo peri-urban communal forests.

Strengths	Weaknesses	Opportunities	Threats
<p><b>S1.</b> Existence of <b>active social capital</b>:</p> <p><b>S1.1. Diversity of associations:</b> associations for young people, old people, families and women. Sports and cultural associations. Activities for revitalization, social cohesion, recovery of surroundings and of local knowledge and traditions.</p> <p><b>S1.2.</b> Existence de <b>inter-community links</b> (Celas-Castelo) due to the structure of associations.</p> <p><b>S1.3.</b> Existence of '<b>well-known faces</b>' in the communities (e.g. Touriñán) as a participatory attraction for visitors.</p> <p><b>S1.4.</b> Existence in the CF communities of academically and business <b>trained personnel</b>.</p> <p><b>S1.5.</b> Existence (although scarce) of <b>young (=active) people</b> involved in the CF, who value it and have a feeling of belonging.</p> <p><b>S2.</b> Reassignment of the meaning of the CF for <b>young people</b>: = <b>leisure + feeling of belonging</b></p>	<p><b>W1.</b> Intra and inter-community <b>conflicts</b> derived from the process of <b>classification of the CF</b>. Association of the communal forest with conflict.</p> <p><b>W2.</b> CF pending resolution of the official <b>demarcation</b>.</p> <p><b>W3. Demographics:</b> Loss of young population, depopulation and partial destruction of the social fabric (closure of businesses and meeting places). Pension economy. [This also relates to the loss of local knowledge and traditions].</p> <p><b>W4.</b> Different interests according to the age. <b>Older people:</b> communal forest = work = misery. They do not visit the CF now (they have no reason), hence they do not know what it is like, leading to a <b>lack of interest</b> in the CF, just in economic benefits (<b>forest = €</b>). [Compare with <b>S2</b>].</p> <p><b>W5. Economic dependence</b> for good <b>functioning</b> of the CF: high maintenance costs (paths,</p>	<p><b>O1.</b> '<b>Silvo-pasto-recreational</b>' = <b>Diversification</b> of uses and services = creation of <b>new business models and payment for ES</b>:</p> <p><b>O1.1.</b> Promotion of <b>complementary CF products: honey, chestnuts, fungi</b>.</p> <p><b>O1.2. Re-introduction of livestock</b> as an economic tool for <b>fire prevention</b> and possible commercialization as a product.</p> <p><b>O1.3.</b> Commercialization of <b>water supply</b> in Castelo. <b>O1.4. Monetization</b> associated with <b>cultural services</b>, e.g. viewpoint-restaurant; guided visits to heritage elements (ancient fortifications, stones, funeral monuments and pathways, mills, electricity hut, etc.).</p> <p><b>O2. Regulation of types of use allowed</b> in the space. Zonification of forest, livestock and recreation areas. <b>Avoids trade-offs</b>.</p> <p><b>O3. Forest planning and regulation.</b> Forest zonification, enhancement of production and protection (broadleaved species).</p>	<p><b>T1. Fire</b>, due to social and ecological factors: presence of eucalyptus, absence of livestock, need for weeding, abandonment of surrounding plots, steep slopes.</p> <p><b>T2. Drought</b> (ecological factor). Leads to reduction in water supply, complementary productions and cultural services (recreation, aesthetic).</p> <p><b>T3. Floods</b> (ecological factor): slope and underground aquifers).</p> <p><b>T4. Poor management by Regional and Municipal Administrations:</b></p> <p><b>T4.1.</b> Do not facilitate management and may even hamper it.</p> <p><b>T4.2.</b> Poor economic and forest management (forest clearings after tree felling).</p> <p><b>T4.3.</b> Do not carry out punitive actions.</p> <p><b>T4.4.</b> Lack of communication between the different authorities and the CF.</p> <p><b>T4.5.</b> Perception of lack of emotional involvement of salaried personnel (and according impotence of these due to lack of resources).</p>

Strengths	Weaknesses	Opportunities	Threats
<p>(compared with older people, with no current motivations, [see W4]).</p> <p><b>S3. Peri-urban CF = strategic location:</b></p> <p><b>S3.1. Attracts visitors.</b> Accentuated <b>use</b> and public <b>recognition</b>. Increases feeling of belonging among neighbours and desire to demonstrate the value of the CF by sharing.</p> <p><b>S3.2.</b> Potentially attracts <b>new residents</b> (demographic revitalization, although 'foreigners' would likely require integration).</p> <p><b>S3.3.</b> Facilitates <b>access</b> of local population to (urban) <b>services</b>.</p> <p><b>S4. Recognition</b> of the provision of multiple <b>ES</b> for the <b>community</b> and visitors (water supply, heritage, recreation, fire prevention, biodiversity, etc.).</p> <p><b>S5. Economic input</b> to the community for some of the <b>ES (timber, water)</b>, thus reinforcing valuation of these.</p> <p><b>S6.</b> Pilot project involving <b>feral horses</b> as a silvicultural tool for <b>fire prevention</b>, preventing</p>	<p>firebreaks, reforestation, cleaning); litigation expenses.</p> <p><b>W6. Dependence on external bodies</b> for the correct functioning and maintenance of the CF: public subsidies, forest agreements with the Regional Administration and with the local council. Often paralyzes management.</p> <p><b>W7. Distrust</b> (vs. cooperation) about profits within and outside of the CF community.</p> <p><b>W8. Difficulty of shared government:</b></p> <p><b>W8.1.</b> Requires dedication: <b>time and knowledge</b>. Feeling of responsibility and 'burden' by executive board members.</p> <p><b>W8.2.</b> Need to reach <b>multitudinous agreements</b> regarding type of management, reinvestment of money, new projects, etc.</p> <p><b>W8.3.</b> Lack of this type of culture, <b>novelty</b> for CF community.</p> <p><b>W9. Poor use of productive resources</b> of the CF (food, fuel, fertiliser) due to changes in lifestyle and socio-economic production model. This leads to <b>abandonment</b></p>	<p><b>O4. Low cost fire prevention</b> with strips of broadleaved species and pastures with <b>livestock</b>.</p> <p><b>O5.</b> Provision of <b>services</b> and <b>CF publicising to attract visitors:</b></p> <p><b>O5.1.</b> Installation of civic centre</p> <p><b>O5.2.</b> Dressing rooms</p> <p><b>O5.3.</b> Information pamphlets</p> <p><b>O5.4.</b> Signalling of routes</p> <p><b>O5.5.</b> Viewpoint-restaurant project</p> <p><b>O5.6.</b> Clear, accessible information about Xalo CF.</p> <p><b>O5.7.</b> Points in the CF for water supply, recovery of springs.</p> <p><b>O6.</b> Strengthening of <b>community fabric:</b></p> <p><b>O6.1.</b> Greater cooperation and unification of efforts between associations.</p> <p><b>O6.2.</b> Communication between associations of young and older people.</p> <p><b>O6.3.</b> Provision of <b>meeting places</b> for local associations.</p> <p><b>O7. Creation of local jobs</b> associated with the care and multifunctional exploitation of the CF.</p> <p><b>O7.1. Shepherd/cowherd.</b></p> <p><b>O7.2. Security guard/custodian:</b> for feral livestock and community</p>	<p><b>T5. Timber companies.</b> Deterioration of paths and heritage, illegal felling, corruption.</p> <p><b>T6. Usufructuary</b> use for commercial purposes, e.g. easements (antennas).</p> <p><b>T7. High voltage power line project</b> (would devastate the CF).</p> <p><b>T8. Lack of recognition and visitor information.</b> Free public use without responsibility vs high cost private maintenance.</p> <p><b>T9. Disrespectful use</b> of the CF, e.g. motorcycling/motocross. Erosion of paths, trade-offs with hunting, walking and cycling (and scariness disservice).</p> <p><b>T10. Lack of market</b> for non-productive/marketable services.</p>



Strengths	Weaknesses	Opportunities	Threats
<p>abandonment by clearing and <b>favouring biodiversity</b>.</p> <p><b>S7. Vision</b> of the CF as a <b>multifunctional</b> entity and existence of pro-community thinking.</p>	<p>of the CF–‘unkempt’–and problems regarding <b>fire prevention</b>.</p> <p><b>W10. Loss of biodiversity and heritage:</b> Due to changes in production model and management: presence of eucalyptus, loss of autochthonous species, absence of livestock, deterioration of ancient funeral monuments.</p> <p><b>W11. Lack of agreed, expert forest management plans.</b> Hinders flow of information to users and managers. <b>Loss of ES and €.</b></p> <p><b>W12. Lack of clear regulations for uses-spaces.</b> Leads to <b>trade-offs</b> (hunting, motorbike trails vs. walks, cycle paths).</p>	<p>infrastructures (sports pavilion, possible civic centre, ancient fortification, etc.).</p> <p><b>O7.3. Development of a cultural industry</b> involving the CF: organization and management of sporting and cultural events, educational activities, guided visits (e.g. educational routes/walks).</p> <p><b>O8. Development of heritage recovery</b> projects (e.g. ancient fortification with USC).</p> <p><b>O9. Cancellation of forest agreements</b> to enhance governance power of the CF by the communities (legal obligation from 2021 [<a href="#">DOG, 2017</a>]).</p>	

**Table 4.3.** SWOT analysis derived from interviews with stakeholders for the achievement of agreed, improved CF management (i.e. future vision).

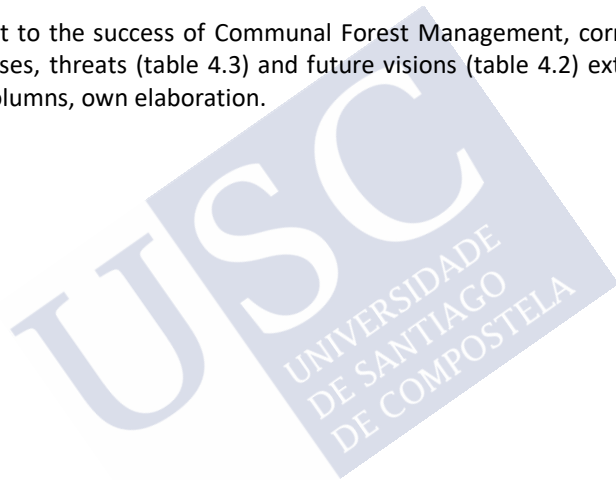
<b>Factors for the success of Community Forest Management (Pagdee et al., 2006)</b>	<b>Correspondence with PCAs proposed by Ostrom (1990)</b>	<b>In Table 4.3</b>	<b>In Table 4.2</b>
<b>1. Property rights regimes</b>			
A. Security of tenure of resource (e.g. long-term benefits, legal land holding and titles).	PCA 7.	-	-
B. Clear ownership to use and manage a resource (e.g. shared and exclusive rights in decision-making).	Minimal recognition of rights.	T8	F3
C. Clearly defined boundaries of the community resources—physical boundaries of the forest.	PCA 1. Clearly defined boundaries.	W2	F1
D. Designated areas for specific use of the forest.		W11, W12	F4, F5
E. Congruence between biophysical and social boundaries of the community (e.g. social norms and rules restricting time, place, technology and use of the resources).	PCA 2. Congruence between appropriation and provision and local conditions.	-	-
F. Formal and informal rules regulating the use of forest products.		-	-
<b>2. Institutions</b>			
A. Effective enforcement of rules/regulations to control rule breakers and brings rule breakers to justice.		T9, T4.3, W1	-
B. Monitoring methods to assess whether the institutional framework remains applicable to the community.	PCA 4. Monitoring	-	-
C. Sanctions/penalties.	PCA 5. Graduated sanctions.	T9, T4.3, W1	-
D. Skilful and experienced administrative members with self-governing resource management.		W8.1	F2, F5
E. Strong leadership and effective local organizations with available financial and human resources.		-	-
<b>3. Incentives and interests</b>			
A. Value. A resource obtains value at a degree that makes it worthwhile for the community to establish local groups responsible for resource management.		-	F6
B. Cost of CFM investment and institutional change.		-	-

<b>Factors for the success of Community Forest Management (Pagdee et al., 2006)</b>	<b>Correspondence with PCAs proposed by Ostrom (1990)</b>	<b>In Table 4.3</b>	<b>In Table 4.2</b>
C. Expectation that villagers will obtain benefits when participating in management programs.		-	F8
D. Forest dependency. The forest is considered a source of community basic needs (e.g. food, fuelwood and medicines, as a place to practice community traditions).		-	F5, F6
E. Sharing common interests that will lead to the creation of a community management group.		W8.2	F2
<b>4. Financial and human resource support from both local and outside agencies to run management programmes</b>			
A. Willingness of authorities and staff to implement CFM.		-	F2
B. Financial and human resource support from NGO, government agencies, international institutions and individuals.		W6, T4.2	F2
C. Technical assistance from forestry officials to the community.		T4.1, T4.2	F5
<b>5. Physical features of the forests</b>			
A. Size of forest (in area). Large vs. small forest.		-	-
B. Location. Accessibility of the location, easy access to outside communities.		-	-
C. Diversity (e.g. forest types, ecological complexity). High vs. low diversity.		-	-
D. Current level of resource degradation. Severe and not severe. The level of degradation may lead to lack of motivation to participate in CFM programs.		W10	F7
E. Trends in destruction are increasing, stable, or decreasing.		W11	F5
F. Predictability of resource flows. (1) Relatively predictable and (2) relatively unpredictable.		T1, T2, T3	-
<b>6. Community features include</b>			
A. Community size. Large vs. small community.		-	-
B. Location. Close proximity to the forest.		-	-
C. Increasing population growth.		W3	-
D. Increasing level of migration.		W3	-

<b>Factors for the success of Community Forest Management (Pagdee et al., 2006)</b>	<b>Correspondence with PCAs proposed by Ostrom (1990)</b>	<b>In Table 4.3</b>	<b>In Table 4.2</b>
E. Presence of conflicts between local people and outsiders.	PCA 6. Conflict-resolution mechanisms.	T9, T5, T6, T7	F3
F. Social-cultural diversity/heterogeneity.		-	-
G. Economic conditions of community members.		-	-
H. Community experience in cooperative works.		W8.3	F2
I. Traditional practices. Community members maintain traditional techniques to use and harvest forest products.		W9, W3	F6
<b>7. Level of participation</b>			
A. Management programmes appear to be more successful when most community members participate.	PCA 3. Collective-choice arrangements.	-	F2
<b>8. Degree of decentralization</b>			
A. Local recognition.	PCA 7. Minimal recognition of rights.	-	-
(1) Legal recognition of local group/authority in forest management.		-	-
(2) Informal recognition of local group: no legal status of the local group, but officials work together with the community.		-	-
(3) Acceptance of local group: no legal status, no cooperation between officials and community, but local groups are allowed to work by themselves.		-	-
(4) No local recognition.		-	-
B. Clear procedures for exercising local control.	PCA 6. Conflict-resolution mechanisms.	T4, W7	-
C. Relocation of administrative function to local groups (local responsibility).		-	-
D. Relocation of budget resources of administration (local authority).		W5, W6	F8
<b>9. Technology and market influence</b>			
A. Technological changes.	PCA 8. Nested enterprises.	-	-

Factors for the success of Community Forest Management (Pagdee et al., 2006)	Correspondence with PCAs proposed by Ostrom (1990)	In Table 4.3	In Table 4.2
B. Higher market demands for forest products and increasing economic value of some forest products.		T10	F3, F5, F6
C. Introduction of infrastructures.		-	F3
D. Instability and fluctuation of market conditions.		-	-

**Table 4.4.** Factors identified as important to the success of Communal Forest Management, correspondence with Ostrom’s Principles of Collective Action (PCA) and the weaknesses, threats (table 4.3) and future visions (table 4.2) extracted from the interviews. Source: left column from [Pagdee et al. \(2006\)](#); next columns, own elaboration.



with something, you like people to see it. But then some people come that we'd be better off without' (#9). The free public use by visitors, without attached responsibilities, contrasts with private, dedicated maintenance at high cost to the proprietors. 'People have no idea that this is a communally owned woodland. Folk come and treat it as if it belongs to everyone. The city's very nearby, people come, think everything's very pretty, but they've no idea what it takes to maintain this' (#7). 'No-one wants to do the weeding work, just to come and visit...' (#9). The condition of the peri-urban forestland is key for attracting visitors (S3.1 in table 4.3). 'The location of the woodland is great, in the sense that it's almost urban. It gets used a lot' (#2). 'This woodland does a huge public service, huge! It's woodland for A Coruña, Arteixo, Mabegondo... People come here to unwind during the week' (#3). However, inappropriate or unrespectful use of the land can create friction or even conflicts between local people and visitors, especially in the absence of efficient official mechanisms for resolving conflicts or issuing sanctions (T4.3 in table 4.3), as is common in this and other communal forests (Alló and Loureiro, 2018). 'You sometimes come across these 4 x 4 s, real monsters that they bring to practice driving and enjoy themselves. Do they damage the land? Sometimes, of course. By who controls that? Who has the means to control all of this? It's not easy. We can only hope that people will be civic-minded' (#2).

Therefore, in addition to establishing an effective method of controls and sanctions, social recognition of the community property and of the effort involved in the management of the communities is a key factor required to incentivize respectful use of the forestland by visitors. Moreover, Domínguez and Shannon (2011) indicate that social recognition of the forest proprietors may favour greater involvement of these in the management of the forestland. Some of the following may be useful tools for promoting such social recognition: development of publicity campaigns in the media regarding the figure of communal forests and the associated communities; participation of the community members in public fora, e.g. radio and television interviews; and talks by community members in educational

centres (ORGACMM, 2018); frequent publication of positive news items about CF in the media, in contrast to the usual tendency for negative reporting (Marey-Pérez et al., 2010; ORGACMM, 2018).

### 3.3. Conflicts derived from the process of classifying communal forests

#### 3.3.1. Intra-community conflicts

The neighbours from Celas and Castelo mention difficulties for coping with the problems derived from the process of official classification of the communal forests (W1 in table 4.3). The Celas CF arose from a situation of individual appropriation of the common land in the classification process that took place in 1985, the consequences of which are still perceived in the form of differences between neighbours in the parish ('One person led the communal forest as if it were his, he didn't take people into account at all. (...). The community is still divided', #8). This implies a barrier to the correct functioning of the community, although smoothed in recent years by the current executive board, but still pending legal resolution. The Castelo CF, on the other hand, was classified in 2002 as a result of an initiative of the younger neighbours, but with direction entrusted to the older neighbours, despite important intergenerational differences in viewpoints<sup>25</sup> ('It was known that the woodland belonged to the neighbours, but it was being managed by the Xunta [Regional Administration]. People of my age carried the Neighbourhood Association and set the communal forest Governing Board, and it went forward. We could not constitute the CF community because we did not meet the necessary conditions. (...). I don't like to always say that things are being done badly, but...' #7).

The return of communal forests to their rightful owners, the neighbours, was automatically promoted or started by agents external to the community in

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<sup>25</sup> In the governing board elections held in 2019, the Castelo CF leadership was taken over by a team of young people, including several women. The implications for the CF managements are worthy of further monitoring.

the interior zones of Galicia (the provinces of Ourense and Lugo), while in Coruña and Pontevedra the councils have been more reticent to give up the benefits derived from ownership of the common lands (Fernández-Leiceaga et al., 2006; Soto, 2016). The fact that classification of the Xalo CF had to be claimed by initiative of the neighbours led to a conflictive start for CF communities which effect is still noticeable.

Entrenched conflicts between stakeholders regarding land management often require professional facilitation and mediation to enable progress in negotiations (Valluri-Nitsch et al., 2017). However, conflict is also recognised as a constant factor in the history of communal forests and plays a central role in processes of social-ecological transition (Soto, 2016), as the generation of 'other shared lives' can only be improved through conflict (García-Quiroga, 2016). In this regard, the cooperation-conflict combination is considered the essence of community life (Stacey, 2001) as well as the seed for the transformation of organizations (Shaw, 2002) and therefore should not necessarily be viewed as hampering the development of a community, but rather as an incentive to continue progressing and as a sign that the community in question is alive and active (Marey-Pérez et al., 2015).

### 3.3.2. Inter-community conflicts: absence of official demarcation

Inter-community conflicts regarding demarcations also arose as a result of the process of official classification of CF, as the maps included in the files relating to classification of the communal forests by the Administration<sup>26</sup> are just sketches and more detailed maps were never developed. Such cases of conflict associated with the lack of demarcation between adjoining CF in Galicia are, therefore, very common, constituting 40% of the cases studied in the meta-analysis of Fernández-Leiceaga et al. (2006) and also stated in other studies (e.g. Cabana et al., 2011 and Marey-Pérez et al., 2014). In the case of the Xalo CF, there has not been a definitive resolution regarding the demarcation, which is viewed as a hindrance to correct management of the

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<sup>26</sup> The files relating to classification of the communal forests can be consulted at: <https://ovmediorural.xunta.gal/gl/consultas-publicas/montes-vecinais-en-man-comun>



land (W1 in table 4.3), as well as something that both communities wish to be addressed in the future (F1 in table 4.2).

‘There’s a bit of a problem with the boundaries, as usual. I say to both groups... “are you going to complicate your life getting involved with court cases and so on for the 10 or 12 hectares of difference between one side and another? In the end you’re going to spend more than the land is worth”’ (#9).

‘The Castelo folk always said that the land was more over that side... but it’s difficult to find written documents now, and getting into these discussions is complicated... moreover with neighbours’ (#7).

According to Marey-Pérez et al. (2014), recognition of a conflictive identity regarding the communal property owing to physical and administrative problems may generate passive communities not interested in managing the land. However, this does not apply to the Xalo communities, as according to Marey-Pérez et al. (2014) again, the perspective of the communal forests as multifunctional systems indicates an active community. This is the case here, as we will see further below (S7 in table 4.3).

### 3.4. Age as a key factor for involvement in communal management

The SWOT analysis identified a relevant factor related to the dichotomous categorization of the community members into ‘young’ and ‘old’. The interviewees often attributed older people with a passive attitude regarding the use and management of the forestland, which leads to a merely economic interest in forest exploitation with productive aims (W4 in table 4.3).

‘The older people say “It’s forest, it’s wood, no good for anything else”. People don’t know where the woodland is and they don’t want to go there, they’re only interested in the money’ (#9).

‘The people from Castelo clearly say “We don’t want deciduous forest, because it doesn’t generate anything” [regarding income]’ (#3).

‘There are a few of us older folk there, but there are some very passive older people too. They’re not the active types that you need to get things moving and make things happen, make proposals and get involved. Some of the people that go to the meetings are quite old and pretty passive. It’s a bit sleepy all of this, it doesn’t have that vitality that I mentioned to you. People go to the meetings, but then then don’t go up there [to the woodland] to see what’s being done, and lots of people can’t go any more’ (#2).

This passivity in the communal management associated with the older people appears to be related to a loss of the physical-emotional attachment to the woodland, in turn motivated by the following:

- (i) Physical impediments that prevent older people going to the woodland and exploiting its services and resources.

‘They can’t go any more. Some because they’re old, others because they depend on the tractor’ (#2)

- (ii) A negative association between the woodland and a past history of subsistence work ‘slavery’ (#10) and ‘misery’ (#2).

‘Lots of older people never go to the forest now because before they had to go and work there and it was work, not leisure. We can see now how to enjoy the land in our spare time, but before it was just the opposite: the land was pastureland for grazing the livestock, it wasn’t woodland’ (#6).

- (iii) Biophysical transformation of the landscape after the State afforestation that prevented the communities from maintaining their traditional subsistence way of life, so that the land became understood as ‘just for pines’ (Cabana et al., 2011) and unrelated to them (García-Quiroga, 2013) in addition to being impossible to recognise.

‘Before, we made use of everything—everything. But people live differently nowadays’ (#10).

‘If you take someone of 80 years old up there, they’ll get lost, because it’s not the land they knew. They won’t find the stones, the markers’ (#7).

‘My dad and all these people came here to plant wheat—they came with the cows and there were paths—but then they started making firebreaks and all of that... If you bring the old folk here, they won’t know it. They knew paths that aren’t there now’ (#9).

We claim that an aging population that doesn’t visit the land or enjoy its products will not be able to appreciate the services that it provides, especially the cultural ES, e.g. recreation, visits, socialization, shade in summer, etc. Accordingly, these people will not be comfortable in the management role. Thus, the interest in the communal forest lies in a short-term vision based on economic yield, preferably involving forestry production (Suárez and Soto, 2018) and even more preferably managed by the Regional Administration through agreements (Cabana et al., 2011). This vision is particularly common in areas characterised by regressive demographics, where intergenerational commitment no longer makes sense (Fernández-Leiceaga et al., 2006). In the present case study, the mean age is high, 50 years in 2018, with pensioners representing 28% of the population and young people below 20 years old representing only 13% (IGE, 2018). In addition, in both CF, agreements are in place with the Regional Administration. Thus, the forestry production vision associated with older people was clearly observed in the interviews, especially in the parish of Castelo, where the population is tending to decline (figure 1.4 in Chapter 1) (INE, 2018).

The link between the community and the common land has previously been recognised as a key factor for the success of the community’s survival. López-Iglesias (2017) differentiated three fundamental problems facing the community at the moment, two of them being the weakness of the sociodemographic base and the scant relationship between most community members and exploitation of the common land. On the other hand, García-Quiroga (2013) stated that it was the link between community and land

which enabled maintenance of common land, despite the changes that have taken place.

Therefore, the importance of older people's attitude about management of the common lands is at present of crucial importance, even when this is not the majority demographic sector in the communities. The importance lies in the fact that the oldest male member of the household has traditionally represented the family unit in the CF assemblies (DOG, 2006, 1992)<sup>27</sup>. Thus, although for the reasons given above it may be assumed that the older people will not be responsible for managing the common land, in practice they often are, and their attitude regarding management of the land and the ecosystem services derived from these is, therefore, critical.

Nevertheless, a tendency towards forest use of the communal land does not necessarily imply a lack of interest in or feeling for the land. Forestry is the simplest method of maintaining active use of land, 'not abandoned', when the community has lost the physical link with the land and given the current context of forested land created by institutional forest policies (both in the past through State afforestation and in the present via forest agreements with the Regional Administration (Balboa et al., 2013)). 'It looks nice planted with trees and it's better that way than with nothing' (#10). This reasoning is similar to that underlying the association reported by Martínez-Cabrera (2016) between feeling of belonging of the proprietors and the acceptance of presence of eucalypts in their plots, in contrast with the prejudices that would a priori indicate otherwise. This author states that one of the main reasons for the acceptance of eucalyptus is the understanding of this

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<sup>27</sup> The regulation of 4 September 1992 following from law 13/1989 related to communal forests, establishes in article 39 that representation of the household in the General Assembly will be designated by the members of each household or, otherwise, by the person responsible for managing the family business. In turn, management of the family business corresponds in the first instance to the 'patrucio' [i.e. the oldest man in the household (RAG, 2020)], in accordance with article 164 of law 2/2006 (civil law, Galicia). In addition, section V of the same law regarding 'house and neighbour', although excluding communal forest because it has its own law, establishes that the 'patrucios' of a parish are those who administer the common goods, thus highlighting the power of representation associated with this family figure.

phenomenon as a continuation of the productive exploitation of the land practised by their predecessors. The same argument can be applied to the forest use of the communal forests to the detriment of other types of use. This underlies one of the main reasons for regenerating the interest of the older people in managing the land: encouraging their enjoyment of the services provided by the communal land may help foster the physical-emotional attachment. Examples of this may include providing products that enhance wellbeing, such as firewood, honey and chestnuts, as well as providing the opportunity to visit the land periodically, safely and comfortably, e.g. by providing transport and guided visits. 'Yes, I would like to go to Mt Xalo for a walk sometime' (#10). However, the generational replacement of family representatives attending community assemblies may be regarded as a source of active social capital for the community.

### 3.5. The social capital of the communal forest: young people and the associative fabric. Reassignment of the meaning of the communal land

In contrast to the older members of the community, the young (or not so old) people are often described in the interviews as active and showing initiative (S1.5 in table 4.3). These members are attributed with the recovery of the Castelo CF ('It happened thanks to the young folk', #9) and they are considered an important source of social capital in the Celas CF ('We want the young folk to join us on the CF Executive Board, so that they bring others', #1). In addition, it is the young people who use the communal land most often for sporting and other leisure activities ('The young ones go around a lot on their bikes', #2). They promote the existence of an active network of cultural and sports associations that organise various different types of activities in the CF, recognised as a factor in the social dynamization of the community (S1 in table 4.3). 'The association Castelo Deporte was formed by the young folk' (#6). 'It was the young people who worked hardest to clear the cycle track on the woodland' (#1). The existence of active associations related to both communal forests (Celas and Castelo) also strengthens the

three types of social capital, i.e. bonding, linking and bridging<sup>28</sup> (Megyesi et al., 2011). ‘We have a very good relationship with them [from Celas]—they have different ideas—they’re younger’ (#9). ‘There are some people from Celas in our associations [in Castelo] and they help us with whatever we need’ (#6).

It is noteworthy that the aforementioned recreational use is leading in the present to development of the essential physical-emotional attachment to the communal land and to the attribution of renewed meanings and appreciation (S2 in table 4.3). ‘We never paid much attention to the woodland although it was just right there beside us. (...) We never did this thing of taking a rucksack and going there all day. We didn’t do it because it was just there, so we didn’t give value to it’ (#6). Visiting the communal land and getting to know it leads to appreciation of the area. This, in turn, fosters a greater desire to maintain the land in good condition and leads to greater involvement in the management beyond economic considerations. ‘This is where we have the race [Castelo Deporte]. The people who come here to run see the work that has been done [clearing] and they appreciate that. If we were paid, we probably wouldn’t do it, as it is something that we enjoy’ (#9).

At this point it is interesting to recognise the parallelism between the social function of the communal land in the past and at present. In the past, the communal land was a place where people met up and interacted through the agricultural work (García-Quiroga, 2013). The same has been observed in similar types of communities in other countries, such as Portugal (Pereira et al., 2005). After a period of disconnection between the land and the community during the ‘triple breakdown’ (1950s-1980s), the role of the communal land as a spatial element of socialization and cohesion has been recovered, with a new significance throughout sporting, leisure and cultural

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<sup>28</sup> According to Megyesi et al. (2011), ‘bonding social capital’ refers to horizontal, face-to-face relationships occurring in homogenous groups (like a neighbourhood community). ‘Bridging social capital’ would be the links between members of more distant groups. Their division into inter-community ties leads to ‘linking social capital’, the linkages between people who interact across explicit institutionalised social power gradients.

activities promoted by the local associations. Thus, over time and through the work-leisure dichotomy, the communal land has become consolidated as a space for community cohesion and now as a space for visitors too.

### 3.6. The diversity of roles involving governance of communal forests

Returning to the role of the active social capital associated with the CF, we found that the associative fabric led to the involvement of committed people in the maintenance of the CF who were not part of the CF community as they were not living in the corresponding parishes. 'Lots of them don't live here, but they come every weekend' (#9). For instance, the parish of Castelo has an ageing population and little generational turnover (W3 in table 4.3; figure 1.5 in Chapter 1), but a high level of engaged social capital via local associations (particularly Castelo Deporte). In this context, it is pertinent to consider whether new roles should be generated in the CF community to integrate people interested in participating in CF governance. In this vein, Fervenza—a member of the CF community from Reboreda (Galicia)—has pointed out that, in order to improve CF management and favour generational replacement, we must 'open the CF up and invite anyone who is interested, including people who are not members of the community or do not live in the parish' (Proxecto Batefogo, 2019—chp.10). This type of situation is not contemplated in the current law pertaining to communal forests (DOG, 1989), but it may constitute a pertinent reflection at the moment for Galician CF communities, especially in those with deeply eroded social capital.

Participation in the processes of collective, democratic government of communal forests provides a valuable opportunity for community and individual development (García-Quiroga, 2013), but instead there is a contrasting high personal cost. This cost is derived from several factors:

- (i) The difficulty in achieving a balanced involvement of all community members.

‘Everyone just does their own thing’ (#1).

‘We, the neighbours, are the biggest threat: that only one person decides about the water supply and what to plant on the forestland’ (#6).

- (ii) The difficulty in reaching collective agreements (W8.2 in table 4.3), sometimes involving hundreds of people (Fernández-Leiceaga et al., 2006).

‘Living together and having everyone agree was always difficult and still is. This is the thing, being able to understand each other’ (#6).

‘Who can get 300 hundred people to agree?’ (#3).

‘It’s very difficult, too bad, for all of us to agree. There are different ideas about everything’ (#8).

- (iii) The lack of experience of the community members as forest managers due to the absence of a forestry culture or tradition (Touza et al., 2010) (W8.3 in table 4.3).

‘They [current CF neighbours] were never involved in CF management and they’re not used to it, they just don’t know... And everyone has their own job, children, family—they don’t have so much time to spare’ (#3).

- (iv) The perception of CF governance as a ‘burden’, especially for members of the executive boards (W8.1 in table 4.3).

‘Everyone’s got their own opinions about the CF. You’ve got to do administrative tasks, keep up-to-date, be responsible... You’ve got to be persistent and lots of other things. It’s not a personal business, I don’t live from this and it’s taking up my time. I do it to help out, but I don’t need this responsibility’ (#2).

‘This is pure altruism, you go to the assemblies and get called all sorts of things. The reward comes when people are happy’ (#1).



The demands largely placed on the board members imply the need for a high level of implication and consensus in the governing board (Fernández-Leiceaga et al., 2006) and may also represent a risk for the community. Megyesi et al. (2011) argue that an imbalance in the composition of the social capital whereby the leaders exert a great deal of power may cause, on the one hand, a situation in which the leaders cannot be easily replaced when required and, on the other hand, that the leaders themselves may tend to develop blinders that reduce their resilience to changing framework conditions. These issues may be avoided by a conscious planned formalization of the organizational structure and suitable sharing of responsibilities (Megyesi et al., 2011).

