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TOPICAL REVIEW

Territories of commons: a review of common land organizations and institutions in the European Alps

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Abstract

Common land organizations and institutions (hereinafter: CLOIs) have been extensively studied worldwide. However, the extent of the European ones is relatively unknown, despite studies and evidence of their long existence. This is the first comparative study on the CLOIs at a European regional scale. This study focuses on the Alps as defined by the Alpine Convention, and presents the first comprehensive review of data, and status of CLOIs across and within 6 alpine countries: Austria, France, Germany, Italy, Slovenia, and Switzerland. The aim is to assess (i) their historical evolution, (ii) their institutional arrangements and governance characteristics, and (iii) their numbers, surface, and land uses. To carry out this analysis, we used secondary data from official statistics, surveys, scientific and grey literature, legislation, and bylaws for each country and each region. The results show that CLOIs emerged in the Middle Ages and went through key changes in the 19th century, primarily due to Napoleon's influence in reorganising public administration structures, and post-World War II centralization processes, especially in eastern European countries. In total, we accounted for between 5785 and 11 063 CLOIs, distributed across 32 types in the 6 countries; among which, CLOIs with full property rights and membership based on farmstead ownership are the most frequent. The main land use for Alpine CLOIs is forest followed by pasturelands. CLOIs holding agricultural land, such as cropland, was instead reported for only one country and was negligible. In this review we have identified and highlighted several scientific gaps for future but urgent research on Alpine commons. This review depicts the need for