Given that the CF communities are nested within a context of multilevel governance regimes, good coordination between the different levels is essential for correct management of communal lands (Gómez-Baggethun et al., 2013; Ostrom et al. 1999). The Forest Authorities were often criticised in the interviews due to the scarce resources invested in maintaining the CF, the incapability to resolve conflicts and the lack of emotional involvement by the paid personnel (T4 in table 4.3). The public employees also recognise their impotence in light of the lack of sufficient funding from the Regional Administration ('What can I do? My hands are tied. There is no money, so I can't implement the type of management that I would like to', #3). The possibility of rescinding the management agreements reached with the Forest Authorities was contemplated by the interviewees from both communities as an opportunity to improve the CF governance ('I think it would be better [to rescind the forest agreement], then you can decide! Look, you're not going to do anything out of this world, but you're not going to leave this without planting anything' #7)<sup>29</sup>. Indeed, the prevailing legislation stipulates the cancellation of all such agreements by the end of 2021 in the cases of communal forests that do not have a balance due or do

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<sup>29</sup> In fact, after the election of the new executive board of the Castelo CF in 2019, the existing forest management agreement between the community and the Regional Administration was rescinded.

not meet the purposes for which the agreement was signed. (DOG, 2017). Fernández-Leiceaga et al. (2006) agree that most forest agreements should disappear, but an amnesty of debts must be granted to give the communities a leading role and facilitate the transition from passive rentier to active participation.

Although only 20% of the communal forests count with an approved management blueprint (Xunta de Galicia, 2019), both Xalo CF were in the process of elaborating or editing one. In fact, a correct forestry planning of the communal forests was considered important by all interviewees (W11 in table 4.3). This was often related to fire prevention and financial optimization of the CF accounts. Confidence in the figure of the forest engineer as an expert in forestry planning and management was frequently referred to: 'We need a professional to direct everything, because the committee members may change' (#2). 'The ideal situation would be to have a regulatory plan that told us what we have to do' (#3). However, Ferverza—in Proxecto Batefogo, 2019—chp.10—warns of the risk of delegating 'CF management in the hands of an engineer who takes decisions with short-term aims based on economic yields, little in tune with the idea of sustainability, community and favouring generational replacement', a common practice in forest regulations. This suggests the need for the emergence of a new role for forest engineers as a bridge helping CF communities to achieve their desired aims, in contrast to the classical role of a unilateral expert manager.

Precisely, bridging institutions play a key role in multilevel complex governance systems (Farhad, 2015). Hence, other figures associated with the CF communities could facilitate sustainable forest management viably providing services of technical and legal assessment. These may include landscape stewardship associations (i.e. external bodies that offer assessment and intervention enabling the community to achieve sustainability objectives<sup>8</sup>), as already successfully implemented in the Grouping of Communal Forests of Pontevedra (Mancomunidade de Montes

de Pontevedra, Galicia)<sup>30</sup>. The Galician Organization of Communal Forests (ORGACCMM) groups all of the Galician CF and provides information and discussion forums. In addition, [Fernández-Leiceaga et al. \(2006\)](#) propose the creation of a specialised administrative structure for these communities, a CF Council, with a Permanent Observatory of CF.

### 3.7. The wildfire threat and the silvopasture alternative

‘There’s the threat of wildfire, which we haven’t suffered from recently. It hasn’t happened, but because we were lucky. The threat is always there’ (#6).

‘I sometimes think that this is a time bomb’ (#7).

Almost every interviewee named wildfire as a threat to the Xalo CF, often as the principal threat (T1 in table 4.3). This was attributed to various social and ecological factors such as the presence of eucalyptus, the absence of livestock to clear the understory, the steep slopes in some zones and the abandonment of surrounding plots that could act as ignition points.

The social perception of fire as a threat has been identified in other studies of communal forests ([Marey-Pérez et al., 2014](#); [Toucedo, 2015](#)) and has been verified as one of the main threats to Galician communal forests in recent years ([Alló and Loureiro, 2016](#); [Balsa-Barreiro and Hermosilla, 2013](#); [Fuentes-Santos et al., 2013](#); [Soto, 2016](#)). Fire is considered, indeed, one of the three most important types of perturbation affecting temperate forests worldwide ([Thom and Seidl, 2016](#)). The consequences are potentially disastrous for the associated CF communities and for society in general, given the ecological and recreational roles of communal lands nowadays ([Cabana et al., 2011](#); [Fernández-Leiceaga et al., 2006](#)). In this regard, the investment by the Galician Government is currently focused on fire prevention policies, despite this has led to a reduction of reforestation works and improvements to the CF having forest agreements ([Fernández-Leiceaga et al., 2006](#)). Thus, the

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<sup>30</sup> Description of the custody agreement and objectives of the Mancomunidade de Montes de Pontevedra can be found at: <http://montespontevedra.org/index.php/custodia>

communities are often left to make this type of investment, which can only work in the most dynamic communities (Fernández-Leiceaga et al., 2006). Both the lack of public investment in reforestation and its replacement by private investment is affecting the Xalo CF. The interviewees often complained about the forest clearings remaining after the Regional Administration carried clear-cutting with no further reforestation, e.g. 'They cut the trees, but didn't replace them, they say that they haven't got money to replant' (#6). 'If they haven't got money to plant, why fell the trees that are there? I'll have to plant some myself' (#9).

In a similar way, Alló and Loureiro (2016) found that the most active communities in relation to communal management record fewer forest fires and have a greater perception of the negative effects of fire related to the development of a strong feeling of belonging. No fires of significant size have been recorded in the Xalo CF in the last few years. The Culleredo council region, which includes Mt Xalo, is not considered a high-risk fire zone, although it is surrounded to the west and southwest by such zones. In addition, Xalo is not included in the category of parishes where high fire activity is recorded and it does not adjoin and is not close to any parishes of this type (PLADIGA, 2019).

A common proposal that emerged during the interviews in relation to preventing forest fires was the use of grazing livestock as a 'cheap and natural' method of clearing that could be used as an alternative or complementary to the use of forest machinery. The combination of livestock introduction and planting broadleaved species as firebreaks was often proposed during the interviews.

'Every herbivore is a firefighter. Wherever there's livestock the forest doesn't burn and you can go walking. They're really cheap, they don't use petrol and they don't break down' (#4).

'Look where there are horses and where there aren't any. You come here and it's noticeable [the absence-presence of scrub in the grazed and non-grazed areas is obvious]. Before bringing the horses here, the gorse was really

high, you couldn't go walking here and look now. No-one has been with a machine to clear this, they [the horses] are here all year. Because, how much does a tractor cost? Year in year out...' (#9).

The social perception of grazing livestock as a positive tool for fire is backed up by worldwide recognition and is, moreover, related to the provision of many other ecosystem services, especially cultural services (Leroy et al., 2018). National studies have also reported that the presence of livestock is perceived to be one of the most important factors contributing to the social wellbeing of an area, with fire prevention particularly highlighted (Oteros-Rozas et al., 2014). Indeed, it has been demonstrated that the presence of livestock grazing in woodland, i.e. silvopasture, constitutes an effective tool for controlling brush, reducing the risk of forest fires and increasing biodiversity of the understory (López et al., 2017; Rigueiro-Rodríguez, 2009). Apart from fire prevention, the interest shown by many of the interviewees in introducing livestock in the Xalo CF is related to improved access to the area for recreational use, the maintenance of a 'clean', not abandoned state, the increased biodiversity, hunting and the creation of associated jobs (S6, O1.2, O4, O7.1 in table 4.3; F6 in table 4.2).

'I bring the birds of prey, the foxes, the wolves. Me alone, with a flock of sheep and livestock, I go up there and bring all of this' (#4).

'There used to be lots of woodcocks because there was livestock. I remember there were curlews, common snipes, lapwings. Now there's no livestock in the forest. But it might be good for keeping the land cleared and not to have to clear it so often' (#5).

'Clearing the brush is really expensive. So, we're planning projects... goats, a flock of sheep, one person. The community would have to pay X. But if they keep the land cleared that's production, indeed' (#1).

However, the presence of sheep and goats is almost non-existent in the Galician communal forests, despite the potential economic and environmental benefits (Fernández-Leiceaga et al., 2006). This is largely due

to the fact that rural development programmes have generally overlooked communal forests when applying means of promoting the use of livestock (Fernández-Leiceaga et al., 2006). Silvopasture systems therefore constitute an agreed opportunity to improve communal land management and ecosystem provision that could be implemented in the near future or increased in the case of Castelo, which is already carrying out a pilot project with feral horses led by individual initiative.

### 3.8. The vision of multifunctional forest management and land use planning

In the interviews, the interest in developing silvopasture systems for the communal forests went hand in hand with a vision of multifunctional forest management<sup>31</sup> (F5.2 in table 4.2).

At present, the neighbours are inclined towards two different visions of correct forest management, which, as already mentioned in section 3.4, may be related to the physical-emotional attachment with the communal land. Thus, there is the vision that focuses exclusively on optimising the forest management to produce timber (F5.1 in table 4.2), which contrasts with the proposal to diversify forest production, with less emphasis on timber yields and greater valuation of the social function of the communal forest. The latter corresponds to the vision that we denominate ‘multifunctional’ or ‘silvo-pasto-recreational’, because of the emphasis given by the interviewees on use of the land for grazing and recreation (F5.2 in table 4.2).

The silvo-pasto-recreational vision does not rule out forest exploitation, but rather argues for diversified and rational planning of the land uses. Thus, the interviewees propose planting timber species in the most suitable areas,

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<sup>31</sup> Here, multifunctional forest management is aligned with the definition by Manning et al. (2018) regarding ‘ecosystem service (ES) multifunctionality’ rather than ‘ecosystem function (EF) multifunctionality’: ‘A key distinction between these is that EF-multifunctionality attempts to objectively represent overall ecosystem functioning without any value judgement regarding the desired level or types of function, whereas ES-multifunctionality represents the supply of ecosystem services relative to human demand’.

separately or in combination with the management of other resources or uses, both for productive, protective or social purposes.

‘How will this be planted in 2040? There could be areas for making money and other areas for planting native species that are there for life. It’s not for... [commercial exploitation] it’s for life, for health. It would be good if there were four walking trails marked, if there was space for bikes, space for whatever...’ (#6).

‘I think that we have to look for alternatives to this. Timber production is part of the use of the woodland, but it’s not the future. We’re looking into planting native species, chestnuts - and focusing on chestnut production. (...). We’re thinking up projects: goats. (...). The value, apart from the timber, is there below [in reference to the views of the landscape]’ (#1).

‘There should be space for some eucalyptus too, that wouldn’t be a problem, if it was done properly... Here, for example, behind where the pylon is, would be better for grazing because it’s impossible to use any machinery here. I don’t think anyone is going to take any wood out here. (...). Having areas for grazing livestock is beautiful and makes firebreaks, and it doesn’t stop you having some chestnut trees or oaks there too’ (#9).

Forest planning for a diversified woodland is, moreover, perceived as protective, as the communal forest would be maintained active and cared for, in contrast to the potential abandonment (W9). ‘You protect the land by using it. It should be used. When it was used before, it was cared for, but now?’ (#7).

It is well acknowledged that land management decisions directly affect the provision of ecosystem services (Rodríguez et al., 2006), with high-intensity management regimes having a negative impact on biodiversity, health, recreation and water supply (Sing et al., 2017). Thus, the proposal of a more intensive, less diversified forest exploitation (F5.1 in table 4.2) will derive in negative effects over ES as well as the greatest trade-offs between ES, whereas multifunctional management favours the greatest possible number

of synergistic interactions between ES and enables integration of production, conservation and recreation within the same space (Torralba et al., 2018). Multifunctional landscapes were found to provide higher numbers of regulating and cultural services and are also preferred for their aesthetic quality (García-Llorente et al., 2012). Moreover, in accordance with the statement made by interviewee #6 [(...) 'planting native species (...) for life, health], Sandifer et al. (2015) offers reasons associated with health and social wellbeing to prioritize forest planning that favours biodiversity, in accordance with an extensive review of studies supporting this idea. Tew et al. (2018) agree that forest regulations aimed towards planting diverse tree species particularly favour the provision of cultural ES. These authors also emphasise the aesthetic importance of forest openings that do not correspond to clearfell areas. However, clear-cutting is currently the most common in forest exploitations in Galicia and involves the use of fast-growing species for timber production (Touza et al., 2010). Fernández-Leiceaga et al. (2006) remarked that this type of plantation reduces the possibility of including different types of use in the same space, whereas planting slow-growing broadleaved species enables extensive livestock grazing of the understorey as well as recreational use of the communal forests. Moreover, managers of communal forests with diverse tree species and age, use to apply longer rotation periods due to the valuation of the non-timber benefits offered by species diversity (Touza et al., 2010).

Therefore, the vision of multifunctional use applied to management of communal forests would favour ES provision and trade-offs reduction between these. Multifunctional landscapes were found to have higher social support for their conservation in a study conducted in southern Spain (García-Llorente et al., 2012). Accordingly, Fernández-Leiceaga et al. (2006) are optimistic and sustain that multifunctionality and multiactivity are currently and will continue to be characteristics of Galician communal forests in the future.

However, beyond forest planning and management, the interviewees also recognise that correct spatial regulation of the recreational uses would



reduce the trade-offs existing between different groups of users (e.g. hunting, motocross, cycling, trekking) (T9 in table 4.3).

‘I think it would be great if this continued to belong to everyone and that it could be exploited more for enjoying our spare time, more comfortably—you know what I mean? (...). What it needs is for the motorcyclists to respect the cyclists, and whoever...’ (#6).

‘There’s room for everyone. If we respect each other, there’s room for everyone’ (#7).

This desire for regulation of the different uses of the space aimed at improving coexistence of the different users was already identified in the findings of the surveys on the social perception of Xalo (Chapter 3, section 3.4 and Appendix B4). [Fernández-Leiceaga et al. \(2006\)](#) argue for agreements between Galician CF communities and the Regional Administration for Regulatory Plans for Uses for each communal forest, based on the Regulatory Plans for Uses of Rural Spaces. According to the authors, these instruments would enable rationalization of the uses of the space and would also count on the necessary monitoring system and graduated sanctions for correct functioning of the communal land ([Alló and Loureiro, 2016](#); [Ostrom, 1990](#); [Pagdee et al., 2006](#)).

Although the scientific literature on multifunctional communal forests in Galicia is still scarce, because communities themselves are undergoing a process of reinvention, the articles by [Domínguez et al. \(2014\)](#) and [Suárez and Soto \(2018\)](#) provide some current examples that may serve as models for other communities. Specifically, these examples share some characteristics with the Xalo communities, such as their location on the Atlantic coast, a relatively high level of socio-economic dynamism, urbanization and eminently urban-forest land use ([EGIV, 2019](#)).

The models reported by [Suárez and Soto \(2018\)](#) include, e.g. the peri-urban Mourente communal forest, which was previously used as a waste dump and for motor races. The area has now been recovered as a green space for

recreational use by the whole community and by visitors from urban zones. The Baroña communal forest benefits from the economic exploitation of diverse forest species while also maintaining areas of broadleaved species for social use. The community collects fungi and chestnuts, own horses, organize guided visits and educational activities and has demarcated a motocross circuit. The Santa Cristina de Ramallosa community forest provides honey and firewood to the community members, who manage an important archaeological park as well as forest production. The O Rosal communal forest comprises an enormous afforested area that represents an important source of employment for local people. A proportion of the benefits obtained are used for social purposes such as repairing local water supply or investing in local sporting, cultural and educational ventures.

Domínguez et al. (2014) reported the projects developed by the Vincios communal forest association, which include introducing livestock to control undergrowth and economically supporting the reforestation with native species, including chestnuts (to produce fruit and timber, increase biodiversity, prevent fires), inoculation with mycorrhizal fungi, installation of a biomass plant and constructing a webpage with sensitive cartographies.

All of these are examples of resilient communities that have adapted to current local needs in their respective areas. The models of communal reinvention are very different from both the old model based on organic agriculture and the model of exclusive forest production, serving as reference models for other communities in the process of reinvention.

### 3.9. Implications for ecosystem services and policy directions for the success of communal forests

The paradigm shift in the lifestyle and production model associated with communal forests after the 'triple breakdown' (Suárez and Soto, 2018) led to a change in the type of products associated with the woodland and a decline in the provision in certain ecosystem services (Gómez-Baggethun et al., 2013). This situation has been widely recognised by the social network of the Xalo communal forest associations, who emphasised the decline in some

ecosystem services such as provision of food, biodiversity, fire prevention and cultural heritage, among others (P4, table 4.2). We have avoided carrying out a standardised classification of the ecosystem services perceived by the interviewees, as the focus of the interviews deliberately avoided mention of the scientific terminology. In addition, the CICES classification that we explored in the previous chapter (Haines-Young and Potschin, 2018) does not fully capture the holistic nature of the multiple values associated with the land in free-listing exercises (Bieling et al., 2014; Stålhammar and Pedersen, 2017).

As mentioned in the previous section, the multifunctional management of the CF resources would enable diversification of uses, services and products, with a consequent increase in ES provision. This would enable, in turn, the possible development of new business models and payments for ecosystem services (van Noordwijk et al., 2012; Wegner, 2016) (O1 in table 4.3), potentially creating new jobs (O7).

Interestingly, many of the alternatives mentioned by the interviewees regarding their visions for the future (table 4.2) coincide with those given above in the examples of resilient community groups managing multifunctional communal forests (Dominguez et al., 2014; Suárez and Soto, 2018). The proposals mentioned by the interviewees to achieve those visions are gathered in table 4.3-Opportunities and included the following: complementary forest products, also known as 'edible forest products' (fungi, honey, chestnuts, forest fruits) (O1.1), both for own consumption and the sale of surplus goods; the introduction of livestock (O1.2) and planting broadleaved species for fire prevention (O4). Projects that provide services to the users were also proposed (e.g. civic centre, dressing rooms, viewpoint-restaurant) (O5), as were new economic activities associated with the provision of cultural services, such as recovery of the archaeological heritage, with the possibility of carrying out guided visits (O1.4, O8) and also water supply and management services in Castelo (O1.3) as already exist in Celas. Finally, in relation to these projects, the interviewees often mentioned a desire to create local jobs (O7), as well as to professionalize the cultural and

sports associations already existent in the SEU in order to consolidate a 'cultural industry' around the communal forests (07.3) that attracts visitors and strengthen personal links (physical-emotional) between local stakeholders and the land.

The importance of the ecosystem services provided by communal forests and their key role in Galician society today is increasingly being recognised, mainly in relation to the environment and recreation (Fernández-Leiceaga et al., 2006; ORGACMM, 2018), but also as a key resource for the development of rural areas (López-Iglesias, 2017). The latter author highlighted the importance of determining the *real* social demand for goods and services derived from Galician communal forests in order to facilitate the transition to multifunctional uses and services in the near future.

In the Xalo CF, the social demand towards provision of a multitude of ecosystem services was demonstrated by the results of the public surveys analysed in the previous chapter. On the other hand, in the current chapter it was found that the community owners of the Xalo CF feel proud to provide this public service and display altruism and dedication with the aim of providing even more ES, under better conditions. However, in order to satisfy the existing demand in a sustainable manner, the design and implementation of new rural development policies are essential to ensure the economic, ecological and social viability of the communal land and the associated community groups. Such policies should first foster recognition of CF and their value regarding the wellbeing of society in general and then proportionally compensate the community groups for provision of the ES. This is particularly necessary in the case of regulating and cultural ES, which are not generally valued in monetary terms (López-Iglesias, 2017). Tools such as payments to the ES providers and compatible business models for ES are emerging as alternative models throughout the world. Some of the existing initiatives are beginning to be reported in the international and Galician scientific literature. We now consider some examples of these.

In a study examining stakeholder perception of Iberian *dehesas* (silvopasture systems), [Garrido et al. \(2017\)](#) highlighted the problem currently existing in Europe in relation to compensation for multifunctional areas, as the institutional structure of the EU is organised in monofunctional sectors. These authors propose creating a scheme involving payment of bundles of ES, rather than individual ES, that recognises the holistic nature of ES and the multifunctionality of land. The authors also emphasise the contrast between the key role of cultural ES in society and the lack of explicit methods of paying for such services beyond tourism. They call for greater awareness of cultural ES and their inclusion in agri-environment schemes in the common agricultural policy (CAP). Such payments should, in addition, be aimed at obtaining results in relation to ES provision rather than the adoption of management practices ([Marie, 2014](#)). However, the first stage of application of the agri-environment measures was low in global terms, both overall ([Pe'er et al., 2019](#)) and specifically in Galicia ([García-Arias, 2008](#)). Thus, in order to accomplish measures of this type for the period 2021-2027, correct implementation of this type of scheme must first be achieved.

In a study on the social perception of European forests, [Elands et al. \(2004\)](#) highlighted the multifunctional role of these for people beyond the traditional timber production and they consider, like [Garrido et al. \(2017\)](#), that European forest policies should focus on non-material benefits (i.e. cultural ES) of the forests in rural areas. [Gómez-Baggethun et al. \(2013\)](#) presented the mistaken example in a southwestern Spanish common area (Doñana) where conservation institutions promoted ES with market value (e.g. nature tourism) at the expense of intangible cultural ES like traditional ecological knowledge or local identity, which were perceived to have diminished critically.

The study by [Lomba et al. \(2019\)](#) regarding reinvention of social-ecological systems classified as high nature value farmlands is also applicable to the communal forests in Galicia. These authors propose a series of recommendations to improve the socioeconomic viability of these systems. These recommendations include the already mentioned social recognition of

the ES provided by social-ecological systems, the empowerment of rural communities, public investments in services and infrastructure for rural areas, promotion of multifunctional landscapes, fostering of technological innovations and compensation for ES provided to society. The authors state that the latter is essential to guarantee the future socioeconomic viability of the communities. They propose direct financial support and also the development and implementation of positive discriminatory measures that would serve as compensation. Regarding the last point, the development of a fiscal scheme adapted to the nature and functions of communal lands is often called for (ORGACMM, 2018), as the community pays for benefits obtained without any type of reduction, in accordance with corporation tax regulations ('Impuesto de Sociedades'), and when the benefits are shared by the community, the members also pay income taxes for the amount received (Bugarín, 2018).

One measure aimed at improving new business models, proposed by Lomba et al. (2019) and by Garrido et al. (2017), is the design of marks of origin that can be differentiated in regional markets. The Mariñas Coruñesas e Terras do Mandeo Biosphere Reserve, which encompasses Mt Xalo, developed a brand for agri-food products and services from the region that offer values in accordance with the land where they are developed<sup>32</sup>. But the use of a specific labelling scheme for communal forests, or even for each CF community, may be of great use to enhance the recognition and valorisation of the specialised products.

The Galician Green Infrastructure Strategy (Díaz-Varela et al., 2019) includes a review of examples of payments for ecosystem services and business models that can be applicable to Galicia. In this study, communal property is understood to represent a specific opportunity for the development of multifunctional uses in urban forest areas, such as Mt Xalo. The Strategy proposes the application of mixed payment schemes for communal forest groups for the provision of environmental and cultural services (e.g.

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<sup>32</sup> URL 'Marca da Biosfera': <http://marcabiosfera.marinasetanzos.gal/>

landscape and recreation) and relates numerous existing examples that are applicable to Galicia. The business ideas proposed for these areas include initiatives such as: environmental education and forest schools, sustainable nature tourism, extensive farming, the development of high quality traditional products, local markets and transformation industries for ecological products, the establishment of technical assessment offices, biomass production for energy and businesses related to multifunctional exploitation of the forestland (e.g. edible forest products, sporting and leisure activities, etc.).

The article by [Domínguez et al. \(2012\)](#) further offers concrete business examples currently launched in Galicia that can serve as a reference for entrepreneurship and as informal local knowledge brokers for the achievement of sustainable rural development.

#### 4. Conclusions

The methodology of on-site interviews with representative stakeholders from the Xalo CF and the subsequent inductive analysis proved very useful for obtaining detailed information about the SEU and the management views of the diverse stakeholders. Although from different points of view, we found a great deal of consensus in what interviewees considered relevant topics concerning the CF. This enabled a strategic SWOT analysis to be carried out to detect the flaws and opportunities for successful CF management, facilitating identification of stakeholders' desired future visions.

After the shifts experienced in the productive model, institutional framework and community identity during the last decades of the 20<sup>th</sup> century, CF communities now have a new opportunity to reflect and reinvent themselves. They are no longer dependent on CF resources for a living, but the ecosystem services the CF delivers are still vital for today's society, as demonstrated by users' demands. This provides an opportunity for communities to rethink and to make the necessary adjustments. The strategic analysis performed in this study, together with the emergence of

new multifunctional communal forest models for the Atlantic region, may facilitate progress towards more sustainable planning and management of the Xalo CF.

The management of communal forests may, however, represent a heavy burden for associated communities, who must organize themselves, cooperate and invest personal resources to practise deliberative governance. This is especially difficult in the current context of rural depopulation, lack of forestry training of CF owners and non-dependence on CF resources beyond financial aid. Collaboration of nested institutions is thus necessary to overcome constraints and facilitate conflict resolution, professional consultancy and planning assistance, nowadays deficient. After the termination of conventions with the forestry authorities in 2021, a Permanent CF Observatory, an Agroforestry Extension Service or landscape stewardship agreements may be of great help to CF managers. However, it is also essential to promote public recognition and compensation for the ES that CF deliver to society, especially for those non-marketable ES that the Xalo CF provides, i.e. cultural and regulating ES. Public inputs such as payments for ecosystem services, public subsidies, taxation regulations or the development of new business models were discussed in this chapter in the light of international ES literature.



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- 1. Presentation of the team and the study (10 min)**
  - 1.1. Who we are and what we do.
  - 1.2. Why interviews and why you as an interviewee?
  - 1.3. Signature of informed consent form for recording the interviews.
- 2. Presentation of interviewee (5 min)**
  - 2.1. Please state your full name, age place of residence and tell us something about your life and your interests.
- 3. The interviewee and Mount Xalo (15 min)**
  - 3.1. What is your relationship with Mount Xalo?
  - 3.2. What does Mount Xalo provide you with?
- 4. Changes in Mount Xalo over time (20 min)**
  - 4.1. Can you think of any changes that have occurred in the landscape, use or management of Mount Xalo?
  - 4.2. Have these changes altered your relationship with Mount Xalo?
  - 4.3. What threats are there to Mount Xalo at present?
  - 4.4. What would you like Mount Xalo to be like in 2040?
- 5. People involved with Xalo (20 min)**
  - 5.1. Looking at the map of social agents associated Mount Monte Xalo is there anything you would add or modify?
  - 5.2. Do you think that there are any people in the community groups who are not given a voice?
  - 5.3. Do you know of anyone that we should contact for the next round of interviews or activities? Please include some women and young people (contact information).
- 6. Would you like to add anything else?**

**Figure A1.** Interview guide.



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Secretaría Xeral de Universidades



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## FORMULARIO DE CONSENTIMIENTO INFORMADO DE ENTREVISTA

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*A entrevista a realizar ten por obxectivo aprofundar no coñecemento do sistema socio-ecolóxico do Monte Xalo ao abeiro do Proxecto de Tese de Doutoramento titulado:*

*“VALORACIÓN DE SERVIZOS AMBIENTAIS EN PAISAXES AGROFORESTAIS DO NOROESTE DA PENÍNSULA IBÉRICA: UNHA APROXIMACIÓN SOCIO-ECOLÓXICA”*

*desenvolvido por Beatriz Rodríguez-Morales dentro do Grupo de investigación ECOAGRASOC da Universidade de Santiago de Compostela, e financiado con fondos do Programa de axudas á etapa predoutoral da Xunta de Galicia cofinanciado polo Fondo Social Europeo.*

### **Por favor, marque cun X as caixiñas coas que estea de acordo:**

- Entendo que fun seleccionada/o como entrevistada/o para colaborar no proxecto de tese de doutoramento de Beatriz Rodríguez-Morales: “Valoración de servizos ambientais en paisaxes agroforestais do Noroeste da Península Ibérica: unha aproximación socio-ecolóxica”.
- Entendo que toda información que achegue nesta entrevista será tratada de xeito anónimo, seguindo a normativa da Lei Orgánica de Protección de Datos de Carácter Persoal (LOPD), Lei 15/1999 de 13 de decembro (Boletín Oficial do Estado, BOE, España).
- Dou o meu consentimento para que a información que achegue coma entrevistada/o poida empregarse nas publicacións e outros resultados xerados dentro o proxecto de tese de doutoramento de Beatriz Rodríguez-Morales.
- Dou o meu consentimento para que o son desta entrevista sexa gravado co fin de facilitar a análise da información achegada.

### **Datos da/o entrevistada/o**

**Nome e apelidos:**

**Lugar e data da entrevista:**

**Sinatura**

---

¡Moitísimas grazas polo teu tempo e axuda, son de gran importancia para o desenvolvemento deste proxecto!

**Figure A2.** Interview consent form.

Este estudo forma parte dunha tese de doutoramento dentro do Grupo de Investigación ECOAGRASOC da Universidade de Santiago de Compostela. Está co-financiado pola Xunta de Galicia e o Fondo Social Europeo, e o seu prazo de execución finaliza en novembro de 2019.


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**FONDO SOCIAL EUROPEO**  
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**UNIÓN EUROPEA**

Non dubides en contactar  
connosco a través de

Beatriz Rodríguez-Morales  
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**¿Que queremos estudar?**  
A diversidade de significados e aportacións que o monte ofrece ás persoas que viven nel e ós seus visitantes.

**¿Por que o Monte Xalo en concreto?**  
O Monte Xalo é un lugar interesante por moitos motivos: natureza, paisaxe, patrimonio, localización, usos, tipo de propiedade e tecido social, por nomear algúns deles.

**¿Que nos gustaría que ofreceza este estudo?**  
Información útil sobre os múltiples valores do Xalo e as súas potencialidades.

**¿Que estamos a facer exactamente?**  
Estamos desenvolvendo un proceso de consulta participativa mediante enquisas, entrevistas, actividades fotográficas, cartografía, etc., para debullar toda a información da forma máis completa posible.

**¿Cales son as fases a seguir?**

- Enquisas á poboación sobre o uso que fan do Monte Xalo e os beneficios percibidos 
- Entrevistas cos representantes da contorna 
- Actividades fotográficas e grupos de discusión con diversos colectivos 
- Elaboración participativa de mapas, valoración e análise das aportacións do Monte Xalo 
- Encontros para a divulgación de resultados e intercambio de saberes 

**Figure A3.** Information leaflet given to interviewees



## Chapter 5

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Looking at the margins. A gender approach to the perception of ecosystem services through geotagged photovoice

## Mestras de Vida e Terra

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*A costa que subimos cara O Petón era empinada e chea de pedras, ao igual que se fai o camiño das mulleres na toma de decisións nun terreo dominado por homes.*

*Nesta actividade non só nos implicamos no coñecemento do Xalo e na procura de aportacións que o monte oferta ás persoas que viven nel e aos seus visitantes.*

*Cansamos de escoitar que as mulleres non saben traballar xuntas, que as come a envexa as unhas das outras, que rivalizamos e competimos. Así medramos baixo a premisa de que non debemos crer en ninguén e debemos desconfiar de todas.*

*Pois esta andaina deulle unha pedrada a ese prexuízo, pois a realidade foi que cooperamos, dialogamos, emocionámonos, alumiñándonos... Ao mellor na construción de futuros son máis precisas as bágoas de emoción que os golpes na mesa e quererse impoñer. Ao fin ao cabo construír é facer, erguer, cooperar... todo o oposto a destruír.*

*Pois fíxose o exemplo nestas mulleres que coidan, arrolan, traballan, estudan, sosteñen, militan.... Que constrúen camiño e nos lembran que non estamos soas, que estamos xuntas e á vez e que xuntas somos mellores. A veciñanza, a unión e a cooperación fannos invencibles.*

*A aprendizaxe non ten idade e foi para min importantísimo ver as aportacións tan ricas e o que representa o monte para as diferentes xeracións. Descubrindo nesta andaina fotográfica a importancia da convivencia entre xeracións, canto nos aportamos unhas as outras en función das nosas experiencias vitais. Algo que esqueceu o noso sistema educativo.*

*A aprendizaxe foi integral, e lembrounos a importancia do que imos perdendo polo camiño, perdemos a nosa tradición oral. A través de novas canles, cada día temos información a golpe de intro, podemos saber o que acontece a miles de quilómetros, mais esquecemos e descoñecemos o que nos rodea, imos esquecendo a toponimia e a nosa historia.*

*Esta actividade reconciliounos con ese saber, aprendemos unhas das outras, recuperando a transmisión oral e como unhas mulleres podemos aprender das outras e transmitirnos saber, pois por moito que o mundo corra, son as mestras de vida e terra as que depositan en nós a sabedoría da nosa terra, e do noso entorno.*

*Mil grazas por acollerme como unha veciña máis.*

**Laura Rey Pasandín**

*Participante na actividade da fotovoz no Monte Xalo. Setembro 2018*



## Teachers of Life and Land

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*The slope we walked up towards O Petón was steep and full of stones, just like women's path in decision making on a field dominated by men.*

*In this activity, we did not just become involved in acquiring knowledge about Mount Xalo and in the search for its contributions to neighbours and visitors.*

*We are tired of hearing that women do not know how to work together, that they envy each other, that we oppose to each other and compete. Thus, we grow up under the premise that we must not believe in anyone and we must distrust everyone.*

*Well, this walk hit with a stone that prejudice, because the reality was that we cooperated, dialogued, felt thrilled, enlightening each other... Perhaps, for the construction of futures, the tears of emotion are more necessary than the blows on the table and the will to prevail. After all, building is making, raising, cooperating... All the opposite of destroying.*

*And the example has been set in these women, who care for, rock for, work, study, support, are activists. These women who build the way ahead and remind us that we are not alone, that we are together at once and that when we are together we are better. The neighbourhood, the union and the cooperation make us invincible.*

*Learning has no age and it was very important to me to see the rich contributions and what the forest represents for the different generations. In this photographic walk I discovered the importance of coexistence among generations and how much we add to each other according to our life experiences. Something our education system has forgotten.*

*The learning was integral and reminded us the importance of what we are losing along the way. We are losing our oral tradition. Through new channels we have everyday information with an enter key, we can know what is going on at thousands of kilometres away, but we are forgetting and ignoring what surrounds us, we are forgetting out toponomy and our history.*

*This activity reconciled us with that knowledge, we learnt from each other, recovering the oral transmission and the way women can learn from each other and carry wisdom, as, no matter how much the world runs, it is the teachers of life and land who place in us the wisdom of our land and our environment.*

*Thank you so much for welcoming me as a neighbour.*

**Laura Rey Pasandín**

*Participant in the photovoice activity in Mount Xalo, September 2018*

# Table of contents

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*Mestras de vida e terra – Masters of life and land* · 188

## 1. Introduction · 193

### 1.1. Objectives

## 2. Methods · 201

### 2.1. Background: Photovoice, visitor-employed photography and photo-series analysis

### 2.2. Process design and data gathering

#### 2.2.1. Research questions

#### 2.2.2. Participants recruitment and information event

#### 2.2.3. Participants training and teams arrangement

#### 2.2.4. Photovoice transect walks

#### 2.2.5. Deliberative plenary

#### 2.2.6. Photo exhibitions

### 2.3. Data analyses

#### 2.3.1. Qualitative analysis: Coding photographs

#### 2.3.2. Quantitative analysis: Statistical analysis

#### 2.3.3. Spatial analysis

#### 2.3.4. Deliberative analysis

## 3. Results · 219

### 3.1. Characterization of participants, teams and transect walks

### 3.2. What was photographed?

#### 3.2.1. Photo collection

#### 3.2.2. Coding frequencies

#### 3.2.3. Interactions among variables of study

##### 3.2.3.1. Descriptive model based on the photographed features

##### 3.2.3.2. The ES & LV conceptual frameworks in the photo activity

#### 3.2.4. Correlations between photo-teams and variables of study

### 3.3. Spatial analysis

### 3.4. The role of women in the governance of the communal forests

### 4. Discussion · 237

#### 4.1. How many meanings can a photo reveal?

4.1.1. Descriptive model for ES occurrence according to the photographed features

4.1.2. The relevance of the cultural ecosystem services

4.1.3. Let's consider them 'socio-ecosystem disservices' rather than 'ecosystem disservices'

4.1.4. The complementarity between landscape values and ecosystem services

4.1.5. Where were the photographed ES and disservices located?

4.1.6. The heterogeneity of perceptions among female participants

#### 4.2. Methodological considerations on the photovoice process

4.2.1. The perils of content analysis in photo assessments

4.2.2. The coding gaps

4.2.3. The cold nature of ES codes and the need for emotion

#### 4.3. The role of women in the governance of the communal forests

4.3.1. Reasons behind the lower participation of women

4.3.2. Potential contributions of women to the governance of the communal forests

4.3.3. Visions about the communal forest

### 5. Conclusions · 270

### 6. References · 274

*Cando aún nos quedan caminos – While we still have paths* · 289

### Appendices · 291



## 1. Introduction

Participatory assessments of ecosystem services (ES) should involve local stakeholders (Bieling et al., 2014; Chan et al., 2016; Fagerholm et al., 2012; Garcia-Martin et al., 2017; Hernández-Morcillo et al., 2013; Kovács et al., 2015; Plieninger et al., 2013b; Stephenson, 2008) as well as include all relevant actors to capture the diversity of knowledge sources and their multiple values (García-Llorente et al., 2016b; García-Nieto et al., 2015; IPBES, 2016; Masterson et al., 2018; Pascual et al., 2017; Paudyal et al., 2018; Ravera et al., 2016a; Santos-Martín et al., 2016; Scholte et al., 2015). Hence, the diversity of stakeholder perceptions and preferences for ES must be accordingly acknowledged and taken into account in environmental decision making processes, as the decisions of those involved in managing a particular social-ecological system (SES) will have an impact on its future dynamics, resilience and the services the ecosystem can provide (Aregu et al., 2016; Delgado-Serrano et al., 2015; Delgado-Serrano and Semerena, 2018; Dunkel, 2015; Martín-López et al., 2012; Rönnbäck et al., 2007).

Now, it is essential to recognize that individual and collective perceptions vary across stakeholder types depending on particular sociocultural factors, such as the place of residence, social status, education, type of relation with the landscape, age, or gender, among others (Calvet-Mir et al., 2016; Casado-Arzuaga et al., 2013; Garcia-Martin et al., 2017; García-Nieto et al., 2015; Iniesta-Arandia et al., 2014a; Kelemen et al., 2013; Martín-López et al., 2012; Oku and Fukamachi, 2006; Oteros-Rozas et al., 2014; Paletto et al., 2014; Quintas-Soriano et al., 2018; Soini et al., 2012). Intersectional studies made clear that these social categorizations, often combined (e.g. rural elder widow; young urban businessman, etc.), serve as a basis for social inclusion or exclusion, have an impact on the unequal distribution of roles in the domestic and community spheres, as well as in the rights of access, use and management of natural resources (Kaijser and Kronsell, 2013; Ravera et al., 2016b). Even though these categorizations are not explicitly referred, they are often presented as natural differences, reflecting the underlying existing power patterns (Winker and Degele, 2011). These discriminations among people and their rights related to the landscape result, inevitably, in

differences in the contributions received by individuals and, therefore, in the diversity of perceptions, preferences and attitudes regarding the land and its associated ES. Under this conceptual framework, gender is conceptualized as a principle of social organization and power relations rather than a dichotomy between women and men according to their biological sex (Arora-Jonsson, 2014; Cruz-Souza, 2006; Kelemen et al., 2016; Ravera and Iniesta, 2017).

Gender mainstreaming has gained relevance since the early ecofeminist studies in the 80s (Alston, 2014; Arora-Jonsson, 2014; Bock, 2015). Nowadays, it is well recognised the necessity of including this perspective in the scientific, institutional and policy agendas for sustainable and equitable ecosystem management strategies. This has been reflected in the Aichi targets for Biodiversity protection<sup>33</sup>, in the Sustainable Development Goals<sup>34</sup> of the United Nations, or in the Rural Development Programme of the European Union<sup>35</sup>. However, gender mainstreaming is considered to have become an empty signifier (Alston, 2014) with a disappointing marginal effect on environmental practice on the ground (Arora-Jonsson, 2014). Gender inequalities remain, being women largely excluded from the ownership of land and decision-making bodies, while undertaking the great majority of the household, caring and unpaid work (Alston, 2014).

Despite the elaborated body of evidences depicted, many authors point at a huge gap in gender research and claim for a responsible science that takes gender disaggregated data, assesses and raises awareness on how the power relations between women and men may affect sustainability and identify the underlying causes (Aguilar et al., 2011; Brisolaro, 2014; Brown and Fortnam, 2018; Cruz-Garcia et al., 2017; Fortnam et al., 2019; Iniesta-Arandia et al.,

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<sup>33</sup> URL of the gender approach of the Convention on Biological Diversity:  
<https://www.cbd.int/gender/>

<sup>34</sup> URL of the gender approach of the SDG:  
<https://www.un.org/sustainabledevelopment/gender-equality/>

<sup>35</sup> URL of the EIGE:  
<https://eige.europa.eu/gender-mainstreaming/policy-areas/agriculture-and-rural-development>

2016; Kelemen et al., 2016; Meinzen-Dick et al., 2014; Ravera et al., 2016a; Yang et al., 2018).

Research on ecosystem services that examines gender aspects represents nowadays less than 1% of the international state of the art on ES (Yang et al., 2018). Besides, those studies usually focus only in the observed differences between the perceptions, preferences or valuations of women and men towards the ES, rather than analysing the structural reasons that motivate those disparities (Kelemen et al., 2016). Nonetheless, the findings of the existing ES-gender studies point at a highly gendered nature of ES, with sound consensus on the operating drivers being culture, traditions, socially constructed gender roles, institutions, markets and labour relations (Fortnam et al., 2019).

Despite this contextual conditioning, Yang et al. (2018) dare to propose a generalized worldwide ES-gender nexus. In light of the findings from an extensive literature review, they relate women with a stronger perception of water quality and erosion control, soil formation, habitat conservation and support for biodiversity, while men would hold a higher knowledge on fuel, timber and extreme event mitigation services. These findings point to women as more prone to support sustainable management practices that contribute to biodiversity maintenance (Yang et al., 2018). This broad generalization may recall the *essentialist* assumptions from early ecofeminist research that considered women as a homogeneous group inherently closer to nature because of their biological role in reproduction (Brown and Fortnam, 2018), however, the authors stress the correlation of the findings with the specific social contexts, in line with contemporary constructivist ecofeminism. Nevertheless, we can still find contrasting examples when looking at diverse local contexts.

For instance, García-Martin et al. (2017) analysed in six European countries the local perception of landscape values<sup>36</sup>, finding that gender provided

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<sup>36</sup> The term 'landscape values' was developed by García-Martin et al. (2017) on the basis of both the ecosystem services framework and the concepts of 'landscape services' (Termorshuizen and Opdam, 2009) and 'ecosystem values' (Brown et al., 2015). According to the authors, landscape values describe the socio-cultural perception of landscape functions.

some statistically significant relationships within study sites but with no recognizable patterns among countries. In Poland, [Grilli et al. \(2016\)](#) researched the personal perceptions about the ES provision from mixed forests compared to pure stands, but they did not find significant differences between women and men. The study of [Villamor and van Noordwijk \(2016\)](#) focused on a matrilineal society in Indonesia where women's land use choices showed a greater tendency to seek immediate financial benefits, reducing the long-term provision of regulating ES, thus, challenging the mainstream gender stereotypes.

Spain has been reported the second country with more studies on ES with gender lens ([Yang et al., 2018](#)) with just 4 papers addressed: those conducted by [Martín-López et al. \(2012\)](#), [Oteros-Rozas et al. \(2014\)](#), [García-Llorente et al. \(2016a\)](#) and [Calvet-Mir et al. \(2016\)](#). Let's see their main findings.

The study by [Martín-López et al. \(2012\)](#) analysed the social preferences for ES in eight Spanish locations, finding that gender was a significant variable with women showing a higher probability of ES perception than men. Besides, the level of formal education and the environmental behaviour of respondents were also influential variables in the probability of people recognizing the ecosystem's capacity to provide services.

In the Conquense Drove Road (central Spain), [Oteros-Rozas et al. \(2014\)](#) studied the perceptions of the importance of the ES associated to this transhumance social-ecological network, finding differences between the perceptions of women and men. Women valued more the ES of soil erosion control and tree regeneration, while men tended to consider the most important ES those related to livestock breeding (i.e. livestock, manure, connectivity and seed dispersal and bullfighting events). Age and place of origin also appeared as significant variables on ES valuation.

In Andalusia, [García-Llorente et al. \(2016a\)](#) analysed the personal willingness to give up time at a local organization to support ES delivery for the revitalization of rural areas. They found a greater commitment in women despite having less time available than men due to their double occupation



in working and family care. Respondent's place of residence was also a determining variable in the results of the study.

The research conducted by [Calvet-Mir et al. \(2016\)](#) advanced the understanding of gendered environmental perceptions through the analysis of values assigned by women and men to the ES supplied by home gardens in the Catalan Pyrenees. Their findings demonstrated women rated higher than men all the ES analysed. In this case study, gender showed to be more important than any other variable considered.

Additionally, there is a fifth study carried out in Spain that considered the gender variable in relation to ecosystem services, the one conducted by [Iniesta-Arandia et al. \(2014b\)](#). Through qualitative research, they analysed the relationships between women and agroecosystems and how these have changed in the last decades, concluding that differences do exist among women according to the generation, types of relationship with agriculture and the type of management performed. This study recognised the diversity of women's motivations, attitudes, knowledge and practices, in accordance with contemporary constructivist ecofeminism, thus helping to overcome the consideration that women constitute a homogeneous group.

Attending to these Spanish case studies, we find the intersection of different sociocultural factors in the shaping of people's attitudes towards ecosystems and the services they provide, with gender showing up as an essential variable. In this regard, Spanish women are depicted as generally more sensitive to ES appreciation and environmental conservation than men, motivated by the traditional context of gender socialization.

Hence, in light of the existent gendered perceptions regarding ES and the pro-environmental trend in women's way of thinking, this should entail implications in the design of policies for ecosystem management and the systemic inclusion of women in environmental decision-making processes. Otherwise, the instrumental view of ES could be further strengthened ([Brown and Fortnam, 2018](#); [Kelemen et al., 2016](#)) and the resilience of the SES compromised ([Aregu et al., 2016](#); [Delgado-Serrano and Semerena, 2018](#)).

To conduct intersectional research, [Kaijser and Kronsell \(2013\)](#) propose to start by reflecting on which social categories have been represented in the process, which were absent and the existing relationships between them. Another key question that the authors point out is to ponder which identities are encouraged and legitimated to become involved in political action. In the Galician communal forests (CF), the participation of women in governance (i.e. in the General Assemblies of Neighbours) is minor due to consuetudinary gender roles and dynamics: the Galician legislation gathers the customary practice of designating the male elders as representatives of the family house in the CF assemblies ([DOG, 2006, 1992](#))<sup>37</sup>. This gender segregation may have an impact on the perception of CF governance as a legitimate space for men only with consequences in the participation, use and perception of the CF and the ES provided to individuals from each gender ([Meinzen-Dick et al., 2014](#)).

This trend has been effectively observed in our previous research stages: a noticeable lower number of women participating in the opinion survey (30%) (section 3.1 in Chapter 3), with statistically significant differences in their ES perception and valuation compared to men (Appendix C in Chapter 3). Furthermore, we verified an almost non-existent representation role of women within the varied institutions related to the social-ecological unit (SEU) (table 4.1 in Chapter 4) and, specifically, within the CF, with less than 30% of female representation in the CF assemblies, according to our informants. Thus, women's views and values have not yet been sufficiently recorded in this broad socio-cultural ES analysis. We can, therefore, infer that

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<sup>37</sup> As already mentioned in [chapter 2](#), the [Regulation of September the 4<sup>th</sup> 1992](#) that develops the [law 13/1989 of communal forests](#), establishes in its article 39 that the representation of the house in the General Assembly of Neighbours will be designated by the members of each house or, otherwise, exercised by the one who assumes the management of the family business. The management of the family business corresponds to the person who determined the contract or, otherwise, to the '*patrucio*', i.e. the oldest man in the house ([RAG, 2020](#)) (articles 163 & 164 of the [Act 2/2006 of the Galician civil law](#)). In addition, the [Act 2/2006 of the Galician civil law](#), although excluding CF for having their own norm, establishes that the *patrucios* are the ones who would administer the common goods of the parish, which emphasizes the power of representation associated to this male figure within the family.

women constitute an underrepresented collective of interest for analysis in this case study.

Contrastingly to the low representativeness of women, they constitute 50% of the population in the parishes of Celas and Castelo (INE, 2019), while in Galicia they reach 52% of the total society (IGE, 2019). Therefore, the participation of women in the decision-making processes of landscape planning and, particularly, in CF governance, is a matter of gender equality and social justice (Aregu et al., 2016) in the form of distributive justice—a type of environmental justice itself (Aragão et al., 2016).

The research interest in this chapter was not focused in finding and comparing the specific differences among women's and men's ES perceptions, but to gather the voices of women—understood as stakeholders in the margins of community governance—in order to complement previous results in this Thesis and to complete the whole picture of the ES assessment. This implies the necessity of testing novel techniques that may be able to engage women in this stage of the research. In this regard, the engagement of actors that remained underrepresented in conventional approaches (e.g. those developed in Chapters 3 and 4) may be encouraged by research methodologies involving artistic and creative practices that allow participants to express freely, such as the photovoice method (Capous-Desyllas and Bromfield, 2018; Harper and TSRAECD, 2009; Wang and Burris, 1997). Also, narrative socio-cultural approaches for ecosystem services valuation may be favoured by the holistic conceptual framework of 'landscape values' (LV) (Stephenson, 2008), closer than existing ES classification systems to how people express their perceived benefits and values from landscapes (Bieling, 2014; Bieling et al., 2014; Fagerholm et al., 2016; Garcia-Martin et al., 2017). The cultural values model proposed by Stephenson (2008) addresses three components of landscape values (forms, practices and relationships) as well as their temporal dimension (past or present, i.e. embedded and surfaces values, respectively) (find more details on this concept in section 2.3.1).

According to this background, the underlying hypothesis are various: (i) when given an appropriate space, women are willing to participate and give their opinion about the communal forest; (ii) to incentive participation, it is convenient the implementation of nonconventional methodologies that are enjoyable, creative and stimulate the sense of belonging, such as photovoice (Wang and Burris, 1997); (iii) the conceptual framework of landscape values (Stephenson, 2008) may be a useful approach to address landscape appreciations referred by people that are not taken into account in existing ES classification systems; (iv) women with different life backgrounds may have different perceptions of the ES provided by the CF; (v) the inclusion of women in the decision-making processes related to CF governance may bring into consideration a broader range of ES values than men only, hence improving the representation of the whole community and, in sum, environmental justice (Aragão et al., 2016).

### 1.1. Objectives

The present chapter aims to give response to two main objectives: on the one hand, the comprehensive ES assessment of the Xalo CF from women's perspectives—including ES, disservices and perceived changes from a spatially explicit perspective; and, on the other hand, the analysis of the role of women in the governance of the Xalo communal forests, i.e. to explore the reasons why women have a lower participation, their potential contributions and future visions.

These objectives can be unfold into several aims: (1) To achieve the effective participation of female stakeholders in the ES assessment of the Xalo communal forests through the creation of a gender space that promotes engagement, empowerment and critical thinking; (2) to apprise the flexibility and effectiveness of the photovoice methodology for novel transdisciplinary ES assessments (qualitative, quantitative, deliberative and spatial); (3) to explore the suitability of the LV conceptual model within the ES assessment; (5) to build a descriptive model of the contributions that landscape features provide for the generation of different ES in the Xalo CF; and (6) to explore nuances in women's perceptions of ES according to their life backgrounds.

## 2. Methods

### 2.1. Background: photovoice, visitor-employed photography and photo-series analysis

Taking a picture is an act triggered by both the immediate landscape and every aspect of human cognition, e.g. personal preferences, emotions, memories and opinions (Dunkel, 2015). Landscape photographs can, thus, illustrate the significance of human-nature relationships and offer an integral understanding of the perspectives, preferences and values that ecosystems provide to humans (Oteros-Rozas et al., 2017).

Photovoice is an effective and creative tool for community-based participatory research that elicits unseen stakeholder perspectives of social-ecological complexity while recognizing power imbalances (Berbés-Blázquez, 2011; Hergenrather et al., 2009; Masterson et al., 2018). Through this methodology, participants take photographs of their own reality to reflect on it. The evocative nature of pictures serves as an effective stimulant for discussion among participants and researchers. Besides, it is the people in the community, and not the researcher, who determine what is relevant to the study (Berbés-Blázquez, 2011). This is in line with the aims of the feminist approach, which refers to assessments that privilege knowledge from the perspective of women themselves as protagonists of the social phenomena studied (Cruz-Souza, 2006).

Photovoice was first established by Wang and Burris in 1997 in the context of public health promotion. They developed the concept of photovoice based on the principles of feminist theory, documentary photography and education for critical consciousness. The main goals of photovoice are to enable participants to identify their strengths and concerns, to promote critical thinking and dialogue around key issues and to eventually affect policy. In the last years, this methodology has been successfully applied to manifold scientific scopes, among them landscape management (Báez-Ponce, 2014; Kong et al., 2015), biodiversity conservation in protected areas (Bosak, 2008), sustainability in the context of Anthropocene (Tippins et al., 2018), community governance (Mistry et al., 2015), citizen science (Franco,

2016), comprehension of social-ecological systems (Masterson et al., 2018) and analysis of the perception of human wellbeing and ecosystem services (Berbés-Blázquez, 2011; Mahajan and Daw, 2016). Also, the methodology proved useful to approach different stakeholder groups, such as women (McIntyre, 2003), elders (Woda et al., 2018) and marginalized communities (Harper and TSRAECD, 2009).

Photovoice is classified as a deliberative (i.e. discourse based) socio-cultural valuation technique (Santos-Martín et al., 2018). It has been claimed as a promising though underutilized tool for the study of human wellbeing in the context of ES (Berbés-Blázquez, 2011) and SES (Masterson et al., 2018) with a huge potential to complement biophysical ES assessments. Photovoice is a very flexible technique that allows for wide adaptation in its design, however, it generally includes the following stages (Hergenrather et al., 2009): (i) establishment of the community issue to investigate, (ii) participant recruitment, (iii) participant training, (iv) photo taking activity, (v) photo-discussion with participants, (vi) data analysis and, optionally but often, (vii) dissemination of the findings through photo exhibitions that aim for social and policy impact to promote community improvement.

Another photo elicitation method close to photovoice is the visitor-employed photography (VEP). This method was designed for capturing on-site and real-time scenic perceptions and attitudes of visitors, who are invited to take photographs of their liked/disliked settings for subsequent analysis (Sun et al., 2019). But, in contrast to photovoice, VEP is less focused in participants' critical dialogue and empowerment (Masterson et al., 2018). Visitor-employed photography was developed in the 1970s by Cherem and Traweek (1977) and has been used in landscape architecture (Chenoweth, 1984), urban forest research (Oku and Fukamachi, 2006) and urban parks (Sugimoto, 2011; Sun et al., 2019). The VEP methodology constitutes an easy exercise for participants to express through visual techniques rather than verbally without a need for specific photographic skills (Oku and Fukamachi, 2006). In the last years, the increasingly easier access to GPS and digital technologies allowed VEP to evolve into participatory photography mapping. Thus, spatially explicit characterization and quantification of distribution

patterns of landscape perceptions (Sugimoto, 2011) and social values for ecosystem services (Sun et al., 2019) were developed. This kind of spatially explicit approach is aligned with the novel photo-series analyses (Harrison et al., 2018) that use social media platforms—such as Flickr—to analyse the content of the pictures uploaded by landscape users as proxies of the cultural ES (Bernetti et al., 2019; Clemente et al., 2019; Dunkel, 2015; Martínez-Pastur et al., 2016; Oteros-Rozas et al., 2017; Richards and Friess, 2015; Richards and Tunçer, 2018; Tenerelli et al., 2016; Yoshimura and Hiura, 2017; Vaz et al., 2020).

## 2.2. Process design and data gathering

We based in photovoice, VEP and photo-series analysis to develop our own transdisciplinary study design, which will be referred as *photovoice* from now on. Several guides and scientific papers were of special interest to assist us outline the process, e.g. Berbés-Blázquez (2011), Infield et al. (2015), Jongeling et al. (2016) and analyse the data, e.g. Martínez-Pastur et al. (2016), Oteros-Rozas et al. (2017), Sun et al. (2019). However, we developed a novel approach by integrating spatially explicit social-ecological information that was later analysed from a quadruple perspective: qualitative, quantitative, spatial and deliberative. We are subsequently describing the methodology applied in full detail.

The photovoice process was carried out during the end of the summer of 2018 to ensure the most pleasant climate possible (neither rainy nor hot), with lasting daylight and green broadleaved landscape (as opposed to winter season). The process consisted on a series of meetings around a photo-taking activity conducted at the Xalo CF, arranged both in small working teams and plenary group meetings. Each team took photographs along a preselected transect walk to subsequently discuss the pictures within the team, first, and in a deliberative plenary session later. The whole process was carried out in Galician language and it comprised the following steps: (i) establishment of the research questions; (ii) participants recruitment and information event; (iii) participants training and teams arrangements; (iv) photovoice transect walks; (v) deliberative plenary; and (vi) photo exhibitions. Each phase of the process is described in detail below.

### 2.2.1. Research questions

The photovoice activity was carefully designed in advance at the office in order to sufficiently assess our research goals. We started elaborating three research questions (RQ) to explore the specific ES, disservices and landscape changes perceived by women related to the SEU. These RQ were:

*Which specific landscape features or places in Mt Xalo...*

- 1) *Contribute to your family/community/own wellbeing?*
- 2) *Do you dislike or think are negative for your family/community/own wellbeing?*
- 3) *Do you consider have changed over time?*

### 2.2.2. Participants recruitment and information event

In order to gather a representative sample of the women population related to the SEU (i.e. CF owners, neighbours and visitors), we threw an online advertisement in our Facebook site<sup>38</sup> that was publicly shared for 10 days. This advertisement stated: *'If you are a woman and you would like to opine about Mt Xalo, come to the informative event about a fun, educational and empowering activity at the Association of Rural Women from Culleredo As Berenguelas<sup>39</sup>, on July 27<sup>th</sup> 2018 at 7 pm'*. The announcement was additionally emailed to our study area contacts and local associations.

The open information event gathered 20 women interested in the activity, most of them members of the women association where the meeting was held<sup>40</sup>, with an age span from 20 to 74 years old. The author of this Thesis—a female researcher—attended the meeting, introduced herself and the main research goals, stressing the need for a gender approach. Then, attendees introduced themselves and personal information forms were delivered in order to record their willingness to participate, their socioeconomic profiles

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<sup>38</sup> URL of our Facebook site, Opine about Xalo: <https://www.facebook.com/opinadoxalo/>

<sup>39</sup> URL of the Association of Rural Women from Culleredo As Berenguelas: <https://www.facebook.com/As-Berenguelas-753558034785188/>

<sup>40</sup> The Association of Rural Women As Berenguelas is located just at the foot of Mt Xalo, in the parish of Santa M<sup>a</sup> de Celas.



and their relationship with Mt Xalo. This was meant to facilitate the subsequent groups arrangement at the office. At the end of the meeting, two additional young volunteers were targeted in the surroundings to balance the age profile of the group. Also, two more women reached us during the following days interested in participating, gathering an eventual total number of 23 participants (as one of the prior attendees could not eventually join the process).

### 2.2.3. Participants training and teams arrangement

The training meeting was held on the 8<sup>th</sup> of September 2018. The 23 participants gathered at the Association of Rural Women together with the female researcher and one female facilitator<sup>41</sup>. The script for the evening followed these stages: (i) greetings, introduction of the researcher, the facilitator and the research process; (ii) establishment of the confidence and confidentiality rules; (iii) explanation of the photovoice activity and presentation of the RQ introduced in section 2.2.1; (iv) arrangement of the working teams, selection of each transect walk and schedule; (v) signature of consent forms; and (vi) basic photography lesson.

According to participants' profiles, we proposed them to split into 5 working teams of 4-5 people, so the transect walks and subsequent team discussions would be operational. It was difficult to find grouping criteria that adjusted to the number of members desired for each team, hence we operated on a flexible manner. The criteria were: (i) age-grouping together the youngest participants (team T1); (ii) visit frequency to Mt Xalo—distinguishing those who had never visited it (team T3) from those who used to do occasionally (team T5) or often (team T2). (iii) Finally, team 4 (T4) gathered those women who had collaborated in the past with their parents' work at Mt Xalo, when it was still an agrosystem used for agriculture and cattle grazing. Note that this information was exported from the forms filled by participants at the information event, finding later on that some data did not adjust completely

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<sup>41</sup> The facilitator was Olalla Caamaño, a social educator specialized in gender.

to the team criteria, hence existing some outliers within every group. See table 5.5 in the results section 3.1 for further details on team characteristics.

Once the group was rearranged by working teams, team members were asked to introduce themselves and to fill a team-form indicating the transect walk details, i.e. team members, description of their chosen route along the CF (maximum 3 km or 2 hours long), starting meeting point and preferred date and schedule for the transect walk. Every team agreed on a route of their wish on the basis of the areas they would be interested in visiting for any personal reason. The resulting transect walks can be seen in figure 5.3, in the results section 3.1.

Also, various individual consent forms for photography permission and property rights were delivered (find these forms in Appendix C). Team members were provided with personal identification cards, A3 cartographic maps of the SEU and pens to draw their preferred transect walks.

The meeting finished after a basic photography class. We brought the digital tablet device that would be later used in the photovoice transect walks. To keep an atmosphere of familiarity and empowerment within the group, the photo-instructor was one of the youngest participants in the photovoice activity, a girl studying professional photography who kindly accepted our request.

#### 2.2.4. Photovoice transect walks

The dates for the 5 different transect walks were the evening of the 15<sup>th</sup> of September 2018 (4 pm - 8 pm) and the afternoon (10 am - 2 pm) and evening of 16<sup>th</sup> and 22<sup>nd</sup> of September 2018. Every team met at the agreed location of the Association of Rural Women As Berenguelas with the research team (the female researcher and the female facilitator) and with our 4x4 driver: a man from the directive board of the CF of Celas who kindly offered to drive us uphill to the forest and pick us up back at the end of the walks. Prior to starting the route, participants received personal accident insurances and the RQ to photograph were remembered (figure B1, Appendix B).

Voice recording and GPS tracking were conducted via smartphone by the researcher during the transect walks. To avoid reported technical flaws coming from photography such as the missing of the dynamic flows and relationships of ecological functions (Berbés-Blázquez, 2011), the full extent of ES (Clemente et al., 2019) or the sense of sound (Oku and Fukamachi, 2006), we allowed participants to record videos. Photographs and videos were taken with a small digital tablet that was set to record the coordinates of each snapshot. The routes took around 2 hours each, including stops to photograph and rest. Team members were encouraged to act as landscape interpreters for the researchers and to take as many pictures as they wished. The research team took care of not interfering in participants' opinions and developed the occasion for participant observation and unstructured interviews along the transect walk.

At the end of the route we were driven back to the village, to either a cafeteria or the location of the Association of Rural Women. Then, team photographs were exported to a laptop and displayed a couple of rounds while team participants were asked to analyse their content and meanings by explaining the RQ they were answering to (i.e. positive, negative or changes) and how. Conversations were voice recorded. In the second view round, participants chose their 10 most meaningful pictures and gave them a title. Finally, each team member selected their preferred single picture to present in an eventual photo exhibition. (See a few examples of the photographs with their titles in figure A1, Appendix A).

#### 2.2.5. Deliberative plenary

The final plenary session was held during the afternoon of the 23<sup>rd</sup> of September 2018 at the Association of Rural Women of Culleredo As Berenguelas. Ten participants could not eventually attend, but every team was represented by some member. The meeting started with a welcoming group dynamic and followed with a presentation by the researcher of the sample of pictures selected from each team, displayed altogether by common topics (e.g. ES types, changes, disservices) and giving the opportunity for participants' intervention.

Subsequently, we took advantage of the collective gender space created in the room to deliberately discuss—beyond the ES assessment—the underlying key issue of the research: the lower participation of women around the communal forest affairs and the role of women in CF governance. For this, we developed the deliberative dynamic known as *World Café* (Brown and Isaacs, 2005). This activity ran around three tables set with organic drinks and snacks and three envelopes containing a question each. The questions were:

*You have shown a tremendous potential for analysing your environment, finding multiple benefits related to Mt Xalo, changes in the landscape and many things yet to improve. So...*

- 1) *Why do you think women are less involved than men in decision-making around the CF?*
- 2) *Which qualities do you think women can bring to the governance of the CF?*
- 3) *Close your eyes and dream of your ideal Mt Xalo, what would it be like?*

Each table was hosted by one volunteer participant who performed a welcoming, the introduction of the question and the record of every answer. Shifts of 10 minutes were established for the other participants to rotate randomly among the 3 tables. Thereupon, the whole group gathered together and the 3 hosts read and explained all the answers, which were voice recorded.

The event ended up with a collective reflection and evaluation of the photovoice process. Also, diplomas of participation were delivered to participants (find a model in figure B2, Appendix B).

#### 2.2.6. Photo exhibitions

The photovoice process was completed with the dissemination and celebration of the work through three public photo exhibitions.

The first exhibition was held on the 15<sup>th</sup> of October 2018, the International Day of Rural Women, in collaboration with and at the venue of the Association of Rural Women from Culleredo As Berenguelas. The exhibition

gathered the 23 selected pictures (1 per participant) with their titles and participants' names. CF owners, neighbours and the general public were invited to the event via personal emails and online announcement. The opening started with an introduction of the research to the public and continued with comments about the photovoice experience from some participants<sup>42</sup>. Besides, one participant read two texts written by herself reflecting on her impressions on the photovoice experience (do not miss these texts, included in the opening and ending of this chapter).

The second photo exhibition was displayed at the Higher Polytechnical School of Engineering<sup>43</sup> of the Universidade de Santiago de Compostela (Lugo, Spain) during March 2019 to celebrate the International Women's Day (8<sup>th</sup> of March). Besides, there was a conference and colloquium on the 27<sup>th</sup> of March at the same venue for students and the general public, counting with the participation of several of the photo authors and the researchers<sup>44</sup>.

The photographs were announced online as available for further exhibitions. A third photo-exhibition was hosted by the elementary school CEIP Plurilingüe of Tarrío in the Culleredo municipality during November 2018.

### 2.3. Data analyses

#### 2.3.1. Qualitative analysis: Coding photographs

All the photographs and videos resulting from the photovoice activity were compiled into a digital database. They were subsequently coded through content analysis (Krippendorff, 1980) according to seven different criteria—explained below—to take as much information from the activity as possible. This was managed with the free software Adobe Bridge CC 2018. Photographs taken by mistake, duplicates or photos of similar features taken at the same location were deleted.

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<sup>42</sup> You can find a few pictures of the exhibition event in our Facebook site, post from October 17<sup>th</sup> 2018.

<sup>43</sup> The Higher Polytechnical School of Engineering is the place where the PhD Thesis was conducted.

<sup>44</sup> You can find a few pictures of the exhibition event in our Facebook site, post from April 2<sup>nd</sup> 2019. URL: <https://www.facebook.com/opinadoxalo/>

Content analysis of visual images is a technique often applied by researchers in VEP (Oku and Fukamachi, 2006; Sun et al., 2019) and photo-series analysis from social media (Clemente et al., 2019; Martínez-Pastur et al., 2016; Oteros-Rozas et al., 2017; Richards and Friess, 2015; Richards and Tunçer, 2018; Tenerelli et al., 2016; Vaz et al., 2020). It is a social science research method, both qualitative and quantitative, originally developed to interpret written and spoken texts (Rose, 2001). The methodology relies in clear methodological guidelines to devise a set of categories for coding the images. This makes content analysis replicable and consistent when approaching a large number of images (Rose, 2001).

The coding process was performed by the researcher who conducted the photovoice activity based on the recorded conversations with photo authors during and after the transect walks. An effort was made not to infer any further interpretation from the researcher side. Seven criteria or variables object of analysis were established, each containing several coding categories, with a total number of 42 categories. The criteria of analysis were: (i) features object of photography; (ii) ecosystem services inferred from participants' explanations on the basis of the CICES v5.1 classification system (Haines-Young and Potschin, 2018); (iii) CICES section; (iv) disservices; (v) landscape values and (vi) temporal dimension of LV according to Stephenson (2008); and (vii) RQ. Figure 5.1 and tables 5.1 to 5.4 itemise and describe the classification categories established for each criterion.

First, the features object of photography were classified into eleven inductive categories according to the researcher's interpretation of the items that authors focused on their photographs. These were: atmosphere, fauna, infrastructures, native trees, other trees, panorama, people, rubbish, stones and understory. Find the details of this classification in figure 5.1.

Then, the ES coding process was twofold. It was firstly open to extract authors' values and transpose them into ES categories, inspired by previous studies such as Arias-Arévalo et al. (2017), Bieling et al. (2014), IPBES (2016), Satterfield et al. (2013), Stålhammar and Pedersen (2017) and Vallés-Planells et al. (2014). This resulted in 18 emergent ES categories (4 provisioning ES, 1

regulating ES, 13 cultural ES). Then, we set ES correspondences with CICES v5.1. for standardized classification. When our ES categories were not fully described in CICES v5.1, we developed additional CICES codes, as it is already contemplated in the CICES v5.1 classification: *'use nested codes to allocate other ES from (non-)living systems to appropriate Groups and Classes'* (Haines-Young and Potschin, 2018). This was only necessary in the cultural ES section, as it is the less developed section in CICES v5.1, containing just an 18% of the total ES classes. See table 5.1 to find the complete ES classification we derived from the content analysis.

The existing ES classification systems often do not fully match with people's description of their perceived benefits and values (e.g. CICES in Bieling et al., 2014 and Stålhammar and Pedersen, 2017, or the Millennium Ecosystem Assessment in Bieling, 2014). Thus, we also tried classifying pictures with an alternative conceptual approach to human wellbeing which is based on peoples' articulated values of the landscape: the cultural values model proposed by Stephenson (2008) and further applied by Bieling et al. (2014) and Fagerholm et al. (2016). This model distinguishes among three components of landscape values: forms, practices and relationships (see table 5.2 for detailed description). The cultural values model claims the understanding of landscapes in a holistic sense, as a *continuum*, integrating both the natural and the cultural processes, insiders with experts' opinions and the past time with the present and future. For the latter bundle, Stephenson (2008) proposes two terms: 'surface values' when the perception of the cultural values is related to the present direct experience, and 'embedded values' to refer to the awareness or memories of past forms, practices and relationships. See table 5.2 for further details.

In absence of a more appropriate word, we assimilated the so-called 'disservices' to the negative aspects of the CF referred by photo authors, with the aim of including not only the negative aspects derived from the ecosystem to human wellbeing, but both the natural-based and the social-based negative phenomena. The inclusion of the social component is in line with Lyytimäki (2017)'s concept of disservices, which considers the boundaries between the ecological and social systems blurred within a SES



## #. FEATURE

Description.



## 1. ATMOSPHERE

Light, shadows, sounds, etc.



## 2. FAUNA

Fauna or their products: wildlife, spider webs, etc.



## 3. INFRASTRUCTURES

Paths, dirt roads tv/radio antennas, gas pipelines, residential areas, geodesic vertex, boundary stone walls, climbing shackles, information panels, picnic areas, etc.



## 4. NATIVE TREES

Native trees, parts of them or their products, e.g.: chestnut trees or their chestnuts, oak trees, birch trees, roots, etc.



## 5. OTHER TREES

Other trees, parts of them or their products, e.g.: pines or their cones, eucalyptus trees, thujas, timber, firewood, etc.



## 6. PANORAMA

Scenery, open landscape views.



## 7. PEOPLE

Person/-s.



## 8. RUBBISH

Waste, litter, fly-tipping.



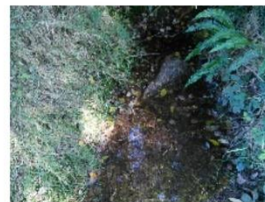
## 9. STONES

Geomorphological features.



## 10. UNDERSTORY

Shrubs, fungi, non-woody plants or their products, e.g.: heather, gorse, broom, blackberry, flowers, forest fruits, etc.



## 11. WATER

Springs, ponds, droplets, the ocean, etc.

**Figure 5.1.** Photo-examples of the eleven feature types object of photography. Every photo was assigned one or more of these categories according to what the photo authors had focused on to take the picture.



	ES abbreviation	ES description	Correspondence in CICES v5.1	CICES Section
1	Drinking water	Fresh water for drinking.	4.2.1.1	
2	Food	Any resource used as a source of food, e.g. mushrooms, forest fruits, reared animals or the forest products used for their nourishment.	1.1.1.1, 1.1.3.1, 1.1.5.1	Provisioning
3	Fuel	Products from the CF used as fuel, such as firewood, heathers, or pine cones.	1.1.1.3, 1.1.5.3	
4	Ornament	Vegetal features gathered for adornment, e.g. pine cones, flowers, heathers or gorses.	1.1.1.2, 1.1.5.2	
5	Fire control	Plants, animals or infrastructures that reduce the incidence, intensity or speed of spread of fire.	2.2.1.5	
6	Aesthetic	Enjoyment of scenery or beautiful living or abiotic features.	3.1.2.4, 6.1.2.1	
7	Communications	Physical characteristics of the landscape that facilitate communication through the installation of radio or tv infrastructures.	6.3.1.1*	
8	Educational	Achieving knowledge through the observation of nature or information infrastructures (e.g. signalling).	3.1.2.2, 6.1.2.1	
9	Inspiration	Living beings or abiotic features that stimulate new thoughts, ideas or creative artistic expressions.	3.2.1.3, 6.2.1.1	
10	Recreation	Interaction with the environment for recreation in a wide sense, e.g. walks, sports, harvesting, etc., or infrastructures made to facilitate recreation (e.g. picnic area).	3.1.1.1, 3.1.1.2, 6.1.1.1, 6.1.2.1	
11	Relax	The experience of physical or mental health, joy, relaxation or wellbeing.	3.1.1.1, 3.1.1.2, 6.1.1.1, 6.1.2.1	
12	Self-improvement	The landscape provides the opportunity for overcoming physical personal challenges (e.g. to walk up a steep slope).	3.1.1.1, 6.1.1.1, 6.3.2.1*	Cultural
13	Sense of place	Identity, memories, feeling of belonging to the landscape.	3.1.2.1, 3.1.2.3, 6.3.3.1*	
14	Sensory	Enjoyment through the senses of sounds, shade, freshness, light, colours, ...	3.1.1.2, 3.1.2.4, 6.1.1.1	
15	Socializing	Landscape features or sites that facilitate social relationships or cohesion.	6.1.1.1, 6.3.4.1*	
16	Spatial reference	Physical characteristics of the landscape that allow for spatial orientation through visual connectivity between areas.	6.1.2.1, 6.3.5.1*	
17	Spiritual	Sense of spirituality, connection with the landscape or profound feelings.	3.2.1.2, 6.2.1.1	
18	Temporal reference	Features from nature that allow for temporal reference (e.g. seasons, festivities).	3.1.2.1, 6.3.6.1*	

**Table 5.1.** Ecosystem services and ES section derived from the photographs. The classification was based on CICES v5.1 according to authors' explanations on the meanings of their pictures. Note that some of the emergent cultural ES needed to develop additional CICES codes (indicated by asterisks) when they gathered additional significances for participants not considered in CICES v5.1.

LV types	LV description
1 Forms	Both natural and human made physical, tangible and measurable aspects of landscape or space. This would include landforms, vegetation, structures, gardens, tracks, etc.
2 Practices	Human practices and natural processes understood together as a continuum. This includes past and present actions, traditions and events, ecological and natural processes and those practices/processes that incorporate both human and natural elements.
3 Relationships	Meaning, significance and interpretations of landscape generated by human relationships with and within landscapes. This would include localised spirituality, myth, sense of place, naming, stories, etc.
Temporal dimension of landscape values	
1 Surface values	Perceptual response to the directly perceived forms, practices and relationships.
2 Embedded values	Awareness of past forms, practices and relationships.

**Table 5.2.** Landscape values and their temporal dimension according to the cultural values model proposed by [Stephenson \(2008\)](#).

and, thus, difficult to distinguish. Also, [Campagne et al. \(2018\)](#) consider the negative effects of ecosystem management over human wellbeing as a disservice. Photographs were openly classified following authors' descriptions, eventually resulting in five categories related only anthropogenic practices: damages, environmental impact, forest management, safety and spatial order (see table 5.3).

Finally, every picture was classified according to the RQ they were answering to, e.g. positive, negative or perceived changes in the landscape (see table 5.4).

Note that each photograph could be assigned one or more themes in every category of analysis according to what participants expressed about it. Find an example of photo classification in figure 5.2. This picture depicts a wet spider web refracting the sunlight into a rainbow. It was titled by the author 'The doubleness of nature' and, according to her explanations, it was classified as follows. (i) Features object of photography: fauna and water; (ii) ES: aesthetic, inspiration and sensory; (iii) CICES section: cultural; (iv)

disservices: none; (v) LV: forms; (vi) temporal dimension of LV: surface values; (vii) RQ: positive.

Once every picture was coded according to the 7 criteria explained above with the help of the AdobeBridge software, the generated metadata were exported to Excel and SPSS with the ExifTool software. Photograph names were arranged in Excel by rows, while team numbers and every theme described above were set in columns. Cells were then coded into a 0-1 absence/presence criterion for subsequent statistical analysis.

Disservices types	Disservices description
1 Damages	Photos of damaged natural entities (e.g. rocks with graffities, eroded soil) or infrastructures (e.g. neglected dirt roads, information panels).
2 Environmental impact	Photos of infrastructures that have an impact on views, air quality, fauna, etc. (e.g. antennas, gas pipelines).
3 Forest management	Photos reporting weeding, neglected forest sites, unwanted tree species or a considered wrong forest planning and management.
4 Safety	Photos of infrastructures that may pose any threat to human health and safety (e.g. gas pipelines, antennas, or dangerous steep dirt roads).
5 Spatial order	Photos of infrastructures that are not considered well located (e.g. residential and picnic areas).

**Table 5.3.** Disservices derived from the photographs.

RQ abbreviation	RQ question: Which specific landscape features or places in Mt Xalo...
1 Positive	...contribute to your family/community/own wellbeing?
2 Negative	...do you not like or you think they are negative for your family/community/own wellbeing?
3 Change	...do you consider that have changed over time?

**Table 5.4.** Research questions that photovoice participants were asked to answer with photographs.



**Figure 5.2.** Example of a picture taken during the photovoice activity by a member from T2. Title: 'The doubleness of nature'.

### 2.3.2. Quantitative analysis: Statistical analysis

We used the SPSS software to analyse the frequencies in (i) the number of photos taken, both in total and by each team, (ii) features photographed, (iii) the derived ES, (iv) CICES sections, (v) disservices, (vi) LV, (vii) temporal dimension of LV and (viii) RQ answers.

Contingency tables and the  $\chi^2$  test were used to explore the statistically significant correlations between photographed features and the other variables of study. Also, contingency tables and the  $\chi^2$  test were applied confronting LV types with ES classes and CICES sections to assess and compare the suitability of these conceptual models for the present study. All the analysed variables were represented in a presence/absence format, hence resulting in 2 x 2 contingency tables. In these cases, the  $\chi^2$  test may be inaccurate, therefore we applied the Yate's correction for continuity in the case of big sample sizes, or the Fisher's exact test when the sample sizes were low or the expected frequencies smaller than 5 (Martín et al., 2008).

Lastly, we studied whether any differences existed in the perception of the CF among women with different life backgrounds (i.e. photovoice teams), again with contingency tables and the  $\chi^2$  test applied to the 5 working teams against every variable of study. When the expected frequencies were lower than 5 in more than 20% of the cells, we asked for the bilateral asymptotic significance, and in the cases where the  $\chi^2$  tests and the likelihood function led to different conclusions for the same level of significance, we took the most conservative in order to reject the null hypothesis (Martín et al., 2008).

### 2.3.3. Spatial analysis

The distribution and density of the locations of each photograph and video was spatially analysed with ArcMap 10.4. The metadata were exported from the tablet device with the ExifTool software, arranged in Excel and imported to ArcMap 10.4 as a shapefile. Also, route tracks were exported from the OruxMaps Android app to the geographic information system. Finally, the coding from the classification process of the photos (i.e. landscape features, ES, CICES section, LV, temporal dimension, RQ) were added to the attribute table of the photo-shapefile in order to have a comprehensive database.

With all these data compiled and organized, we studied the spatial distribution patterns of the photographs in order to identify hotspots of ES and disservices and trade-off areas. It was not feasible to conduct this type of analysis distinguishing by subtypes of ES or disservices due to a low number of points per category, but we found useful the ES-disservices comparison because it is consistent with the one implemented in Chapter 3 (section 2.4.3).

Two methodologies were implemented: (i) the ArcMap multi-distance spatial cluster analysis (Ripley's K function) (ESRI, 2018a) together with the kernel density tool (ESRI, 2016); and (ii) the optimized hot spot analysis (ESRI, 2018b). Both methods were compared to analyse the spatial aggregation patterns of ES and disservices.

The multi-distance spatial cluster analysis (Ripley's K function) determines whether features exhibit statistically significant clustering, dispersion or a random distribution over a range of distances by comparing the real spatial distribution of points with the Complete Spatial Randomness (CSR) represented by a random distribution, respectively represented by the observed and expected K-function curves. Confidence envelopes, higher and lower, were constructed for the expected K curve by calculating 999 permutations of a random homogeneous Poisson process distribution of points. The relationship between the observed and expected curves enables the identification of the maximum K value at which point aggregation is considered statistically significant, being determined by the coincidence of the observed K value and the upper confidence value. We set the number of distance bands to 100, the beginning distance to 0 and the distance increments to 40 m, according to the scale of the spatial processes we wanted to study.

Then, in order to depict the spatial intensity of the ES and disservices, density surfaces were generated from the point data layers using the kernel density analysis option in ArcGIS. We assigned a window diameter for the kernel equivalent to the maximum aggregation distance calculated with the Ripley's K function, so the resulting mapped clusters are guaranteed to be non-random.

The second approach we used to analyse the spatial aggregation patterns of ES and disservices was the ArcMap optimized hot spot analysis. This tool creates a map of statistically significant hot and cold spots using the Getis-Ord  $G_i^*$  statistic, evaluating the characteristics of the input feature to produce optimal results (ESRI, 2018). The outcome from this process is a feature class with a z-score, p-value and confidence level bin. The latter identifies statistically significant hot and cold spots, corrected for multiple testing and spatial dependence using the false discovery rate correction method. To evaluate the spatial clustering of the point locations we used both the 'count incidents within fishnet polygons' and the 'snap nearby incidents to create weighted points' options of the tool. For the disservices,

we could only try the first calculation because the number of events (42) was lower than the minimum required for reliability (> 60) when using the snap nearby incidents operation. Therefore, we adopted results from the fishnet polygons for both ES and disservices. The values of the resulting square grid were then transferred as attributes to the photo-points shapefile for visual representation.

#### 2.3.4. Deliberative analysis

On the basis of the photovoice activity—that served to assess the ES, disservices and changes acknowledged by women from a spatially explicit perspective—we went a step further to analyse the reasons behind a lower female participation in the governance of the CF. The deliberative dynamic of the world café developed in the final plenary session of the photovoice served to delve into the role of women in the Xalo communal forests. Participants' deliberative reflections were gathered by table hosts during the plenary and shared with the group. These findings were later structured and summarized by the researcher, complementing that information with the recordings from the transect walks.

The last section of the discussion in this chapter (section 4.3) is fully dedicated to this topic, giving answer to the second main objective indicated in the introduction (section 1.1), i.e. to explore the reasons why women participate less than men in CF governance, their potential contributions and visions.

### 3. Results

#### 3.1. Characterization of participants, teams and transect walks

The photovoice process gathered a diverse intergenerational group formed by 23 women whose ages varied from 16 to 74. Their average age was 53, being 30% above 65 years. According to the forms filled in the information event, almost everyone (22 out of 23) belonged to the municipality of Culleredo and 14 of them specifically to the parish of Santa María de Celas, one of the parishes that owns a CF in Mt Xalo. None of them were from

Santiago de Castelo, the other parish related to the CF. The remaining participant was coming from the close city of A Coruña. Hence, the geo-profiles of photovoice participants (*sensu* Chapter 3, section 2.2) were 61% locals, 35% vicinity and 4% urban. Several participants were relatives, e.g. sisters, cousins, mother-daughter and niece-aunts. Most women were employed at that moment (44%) or retired (35%), 13% were students. Their relation with Mt Xalo was varied: 13% had never visited it—though they were willing to through this activity—, 26% had worked in the CF in the past assisting their parents in cattle grazing and/or gorse harvesting and 65% declared they used to visit the CF occasionally or often. The great majority (96%) stated they felt some degree of place attachment to Mt Xalo, but they generally considered to have a low knowledge on it (87% rated it in 3 or lower on a 1 to 5 ordinal scale). Many participants (43%) were not very familiarized with either smartphones or digital cameras for photographing, justifying the need for the basic photography class we provided.

The 23 participants were divided into 5 teams according to the criteria described formerly in section 2.2.3, i.e. age, visit frequency and agronomic activity developed in the CF in the past. See table 5.5 for team details and find their portraits in figure A2, Appendix A.

Team	Criteria	Age (years)	Average age	# Members	Geo-profs.
T1	Youngest participants	16 - 38	24	5	L & U
T2	Women who visit Mt Xalo often	49 - 60	55	4	L & V
T3	Women who never visited Mt Xalo	61 - 70	67	5	L & V
T4	Women who used to work in the agrosystem of Mt Xalo in the past	59 - 74	68	4	L & V
T5	Women who visit Mt Xalo occasionally	52 - 58	54	5	L & V

**Table 5.5.** Teams arrangement, characteristics and criteria. Geo-profiles refer to the criteria established in Chapter 3, where L: locals, V: vicinity, U: urban.



The transect walks selected by each team are shown in figure 5.3. Their average length was 3.4 km  $\pm$  0.25 km. Every route was different, though four teams (T1, T3, T4, T5) passed along the popular scenic site O Castelo or O Petón (located just at the finishing spot of T1, see the marker in figure 5.3). The only team that did not choose this area (T2 - women who visit Mt Xalo often) was motivated by the wish to discover or show each other new locations. Despite no participant belonged to the parish of Santiago de Castelo, 4 teams walked at some point by its CF, often further from O Petón (which lays within the borders of that CF), with one of the routes being entirely within the Santiago de Castelo CF (T5).

## 3.2. What was photographed?

### 3.2.1. Photo collection

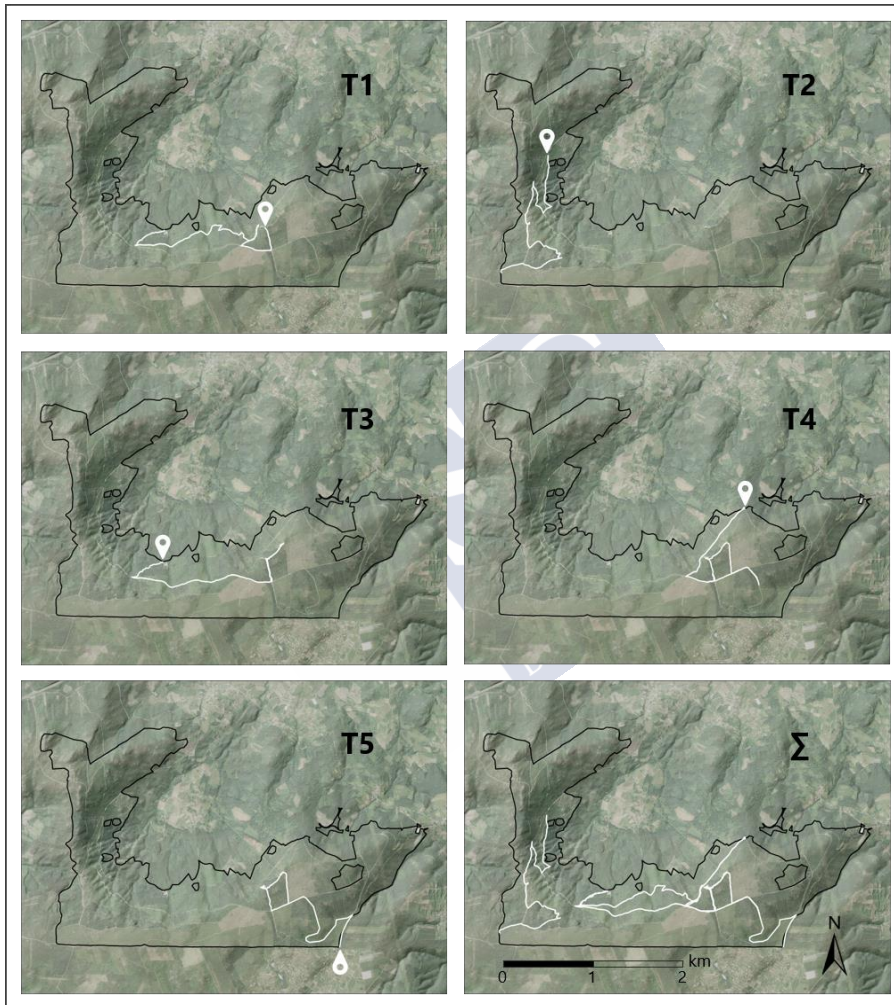
The initial number of photographs taken was 359 (357 photos and 2 videos), but after the deletion of duplicates and mistaken shots, the final number was 225 (223 photos and 2 videos). The videos were recorded by participants to better address the dynamic nature of the scene they wanted to capture: the birdsongs and a somersault of joy by one participant. The refined number of shots taken by each team ranged from 32 (T4) to 61 (T5), with an average of 45  $\pm$  12 pictures.

### 3.2.2. Coding frequencies

Regarding the features object of photography, the greatest frequencies were for infrastructures (25%) and people (23%), followed by stones (19%), scrub, fungi or vegetables (14%), native trees, such as chestnuts, birch trees and oaks (13%) and scenic views (13%).

A total of 18 ES types were inferred from the photographs, being the most commonly depicted the aesthetic (30%), sense of place (26%), recreation (19%) and sensory (19%), all of them cultural ES, followed by socializing and spatial reference (15%), inspiration (12%), food (10%) and relax (7%). Other elicited ES, although to a lesser extent, were educational (4%), ornament

(4%), communications (4%), spiritual (3%), self-improvement (2%), fuel (1%), drinking water (1%), fire control (1%) and time-reference (1%).



**Figure 5.3.** Transect walks chosen by the 5 teams participating in the photovoice activity. Each map illustrates the team number (e.g. T1) and the chosen route, in white and with a marker indicating the finishing spot. The last map (bottom right) gathers the five routes while indicating the spatial scale and North arrow applicable to all maps.

Regarding the five coded disservices—or concerns about the SEU–forest management and damages where the most frequent (7%), followed by environmental impact (4%), safety issues (3%) and infrastructures considered to be located in inappropriate places (1%).

We added the disservices category to CICES sections for comparison purposes, finding that, by far, the cultural ES were the most frequently photographed, with a 92% of occurrence. Afterwards, disservices reached 20% of photo shots, followed by provisioning (13%). Regulating ES were barely depicted (1%).

The most represented LV were forms (76%), followed by relationships (57%). Practices were referred in 18% of the occasions. The great majority of LV referred to the present moment (96% surface values), but 20% of them were also retrieving memories or awareness of past forms, practices or relationships.

Finally, the great majority of pictures (83%) represented positive aspects for the wellbeing of participants and/or the community compared to a low percentage (20%) illustrating negative aspects. Changes in the landscape were depicted in 13% of the photos.

The coding frequencies (%) of the seven variables of analysis are shown in figure 5.4.

### 3.2.3. Interactions among variables of study

The confrontation between the eleven features object of photography and the rest of variables (ES, disservices, CICES section, LV, temporal dimension and RQ) resulted in 351 contingency tables and their corresponding  $\chi^2$  tests, from which 34 pairs ensued statistically correlated (see table 5.6). The same analysis was conducted for LV and their temporal dimensions with ES and CICES sections (including disservices), resulting in a total of 110 contingency tables and their corresponding  $\chi^2$  tests. In this case, 24 combinations were statistically significant (see table 5.7).

### 3.2.3.1. Descriptive model based on the photographed features

Attending to the features object of photography, all of them but fauna had at least one significant correlation with another variable. See table 5.6 for statistically significant positive correlations.

- i. Features – ES: The features that correlated to a greater number of ES were stones and understory. Stones correlated to inspiration based on their whimsical shapes; to spiritual ES due to personal meanings and overwhelming figures; and to self-improvement because walking around them represented a challenge sometimes. Understory vegetation was found to associate with food, ornament and sense of place, as it often appealed to practices such as food and ornament gathering in family. Native trees contributed to food through their fruits (e.g. chestnuts) and to aesthetics. Other trees were significantly related to fuel and ornament mainly due to the uses of pine cones. People present in the pictures were related with relax and spiritual ES. Atmosphere (e.g. light, shadows and sounds) was linked to the aesthetic and the sensory ES. Infrastructures (e.g. antennas, dirt roads) to communications. Panorama pictures correlated with spatial reference. Finally, the feature water was associated to the drinking water ES.
- ii. Features – disservices: The features that showed significant correlation with disservices were infrastructures (which related to four different types of disservices: environmental impact, safety issues, spatial order and damages); non-native trees (related to unpleasant forest management, often found inappropriate due to their species or plantation site); and rubbish (linked to the category of damages).
- iii. Features – CICES section: The CICES section provisioning was the only one showing significant correlations with features. These were native trees (by providing food), other trees (by fuel and ornament) and understory (due to food and ornament).

- iv. Features – LV: The LV type ‘forms’ was associated with infrastructures, other trees and understory, while the LV type ‘practices’ was also related to understory.
- v. Features – temporal dimension of LV: No significant relationship was found between the temporal dimension of LV and the photographed features.
- vi. Features – RQ: The features that correlated with research questions were infrastructures and rubbish, associated with the negative QR. Other trees related with changes through time, mainly due to the abandonment of the use of the pine cones as fuel, food or ornament.

#### 3.2.3.2. The ES and LV conceptual frameworks in the photovoice activity

A few positive correlations were found among the conceptual frameworks of ES and LV. See table 5.7 for statistically significant positive correlations.

- i. Landscape values concerning ‘practices’ were significantly related to all of the CICES sections except the cultural (i.e. regulating, provisioning, disservices). However, there were some specific cultural ES, such as recreation and education, that did correlate to practices. Other ES that correlated with ‘practices’ were the provision of food and fuel, usually related to the development of traditional works and the regulation of fire events. The variable disservices was also related to practices that had to do with fly-tipping.
- ii. The landscape values concerning ‘forms’ correlated to the section of disservices, mainly due to infrastructures, and they also correlated to the ES inspiration, through stones.
- iii. The LV ‘relationships’ were linked to a variety ES types: food, ornament, recreation, sense of place, socializing and spatial reference. The CICES section provisioning also showed a positive correlation with relationships.

- iv. Some ecosystem services were statistically related to ‘embedded’ landscape values, i.e. they were associated to practices, forms or relationships from the past. These were food, water, ornament, sense of place and the spatial reference ES. Also significantly correlated with the ‘embedded’ LV were the cultural and the provisioning CICES sections.

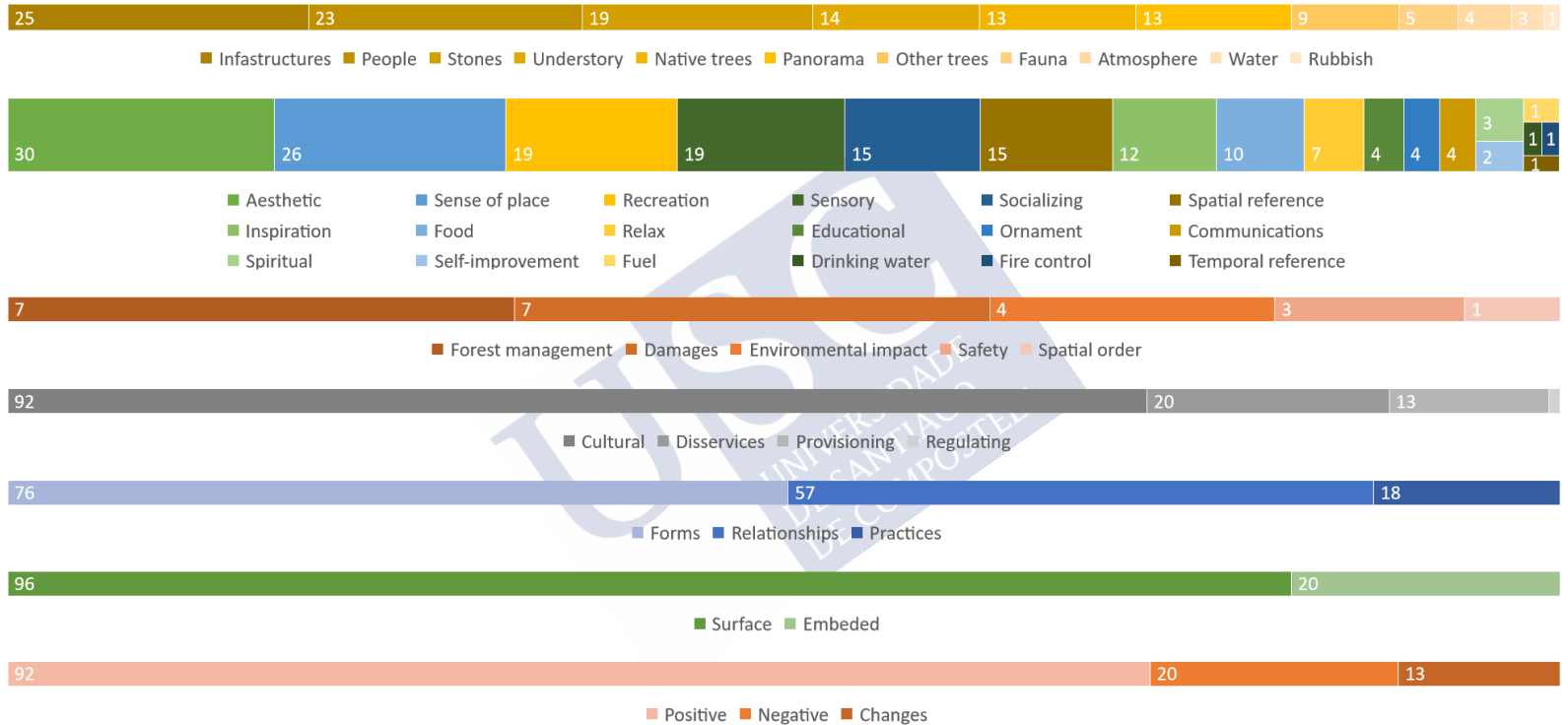
#### 3.2.4. Correlations between photo-teams and variables of study

Table 5.8 gathers the results of the statistically significant positive correlations among photo-teams and every variable of study. These results depict a set of varied women’s perceptions that are associated to their life backgrounds. The results are discussed in detail in section 4.1.6.

### 3.3. Spatial analysis

Figure 5.5 shows the spatial distribution of the 225 photographs taken by photovoice participants, while figures 5.6 and 5.7 offer the visual comparison between clustering methods for ES and disservices, respectively, by overlapping the optimized hot spot analysis over kernel density surfaces. The multi-distance spatial cluster analysis (Ripley’s K function) gave a window diameter for the calculation of the kernel density analysis of 800 m in the case of ES and 950 m for disservices. The significant clusters found with the optimized hot spot analysis have a confidence level of 99% for ES, and 99% and 95% for disservices. Results from the two cluster analyses (i.e. kernel density based on Ripley’s K and the optimized hot spot analysis) threw analogous results both for ES and disservices, depicting very similar locations for non-random point aggregations.

The central-eastern zone of the SEU gathered almost a half of the total number of pictures (46%) (figure 5.5). This location corresponds to the pathway that links the parking lot with the popular scenic and climbing spot O Petón and the antennas lookout. It also resulted in the only statistically significant clustered location for both ES and disservices (figures 5.6 and 5.7, respectively), which is visually evident in the case of disservices, with barely any other locations registering negative events (figure 5.7).



**Figure 5.4.** Frequencies (%) of the seven coded variables. From top to bottom: (i) photographed features, (ii) ES, (iii) disservices, (iv) CICES section, (v) LV, (vi) temporal dimension of LV and RQ. Note that frequencies do not sum 100% because photographs could be assigned one or more themes in every category of analysis.

Features		Variables of study					
1	Atmosphere	ES_Aesthetic (F) *	ES_Sensory (F) *				
2	Infrastructures	ES_Communications (F) ***	D_Environm. Imp. (F) ***	D_Safety (F) **	D_Spatial order (F) *	D_Damages (F) *	LV_Forms (Y) 5,911* RQ_Negative (Y) 11,045***
3	Native trees	ES_Food (F) ***	ES_Aesthetic (Y) 8,920**	C_Provisioning (F) ***			
4	Other trees	ES_Fuel (F) *	ES_Ornament (F) ***	D_Forest managt. (F) ***	C_Provisioning (F) *	LV_Forms (F) **	RQ_Changes (F) *
5	Panorama	ES_Spatial reference (F)					
6	People	ES_Relax (F) ***	ES_Spiritual (F) *				
7	Rubbish	D_Damages (F) ***	LV_Practices (F) *	RQ_Negative (F) *			
8	Stones	ES_Inspiration (F) *	ES_Spiritual (F) *	ES_Self-improvmt. (F) *			
9	Understory	ES_Food (F) **	ES_Ornament (F) *	ES_Sense of place (Y) 5,934*	C_Provisioning (F) **	LV_Forms (Y) 6,995*	LV_Practices (Y) 5,908*
10	Water	ES_Drinking water (F) ***					

**Table 5.6.** Statistically significant relationships between pairs formed by the features object of photography and the derived ES, CICES sections, disservices, LV and RQ. For simplification, we added the following prefixes to the variables: ES for ecosystem services, D for disservices, C for CICES sections, LV for landscape values and RQ for research questions. P value is represented as \* when  $P \leq 0.05$ ; \*\* when  $P \leq 0.005$ ; and \*\*\* for  $P \leq 0.001$ , preceded by letter F between brackets when the result comes from the Fisher's exact test, or by letter Y when it is from Yate's  $\chi^2$  test.

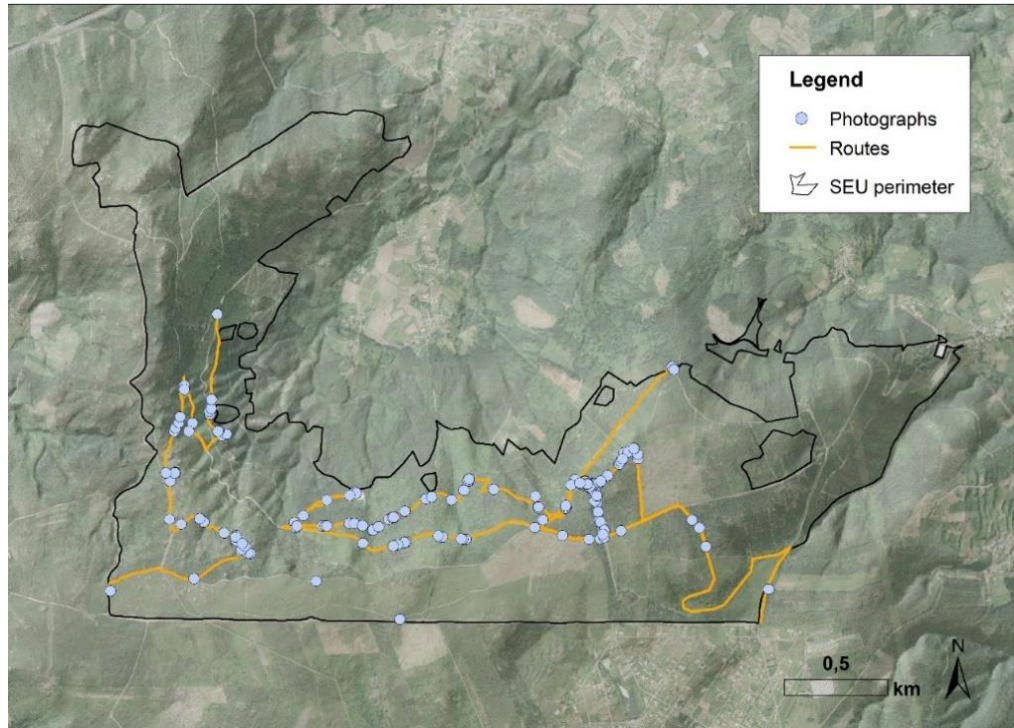


Variables of study									
Landscape Values									
1	Practices	C_Regulating (F)*	C_Provisioning (Y) 46.394***	C_Disservices (Y) 5.698*	ES_Food (F) ***	ES_Fuel (F) *	ES_Fire (F) *	ES_Recreation (Y) 18.020***	ES_Education (F) *
2	Forms	C_Disservices (Y) 7.393*	ES_Inspiration (F) 5.165*						
3	Relationships	C_Provisioning (Y) 5.582*	ES_Food (Y) 4.918*	ES_Ornament (F) *	ES_Recreation (Y) 9.198**	ES_Sense of place (Y) 12.011***	ES_Socializing (Y) 23.961***	ES_Spatial reference (Y) 16.250***	
Temporal Dimension									
1	Embedded	ES_Food (F) ***	ES_Water (F) *	ES_Ornament (F) *	ES_Sense of place (Y) 57.494***	ES_Spatial reference (Y) 7.726*	C_Cultural (F)*	C_Provisioning (Y) 18.726*	

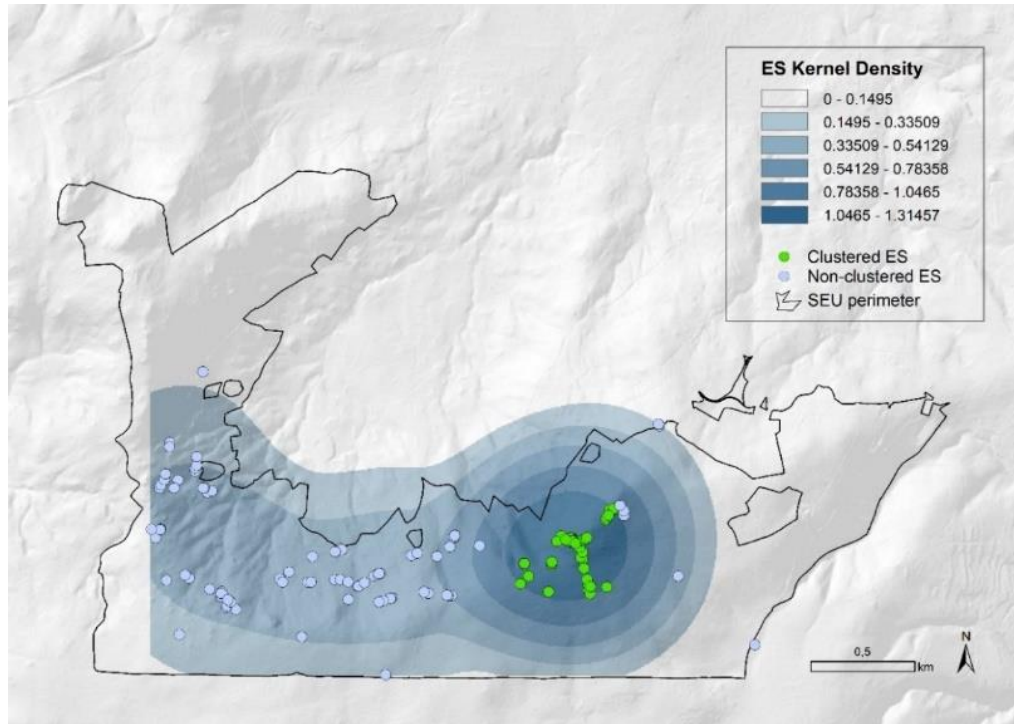
**Table 5.7.** Statistically significant relationships between the three dimensions of landscape values and their temporal dimension with the derived ES and CICES sections (the latter including the category of disservices for comparison). For simplification, we added the following prefixes to the variables: C for CICES sections, ES for ecosystem services. P value is represented as \* when  $P \leq 0.05$ ; \*\* when  $P \leq 0.005$ ; and \*\*\* for  $P \leq 0.001$ , preceded by letter F between brackets when the result comes from the Fisher's exact test, or by letter Y when it is from Yate's  $\chi^2$  test.

VARIABLES OF STUDY	PHOTO-TEAMS					$\chi^2$ test $\chi^2$ (df 4)
	T1	T2	T3	T4	T5	
PHOTOGRAPHED FEATURES						
Atmosphere <sup>es</sup>	2	0	24	3	0	35.038***
Fauna <sup>es</sup>	9	11	0	3	0	11.199*
Infrastructures <sup>lf</sup>	25	9	35	31	28	10.365*
Native trees	21	13	24	3	5	12.526*
People	6	33	32	28	21	14.093*
Stones	8	11	12	31	33	18.065***
ECOSYSTEM SERVICES						
Food <sup>es lf</sup>	8	20	0	9	10	11.548*
CICES SECTION						
Provisioning <sup>lf</sup>	13	20	0	16	13	11.370*
LANDSCAPE VALUES						
Practices <sup>lf</sup>	17	11	3	28	28	14.713**
Relationships	40	62	47	75	66	14.479*
DISSERVICES						
Forest management <sup>es</sup>	4	0	3	25	8	20.846***
Safety <sup>es lf</sup>	0	7	0	9	0	13.735**
TEMPORAL DIMENSION						
Embedded <sup>lf</sup>	28	18	3	34	16	15.272**
Surface <sup>es lf</sup>	100	89	100	94	95	11.538*
RESEARCH QUESTION						
Positive	85	91	97	56	80	23.157***
Negative	13	9	15	53	18	28.134***
Changes	6	11	6	31	15	13.877*

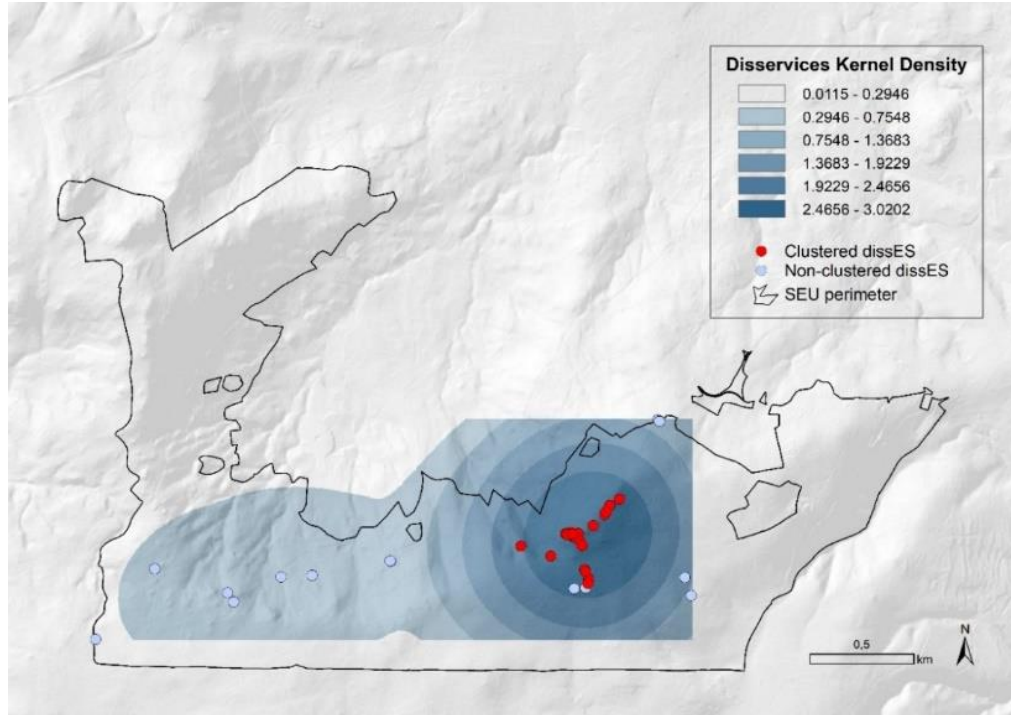
**Table 5.8.** Statistically significant relationships among the photovoice teams and all the analysed variables (features, ES, disservices, CICES, LV, temporal dimension of LV and RQ). P value is represented as \* when  $P \leq 0.05$ ; \*\* when  $P \leq 0.005$ ; and \*\*\* for  $P \leq 0.001$ . The superscript <sup>lf</sup> is indicated beside the variable name when the values of the likelihood function were used instead of the  $\chi^2$  test in order to reject the null hypothesis. The superscript <sup>es</sup> is used to indicate when the bilateral exact significance was considered. Light grey shading indicates the strongest positive dependences (corrected residues  $> 2$ ) between the teams and the variable of study; dark grey shading indicates the strongest negative dependences (corrected residues  $< -2$ ).



**Figure 5.5.** Location of the 225 photographs taken (blue dots) by photovoice participants along the five transect walks (all of them in yellow colour).



**Figure 5.6.** Kernel density map for the photographs depicting any type of ES, represented by blue continuous surfaces, classified by Jenks natural breaks. Result units are expressed in  $1 \times 10^{-5}$  dots/km<sup>2</sup>. Also, optimized hotspot analysis calculated by the count of incidents within fishnet polygons is superimposed in the form of dots for clustering comparison among methods. Green dots depict ES significantly clustered.



**Figure 5.7.** Kernel density map for the photographs depicting any type of disservice, represented by blue continuous surfaces, classified by Jenks natural breaks. Result units are expressed in  $1 \times 10^{-5}$  dots/km<sup>2</sup>. Also, optimized hotspot analysis calculated by the count of incidents within fishnet polygons is superimposed in the form of dots for clustering comparison among methods. Red dots depict disservices significantly clustered.

### 3.4. The role of women in the governance of the communal forests

Table 5.9 synthesizes participants' conclusions about the role women are playing and can further play in the context of CF governance. It was based in the analysis of the recordings from the deliberative dynamic 'world café' developed during the final plenary session of the photovoice process and completed with the recordings from the transect walks.

The table is divided into three main sections that correspond with the three questions raised during the world café, i.e. (1) why do women participate less in CF governance, (2) which are their potential contributions if they were more involved and (3) how would they like Mt Xalo to be like.

The stated motives for a lower participation in the decision-making processes held during CF assemblies were mainly related to (i) the existence of socially constructed gender roles and dynamics, that further intersect with age dynamics; (ii) the existence of conflicts during CF assemblies related to both the controversial history of the communal forest and to men's attitudes; and (iii) in sum, to the comfort of staying aside of CF forums to avoid the previous two themes (conflicts and gender stereotypes).

Regarding the potential contributions that women could bring to the governance of the CF, they found two main themes: the development of a peaceful coexistence and the implementation of pro-community actions. In this case, women pronounce contrary to the assumed gender stereotypes that relate them with trouble, making reference to skills that would facilitate the democratic functioning of CF assemblies and the prioritization of the common wellbeing.

When asked to plan their ideal CF, participants alluded to a wish for multifunctionality, a well-funded design and maintenance of the different spaces (e.g. bike routes, motorbike trails, hiking paths) and an adequate forest planning and management that would foster native tree species. Finally, participants proposed to start a promotion campaign of the CF to make it more visible and better accessible for visitors.

Find more details in table 5.9 and a thorough discussion of the findings in section 4.3.

Research Question	Themes	Sub-themes	Exemplifying Quotations
<p><b>1</b></p> <p><u>Lower Participation</u></p> <p>Why do you think women are nowadays less involved than men in decision making in the CF?</p>	Gender Roles and Dynamics	The gender division of labour	<p><i>Women have their jobs, but they also take care of the house and the children, who are in fact from both parents.</i></p> <p><i>We have to give up a lot to get the same opportunities.</i></p>
		Informal Rules (Tradition)	<p><i>CF directives were always formed by men.</i></p> <p><i>This has always been the custom.</i></p> <p><i>We grew up watching men attending the assemblies.</i></p> <p><i>We are used to men having the power.</i></p>
		Power dynamics	<p><i>They involve young people, but they do not make an effort to integrate women in the CF.</i></p> <p><i>There is machismo.</i></p> <p><i>There is an ancient rigid dynamic.</i></p> <p><i>We would not want to upset the elders [who are the majority in CF assemblies] with our contrary opinions.</i></p> <p><i>We do not find ourselves in this arena. If I attended CF assemblies, I would feel lonely.</i></p>
		Social perceptions	<p><i>We are afraid to slip up and be judged.</i></p> <p><i>We do not want to be a nuisance.</i></p> <p><i>We would not like women to be associated with troubles.</i></p> <p><i>They think women are more hysterical, hence I would not talk in the CF assemblies.</i></p>
	Conflicts	CF history	<p><i>The CF splits us.</i></p> <p><i>The CF has always been conflictive.</i></p> <p><i>Everything [related to the CF] is trouble.</i></p>
		Associated to men behaviour	<p><i>Men focus on leadership and competitiveness.</i></p> <p><i>There is a violent culture around the CF.</i></p>
	Comfort	Convenience of staying aside	<p><i>It is more comfortable for us not to participate.</i></p>

**Table 5.9.** Synthesis of participants' conclusions during the final plenary of the photovoice activity regarding the role of women in CF governance.

Research Question		Themes	Sub-themes	Exemplifying Quotations
2	<p><u>Potential Contributions</u></p> <p>What qualities do you think women can provide to the governance of the CF?</p>	Peaceful coexistence	Teamwork	<i>We are more used to working together.</i> <i>Women are educated to be more cooperative and networking.</i>
			Inclusiveness	<i>Everybody would have a room for participation.</i>
		Pro-community thinking	Non-profit intentions	<i>Our point of view is more community-oriented than economy-oriented.</i>
			Different priorities	<i>We do not care about the same things.</i> <i>Men promote more hunting and motor-riding, while women would promote hiking, family excursions, mushroom harvesting...</i> <i>We would promote school education in the forest (scholar trips) and about the forest.</i> <i>We would promote environmental volunteering at the forest for garbage cleaning.</i> <i>We would rethink the arrangement of tree species and spatial order.</i>
3	<p><u>Visions about the CF</u></p> <p>Close your eyes and dream of your ideal Mt Xalo, what would it be like?</p>	Planning and management	Multifunctionality	<i>We want diversity of CF uses.</i> <i>There is room for everyone: people, bikes, quad bikes...</i> <i>Harvesting mushrooms, chestnuts, forest fruits...</i>
			Forestry planning and management	<i>Less eucalyptus, thujas and pines and more autochthonous trees.</i> <i>Forest maintenance and weeding.</i> <i>Forest planning for new plantations.</i> <i>Forest monitoring and guarding.</i>
			Space planning and management	<i>Good maintenance of dirt roads for every use.</i> <i>Rethink the outline of routes and dirt roads.</i> <i>Promotion of thematic routes, e.g. botanical, mythical stones, wild food gathering, hiking, biking, ...</i> <i>Free of rubbish.</i>
		CF promotion	Visitors attraction	<i>To make a website advertising interesting touristic routes in Mt Xalo.</i> <i>To give Mt Xalo more visibility, to show its potential.</i> <i>To improve or rethink the accessibility to the CF and its resources.</i>

**Table 5.9 [Continues].** Synthesis of participants' conclusions during the final plenary of the photovoice activity regarding the role of women in CF governance.



## 4. Discussion

This section is divided into three main parts that address the main objectives of the chapter. Section 4.1 disentangles the comprehensive ES assessment of the Xalo CF from women's perspectives, section 4.2 discusses methodological considerations, while section 4.3 develops the current and potential role of women in the governance of the communal forests.

### 4.1. How many meanings can a photo reveal?

#### 4.1.1. Descriptive model for ES occurrence according to the photographed features

The various statistical analyses performed allowed for the characterization of the ecosystem services perceived by photovoice participants and the identification of the specific landscape features that contribute to generate those ES. This descriptive model may constitute a key information for adequate landscape planning in the SEU (Oteros-Rozas et al., 2017).

In our assessment, infrastructures, people and trees were the most frequently photographed features, when considering native and other trees as a single category (22% in total). These findings are similar to those obtained by Oteros-Rozas et al. (2017) in their Pan-European cultural ES assessment based on social media platforms, where trees and infrastructures were the most frequently depicted features. However, the photovoice activity revealed these features were not only related to ES but also to disservices. Non-native trees were associated with the provision of fuel and ornament ES, mainly from the past (embedded LV) as well as to unpleasantness due to current forest management, in contrast with native trees, only related to the ES food and aesthetics. Infrastructures were photographed to portray the communication ES but also with manifold disservices (environmental impact, safety, spatial order and damages). People were next in the frequency of photography, demonstrating the importance of the social-ecological interplay in the generation of the cultural ES, such as relax and spirituality.

Two usually over-portrayed landscape features in European ES assessments compared to their actual land cover are shrubs (Oteros-Rozas et al., 2017) and rocks (Clemente et al., 2019; Oteros-Rozas et al., 2017). Coincidentally, stones and understory were among the most common photographed features in our study and they were, besides, significantly associated to the greater number of ES types. Stones appeared as important sources of inspiration, spirituality and self-improvement, while understory was depicted as a food and ornament provider and associated with sense of place. It is noteworthy the relation of understory with a varied set of ES, practices and relationships (both surface and embedded) but with no disservice at all, in contrast with previous findings that related shrubs with a neglected forest (Chapters 3 and 4). This leads to the idea that an appropriate management of the communal forest that controls the vertical structure of understory while maintaining the horizontal structure can have an effect on the generation of multiple ES (e.g. provisioning ES, sense of place, fire control), the enhancement of biodiversity (López et al., 2017) and an increased forest accessibility. The convenience of introducing cattle for these means was formerly discussed in line with CF owners' visions and findings in the scientific literature (Chapter 4) and this was also referred in one of the pictures taken by T4, titled 'natural management and weeding' in reference to a herd of grazing horses. Mt Xalo gathers three Sites of Community Importance from the European Habitats Directive 92/43/EEC composed by heathlands (MITECO, 2020), one of them being considered a priority habitat (H4020 - Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*), which highlights the relevance of the heathlands present in the SEU from a biophysical perspective in addition to the social values.

The ethereal feature 'atmosphere' (e.g. the shade and shadows of trees, vegetation colours, nature sounds), difficult to capture by other valuation techniques, emerged as an important element that produced sensorial experiences (also found in Bieling et al., 2014) and the aesthetic ES. 'Panorama' pictures were frequently taken to portray participants' villages, homes and recognizable surroundings, remarking the facility of spatial

reference provided by Mt Xalo (previously referred by [Vallés-Planells et al., 2014](#)). The complete set of relationships between landscape features and the ES generated is found in table 5.6.

#### 4.1.2. The relevance of the cultural ecosystem services

The photovoice activity revealed a huge relevance of the cultural ES, which were present in 92% of the photographs through 13 different cultural ES types out of the total 18 ES. The top 7 photographed ES were also cultural: aesthetic, sense of place, recreation, sensory, socializing, spatial reference and inspiration. The richness of the cultural ES class was further evidenced by the need to add new CICES types, such as communications, self-improvement or temporal and spatial references. These findings are contrasting with the little attention that the cultural ES have received in ecosystem services classification systems—e.g. in CICES only 18% of all the ES types are cultural—and ES research ([Boerema, 2016](#); [Chan et al., 2012](#))—considered only in 18% of the mapping assessments ([Crossman et al., 2013](#))—and the great importance the cultural ES have improving validity and legitimacy in decision making ([Chan et al., 2012](#)). On the contrary, the regulating ES were barely absent (1%) in the photovoice exercise, similar to what [Bieling \(2014\)](#) found in her arts-based ES study with local residents in a German biosphere reserve. Here, the cultural ES exceeded 90% of occurrence and the regulating reached just 2%. Despite in both studies people were free to refer any kind of perceptions, wishes, concerns and values about the SES, the applied valuation methods may have acted as value-articulating institutions with a determinant influence in the elicited answers ([Jacobs et al., 2018](#)). In fact, results from Chapter 3, i.e. questionnaires of public ES perception, showed contrasting findings with the photovoice method, as the regulating ES were the most often perceived (66% in average, followed by the cultural ES, 41%, and provisioning, 31%). Respondents' profiles were different in both ES assessments, but the fact of presenting a predefined set of ES types and the way RQ were asked has surely had an influence in the subsequent outcomes. Nevertheless, the regulating services are, in general, not well perceived by people ([Costanza et al., 2017](#)).

With respect to the provisioning ES, these were recognised at a low rate (13%) and only a few ES classes (drinking water, food, fuel, ornament), often related to practices and relationships from the past (embedded LV), denoting changes in the CF uses and management of its resources. It is noticeable that no photograph intended to depict the provision of industrial timber or pulpwood despite the current forestry use of this common land. Similar findings were reported from the public survey analysed in Chapter 3, denoting either a lack of social appreciation or awareness for this ecosystem service in the SEU. This is opposite to CF owners' perceptions, who would like to improve forestry productivity (Chapter 4), the only ES that generates monetary inputs for the community nowadays, together with water supply. In sum, photovoice participants showed a mainly non-monetary demand towards the ES provided by the CF, represented by a high appreciation of the intangible cultural ES and a lower emphasize of the provisioning ES, which were never expressed in monetary terms except for one reference to the pine cones collected for sale in past times (one photo-title was 'The pine cones, a source of income in the past', T4). Similarly, [Brown and Fortnam \(2018\)](#) and [Fortnam et al. \(2019\)](#) relate women from diverse sociocultural contexts with the support of non-monetary ES according to their specific gender roles and labour division.

4.1.3. Let's consider them 'socio-ecosystem disservices' rather than 'ecosystem disservices'

In section 2.3.1, we introduced the category of the so-called 'disservices' as both natural-based or human-based negative phenomena within the social-ecological unit. This was intended to include the whole spectrum of negative answers to the RQ referred by photo-participants.

After content analysis of the pictures, we found that all the events were referring to negative impacts produced by human activities with a negative impact on the environment rather than just environmental characteristics: damages, environmental impact, forest management, safety and spatial order. All of them are related to human practices that affect the landscape,

which, in turn, become negative for human wellbeing. Similar findings were gathered from the public survey in Chapter 3 and interviews with stakeholders from the SEU in Chapter 4. This leads to the idea that the ecological components of this SEU are not perceived as a negative impact generators per se, but it is the human management of the ecosystem what can eventually cause discomfort and constrain ES supply. A careful planning and management of the SEU may, therefore, avoid or alleviate human-caused negative impacts in the CF.

The terminology we applied to this concept—disservices—is likely wrong for most authors, who only consider the ‘ecosystem’ disservices (e.g. [Shackleton et al., 2016](#); [Sandbrook and Burgess, 2015](#)) rather than the ‘socio-ecosystem disservices’. Nonetheless, [Lyytimäki \(2017\)](#) recognises that the boundaries between the ecological and social systems are blurred within a SES, while [Campagne et al. \(2018\)](#) acknowledge the negative effects of ecosystem management over human wellbeing as a disservice. Hence, we find the term ‘ecosystem disservices’ and its definition (e.g. [Shackleton et al., 2016](#)) would be more comprehensive if acknowledged as ‘socio-ecosystem disservices’, i.e. the functions, processes and attributes generated by ‘social-ecological systems’ [instead of ecosystems] that result in perceived or actual negative impacts on human wellbeing.

But even for ‘ecosystem’ disservices, there is still no widely accepted typology to systematically analyse them ([Shackleton et al., 2016](#)). Some proposals were recently developed by [Shackleton et al. \(2016\)](#), [Lyytimäki \(2017\)](#) and [Campagne et al. \(2018\)](#). Each one is different, but they mainly include negative impacts that can affect health, economical, ecological or cultural dimensions. In our analysis, health issues were represented by the category ‘safety’, ecological dimensions were gathered as ‘environmental impact’, while the cultural disservices were represented by ‘damages’, ‘forest management’ and ‘spatial order’. The economical dimensions were not specifically addressed in any photograph.

Disservices were the second category most depicted by photovoice participants (20%), although still far from the cultural ES (92%). The descriptive model also allowed to disentangle the negative contributions of specific landscape features to community wellbeing. The disservices section correlated mainly with the feature 'infrastructures' in every possible way (i.e. damages, spatial order, environmental impact and safety), with 'other trees', due to forest management, and with 'rubbish', as damages.

#### 4.1.4. The complementarity between landscape values and ecosystem services

The classification of the perceived benefits provided by nature is a challenging task both conceptually and technically, as the idea of ecosystem services is a boundary object between disciplines and because the agreement in terminology and thematic resolution between diverse disciplines is a complex task (Haines-Young and Potschin, 2014).

In our study, the correspondence analysis between the CICES and LV frameworks constituted a tentative exercise that threw some significant results that link specific ES classes and sections to either forms, practices or relationships and to past times. In sum, the information provided by each classification system resulted complementary.

Some studies recommend the landscape values framework as more suitable for the participatory assessment of human wellbeing (Bieling et al., 2014; Fagerholm et al., 2016; Stephenson, 2008), while others suggest the use of the CICES system as more rigorous due to its high level of detail and nested hierarchical structure (Czucz et al., 2018; Haines-Young and Potschin, 2014). But it has been recognised that the use of several linked classification systems may likely be needed to achieve practical and full operationalisation of ES assessments (Haines-Young and Potschin, 2014). In the photovoice activity, the application of the LV framework resulted especially useful for the acknowledgement of the embedded temporal dimension of some practices and relationships associated with specific ES. If the embedded dimension was not considered, the interpretation of the frequency results

for the current provision of LV and ES would be inflated. Nonetheless, we must consider that the great level of representation found for landscape forms in the pictures (76%) was certainly stimulated by the applied valuation method, based in photo-taking. On the other hand, the classification of ES based in CICES was not completely appropriate for the assessment, as it was often needed to merge several CICES classes or add new ones to comprehend authors' values (see table 5.1). Both situations (the overlapping of CICES classes and the potential gaps) were warned by [Czúcz et al. \(2018\)](#), who recognize that in some cases the thematic resolution of the CICES classification system can result unsuitable for practical applications. Nevertheless, the division of ES into ES classes (e.g. provisioning, regulating and cultural) did help to understand the nature of the perceived benefits and the great relevance of the cultural relationships of the women with the CF. Hence, we consider that both the ES and LV frameworks provided complementary approaches in this study, although the simultaneous use of the two systems increased complexity to the assessment.

#### 4.1.5. Where were the photographed ES and disservices located?

Each photovoice team chose a different route for their transect walks, which complicates the comparison among the frequency of features they could photograph and the inferred ES, as the chances of finding similar landscape features changed with the chosen route. Nonetheless, this can also be interpreted according to the diversity of interests among participants, hence constituting a significative datum.

The spatial analysis allowed for the detection of areas of high density of ES and disservices, pointing mainly at one zone: the scenic vantage point named O Castelo or O Petón, in line with previous results from this Thesis (Chapter 3, section 3.5). O Petón was the most popular spot for photovoice participants when selecting the transect routes, with four out of five of them passing by that location, which facilitates the occurrence of a spatial overlap in photo-taking. This coincidence among teams is related to the popularity of the scenic spot—an iconic reference location with wide views also used for

the practice of sports such as climbing and hiking. It is also the easiest accessible spot of the SEU, next to the parking lot and easily recognizable by being at an elevated location close to the antennas. There are other scenic areas in the SEU, but they remain unknown due to remoteness and difficulty of access, which constrains their provision capacity of cultural ES (Torralba et al., 2018) and, consequently, the socio-cultural assessment by participants, specifically when it is based in nature photographs (Martínez-Pastur et al., 2016; Richards and Friess, 2015). On the other hand, the lack of access to some areas might be a relevant factor for the preservation of their ecological integrity (Di Marco et al., 2019; Watson et al., 2016) and an accordingly lower record of disservices (e.g. neglected). In fact, the photographed human-based disservices were also concentrated in the popular area around O Petón (motivated by the installation of infrastructures and rubbish left by visitors), while, in contrast, the route walked by T2 (the only one far from O Petón) gathered the lowest number of disservices photographed.

The two spatial methodological approaches explored (the kernel density analysis and the optimized hotspot analysis) threw similar findings on the aggregation patterns of both ES and disservices. However, the moving window technique applied—which comprehensively covered a set polygon gathering every point rather than adjusting only to the transect routes—facilitated the spatial clustering in the area where four of the five team routes converged. This fact has likely led to methodological flaws such as the underestimation of other potential small-scale clusters in distant areas, as it may be the case of the route walked by team T2. An additional drawback may be the potential existence of a mismatch between the location where the photo is taken and that where the ES are actually generated (Dunkel, 2015; Sun et al., 2019; Yoshimura and Hiura, 2017). Nevertheless, in this study that may be the case just for panorama pictures, as we could verify in situ that the remaining landscape features were reached at a short-medium distance.



#### 4.1.6. The heterogeneity of perceptions among female participants

The five photovoice teams showed different correspondences with the variables of study. These divergences confirmed the assumption that women do not constitute a homogeneous collective concerning their relationship with nature and valuation of its benefits, in line with contemporary critical ecofeminisms and previous ES assessments conducted in Spain (Iniesta-Arandia et al., 2014). Also, the intergenerational character of the photovoice group revealed positive for the attainment of co-learning among participants.

Attending to the statistical correspondences between the teams and the analysed variables, T1, the team formed by the youngest participants, took a significant high number of pictures of native trees. This was favoured by the forest cover of their route, intentionally chosen ('We are not going to find many eucalyptus trees here because this is an autochthonous broadleaved tree area'), that served them to stress values such as biodiversity and family memories. T1 was also taking more pictures of wildlife and different types of dirt roads than other teams, but they photographed significantly less stones. Again, this was conditioned by route characteristics, deprived of rocks except at the end point, O Petón. This team took less pictures of themselves or other people and of the LV relationships than the other teams. Despite their shorter age, the embedded LV were very patent (28%, the second-highest rate of all teams) as well as the ES temporal reference. This was due to the fact that they often recalled their memories from childhood in the CF in relation to knowledge transfer from their relatives (e.g. some photo-titles were: 'The tree of my grandmother', 'Childhood of blackberries', 'The passage of time' or 'The end of the summer') or to recent noticeable changes in the landscape (e.g. 'A before and an after', which depicted an industrial park constructed at the foot of Mt Xalo).

Team number 2 was formed by women who used to visit Mt Xalo often. After the transect walk, they named their team 'Mt Xalo: a nexus for neighbours almost strangers', revealing the potential of the CF to enhance social

relationships. They were very observant of fauna and flora details, taking more pictures of wildlife than any other group, usually focused on the 'know how to look' (examples of photo-titles are 'Learn how to look', 'The stones are watching us', 'The doubleness of nature', 'The other Xalo' or 'Scarce animal world'). They had the lowest number of negative photo-answers to the RQ ('Everything is positive!') and no disservices related to forest management, partly because their walk was particularly recreational and nature-observational. This team achieved the greatest frequency of the ES food, often associated to varied family memories ('Pine cones, memories of childhood, family and Christmas'). Important topics arose during the route that were not photographed, like the fear of a fire event, the good quality of the water provided by the CF, the lack of shade in other CF locations or the wish to spread their mortuary ashes in Mt Xalo.

T3 was the team formed by those women who, despite being from the vicinity, had never visited Mt Xalo. This was clearly reflected in the low number of pictures about embedded values (i.e. memories) and practices (3% both). No photographs of food or provisioning ES (0%) were taken. Native trees and atmosphere were features often portrayed by this team, who wanted to capture the light games, shadows and shade that their combination provided ('Lights and shadows', 'The light at the end of the tunnel' or 'If God exists It is in Xalo' are some examples. Find the latter photo in figure A1, Appendix A). This first experience visiting the Xalo CF was very much enjoyed, reaching the highest frequency of positive answers to the RQ (97%, 'Everything is beautiful, everything is positive, nothing is negative!'). Their summary word for the transect walk experience was 'impressive', while mentioning they would like to repeat it ('We are going on holidays somewhere else while we have these beauties so close') and naming themselves as 'In team we can achieve it!'. Conversations along the walk were very rich in topics, many of which were not photographed (e.g. traditional knowledge on ethnobotany, stakeholder participation in different institutions).

T4 was mainly composed by those women who had been involved in the past use of the communal resources provided by the CF, e.g. cattle grazing, heather and gorse harvesting, pine cones gathering, etc. This team took significantly more pictures than the others of LV relationships (75%), most of LV practices, the majority of embedded LV and the majority of answers to the RQ 'changes'. This is in accordance with the big amount of memories and knowledge they gathered and expressed from their past use of the CF and the consequent awareness on land use and land cover changes. Some photo-titles were: 'Heathers, the flower from the woods, which used to have plenty of uses but not any more', 'Pine cones, a source of income in the past', 'Horses, natural management and cleaning', 'The Conle Stone, a memory, a reference spot'. (Find the former photo in figure A1, Appendix A). In reference to landscape changes, they mentioned 'Since this forest was planted I never visited it again. I could explain you from the valley: "look, over there I used to bring the cattle, or over there, in front, I gathered the gorse"—but here I do not know where I am, this is now different, very changed. I am talking about 40 years ago...'. T4 took less pictures than other teams of positive things (i.e. RQ) and more about negative issues, specially related to forest management and safety issues. They were happy to visit some CF spots after many years and, hence, they named their team 'A different evening remembering past times'.

Team number 5 gathered women who had not visited Mt Xalo but a few occasions in the past. This team chose the name 'The Heathers'. They started the walk at the outcropping O Petón, where they stayed for a long time fascinated with the scenic views and the tranquillity ('I hadn't been in such a silence for a long time, not feeling things around... (...) And yet, look how we are, we have this so close and so beautiful, but we go somewhere else. We do not see what we have here'. 'You can come here with everything negative to meditate and you come out with everything positive'). They also revisited memories of past visits and childhood adventures in the stone passages (e.g. 'Devil's ribs, challenge overcome!', 'Remembering headings in Xalo'). Accordingly, this team took more pictures of stones than the others and less

of fauna, native trees or atmosphere. They also took a significant number of pictures referring to LV practices (e.g. 'The resources used in the past and in the present' in a photo mosaic with gorse, heather and fern vs. timber; or 'Vandals, they are everywhere', depicting the unpleasant practice of painting the rocks). The long stay at the outcrop enjoying the views allowed them for the visual analysis of the peri-urban landscape changes (i.e. the spatial reference ES): industrial sprawling, road development, the airport, in sum, 'The visualization of progress from Xalo'. The location of their homes from the scenic viewpoint was a constant in the majority of teams, hence the ES spatial reference did not show statistically significant divergences.

#### 4.2. Methodological considerations on the photovoice process

Masterson et al. (2018) indicated that the photovoice method can include two modes of practical application which produce different data and impact: photovoice as a deep learning process or as a scoping tool. We think both modes were somehow implicit in our research. On the one hand, the photovoice exercise resulted an effective technique for creating an intergenerational space for women participation, engagement, empowerment, deliberative critical thinking and co-learning. On the other hand, our transdisciplinary ES assessment allowed the identification and analysis of relevant social-ecological features, ES, disservices and changes in the SEU from a qualitative, quantitative and spatially explicit approach.

Furthermore, photovoice served to stimulate arts-thinking through visual media (i.e. photos). Besides, the activity elicited other arts-based outcomes, such as text writing from one of the participants. Her two fabulous texts written after the photovoice experience were ceded and can be found in the opening and closing of this chapter ('Teachers of Life and Land' and 'While we still have paths'). These texts were also publicly shared during the photo exhibitions, hence adding value to the social impact of the research, while summarizing impeccably the photovoice process and outcomes. Furthermore, they constitute a valid alternative tool for results dissemination and policy impact while integrating an emotional component. Indeed, the

implementation of arts-based research is gaining growing recognition in sustainability science nowadays (Capous-Desyllas and Bromfield, 2018). Photovoice is widely acknowledged as a tool for both understanding and communicating sustainability issues in community research (Tippins et al., 2018) and short-form writing is considered a creative practice that enhances engagement and learning in conservation science (Januchowski-Hartley et al., 2018). Participatory theatre has been implemented in the exploration of future scenarios in protected areas with young people (Heras et al., 2016) and it is also a powerful tool for imparting technical information while encouraging sustainability action (Breslow, 2005; Clark, 2008). Children's perceptions of the environment have been explored through the analysis of their drawings (Pellier et al., 2014; Snaddon et al., 2008; Snaddon and Turner, 2007). Art can be additionally applied as an innovative way to interpret data without losing scientific rigor (e.g. Capous-Desyllas and Bromfield, 2018), approaching society to scientific findings by bringing back the necessary curiosity, discovery and surprise that science was once associated with (Seppelt et al., 2018).

However, a negative aspect of the methodology applied was its operational complexity. The photovoice approach required careful planning and the investment of manifold resources, especially time from both researchers and participants, as already reported by other researchers (Masterson et al., 2018). Besides, the geotagged photovoice produced large amounts of diverse data that were not easy to process, analyse or summarize. The main difficulties were related to the coding analysis, as there is not a clear systematic protocol for analysing images within qualitative research literature (Capous-Desyllas and Bromfield, 2018) and content analysis of images from a quantitative perspective presents several flaws (Rose, 2001). Let's see these difficulties in detail.

#### 4.2.1. The perils of content analysis in photo assessments

Content analysis of visual images is a widely used technique in visitor-employed photography (Oku and Fukamachi, 2006; Sun et al., 2019) and,

especially, in the growing body of ES assessments based on crowdsourced geotagged photographs (Clemente et al., 2019; Martínez-Pastur et al., 2016; Oteros-Rozas et al., 2017; Richards and Friess, 2015; Richards and Tunçer, 2018; Tenerelli et al., 2016; Vaz et al., 2020). Content analysis was a useful technique in our photovoice experience to characterize the landscape features object of interest and the derived ES and disservices, though it was thanks to the combination with the physical and emotional involvement of the researcher in the photo activity. On the contrary, when there is no connection between the researcher and the source of the picture, the analytical technique presents important pitfalls for the systematic analysis of photographs (Rose, 2001). This calls for caution on the praise application of content analysis for a rapid ES assessment (e.g. Bernetti et al., 2019; Richards and Friess, 2015; Richards and Tunçer, 2018). Rose (2001) pointed at a number of problems in the interpretation of the meaning of photos through content analysis that are being discussed in the next sections. In summary, these are: (i) the tendency to consider that something occurring very often is more important; (ii) the impossibility of dealing with the sites where the meanings of the images were conceived; (iii) the difficulty of addressing the context and significance of the pictures; (iv) the complication of evoking the mood of an image through codes; (v) the lack of reflexivity demanded from the researcher side due to the assumption that this is an objective method, when the specific audience of the picture conditions the meanings inferred.

Some authors applying content analysis to photos from social media platforms have acknowledged these issues (e.g. Clemente, 2019 and Martínez-Pastur et al., 2016 make reference to context, significance and coding gaps) and claim for a more holistic methodology (Richards and Friess, 2015) that acknowledges the socio and psycho-cultural aspects of individuals' motivations (Tenerelli et al., 2016). Furthermore, Oteros-Rozas et al. (2017) recognise the heterogeneity in data availability and data quality from online platforms and, especially, a lack of representativeness in the social groups and profiles that have access to these social media. These authors claim for a better representation of the elderly, the rural and the

indigenous communities in order to achieve a better decision-making in the management of local landscapes. In contrast with the photo-series analysis from social media, photovoice resulted appropriate in our experience to engage with and acknowledge the perspectives of rural women of all ages. The methodology had previously proven successful with older adults (Woda et al., 2018), women (McIntyre, 2003), indigenous (Mistry et al., 2015) and marginalized communities (Harper and TSRAECD, 2009). Nonetheless, from an intersectional perspective, a further concern in the application of photovoice could be the potential exclusion of functionally diverse people, e.g. visual and mobility functional diversities, if not thoroughly planned and adapted in advance.

#### 4.2.2. The coding gaps

The coding analysis was based in the voice recordings from the transect walks and subsequent review of photos with the authors. These recordings served to complete triangulation for coding systematization from the researcher side. We consider the analysis would likely have been better operationalized if coding was conducted together with participants after an introduction of the ES framework. But we did not want participants to work classifying exhaustively the big amount of pictures or use technical language with them, as that may have precluded participants from engaging in the activity (Berbés-Blázquez, 2011). However, some meanings were surely lost within the classification process of photos due to the lack of an explicit verbal explanation from participants.

For instance, the nature of the photographic transect walks was itself 'recreational'—*sensu* ES—and they certainly stimulated participants' artistic skills and 'inspirational' values. Likewise, critical awareness of the many benefits provided by the SEU was elicited, which can be interpreted as an 'educational' ES. Therefore, it was tempting to assign these ES to every picture when coding, but if they were not referred by the authors, we did not either. Hence, although we consider proved that the SEU is a recreation, inspiration and education ES provider, this was not reflected in the statistics.

A similar concern was found with regard to photos depicting fauna or flora. These features were never verbally referred by authors as a source of wellbeing related to biodiversity or existence values, hence this ES category is not present in our record. However, some authors suggested there is a human impulse for the appreciation and need of connection with other forms of life—this phenomenon is known as the biophilia hypothesis (Ulrich, 1993; Wilson, 1984)—hence the act of photographing fauna and flora could be understood as a representation of this affection (Martínez-Pastur et al., 2016). Accordingly, in their respective photo-series analyses from social media, Martínez-Pastur et al. (2016) classified any photo depicting animals or plants as a category of cultural ES called ‘existence value’ for biodiversity conservation, while Richards and Friess (2015) classified them as ‘nature appreciation’ providers. If we had coded this way, that ES category would have gathered the highest frequency rate, with 41% of occurrences within the whole photo collection (when adding up the photos containing native trees, other trees, understory and fauna). Instead, those living features were usually described by photo authors as ‘beautiful’ and therefore related to the aesthetic or ornament ES, being aesthetic the ES which reached the highest frequency in our assessment (30%). Bieling et al. (2014), following Gobster’s et al. (2007) foundation, highlighted ‘beauty’ as a holistic issue located at the core of the human-nature relationships. Accordingly, several European studies recognise aesthetic as one of the most relevant ES for people (García-Martin et al., 2017; Harrison et al., 2010; Plieninger et al., 2013) and emphasized the important role of aesthetics in the preservation and shaping of rural landscapes (García-Llorente et al., 2012).

Photovoice effectively helped to create rich informal conversation forums (one of the original aims of the methodology, Wang and Burris 1997) and critical dialogue among participants during the transect walks. The voice recordings helped gathering relevant topics that complete our knowledge on the SES, but those were sometimes not represented by a photograph. These non-visual contributions are therefore lost in the statistics of the content analysis of images. An example of this is the wish of participants from T2 to



have their body ashes spread in Mt Xalo when they die, or statements such as ‘this place brings me complete happiness, peace and proud’ (T2), voice recorded but not corresponded with a picture.

Another bias related to content analysis is the assumption that something occurring rarely is less important than something occurring often (Rose, 2001). In our experience, this can be the case of the ES types with a lower rate in the frequency results (e.g. drinking water, fire control), which may be very relevant for participants but found in fewer occasions during the transect walks or not verbally referred later. As formerly mentioned, the valuation approaches applied condition the type of data generated and the type of values that are elicited (Jacobs et al., 2018). The geotagged photovoice methodology may have been accordingly not able to capture the whole spectrum of ES, but it still allowed for the recognition of a broad range of ES (18 ES), especially the usually neglected cultural ES (Chan et al., 2012). Among these, we recorded some ES difficult to capture by other means, like the inspirational, spiritual, sense of place (Hernández-Morcillo et al., 2013) or those ES additionally developed, e.g. self-fulfilment, spatial and temporal references. The inspirational ES was practically not acknowledged in the public survey analysed in Chapter 3, hence triangulation with photovoice (a creativity-stimulating technique) added new meanings to the global ES assessment.

#### 4.2.3. The cold nature of ES codes and the need for emotion

Participants’ conversations and explanations recorded from the transect walks and at the cafés were essential for photo classification, as the authors discussed manifold personal meanings about the SEU that otherwise would not have been evident at all for an outsider (Stephenson, 2008). The qualitative analysis of the voice recordings was rich in contents and descriptions, but the translation into quantitative codes led to the loss of significant nuances. For instance, the category sense of place gathered multiple stories about identity issues and family memories related to the CF

that cannot be explicitly addressed by the code name, not to mention by the ES class of CICES. Let's see a few examples with this and other ES categories.

The ES inferred from the photo entitled 'Childhood of blackberries' (find this picture in figure A1, Appendix A) were food, recreation and sense of place. The personal story behind the photographed bush was 'Blackberries used to be our reason to visit the forest [when we were children], so that our aunty would afterwards cook a pie for us' (T1). Another photo story related to sense of place from a T1 member, told about the personal meaning of the outcrop O Petón, which was such a special place for her partner that when they dated for the first time he took her there.

The photo 'Ampa's gorge' (figure A1, Appendix A) showed a participant from T2 looking at 'her gorge' with the gooseflesh. It was classified as spiritual and sense of place, but the profound feelings experienced at that moment seem to be missed somehow within ES codes.

A photograph from T3 depicted a few pine trees in yellow colour because of an illness. It was classified as a disservice due to a neglected forest management, but one of the titles considered by the author was far more eloquent: 'Mt Xalo is dying'.

The relax and peace experienced by a member of T4 was described as 'This is tranquillity for me. I could spend hours looking from O Petón and thinking of nothing', which was summarized as 'relax'. Similarly, participants from T5 felt joy, relax and wellbeing altogether inside one rocky alley, expressing it that as 'You come here to meditate with everything negative and you come out with everything positive'. Mental and physical health were also gathered within the 'relax' ES. 'This is health. Headaches and colds go away when you come here for a walk' (T2).

In several occasions, the recreation potential of Mt Xalo was valued through comparisons with other landscapes and leisure alternatives, which adds relevance to the ES this CF provides. E.g. 'Look, I like this rather than visiting a museum. Yes, I like much more Nature than being in a close place' (T3). 'I

hadn't been in such a silence for a long time, not feeling things around... And yet, look how we are, we have this so close and so beautiful, but we go elsewhere. We do not see what we have here' (T5).

Hence, although we intended to capture all the meanings referred by the photo authors, we feel that the mood of the moment is somehow lost within ES codes (Rose, 2001). The birdsongs, the gooseflesh and the mortuary ashes are far more eloquent than the name of an ES category. Chan et al. (2012) recognized that some classes of value rely on the experience and are hence difficult to articulate. This is the case of the 'transformative values'—the value of a thing for the way it changes how we think—which generally need to be associated to a narrative to be appreciated because the transformation is personal (Chan et al., 2012). A single profound experience can be enough to acknowledge a relational ecosystem service, even when it is more common as the result of a long history of engagement with the place (Bieling, 2014). In the photovoice activity, the women who had never visited Mt Xalo (T3) were 'profoundly impressed' after their first experience. This leads to highlight the importance that researchers have in embracing 'emotion' for interpreting the meaning and value of people's experiences in nature. This has been strongly emphasized by Stålhammar and Pedersen (2017), who state that the emotional component has been ignored in most ES valuations, making these less meaningful because a significant part of how people value things is lost. In this photovoice experience, the researcher engaged both physically and emotionally, but it was difficult to keep the emotion within ES codes and frequencies. The texts written by the photovoice participant that open and close this chapter were an effective complement to our results for the addition of the emotional component.

Besides emotion, two other necessary requisites for a transformative vision of the human-nature relationships that help recognizing the diversity of worldviews are reflexivity and reciprocity (Pascual et al., 2017). Reflexivity refers to the practice of situating oneself in the research process to understand how knowledge is constructed and shared and how power relations affect the research and its outcomes. The social actors called to

engage in the research process, the methodological tools applied and the ES object of valuation have an impact on the results obtained. However, reflexivity constitutes a missing keystone in most ES assessments (Jacobs et al., 2018), being described as a practice especially relevant in the context of feminist research (in Iniesta-Arandia et al., 2016) that we have tried to implement. On the other hand, reciprocity deals about counteracting asymmetrical or extractive relationships, e.g. ensuring that results are returned to the communities in an understandable and useful format (Iniesta-Arandia et al., 2016). The photo exhibitions conducted after the photovoice activity served to put photovoice participants and the research in contact with the community neighbours and the general public, thus, to fulfil reciprocity. Nonetheless, reciprocity was further achieved within the photovoice process through the interexchange given between participants and researchers, that became a true two-way transformation and co-learning experience.

#### 4.3. The role of women in the governance of the communal forests

The photovoice process resulted effective to engage women in the socio-cultural ES valuation of the Xalo CF. But once female have reflected on the benefits this common land brings them and the community, what about their role in the CF governance? The final plenary of the photovoice process served to generate a deliberative gender space to reflect on this question.

The general context of Galician communal forests has already been introduced in former sections (e.g. Chapter 1, section 2). Communal forest communities are democratic participatory spaces where local stakeholders take decisions that affect collective wellbeing. But CF communities can still incur in 'participatory exclusions' (Agarwal, 2001; Barros, 2019). The Galician civil law and act of communal forests gather the consuetudinary rule that it is the man head of the family who preferably represents the household in the CF affairs. Thus, within CF communities, men can be understood as high influence stakeholders and women as low influence (*sensu* García-Nieto et al.,

2015). Indeed, from the sample of women participating in the photovoice activity, ten gathered the requisites to represent the household in the CF assemblies (i.e. residence, age and ownership requirements), but only one participant affirmed she attended CF meetings regularly (T3), while two participants expounded they had just attended once or twice (T1, T2).

We already exposed in Chapter 4 (table 4.4) that a key factor for the success of community forest management is the participation of the majority of community members (Pagdee et al., 2006). It is, thus, essential to understand how internal policy is involved in the constitution of the female exclusion or, put another way, the gendering process of policymaking (Bock, 2015).

In the results section 3.4, table 5.9 gathers all the arguments formulated deliberately by photovoice participants regarding the role of women within CF governance. This represents a valuable contribution in light of the lack of data published on this topic in the Galician context (Proxecto Batefogo, 2019) and the importance that listening to those affected by the problem and how they define the problem has (Bock, 2015).

#### 4.3.1. Reasons behind the lower participation of women

When asking about the motives behind the lower participation of women in the decision-making processes around the Xalo CF, participants referred to the established gender roles and dynamics, their intention to avoid conflict and the convenience of staying aside. The analysis made by women from the SEU was found extraordinarily parallel to the conceptual framework developed by Agarwal (2001), which explored the reasons behind participatory exclusions in the community forests of India and Nepal. Certainly, this framework was claimed applicable to elsewhere, as participatory exclusion based on gender is a systemic phenomenon operating in many countries, almost universal (Agarwal, 2001). Let's see these factors in detail.

Within the section of 'gender roles', women firstly referred to the gender division of labour as a constraint to achieve the same opportunities as men

to join CF meetings. 'Women have their jobs, but they also take care of the house and the children, who are indeed from both parents'. 'We have to give up a lot to get the same opportunities' (table 5.9).

On the one hand, there is evidence that culturally specific views of gender reinforce the idea that certain physical or social spaces are explicitly for men or women (Arora-Jonsson, 2014). Women are often confined to the domestic sphere—where it is difficult to exercise any power and influence—and portrayed as caretakers, while men are conceived as more likely to be the representatives involved in the public spheres (Cruz-Souza, 2006; Meinzen-Dick et al., 2014). 'In Celas, women used to be at home and in the church, while men occupied the leisure activities, and the communal forest was part of that leisure, together with bars. Nowadays, there is a local social association which is led by both men and women, but women organize family activities, so no stereotype is broken' (T1).

On the other hand, women use to bear the main responsibility for childcare and housework in addition to their own job, with little recognition or support of their efforts (Agarwal, 2001; Arora-Jonsson, 2014). This double occupation in working and family care restricts women's capability to attend long meetings which are besides held at inconvenient times. Hence, strategies for the conciliation of duties are necessary, such as the rescheduling of times for collective meeting (Proyecto Batefogo, 2019). On the contrary, when joining organizations, women have often been expected to accommodate themselves to existing norms and structures rather than the structures be changed to accommodate women (Arora-Jonsson, 2014). Besides, both men and women should be equally responsible for the nurture and care of their family. Herrero (2013) speaks about 'naturalizing' men or 're-culturizing' society for this end, this is, adjusting political, relational, domestic and economic organization to the conditions of life, making *ecodependence* visible for everybody.

A second important factor that participants related to the lack of women within CF directive boards and assemblies was the both formal and informal

rule that designates men as the legitimate representatives of the house by tradition. In their own words: 'CF directives were always formed by men', 'This has always been the custom', 'We grew up watching men attending the assemblies', 'We are used to men having the power'. 'It is socially established like that and moving those pillars is almost sacrilege' (T1). This tradition is rooted in the already mentioned iconic role of the head of the family, i.e. the one owning properties: the man, by custom—and afterwards recorded in the legislation ([Act 2/2006, Galician civil law](#))—which makes reference to another factor discussed by [Agarwal \(2001\)](#), personal endowments, the fact that rural women usually lack personal property. 'Women do not own properties, they do not have the economic power, we are not a matriarchal society' (T1). In this regard, one of the strategies the Spanish rural women adopted for responding to discrimination was the acquisition of the ownership of exploitations, despite administrative, social and family barriers ([Cruz-Souza, 2006](#)).

In their study about forests and gender, [Aguilar et al. \(2011\)](#) advice paying special attention to traditional inequalities that could exclude women from participating in all activities and/or having control over natural resources. Regarding this, [Ravera et al. \(2016a\)](#) point to the institutional context as one determinant of the gendered roles in the access, control and use of natural resources. These authors refer to informal institutions—e.g. customary norms over communal property rights—as a discrimination factor against women's needs in favour for men's preferences over land use, with consequences on the resilience of the SES ([Ravera et al., 2016a](#)). Similarly, [Brown & Fortnam \(2018\)](#) hold that the exclusion of women from decision-making processes and the assumption that men represent the whole community may overlook important ES. One possible solution to start integrating women within CF assemblies was deduced from [Agarwal \(2001\)](#), who found that communal membership to only one person per household effectively excluded women, while formal rules allowing the attendance of one man and one woman per household were more inclusive. Accordingly, in their cross-country analysis of women's participation in forest management, [Coleman & Mwangi \(2013\)](#)

concluded that when institutions exist that are less exclusionary, women's participation is likely. Other important factors deduced by these authors for women participation were a good level of education and small economic inequalities across participants, specifically across genders.

A factor related to the operation of informal rules further recognised by participants was the intersectionality of 'power dynamics' between genders ('There is machismo') and among ages ('They involve young people, but they do not make an effort to integrate women in the CF', 'We would not want to upset the elders with our contrary opinions').

Too often, gender research pays attention only to women and does not aim to understand men's roles (Yang et al., 2018), but it is highly relevant to acknowledge the role of men as important actors for strengthening women's rights (Mukasa et al., 2016) and the impact that inviting or, by omission, excluding women in decision-making processes can have. Bock and Derkzen (2008) showed that European women are rarely invited to participate in decision making on rural development plans, leading to exclusion and the lack of any political debate by women. The invitation of women to participate in forest management may further contribute to their empowerment (Sarin, 1998 in Agarwal, 2001).

Agarwal (2001) found that the low number of women who dared to attend community forestry meetings rarely spoke up and, if they did, their opinions were disdained. In our case study, only one out of ten participants from the parish of Celas affirmed to attend CF assemblies often, but in the role of 'listener' rather than actively. 'I am a CF neighbour. I attend assemblies and I am informed. (...). It is always the same people who speak'. Also coincidentally in both Agarwal (2001)'s case study and ours, is the fact that the active women members were mostly widows or older married women. Our informant stated: '90% of the women who attend CF assemblies are from my generation [about 70 years old] and all of them have the same level of studies than me, not even elementary' (T3). In the interview with the Castelo CF executive board (Chapter 4) this was also mentioned: 'Now there are many



widows or single women who are household representatives.’ This is likely a generalized behaviour in the Galician CF (Proxecto Batefogo, 2019). Fervenza—a member from the Galician communal forest of Reboveda—states that the majority of women attending CF assemblies were widows and old women who participate just as listeners, do not give importance to their presence at the meeting nor are used to listen other women speak (Proxecto Batefogo, 2019—chp.10).

Now, focusing on the existing dynamics among ages, it is again outstanding the similarity of the statements made by photovoice participants with those gathered by Agarwal (2001). E.g. Agarwal mentions that ‘when senior family males are present, women hesitate in attending meetings, speaking up at them or opposing the men publicly. The hierarchy that marks respectful family behaviour gets carried into community spaces.’ In our study, photovoice participants stated: ‘We would not want to upset the elders with our contrary opinions’ and ‘We all know each other, we are friends or daughters of friends, it is not nice to oppose to them’ (T1). These age dynamics were formerly discussed in Chapter 4 with men related to the CF. The respect for older CF members was referred by interviewees as a constraint for innovative action. In this line, Fervenza pointed to generation replacement as a keystone for the sustainable future of Galician CF (Proxecto Batefogo, 2019—chp.10).

A statement from a photovoice participant that relates several key issues was: ‘Nowadays there are many young people [involved in the CF], which is important. Youngsters should be involved everywhere. But I miss—from outside the CF—I miss more women involved. I know that forming part of the forest community means a lot of work. Women have their own job and their children, who are from both mother and father, but women are the ones who take care. I think that the directive board of the CF should be mixed, with parity in its composition. Because women have also very good ideas. I do have an opinion, Perhaps I do not convey it well, but I have an opinion.’

The parity issue in general politics and public decision-making has improved in most member states in the last years, but it is still far from reality (Bock, 2015). The latter is the context operating in Spain and Galicia, in light of the official statistics (IGE, 2020)<sup>45</sup>. However, to reverse this situation it is not enough just adding women in power positions of management committees, as this will not guarantee that they speak up, represent other women's interests or influence decision-making (Meinzen-Dick et al., 2014). This objection was clearly gathered in the analysis made by photovoice participants, summarized in this statement: 'We do not find ourselves in this arena. If I attended CF assemblies, I would feel lonely'. Accordingly, Agarwal (2010) found that a minimum threshold of 30% of women forming part of the executive committee of community forestry was necessary to encourage women's effective participation. This author had already suggested in 2001 that to gain voice in mixed forums and challenging gendered social norms and perceptions, a critical mass of active women was needed together with a sense of group identity. And she pinpointed again to a 30% threshold according to findings from previous studies conducted in Scandinavia (Dahlerup, 1988, in Agarwal, 2001).

Perhaps, a prerequisite for the achievement of equal participation on mixed spaces such as CF assemblies (or at least a 30% of active women), is that women first empower themselves in separate women groups, where they can speak up freely and analyse their current situation and aims (Cruz-Souza, 2006). The final plenary of the photovoice process -where we conducted the analysis of women within CF governance- showed up as a very necessary 'gender space' for discussion about the gendered dimensions of the CF that had not previously existed in the studied community. Gender spaces have proved important rooms for the analysis of complex SES while guaranteeing women's confidence (Delgado-Serrano and Semerena, 2018). They are also

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<sup>45</sup> Find the statistics offered by IGE on the reality of the Galician and Spanish women in terms of power and decision-making in public administrations, universities and the private sector. URL: [https://www.ige.eu/web/mostrar\\_actividade\\_estadistica.jsp?idioma=gl&codigo=0205011&num\\_pag=6](https://www.ige.eu/web/mostrar_actividade_estadistica.jsp?idioma=gl&codigo=0205011&num_pag=6) (Accessed 11/02/2020).

known to help building critical networks for information sharing and the start of collective action (Meinzen-Dick et al., 2014). Besides, women's associations can change norms and perceptions while increasing women's public presence and strength (Agarwal, 2001, 2009). In this regard, the Association of Rural Women from Culleredo As Berenguelas constitutes a valuable space for the empowerment and visibility of local women<sup>46</sup> that can serve as a safe forum to continue with gender reflections or as a platform for the constitution of new women's groups.

Another positive side effect of women's spaces can be the overcoming of the social construct of 'gendered behavioural norms' that impose the identification of women with self-effacement, shyness and soft speech (Agarwal, 2001). Bock (2015) indicates that women usually prefer to engage in activities that carry a low public exposure, low competitiveness and align with traditional gender images. The statements from the photovoice participants denote this trend and the unwanted self-perception of men relating them with trouble: 'They think women are more hysterical, hence I would not talk in the CF assemblies'. 'We do not want to be a nuisance'. We would not like women to be associated with troubles'. 'We are afraid to slip up and be judged'. Fervenza (Proyecto Batefogo, 2019–chp.10), from the Galician CF of Reboredo, described similar social perceptions about women at the CF meetings: 'They treated us as if we were kids'. [Men said:] 'This woman is the same as always, this is the one who shouts...'. Hence, here comes the referred additional positive effect of women's groups. Agarwal (2001) concluded after 22 years of fieldwork experience that women who join a separate group gradually lose their 'fear of making fools of themselves' when speaking up, are able to improve men's perceptions about women's capabilities and finish with the social conception that women's only legitimate space is domestic. However, the author also warns that, although

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<sup>46</sup> Find the report 'As Berenguelas and the empowerment of rural women in Culleredo' about the role this women's space is playing in the region and the confluence with the photovoice research. It is in the magazine Fouce 325 (March-April 2019), page 13. URL: <http://www.sindicatolabrego.com/index.php?s=18>

separate women's groups are necessary, they are not a sufficient condition for the effective participation of women in CF meetings, as they can sharpen gender segregation if not subsequently integrated into mixed groups.

In line with this stated wish from photovoice participants that women are not associated with *conflict* is the way around: the idea that men have developed 'A violent culture around the CF' and that they are more 'focused on leadership and competitiveness'. Once more, we find extraordinary similarities among Agarwal (2001)'s research and our findings. Agarwal reported women hesitated to attend the meetings due to the aggressive behaviour of men and the occurrence of fights during the meetings. In case they attended, they would sit at the back of the room where they are less visible. A photovoice participant from T2 told: 'I attended an assembly once. I sat at the end of the room. A violent fight broke out in front of me! The stories that divide the parish make me very nervous...'. This quotation makes also reference to another relevant problematic issue beyond men's attitudes: the already acknowledged (Chapter 4) existence of conflicts associated the history of the communal forest of Celas ever since the early days of its classification. 'The CF has always been conflictive'. 'The CF splits us'. 'Everything [related to the CF] is trouble'.

A final motive given by women to avoid participation in the CF governance was the simple convenience of staying aside from both conflicts and stereotyped gender roles. The extensive list of difficulties revealed by photovoice participants to join CF meetings that has just been examined (i.e. the gendered division of labour, the rules to become a CF representative, the driving power dynamics, the social perceptions of women's behaviour, a history of conflicts and an intimidating behaviour from their neighbours) evidences their last quotation: 'It is more comfortable for us not to participate'.

#### 4.3.2. Potential contributions of women to the governance of the communal forests

Despite the low participation rate of women in CF governance, their effective inclusion in CF planning was associated by participants with varied positive outcomes. When asked about the specific contributions that the inclusion of women in decision-making processes would have, photovoice participants made reference, on the one hand, to the development of a peaceful coexistence among community members and, on the other hand, to a shift in priorities of ES management towards greater pro-community goals (table 5.9).

Once more, the thoughts of participants were not contextually isolated, but in line with the scientific literature on gender studies. They referred to the development of a 'peaceful coexistence' among CF members through two qualities attributed to women: teamwork ('We are more used to working together'. 'Women are educated to be more cooperative and networking') and inclusiveness ('Everybody would have a room for participation'). There are scientific evidences supporting these assertions. For instance, in contrast to the quotation mentioned in the former section that related men to leadership and competitiveness, [Bock \(2015\)](#) states that women usually prefer engaging in informal political activities that are perceived as less competitive and [Villamor & van Noordwijk \(2016\)](#) hold that women are generally less self-assertive and competitive than men. An empirical study conducted by [Westermann et al. \(2005\)](#) across 20 countries of Latin America, Africa and Asia analysed different groups of people with varying gender compositions and management practices of natural resources. The authors found that groups including more women showed a better collaboration, solidarity and conflict resolution. The presence of women in community forestry groups and, specifically, in leadership positions has been significantly correlated with the reduction of disruptive conflict in the wide cross-country analysis of [Coleman and Mwangi \(2013\)](#). On the other hand, the fact that women have experienced the role of being low influence stakeholders with

difficulties for inclusiveness might help empathizing with other underrepresented collectives, e.g. young people.

In regard to 'pro-community thinking', we already argued in the introduction section of this chapter that a large body of research relates women with a higher degree of pro-environmental attitudes (Calvet-Myr et al., 2016). Furthermore, many studies specifically relate women with a bent to communal behaviour, by showing a lower self-interest and a greater concern for the wellbeing of other community members (Leach et al., 1995; Ray et al., 2017; Villamor & van Noordwijk, 2016). Ray et al. (2017) analysed the attitudes of genders in community-based forest management finding that, in spite of the negative perception about women's involvement in co-management, women were actually more pro-conservation and pro-social than men and they additionally achieved a generalized positive forest conservation attitude from everybody involved.

Photovoice participants specifically mentioned their 'non-profit intention' in forest management: 'Our point of view is more community-oriented than economy oriented' and the perception that their priorities would be different to the ones already implemented in CF governance: 'We do not care about the same things'. 'Men promote more hunting and motor-riding, while women would promote hiking, family excursions, mushroom harvesting...'. 'We would promote school education in the forest (school trips) and about the forest'. 'We would promote environmental volunteering at the forest for garbage cleaning'. Brown & Fortnam (2018) and Fortnam et al. (2019) indicated that women's priorities tend to be towards non-monetised cultural and regulatory ecosystem services. These, however, may be invisible in cost-benefit analyses, hence being dismissed in ecosystem management decision-making processes, usually focused on provisioning services like timber (Brown & Fortnam, 2018). Thus, ES assessments from a socio-cultural approach can help acknowledging the intangible benefits valued by women and integrate them into decision-making. This has shown true in the present study, which, as formerly discussed (section 4.1.2), found a wide variety and high relevance of the cultural ES among women's perceptions. These results

are also coincident with the ones gathered in the survey (Chapter 3), where differences among women's and men's preferences for ES were statistically significant. Women had perceived at a higher rate the ES related with walks, wild food and socializing, while men stood out for sports (Chapter 3, section 3.2.3). ES preferences were also leant towards sports among men, together with the provision of livestock, in contrast to women's preferences for walks (Chapter 3, section 3.3.3). The latter quotations are in agreement with those results, e.g. 'Men promote more hunting and motor-riding, while women would promote hiking, family excursions, mushroom harvesting...'. Nonetheless, the visions discussed in Chapter 4 extracted from the interviews throw a nuanced image of men's priorities, not just focused in the development of such sports or the marketable-provisioning ES, but also showing a desire for pro-community foci. Indeed, the challenging of gender roles and the construction of new masculinities is already taking place nowadays. Bye (2009) revealed the negotiation of the 'tough man' image of Norwegian rural men, from hunting and motor sports towards the construction of alternative masculinities closer to emotional openness and caring.

#### 4.3.3. Visions about the communal forest

A last exercise proposed in the deliberative final plenary of the photovoice process was a reflection about their ideal communal forest, i.e. the visions of the local women about the CF. It was remarkable the number of proposals gathered in the short time available, especially considering their lack of experience in CF planning. And it is further remarkable the great resemblance between the resulting visions of women and men. Women emphasized four main topics that correspond straightforwardly with five out of the seven topics gathered from men in Chapter 4: compare men's visions from the right column of table 4.2 in Chapter 4 with women's in the last section of table 5.9 in the present chapter).

Firstly, women highlighted the importance of developing multifunctional uses in the CF: 'We want diversity of CF uses.' 'There is room for everyone:

people, bikes, quad bikes...' 'Harvesting mushrooms, chestnuts, forest fruits...'. This is very much in line with the men's vision 'F6. Additional CF uses, e.g. honey, mushrooms, chestnuts, (...)'.

Second, women raised a point about adequate forest management. They claimed a greater presence of native trees, the rational planning of new plantations, a proper maintenance of the understory and forest monitoring. This is similar to the popular vision 'F5. Expert forest management oriented to (2) multifunctional purposes.' In this regard, [Agarwal \(2009\)](#) relates a high proportion of women in forestry executive committees with significantly greater improvements in forest condition.

Third, the proper planning and management of the CF space was discussed by women according to their perceptions from the photovoice transect walks. They suggested to 'Rethink the outline of routes and dirt roads', the 'Good maintenance of dirt roads for every use' and the 'Promotion of thematic routes, e.g. botanical, mythical stones, wild food gathering, hiking, biking, ...'. Again, there was a specific men's vision that explicitly treated the spatial planning and delimitation of uses: 'F4. routes signalling for biking, hiking, etc.'. Besides, in an inclusive way, the vision 'F7. Restoration and recovery of the natural and cultural CF heritage, e.g. paths, mythical stones, archaeological assets, springs, etc.' can be also related with women's wish for the correct development of the thematic routes.

Lastly, women put emphasis in the promotion of the CF for visitor attraction, showing a sense of pride and a wish to share: 'To give Mt Xalo more visibility, to show its potential'. 'To improve or rethink the accessibility to the CF and its resources', even proposing 'To make a website advertising interesting touristic routes in Mt Xalo'. This was gathered in men's vision 'F3. Recognition by visitors of the CF proprietorship combined with visitor attraction projects.'

There were only two questions included in men's visions that were not addressed by women: 'the official demarcation of property boundaries' (F1) and 'more implication in CF management and mutual understanding' among



stakeholders (F2). The reasons for these absences may be twofold. On the one hand, the world café gave a limited time for collective brainstorming and thorough analysis. On the other hand, the lack of awareness on specific CF needs such as F1 and F2 can be a consequence of the exclusion of women from CF governance, as they have not ever had the chance to reflect with their neighbours about these casuistries.

The latter motive is remarkably noteworthy because the effective inclusion and participation of women in the governance of the communal forest would solve the unfair gendered participatory exclusion as well as may be the keystone to achieve men's wish F2: more implication in CF management and mutual understanding among stakeholders. Women's potential contributions discussed in the former section (4.3.2) were precisely associated with peaceful and receptive attitudes and with the development of community sensitive goals (e.g. better collaboration, solidarity, conflict resolution and pro-social behaviour, in [Coleman and Mwangi 2013](#); [Ray et al., 2017](#); [Westermann et al., 2005](#)). These skills would indeed facilitate the democratic functioning of CF assemblies.

It is recognized that the masculinisation of the decision-making processes derives in institutions failing to reflect the needs, interests and worldviews of society as a whole ([Kelemen, 2016](#); [UNEP, 2016](#)). Besides, the involvement of actors from both genders in ecosystem management decision-making eventually favours knowledge sharing, co-learning and, in sum, making better decisions for environmental sustainability ([Kelemen et al., 2016](#); [Villamor et al., 2014](#)) and resilience ([Aregu et al., 2016](#)). As [Sodhi et al. \(2010\)](#) indicated, it is not about overlooking the contributions that men have made to conservation or implying that they should not be involved in conservation, but that equitable and complementary mixed-gender participation will not only benefit social justice but also environmental conservation.

## 5. Conclusions

The applied transdisciplinary ES assessment consistent in a geotagged photovoice resulted an effective technique as both an ES scoping tool and a collective learning process (Masterson et al., 2018). It allowed the identification and analysis of relevant landscape features, ecosystem services, disservices and changes in the SEU from a multiple perspective: qualitative, quantitative, spatial and deliberative. At the same time, it generated an intergenerational gender space for women participation, engagement, empowerment and deliberative critical thinking about the CF and its governance that had not previously existed in the studied community.

The statistical analyses facilitated the building of a descriptive model for the contributions of landscape features in the generation of different ES, disservices and LV. The most salient features for the generation of community wellbeing were the stones, understory, native trees and panorama views, producing a range of ES each. The huge relevance found for the cultural ES contrasts with the little attention that these have received to date in ecosystem services research. Despite their widely recognized importance, the assessment complexity of the cultural ES makes them generally neglected in land management decisions (Tew et al., 2018), but the findings of this study pave the way for their implementation in the communal forest planning strategies.

Relating to the negative contributions of the CF to community wellbeing, we found once more—like in previous chapters of this Thesis—the prominence of the impact that human practices have on the ecosystem and, therefore, on the ES and disservices it can deliver. The careful planning and management of the SEU can, thus, help avoiding or alleviating human-caused negative impacts in the CF.

The conceptual frameworks of the landscape values and the ecosystem services were assessed, finding complementarity between them in the type of information delivered. The temporal dimension of landscape values (i.e.

surface and embedded values) resulted especially interesting to differentiate the temporal scale of the perceived ES. They often recalled past practices and land use changes, such as the abandonment of the use of manifold CF resources that delivered provisioning ES like fuel, food or water. On the other hand, the CICES system provided valuable information mainly regarding the ES section, revealing the huge relevance of the cultural ES. We consider no current classification system is completely operational alone.

The geotagging of photographs resulted useful to investigate the spatial patterns of the ES and disservices. Like in previous findings (Chapter 3), the outcrop O Petón emerged as the CF spot gathering the majority of ES and disservices—motivated by its facility of access, identification and, in sum, popularity. However, although this spot had a broad recognition, statistically significant nuances were found among photo-teams in the perceptions of ecosystem services according to their age and relationship with the CF in the present and in the past. These divergences confirmed the assumption that women do not constitute a homogeneous collective in their relationship with nature and the valuation of its benefits, which is in line with contemporary critical ecofeminisms and previous ES assessments conducted in Spain (Iniesta-Arandia et al., 2014).

The methodology of the geotagged photovoice—with the implementation of qualitative, quantitative, spatial and deliberative analyses—resulted useful to achieve our research goals. However, it required the intensive investment of resources, especially time and participants commitment. The analysis of the vast amount of data generated resulted complex and entailed a number of pitfalls, mainly associated to the content analysis of the visual data (Rose, 2001), the coding gaps and the cold nature of ES codes. The physical and emotional engagement of the researcher along the photovoice process allowed to consider the specific context of the moment and the location where the photo-meanings were generated. Also, reflexivity and reciprocity were incorporated into the process, thus bringing the agency of the photos. Besides, on the contrary to other methodologies dealing with photo-series analysis (e.g. social media platforms), the applied photovoice allowed to

focus on the underrepresented stakeholder group of women, who would otherwise be excluded from conventional ES assessments—as demonstrated in previous research stages of this Thesis (Chapters 3 and 4).

The final plenary meeting of the photovoice process served as a deliberative forum to discuss these findings as well as the status quo of women in the governance of the CF. The extensive list of difficulties found by women to join CF meetings included the gendered division of labour, the existing rules to become a CF representative, power dynamics, the social perceptions of women's behaviour, a history of conflicts around the CF and a perceived intimidating behaviour from their neighbours, which evidences their last motive: 'It is more comfortable for us not to participate'. These findings point to the necessity of various sociocultural changes and a few initial suggestions to improve the participation of women in CF meetings. Some of these can be: (i) the change of CF formal rules to allow the representation of one man and one woman per household together with (ii) the acquisition by the women of the ownership of exploitations; (iii) the rescheduling of times for collective meeting to avoid coincidence with domestic duties; (iv) the co-responsibility of genders for the nurture and care of their families; (v) the active invitation of men for women to become involved in the decision-making; and (vi) the constitution of specific women's groups for discussion of relevant topics and empowerment. The existence of a local women's association, the Association of Rural Women from Culleredo As Berenguelas, constitutes a revitalizer for the women of the region that resulted in a key facilitator in the organization and involvement of participants in the photovoice process.

The potential contributions of women to CF governance and their future visions were also explored in the plenary meeting and further discussed in light of existing literature. In sum, the effective inclusion of women in the governance of the communal forests would entail, not only the overcoming of the social unfairness of participatory exclusion, but an outstanding opportunity to satisfy previously targeted necessities (Chapter 4), i.e. improved understanding among CF members, the reduction of conflicts, the

development of pro-community goals and the enhancement of forest conditions.



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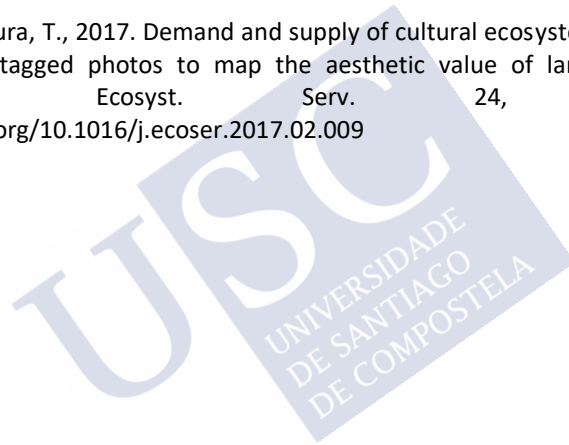
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## Cando aínda nos quedan camiños...

---

*E paisaxes no Monte Xalo  
Que estando a un só paso de nós  
Pode sernos un gran descoñecido  
Sendo un lugar para soñar,  
Onde as rochas adquiren rostro  
E trompas de animais,  
Vixiándonos seres inertes  
E convivimos con seres vivos.  
O Petón é a referencia  
O núcleo deste monte  
Onde as chorimas bican o chan  
E as arañas fan o seu leito sobre as queirugas  
Indicando a luz ao final do camiño  
Deixando atrás o bosque espido.  
Hai moito máis que madeira para vender  
Hai ganancias que non se contan  
Só se senten no máis profundo  
Onde o agasallo da terra se fai enerxía  
E nos lembra que o mundo non é plano  
E non entende de liñas rectas  
Debuxando curvas infinitas ante o noso ollar.  
As silvas tapan os camiños  
Para ocultar os segredos que alberga o monte  
E nas imaxes que levamos  
Non se escoitan os trinos  
Da súa banda sonora.  
Non pedimos tanto.  
Só que nos deixen o monte!  
Que nos deixen as bagoas nas xestas!  
Que auga sexa cristal  
E que o motor se gaste no asfalto!  
Mentres nos queden camiños...*

**Laura Rey Pasandín**

Participante na actividade da fotovoz no Monte Xalo. Setembro 2018

## While we still have paths...

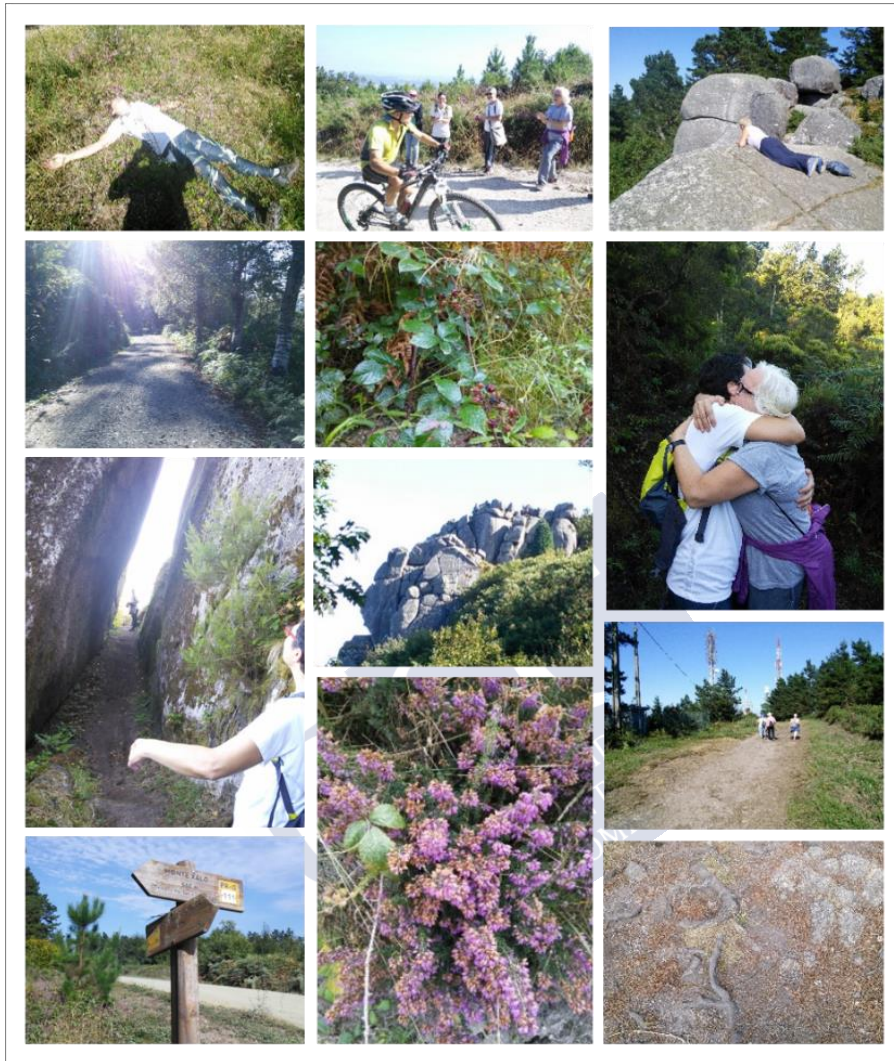
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*And landscapes on Mount Xalo  
That being just one step away from us  
It can be a great stranger  
Being a place to dream,  
Where rocks acquire face  
And trunks of animals,  
Watching us inert beings  
And we coexist with living things  
O Petón is the reference  
The core of this mount  
Where gorse flowers kiss the ground  
And spiders make their bed on the heathers  
Indicating the light at the end of the path  
Leaving the bare forest behind.  
There is so much more than timber to sell  
Some gains cannot be counted  
They are only felt in the deepest  
Where the gift of the land becomes energy  
And it reminds us that the world is not flat  
And it doesn't understand of straight lines  
Drawing endless curves before our eyes.  
Blackberries conceal the paths  
To hide the secrets the mount keeps  
And in the pictures we take  
No trills are heard  
From its soundtrack.  
We do not ask for that much  
Just for the mount to be left to us!  
For the tears in the brooms!  
For the water to be crystal clear  
And the engine is spent on the tarmac!  
While we still have paths...*

**Laura Rey Pasandín**

*Participant in the photovoice activity in Mount Xalo. September 2018*





**Figure A1.** A few examples of pictures from the photovoice exercise. Photo-captions (Galician - English) from up to down and left to right: 1. Coller a enerxía da terra - To take Earth's energy; 2. Se Deus existe está no Xalo - If God exists It is in Xalo; 3. O desfiladeiro de Ampa - Ampa's gorge; 4. Recordando rumbos no Xalo - Recalling courses on Xalo; 5. No Xalo cabemos todos - We all fit in Xalo; 6. Infancia de amoras - Blackberry childhood; 7. O Petón, centro de vida - O Petón, life hub; 8. Queiroas, a flor de sempre do monte, que antes tiña moitos usos e agora xa non - Heathers, the flower from the woods, which used to have plenty of uses but not anymore; 9. Contemplando relaxada - Contemplating relaxed; 10. Se o monte é infinito a axuda tamén - if the woods are infinite, help is too; 11. [Antenas] Un mal necesario - [Antennas] A necessary evil; 12. Camiño coas nosas raíces - The pathway of our roots/I walk along our roots.

You can find a full presentation of the photos selected and titled by each team on the next link:

<https://cutt.ly/qyaOdma>





**Figure A2.** The 23 participants in the photovoice activity, by teams.





Saca **FOTOS** de



**COUSAS CONCRETAS** ou **LUGARES** do Xalo que...

- ☆ 1. ...consideres **que contribúen ó teu BENESTAR**, o da túa familia ou da túa comunidade.
- ☆ 2. ...**non che gustan**, ou que pensas que son **NEGATIVOS para o teu benestar**, o da túa familia ou comunidade.
- ☆ 3. ...che pareza que **CAMBIARON co tempo**.

Antes de sacar as fotos, **pensa en** todos os aspectos que podes ter en conta:

- ✓ **Elementos concretos** que te atopas no camiño
- ✓ **Persoas** que visitan e comparten o Xalo
- ✓ **Produtos** que se aproveitan do monte para beneficio económico da comunidade ou para beneficio propio
- ✓ Aspectos relacionados co **medio ambiente** e a **saúde**
- ✓ As **vivencias persoais** que disfrutas no monte
- ✓ **Lembranzas** que tes do Xalo
- ✓ A **importancia** propia que pode ter o **monte**
- ✓ Os outros habitantes do monte (**vexetación, fauna,...**)
- ✓ As **lendas** e historias asociadas ó monte
- ✓ O **estado de conservación** no que se atopa o monte
- ✓ O **estado de explotación** no que se atopa o monte

**Figure B1.** Research questions delivered to photovoice participants during the training session and transect walks.



# Certificado de Participación

Este certificado concédese a

---



Pola súa participación na actividade de  
**Fotovoz no Monte Xalo**  
da Universidade de Santiago de Compostela



☆ En Celas de Peiro, a 23 de setembro de 2018

Beatriz Rodríguez-Morales,  
Investigadora do estudo

**Figure B2.** Diploma of participation delivered to photovoice participants.



## AUTORIZACIÓN DE PARTICIPACIÓN NA ACTIVIDADE DE FOTOVOZ



A actividade a realizar ten por obxectivo afondar nos significados que o Monte Xalo ten para a sociedade, e está incluída dentro do proxecto de investigación titulado: "VALORACIÓN DE SERVIZOS AMBIENTAIS EN PAISAXES AGROFORESTAIS DO NOROESTE DA PENÍNSULA IBÉRICA: UNHA APROXIMACIÓN SOCIO-ECOLÓXICA", desenvolvido por Beatriz Rodríguez-Morales dentro do Grupo de investigación ECOAGRASOC da Universidade de Santiago de Compostela. Concretamente, a actividade de fotovoz busca dar un espazo de reflexión e protagonismo ó colectivo de mulleres participantes. A actividade consiste nunha andaina fotográfica polo Monte Xalo e posterior coloquio.

**Por favor, marque cun X as casillas coas que estea de acordo:**

- Eu, \_\_\_\_\_, con DNI \_\_\_\_\_,
- dou consentimento para participar na actividade de *fotovoz* organizada por Beatriz Rodríguez-Morales, investigadora da Universidade de Santiago de Compostela, consistente nunha andaina fotográfica polo Monte Xalo e posterior coloquio.
  - Entendo que toda información recollida nesta actividade será tratada de xeito anónimo, seguindo a normativa da Lei Orgánica de Protección de Datos de Carácter Persoal (LOPD), Lei 15/1999 de 13 de decembro (Boletín Oficial do Estado, BOE, España).
  - Dou consentimento para que a información que achegue ó abeiro da actividade de *fotovoz* poida empregarse nos resultados xerados dentro deste proxecto de investigación.
  - Dou o meu consentimento para que poidan tomarse fotografías da miña persoa durante o transcurso da actividade de *fotovoz*, sempre que sexa con fins pertinentes dentro da actividade.
  - Dou o meu consentimento para que se grave o son durante os coloquios da actividade de *fotovoz* co fin de facilitar a recollida da información achegada.
  - Dou o meu consentimento para que as fotografías tomadas por min durante a andaina poidan ser empregadas nas actividades resultantes do *fotovoz*, tales como o coloquio grupal, posibles exposicións públicas, e outras publicacións relacionadas co proxecto de investigación.

En \_\_\_\_\_, a día \_\_\_\_\_

Sinatura da participante:.....

Proxecto desenvolvido coa financiación de:



FONDO SOCIAL EUROPEO  
"Creando oportunidades"



XUNTA DE GALICIA  
CONSELLERÍA DE CULTURA, EDUCACIÓN  
E ORDENACIÓN UNIVERSITARIA  
Secretaría Xeral de Universidades



Para calquera consulta, non dubide en contactar con Beatriz Rodríguez-Morales no teléfono 666 85 95 67  
¡Moitas grazas pola súa colaboración!

Figure C1. Consent form for photography permission and property rights.

## AUTORIZACIÓN DE PARTICIPACIÓN NO FOTOVOZ PARA MENORES DE IDADE



A actividade a realizar ten por obxectivo afondar nos significados que o Monte Xalo ten para a sociedade, e está incluída dentro do proxecto de investigación titulado: "VALORACIÓN DE SERVIZOS AMBIENTAIS EN PAISAXES AGROFORESTAIS DO NOROESTE DA PENÍNSULA IBÉRICA: UNHA APROXIMACIÓN SOCIO-ECOLÓXICA", desenvolvido por Beatriz Rodríguez-Morales dentro do Grupo de investigación ECOGRASOC da Universidade de Santiago de Compostela. Concretamente, a actividade de fotovoz busca dar un espazo de reflexión e protagonismo ó colectivo de mulleres participantes. A actividade consiste nunha andaina fotográfica polo Monte Xalo e posterior coloquio.

Por favor, marque cun X as caixiñas coas que estea de acordo:

Eu, \_\_\_\_\_, con DNI \_\_\_\_\_,  
titor/a legal da menor \_\_\_\_\_, con DNI \_\_\_\_\_,

- Dou permiso para que esta participe na actividade de fotovoz organizada por Beatriz Rodríguez-Morales, investigadora da Universidade de Santiago de Compostela, consistente nunha andaina fotográfica polo Monte Xalo e posterior coloquio.
- Entendo que toda información recollida nesta actividade será tratada de xeito anónimo, seguindo a normativa da Lei Orgánica de Protección de Datos de Carácter Persoal (LOPD), Lei 15/1999 de 13 de decembro (Boletín Oficial do Estado, BOE, España).
- Dou o meu consentimento para que a información que a participante achegue ó abeiro da actividade de fotovoz poida empregarse nos resultados xerados dentro deste proxecto de investigación.
- Dou o meu consentimento para que poidan tomarse fotografías da participante durante o transcurso da actividade de fotovoz, sempre que sexa con fins pertinentes dentro da actividade.
- Dou o meu consentimento para que se grave o son durante os coloquios da actividade de fotovoz co fin de facilitar a recollida da información achegada.
- Dou o meu consentimento para que as fotografías tomadas pola participante durante a andaina poidan ser empregadas nas fases subseguintes, tales como o coloquio grupal, posibles exposicións públicas, e outras publicacións relacionadas co proxecto de investigación.
- Dou o meu consentimento para que a participante sexa transportada en vehículo dende o punto de encontro ata o lugar de comezo da ruta por parte da organización da actividade.

En \_\_\_\_\_, a día \_\_\_\_\_,

Sinatura do/a titor/a legal da menor:.....

Proxecto desenvolvido coa financiación de:



FONDO SOCIAL EUROPEO  
"O PSR Axenda do Meu Rural"



XUNTA DE GALICIA  
CONSELLERÍA DE CULTURA, EDUCACIÓN  
E ORDENACIÓN UNIVERSITARIA  
Rede Galega de Universidades



Para calquera consulta, non dubide en contactar con Beatriz Rodríguez-Morales no teléfono 666 85 95 67  
¡Moitas grazas pola súa colaboración!

Figure C2. Consent form for photography permission and property rights for underage participants.



## AUTORIZACIÓN DE FOTOGRAFÍA PARA A ACTIVIDADE DE FOTOVOZ



A actividade a realizar ten por obxectivo aprofundar nos significados que o Monte Xalo ten para a sociedade, e está incluída dentro do proxecto de investigación titulado: "VALORACIÓN DE SERVIZOS AMBIENTAIS EN PAISAXES AGROFORESTAIS DO NOROESTE DA PENÍNSULA IBÉRICA: UNHA APROXIMACIÓN SOCIO-ECOLÓXICA", desenvolvido dentro do Grupo de investigación ECOAGRASOC da Universidade de Santiago de Compostela. Concretamente, a actividade de fotovoz busca dar un espazo de reflexión e protagonismo ó colectivo de mulleres participantes. A actividade consiste nunha andaina fotográfica polo Monte Xalo e posterior coloquio.

**Por favor, marque cun X as casillas coas que estea de acordo:**

Eu, \_\_\_\_\_, con DNI \_\_\_\_\_,

Dou o meu consentimento para ser fotografiado/a dentro da actividade de fotovoz presentada.

Dou o meu consentimento para que as fotografías tomadas sobre a miña persoa poidan ser empregadas nas actividades resultantes do fotovoz, tales como posibles exposicións públicas, e outras publicacións relacionadas co proxecto de investigación.

**E gustaríame...**

Recibir unha copia da(s) foto(s) nas que salgo.

Ser avisado/a das posibles exposicións públicas, e/ou outras publicacións relacionadas con este proxecto de investigación.

**Datos de contacto:**

Correo electrónico ou dirección postal:

Teléfono:

En \_\_\_\_\_, a día \_\_\_\_\_

**Sinatura da persoa fotografada ou titor/a legal:**.....

Proxecto desenvolvido coa financiación de:



FONDO SOCIAL EUROPEO  
"O PSEI APROXIMÁMONOS Á GALIÇA"



XUNTA DE GALIÇA  
CONSELLERÍA DE CULTURA, EDUCACIÓN  
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¡Moitas grazas pola súa colaboración!

**Figure C3.** Consent form for photography permission and property rights for third parties.



# Chapter 6

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Conclusions

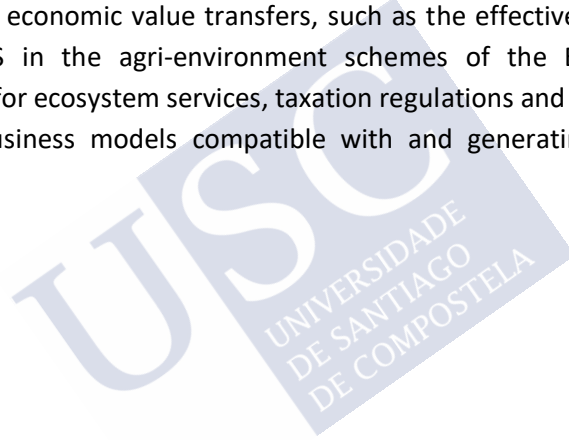


This thesis explores the social perception of the ecosystem services (ES) provided by a peri-urban communal forest (CF) from northwestern Spain from a multidisciplinary socio-cultural approach and implementing a gender perspective. The results obtained allow to infer the following conclusions:

1. The Xalo communal forests were acknowledged as a local-scale hotspot of ecosystem services provision at the regional scale. The cultural and the regulating ES were the most frequently recognised, being the cultural the richest section, with 21 different cultural ES classes identified in total.
2. The disservices perceived by people were related to anthropogenic activities rather than to ecological factors alone, denoting the relevance of appropriate landscape planning and management in the elusion and alleviation of the major negative impacts of the social-ecological unit for human wellbeing.
3. The spatial identification of trade-offs between ecosystem services and disservices in the case study pointed at the most accessible and popular area of the communal forests. The identification of these areas can help decision-makers to tackle conflicting land uses.
4. Differences in the appreciation of ES were detected and characterized between landowners and various types of visitors, being the most contrasted profiles communal forest owners and urban visitors. Landowners perceived most ES at a greater extent than any visitor type and they valued drinking water the most. The main use of the communal forests by visitors is the practice of sports.
5. Differences in ES appreciation were also found between men and women, with men valuing more the practice of sports and women going for a walk in the communal forests. However, women's perceptions of ES vary according to their profiles (age and type of relationship with the CF), demonstrating that they do not constitute a homogeneous collective.

6. The participation of women in the governance of the communal forest is lower than men's, being the underlying reasons related with the formal and informal rules to become a CF representative, the gendered division of labour, power dynamics, the social perceptions of women's and men's behaviour, a history of conflicts around the CF and the convenience to stay away from all of these issues.
7. The effective inclusion of women in the governance of the communal forests would likely bring environmental and social justice to the forestry communities by overcoming the social unfairness of participatory exclusion, developing pro-community goals and improving understanding among CF members.
8. The communal forests of this case study present many factors that facilitate success in the collective management of this common land, while various key issues were identified as missing, such as the public recognition of the ownership regime, clearly defined boundaries, conflict resolution mechanisms, graduated sanctions and monitoring or the participation of the whole spectrum of stakeholders.
9. Nonetheless, this research also facilitated the recognition of common visions among stakeholders regarding the management of communal forests which, together with the comprehensive socio-cultural assessment of the ES demanded, can provide key information to forestry communities, especially in the context of reinventing the identity and functionality that communal forests are experiencing nowadays.
10. Multifunctional communal forests pose a great opportunity for regional rural development, but external support from bridging institutions is needed to promote the social recognition of this figure, act as consultants, protect the area against unwanted extractive projects, issue sanctions when corresponding and, specially, proportionally compensate the communities for the provision of the ecosystem services to society.

As a final conclusion, we find that the intersectional socio-cultural assessment of the ecosystem services that Galician communal forests are delivering to society may provide essential information for local communities and political actors to design adequate planning instruments and rural development policies that ensure the provision of the multiple and varied ecosystem services demanded by people, especially in the current context of reinvention towards new multifunctionalities that many communal forests are facing. Also, such policies must promote the social recognition of communal forests and develop compensation mechanisms that bring agency to local communities. In this regard, it is essential the exploration of alternative economic value transfers, such as the effective inclusion of the cultural ES in the agri-environment schemes of the European Union, payments for ecosystem services, taxation regulations and the development of new business models compatible with and generating of ecosystem services.







# Resumo

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**Análise da percepción social dos servizos  
ecosistémicos dun monte veciñal en man común  
periurbano do noroeste de España: unha  
aproximación socioecolóxica**



A presente Tese de Doutoramento explora a percepción social dos servizos ecosistémicos provistos polos montes veciñais en man común do Xalo (Galicia, NO España) dende unha aproximación sociocultural multidisciplinar e aplicando a perspectiva de xénero.

O concepto de *servizos dos ecosistemas* (SE) —tamén coñecidos como *servizos ecosistémicos*— refírese ás contribucións directas e indirectas dos ecosistemas ao benestar humano, é dicir, aos beneficios que as persoas reciben da natureza. Este concepto converteuse nas últimas décadas no paradigma da conservación na investigación e nas políticas de planificación do territorio. Por outra banda, os *diservizos dos ecosistemas* son os impactos negativos que os ecosistemas poden ter sobre o benestar das persoas. Ambos os conceptos (servizos e diservizos) son eminentemente antropocéntricos, xa que se centran na valoración dos ecosistemas por parte das persoas para o seu propio benestar, constituíndo unha das principais críticas recibidas dende os inicios ata día de hoxe. No entanto, a relación recíproca e interdependente entre natureza e sociedade é amplamente recoñecida pola comunidade científica, sendo á súa vez unha das mensaxes principais do propio enfoque de servizos. O concepto de *sistema socioecolóxico* (SES) aparece como marco auxiliar para o estudo das relacións entre natureza e sociedade. Este concepto pon de manifesto que os sistemas sociais e os ecosistemas participan dun proceso de co-evolución no que ambos foron moldeándose e adaptándose conxuntamente, pasando a formar parte dun único sistema inextricable coñecido como *sistema socioecolóxico* ou *socioecosistema*. Así, calquera decisión tomada sobre a xestión dun determinado territorio afectará tanto á estrutura e funcionamento dos ecosistemas coma aos aspectos sociais. Por tanto, a investigación no eido dos servizos ecosistémicos debe ter un enfoque interdisciplinario e holístico que integre as ciencias sociais coas naturais e combine distintas metodoloxías de análise que permitan representar a diversidade de valores existentes derredor da natureza.

Actualmente, existe unha gran variedade de métodos de aproximación aos servizos ecosistémicos, podéndose distinguir tres categorías principais:

biofísicas, monetarias e socioculturais. As metodoloxías socioculturais son especialmente útiles a fin de demostrar o carácter multidimensional do benestar humano, xa que permiten describir a importancia, preferencias, necesidades ou demandas expresadas polas persoas sobre a natureza. Ademais, permiten articular a pluralidade de valores existentes, identificar posibles conflitos de intereses e abordar aspectos intanxibles dos SE como os valores espirituais, simbólicos ou culturais, difíciles de medir mediante outras aproximacións. Os expertos no eido dos SE recomendan desenvolver avaliacións integradas que inclúan diversas aproximacións e metodoloxías; porén, as avaliacións socioculturais foron escasamente empregadas ata hai poucos anos, considerándose unha prioridade de investigación para desenvolver. Neste sentido, a participación das comunidades locais e demais actores interesados resulta de especial interese na avaliación dos SE dun determinado territorio a escala local, xa que a diversidade e subxectividade de valores e beneficios percibidos por estes axentes non pode ser inferida polos expertos académicos ou a través de datos *proxy*. Máis aínda, as percepcións das persoas implicadas na xestión dun determinado socioecosistema teñen repercusións sobre as súas decisións de xestión e, en último termo, sobre os potenciais servizos que o ecosistema é capaz de proporcionar.

Os montes veciñais en man común (MVMC) constitúen un tipo singular de tenza da terra existente dende hai séculos en Galicia (rexión do noroeste de España). Son montes de natureza privada pero colectiva (comunais) pertencentes ás comunidades de persoas que residen no lugar ou parroquia asociada ao monte. É dicir, pertencen ao grupo social que integra a comunidade en cada momento, sendo a residencia efectiva no lugar a que dá o dereito de uso e xestión do monte. Neste sentido, resulta esencial recoñecer que os MVMC son a suma de dous elementos inextricables: a terra e a comunidade. Ambos interactúan reciprocamente a escala local mediante complexas dinámicas adaptativas. Podemos, por tanto, considerar os MVMC como sistemas socioecolóxicos locais ou, máis precisamente, *unidades socioecolóxicas* (USE). As comunidades veciñais veñen xogando un papel

esencial ao longo da historia na xestión sostible dos MVMC ao actuar como responsables das decisións sobre os recursos do monte e influír na capacidade de provisión de servizos ecosistémicos. Os MVMC constituíron historicamente unha parte importante da base territorial do sistema agrario tradicional que permitiu a subsistencia da veciñanza. Porén, unha historia marcada polo desposuímento e o conflito iniciada a principios do século XIX e marcada por cambios nos modelos social e económico derivou nun proceso de ruptura dos MVMC co modelo anterior. Estes cambios operaron sobre o marco institucional dos MVMC, a súa funcionalidade e a propia identidade das comunidades veciñais, hoxe entendidas principalmente como provedoras de servizos materiais e inmateriais para a sociedade (principalmente madeira, servizos ambientais e de lecer). A diversidade de situacións existentes na actualidade respecto ao estado dos MVMC varía entre o abandono, o uso forestal intensivo e, cada vez máis a miúdo, a multifuncionalidade.

Así, os montes veciñais constitúen unha oportunidade clave para o desenvolvemento rural de Galicia e a provisión de servizos ecosistémicos para as comunidades locais e o conxunto da sociedade, posto que reúnen unha serie de características intrínsecas idóneas. Por unha banda, ocupan unha superficie significativa da paisaxe forestal galega (algo máis dun terzo do total), sendo por lei indivisibles, inalienables, imprescritibles e inembargables. A superficie media dos MVMC é moi extensa en comparación cos terreos privados individuais (máis de 200 ha por MVMC fronte ás 1,5-2 ha de media dos segundos), o cal facilita unha posible xestión diversificada e sostible. Ademais, a toma de decisións sobre o monte veciñal é colectiva e democrática que constitúe unha alternativa de gobernanza de abaixo cara arriba dirixida polas comunidades locais e unha forma alternativa de relacións socioecolóxicas fronte á dominante lóxica do capitalismo. O reto de reorganización institucional, funcional e de identidade ao que se veñen enfrontando as comunidades de montes dende a recuperación dos seus lexítimos dereitos —dende as décadas de 1970 e 1980, principalmente— supón unha oportunidade para repensar e artellar novos modelos de

comunidade resiliente ante as actuais condicións socioeconómicas. Neste sentido, cada vez se dan a coñecer máis exemplos de comunidades activas en proceso de reinvención, tanto das súas funcionalidades coma da identidade, para dar resposta á demanda de servizos ecosistémicos das comunidades locais e do conxunto da sociedade. Moitas destas comunidades activas atópanse na franxa atlántica, a miúdo en zonas periurbanas. Un destes exemplos constitúeno actualmente os montes veciñais do Xalo, sendo este o caso de estudo analizado na presente Tese de Doutoramento.

Os montes veciñais do Xalo conforman unha unidade socioecolóxica que está formada por dous montes veciñais colindantes pertencentes ás parroquias de Santa María de Celas e Santiago de Castelo, no concello de Culleredo (Galicia, España). A área da USE é de aproximadamente 444 ha e reúne unha serie de características biofísicas e socioeconómicas de elevado interese para a investigación dos SE. Trátase dunha USE dedicada parcialmente a uso forestal madeireiro, que prové de auga o concello e é moi empregada pola veciñanza e visitantes para uso sociorecreativo (favorecido pola situación periurbana do monte, próximo ao municipio densamente poboado da Coruña). Situada na Reserva da Biosfera Mariñas Coruñesas e Terras do Mandeo (UNESCO MAB), está catalogada como área de especial interese paisaxístico pola Xunta de Galicia, é vértice xeodésico, reúne diversos elementos patrimoniais, cinco tipos de hábitat de interese comunitario para a UE e diversas especies de fauna endémica e protexida. Aínda que a demografía da USE está maiormente en recesión dende os últimos vinte anos, o tecido asociativo da zona é activo. Conta con dúas comunidades de montes implicadas na gobernanza dos montes veciñais e diversas asociacións locais de ámbito deportivo, medioambiental e cultural que desenvolven a súa actividade derredor do Monte Xalo, dinamizando este espazo. Por tanto, sendo un monte de propiedade privada, a condición periurbana xunto coas características socioecolóxicas singulares fan do Xalo un lugar de marcado uso público na actualidade e provedor dunha variedade de servizos ecosistémicos aínda por estudar.

Para facilitar a transición dos MVMC cara a un uso multifuncional sostible, resulta fundamental entender a pluralidade de valores e visións das comunidades veciñais e demais axentes implicados no uso e xestión do monte, así como coñecer a demanda social actual de bens e servizos provistos polos MVMC. Porén, a pesar do crecente interese académico suscitado polos MVMC e da relevancia que o enfoque de servizos ecosistémicos ten actualmente na investigación e nas políticas territoriais, non coñecemos estudos ata a data que investiguen especificamente sobre os SE asociados aos distintos montes veciñais galegos.

Tendo en conta estes antecedentes, o obxectivo principal da Tese é a análise da percepción social dos servizos ecosistémicos asociados á USE conformada polos MVMC do Xalo mediante a aplicación de metodoloxías participativas multidisciplinares.

Este obxectivo xeral divídese nos seguintes obxectivos específicos que serán abordados nos distintos capítulos da Tese:

1. Identificar os servizos e diservizos ecosistémicos percibidos pola sociedade respecto aos MVMC do Monte Xalo distinguindo entre as perspectivas dos propietarios e distintos tipos de visitantes.
2. Afondar na pluralidade de valores e visións de futuro dos axentes representativos da USE respecto ás estratexias de xestión sostible dos SE provistos polos MVMC do Xalo.
3. Incluír a perspectiva das mulleres —atopada deficitaria— sobre os servizos e diservizos ecosistémicos do Xalo a través de metodoloxías transdisciplinares innovadoras.
4. Explorar os motivos da menor participación das mulleres na gobernanza dos MVMC, as súas posibles achegas e visións de futuro.

Para acadar estes obxectivos, a Tese estrutúrase en seis capítulos. O **Capítulo 1** e o **Capítulo 2** son introdutorios e describen os antecedentes, obxectivos e metodoloxías empregadas, mentres que os Capítulos 3, 4 e 5 constitúen o corpo principal da Tese, para rematar cunhas conclusións

globais no Capítulo 6. A continuación, descríbense os contidos dos Capítulos 3, 4 e 5.

O **Capítulo 3** explora os servizos e diservizos ecosistémicos percibidos e valorados pola sociedade actual a través dunha enquisa pública, o método máis empregado na valoración sociocultural de servizos ecosistémicos. A enquisa consistiu nun cuestionario *online* que incluíu un sistema de información xeográfica de participación pública (PPGIS). Na sondaxe participaron 175 persoas que foron categorizadas en catro perfís xeográficos: comuneiros dos montes veciñais de Celas e Castelo («locais»), veciños doutras parroquias e concellos limítrofes («veciñanza»), habitantes do municipio urbano da Coruña («urbanos») e visitantes provenientes de lugares máis afastados («outros»). Para analizar a demanda dun amplo rango de servizos ecosistémicos, incluíronse 28 SE e 2 diservizos, facendo énfase na categoría dos SE culturais (16 de 28). Os datos recollidos foron analizados dende unha tripla perspectiva: (i) cuantitativamente, mediante estatísticas descritivas, táboas de continxencia e o test do  $\chi^2$ ; (ii) de xeito semicualitativo, codificando e contabilizando os diservizos descritos nas preguntas de tipo aberto; e (iii) de xeito espacial, medindo a intensidade e diversidade dos SE e diservizos recollidos a través do PPGIS.

Os resultado obtidos amosaron que os enquisados recoñeceron en maior ou menor medida a totalidade dos 28 SE ofrecidos no cuestionario. Os SE máis recoñecidos (frecuencia  $\geq 50\%$ ) foron a práctica recreo-deportiva, todos os SE de regulación, a provisión de auga potable e de alimentos silvestres, o valor cultural (mítico) dos afloramentos rochosos, a socialización no monte, o SE estético, o SE de relaxación e o sendeirismo/paseos. Cabe destacar que o perfil xeográfico dos enquisados amosou unha influencia significativa no grao de percepción dos distintos SE, sendo os perfís máis diverxentes os dos comuneiros propietarios do monte —capaces de recoñecer practicamente calquera dos SE en maior medida— e os visitantes urbanos.

Respecto aos SE máis valorados polo conxunto da poboación enquisada, os máis populares foron o abastecemento de auga potable (SE provisión), o uso



recreo-deportivo do monte (ciclismo, escalada e sendeirismo, SE cultural-recreativo), a regulación climática por parte do ecosistema (SE regulación) e o sentimento de pertenza, a socialización no monte e o significado cultural dos afloramentos rochosos (SE culturais non-recreativos). Novamente, atopáronse diferenzas significativas en función dos perfís de procedencia, destacando a importancia da práctica recreo-deportiva para a poboación urbana e a provisión de auga potable para as comunidades locais.

Ademais, nunha análise exploratoria, observáronse diverxencias nas percepcións e valoracións en función do xénero, asociando aos homes coa práctica deportiva en maior medida e ás mulleres coa visita ao monte para pasear. Cabe destacar tamén que a participación no estudo foi eminentemente masculina (70 %). En canto aos diservizos identificados, estes foron maiormente de orixe antropoxénico, relacionándose especialmente coa existencia de zonas danadas ou abandonadas, a miúdo por unha inadecuada planificación e xestión forestal. A análise espacial a partir do PPGIS permitiu identificar as zonas da USE cun maior número e diversidade de SE e diservizos, revelando zonas de compromiso (*trade-offs*) entre ambos os tipos, con especial incidencia na zona máis accesible e popular do Monte Xalo (O Castelo ou Petón).

Esta primeira aproximación aos servizos ecosistémicos da USE puxo de manifesto o papel multifuncional destes montes veciñais para a sociedade actual. É destacable o papel recreativo e ambiental do monte —como era esperado—, mais a provisión de auga e alimentos silvestres, así como os servizos culturais de tipo cognitivo (sentimento de pertenza, socialización e mítico) tamén resultaron protagonistas. Chama a atención, non obstante, o escaso recoñecemento social da condición veciñal do monte (só un 26 % das persoas enquisadas). Isto resulta un escollo importante a fin de garantir a sostibilidade destes sistemas socioecolóxicos, poñendo de manifesto a necesidade de colaboración das institucións e políticas públicas na posta en valor da figura dos MVMC que garanta a compensación dos SE dos que estes provén a sociedade.

O **Capítulo 4** profunda na pluralidade de significados e valores dos actores representativos da USE derredor da xestión do comunal. Neste capítulo préstase especial atención á diagnose estratéxica sobre as potencialidades e deficiencias do espazo monte e das súas comunidades propietarias para unha xestión sostible dos servizos ecosistémicos, recollendo as visións de futuro, especialmente interesantes no contexto actual de reinvenção das comunidades de montes veciñais. A metodoloxía empregada consistiu en entrevistas semiestruturadas a actores representativos da USE (9 homes e 1 muller) que foron transcritas e codificadas segundo a teoría fundamentada. A información resultante foi organizada e condensada en dúas táboas complementarias: (i) unha que recolle as percepcións dos entrevistados respecto aos cambios nos MVMC do Xalo dende o pasado ao presente e a súa visión (desexo) de evolución do presente ao futuro próximo; e (ii) unha segunda táboa que sintetiza unha análise DAFO (debilidades, ameazas, fortalezas e oportunidades) sobre a xestión do comunal, de utilidade para acadar as visións de futuro recollidas na primeira táboa. Os resultados foron discutidos respecto doutros traballos científicos sobre montes veciñais e outras terras comunais.

A pesar dos distintos puntos de vista das persoas entrevistadas, encontrouse un gran consenso nos temas considerados relevantes respecto ao monte veciñal. Entre as cuestións máis destacadas xurdiron o sentimento de pertenza e a importancia do recoñecemento público dos montes veciñais para a súa preservación, xunto coa necesidade de delimitación oficial dos perímetros do monte para evitar conflitos intra- e intercomunitarios. A idade emerxeu como factor clave na implicación veciñal na xestión do monte, relacionada á súa vez co vencello físico-emocional co espazo, favorecido polo tecido asociativo promotor do uso recreativo do monte. A diversidade de roles na gobernanza do comunal é discutida nun contexto de complexidade institucional derredor do monte, onde os organismos públicos e outros actores externos poderían exercer un papel facilitador na xestión do comunal. Os entrevistados destacaron especialmente o lume como ameaza para a integridade do monte e, a miúdo, a introdución de gando en extensivo

como alternativa á roza mecánica do sotobosque en combinación coa plantación de frondosas autóctonas. Este tipo de propostas foron en consonancia cunha visión multifuncional respecto á xestión do monte, principalmente de tipo *silvo-pasto-recreativa* (termo acuñado como comparativa co uso tradicional *agrosilvopastoral*), que favorece a provisión de servizos ecosistémicos respecto aos usos intensivos, en especial, os de tipo cultural. Finalmente, o capítulo analiza as implicacións que as políticas de desenvolvemento rural poden ter como garantes da provisión de SE á sociedade a través da promoción da xestión multifuncional dos MVMC e a xusta compensación ás comunidades de montes que xestionan e preservan o recurso.

O **Capítulo 5** faise eco da necesidade detectada en fases anteriores (Capítulos 3 e 4) de aplicar un enfoque de xénero na investigación. As enquisas públicas do Capítulo 3 obtiveron soamente un 30 % de participación feminina, mentres que, nas entrevistas aos actores representativos da USE, a proporción de mulleres foi dun 10 % (fronte a un 50 % e 52 % de poboación feminina na USE e Galicia, respectivamente). Así, no Capítulo 5 tratamos de xerar un espazo axeitado para a participación das mulleres co fin de completar os datos de percepción dos servizos ecosistémicos obtidos previamente. Para iso, empregouse unha metodoloxía novidosa no ámbito dos SE, de carácter artístico e transdisciplinar: a técnica da fotovoz combinada con transectos xeorreferenciados. Concretamente, consistiu nunha serie de encontros deliberativos organizados tanto en pequenos grupos coma en reunións plenarias ao redor dunha actividade fotográfica levada a cabo no Monte Xalo. A información xerada foi analizada dende unha cuádrupla perspectiva (cualitativa, cuantitativa, espacial e deliberativa) co fin de coñecer os servizos ecosistémicos, diservizos e cambios na USE identificados polas participantes, así como as relacións entre as distintas variables de estudo. Os SE foron analizados a través do sistema CICES (clasificación internacional común dos SE) e tamén polo modelo dos valores culturais (*landscape values*), que resultaron complementarios.

No proceso da fotovoz participou un grupo interxeracional (16-74 anos) de 23 mulleres distribuídas en cinco equipos fotográficos segundo a súa idade e tipo de relación co Monte Xalo. A mostra total analizada foi de 223 fotos e 2 vídeos a partir dos cales se inferiron 18 tipos de SE, 13 deles de tipo cultural, e 6 tipos de diservizos, todos eles relacionados con actividades humanas. As pedras e o sotobosque foron os elementos da paisaxe asociados a unha maior diversidade de servizos, sendo o SE estético e o sentimento de pertenza os SE máis frecuentemente retratados nas fotografías. A xeolocalización das fotografías permitiu analizar os padróns espaciais dos servizos e diservizos, encontrando as maiores densidades de ambos na área máis popular do monte, ao igual que acontecía nas enquisas públicas. Cada un dos 5 equipos de mulleres amosou un perfil característico e diferenciado na súa percepción do monte, o que indica que as mulleres non constitúen un colectivo homoxéneo en canto á súa forma de relacionarse e percibir a natureza, en consonancia coas teorías ecofeministas contemporáneas. A metodoloxía aplicada foi útil para analizar o conxunto de datos dende distintas perspectivas, mais tamén precisou do investimento intenso de recursos. A involucración física e emocional das participantes e a investigadora resultou un compoñente esencial para superar obstáculos relacionados coa análise dos datos, consonte as teorías de análise visual de imaxes.

O último encontro grupal do proceso da fotovoz serviu como espazo deliberativo onde reflexionar sobre a información debullada nas andainas fotográficas, así como sobre unha cuestión emerxente ao longo da investigación: o *statu quo* das mulleres na gobernanza dos montes veciñais, en xeral, moi minoritaria. Mediante a metodoloxía do «café do mundo» (*world café*) recolléronse as opinións sobre os motivos da baixa participación feminina nos encontros das comunidades de montes. Estes foron asociados principalmente aos ríxidos roles de xénero existentes na comunidade e ás dinámicas entre eles, aos conflitos relacionados co monte e o comportamento das persoas, e á comodidade de quedarse á marxe destas complexidades. Ademais, reflexionouse sobre as calidades que as mulleres

poderían achegar á gobernanza dos montes veciñais e sobre as súas visións de futuro, discutido no capítulo en relación a outras investigacións. En suma, a inclusión efectiva das mulleres na gobernanza dos montes veciñais implicaría a superación da inxusta exclusión participativa e podería resultar nunha excelente oportunidade para mellorar o entendemento no seo da comunidade, a redución de conflitos, a aplicación de obxectivos procomunitarios e a mellora das condicións do monte.

O proceso da fotovoz e a repercusión social que esta metodoloxía ten como un dos obxectivos fundamentais culminou coa difusión e celebración do traballo das participantes a través de varias exposicións fotográficas en distintos foros públicos.

Finalmente, o **Capítulo 6** recolle as principais conclusións obtidas dos resultados debullados nos tres capítulos anteriores. Os resultados apuntan aos montes veciñais do Xalo como un *hotspot* de provisión de SE a escala rexional, onde os servizos culturais e de regulación foron os máis frecuentemente recoñecidos, sendo a sección cultural a máis rica, cun total de ata 21 tipos de servizos identificados. Este achado pon de manifesto a gran necesidade de incluír os beneficios non-materiais que a sociedade demanda dos montes veciñais nos instrumentos de ordenación e no deseño de políticas de desenvolvemento rural. Estas políticas deben promover ademais o recoñecemento social dos MVMC e desenvolver mecanismos de compensación para as comunidades de montes que as asistan na xestión sostible das súas terras. Neste sentido, resulta esencial a exploración de transferencias económicas alternativas, como a inclusión efectiva dos servizos culturais nos esquemas agroambientais e outros instrumentos da arquitectura verde da Política Agraria Común da Unión Europea, os pagamentos por SE, as regulacións fiscais e o desenvolvemento de novos modelos de negocio compatibles e xeradores de SE.

Como conclusión última, encontramos que a avaliación sociocultural dende un punto de vista interseccional da demanda de servizos ecosistémicos nos montes veciñais galegos é unha ferramenta fundamental que pode

proporcionar información clave para as comunidades locais e os actores políticos no deseño axeitado de instrumentos de ordenación e políticas de desenvolvemento rural que aseguren a provisión multifuncional de servizos ecosistémicos, especialmente no contexto actual de reinvencción cara a unha nova multifuncionalidade que cada vez máis comunidades de montes lideran.



## List of Publications

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The following are the publications contributed by the author that were directly derived from this Thesis:

- Rodríguez-Morales, B., Roces-Díaz, J. V., Kelemen, E., Pataki, G., Díaz-Varela, E., 2020. Perception of ecosystem services and disservices on a peri-urban communal forest: Are landowners' and visitors' perspectives dissimilar? *Ecosystem Services* 43, 101089. <https://doi.org/10.1016/j.ecoser.2020.101089>
- Rodríguez-Morales, B. 2019. O lume como (di)servizo dos ecosistemas. Unha ollada en clave de xénero. In: *Árbores que non arden. As mulleres na prevención de incendios forestais. Proxecto Batefogo. Catroventos. Capítulo 2.* ISBN 978-84-949154-6-8.
- Rodríguez-Morales, B., Díaz-Varela, E., Roces-Díaz, J.V. 2019. Una mirada a los servicios de los ecosistemas en clave de género. XII Congreso de Economía Agraria. La Sostenibilidad Agro-territorial desde la Europa Atlántica. 4-6 sept. 2019, Lugo. ISBN 978-84-09-12764-1.
- Rodríguez-Morales, B., Roces-Díaz, J.V., Díaz-Varela, E. 2019. Diferencias en los beneficios percibidos por la sociedad de un monte vecinal en mano común. XII Congreso Iberoamericano de Estudios Rurales (CIER). Territorios Globales, Ruralidades Diversas. Asociación Española de Economía Agraria. 4-6 julio 2018, Segovia. ISBN 978-84-09-08175-2.

Additionally, the author of this Thesis contributed in other publications where her background on socio-cultural approaches in ecosystem services

valuation was of interest (Díaz-Varela et al., 2018, 2019) and in previous works where the exploration of ecosystem services mapping was approached through purely biophysical techniques (Fernandez-Campo et al., 2017).

Díaz-Varela, E., Blanco-Arias, C.A., Rodríguez-Morales, B., Díaz-Varela, R.A. 2019. Enhancing communication and co-learning in socio-ecological landscape management through elicitation of local communities' visions and values. In: UNU-IAS and IGES (eds.). Understanding the multiple values associated with sustainable use in socio-ecological production landscapes and seascapes (Satoyama Initiative Thematic Review vol. 5), United Nations University Institute for the Advanced Study of Sustainability, Tokyo. Chapter 7.

Díaz-Varela, E.R., Álvarez-Álvarez, P., Rocas-Díaz, J. V., Rodríguez-Morales, B., 2018. The contribution of chestnut orchard recovery projects for effective area-based conservation: Two cases in Asturias (North-West Spain). In: UNU-IAS and IGES (Ed.), Satoyama Initiative Thematic Review. Tokyo. Chapter 3.

Fernandez-Campo, M., Rodríguez-Morales, B., Dramstad, W.E., Fjellstad, W., Diaz-Varela, E.R., 2017. Ecosystem services mapping for detection of bundles, synergies and trade-offs: Examples from two Norwegian municipalities. *Ecosystem Services* 28, 283–297. <https://doi.org/10.1016/j.ecoser.2017.08.005>



# PhD Thesis Assessment

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## International Mention



## Ph.D. THESIS ASSESMENT (INTERNATIONAL MENTION)

(To be filled by an expert of a university or research institute from a member state of a country other than Spain, and sent to the coordinator of the program where the PhD thesis is being considered)


DOCTORAL STUDENT AND THESIS DATA	
<i>Ph.D. Student name and surname:</i>	Beatriz Rodríguez-Morales López
<i>Title of the Thesis</i>	Analysis of the social perception of ecosystem services on a peri-urban communal forest from northwestern Spain: a social-ecological approach

EXPERT/EXAMINER DATA	
<i>Name and surname:</i>	Marién González Hidalgo
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<i>University/Research Center</i>	Swedish University of Agricultural Sciences
<i>Address and Country:</i>	Department of Urban and Rural Development-SOL Box 7012, Ulls väg 27. SE-750 07 Uppsala, Sweden

THESIS ASSESSMENT				
	Very Good	Good	Pass	Fail
<i>Originality</i>	X			
<i>Aims</i>	X			
<i>Methodology</i>	X			
<i>Results relevance/significance</i>	X			
<i>Discussion and conclusions</i>	X			

*Please, mark with an X your evaluation*

FREE FORMAT REPORT (USE ADDITIONAL BLANK PAGES IF NEEDED)
<p>This is an original, well written and well-structured thesis. I have enjoyed and learnt a lot while reading it. Beatriz has done comprehensive and systematic review of the literature and on-going debates around the concept of ecosystem services, which I have enjoyed reading.</p> <p>I have also enjoyed and learnt about the communal forests in Galicia, and more concretely about the case study in Galicia. The geographic, ecological, social and environmental characteristics of the peri-urban communal forests of Culleredo, in Galicia, are described with enormous detail, showing a profound knowledge of the context and therefore convincing the reader about the evidence discussed around the local perception of the ecosystem services.</p> <p>In my view, one of the main strengths of the thesis is the comprehensive and creative use of different methodologies. The use of this diversity of (quantitative and qualitative) methods not only enables data triangulation and ensures academic rigour, but most importantly shows the researcher's commitment with creativity (adapting methodologies such as photovoice, World Café) and ensuring the participation of the local community in the research process, in ways that are useful also for them.</p> <p>The academic value of the thesis is also ensured since several chapters have been published in different journals and books in English, Spanish and Gallego. This diversity of formats and languages shows that the results of the thesis have been discussed in a diversity of forums.</p> <p>I only see one small "weakness" in the thesis, related to the literature on the commons. While this literature is not the main focus of Beatriz, the evidence brought up in the thesis regarding the socio-environmental challenges, conflicts and (gender) exclusions in the communal lands of Galicia could inspire current discussions about the commons and practices of commoning. I am sure that, with the immense work done, Beatriz could contribute now and in the future to these or many other conceptual, methodological and policy-oriented debates on the socio-environmental challenges of forest systems</p>

Date/ Fecha: 08.05-2020	Signature/Firma: 
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## Ph.D. THESIS ASSESSMENT (INTERNATIONAL MENTION)

(To be filled by an expert of a university or research institute from a member state of a country other than Spain, and sent to the coordinator of the program where the PhD thesis is being considered)

<b>DOCTORAL STUDENT AND THESIS DATA</b>	
<i>Ph.D. Student name and surname:</i>	Beatriz Rodríguez-Morales López
<i>Title of the Thesis</i>	Analysis of the social perception of ecosystem services on a peri-urban communal forest from northwestern Spain: a social-ecological approach

<b>EXPERT/EXAMINER DATA</b>	
<i>Name and surname:</i>	Cristina Quintas Soriano
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<i>Address and Country:</i>	Agricultural Landscapes, Steinstraße 19 37213 Witzenhausen, Germany

<b>THESIS ASSESSMENT</b>				
	Very Good	Good	Pass	Fail
<i>Originality</i>		X		
<i>Aims</i>	X			
<i>Methodology</i>	X			
<i>Results relevance/significance</i>	X			
<i>Discussion and conclusions</i>	X			

*Please, mark with an X your evaluation*

<b>FREE FORMAT REPORT (USE ADDITIONAL BLANK PAGES IF NEEDED)</b>
<p>This thesis presents a timely research, critically applying existing yet new concepts and moving them further. The application of multiple and diverse socio-cultural methodologies, which are also complementary, to visualize societal values toward ecosystem services is one thing, but then stretching this towards social values and including gender perspective is especially relevant to the research field of ecosystem service science and especially sustainability science. The research is well presented, transparent and elegantly structured, and easily complies with the quality requirements. Co-authorships and collaborations point towards a high-level and promising research direction.</p> <p>I especially appreciate the practice-based motivation to extend existing concepts, which helps ecosystem service science to become a truly applied branch of natural resource studies. In addition, the selection of the case study representing a common good for ecosystems governance is very relevant. Broadening valuation methods, combining results in a plural socio-cultural valuation context and drawing critical conclusions on results, potential outcomes as well as methodology are the main scientific contributions. Research like this is essential for valuation theory and practice to become scientifically more mature. Especially relevant is on one side, the multiple consideration of socio-cultural methods that so far has been limited applied in the ecosystem research field; and on the other side, the inclusion of a gender analysis into social values which acknowledge the path that is need to go, since the incorporation of gender will be a hot topic in sustainability science in the coming years.</p>

In summary, the thesis complies easily with scientific quality requirements. The structure, discourse, methodology, transparent presentation and general format have very little or nothing to comment on.

Date/ Fecha:  
8<sup>th</sup> May 2020

Signature/Firma:

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*Aqueles que, como científicos ou leigos, viven entre as belezas e misterios da terra nunca se senten sos nin cansos da vida. Independentemente de cales sexan as frustracións ou preocupacións das súas vidas persoais, os seus pensamentos atopan camiños que os levan ao contento interior e a un entusiasmo renovado por vivir. Quen contempla a beleza da terra atopa reservas de forza que lle perdurarán mentres dure a vida. Hai beleza, tanto simbólica coma real, na migración das aves, no devalo e o abalo das mareas, no gromo pechado e á espera da primavera. Hai algo infinitamente sandador nos retrousos repetidos da natureza: a seguridade de que a alborada vén despois da noite e a primavera despois do inverno.*

**Rachel Carson**

**O Sentido do Abraio**

*A celebración da Natureza para persoas de todas as idades*

*Tradución de Patricia Buxán Outeiro (Catro Ventos Editora)*



Photo by Patricia Mata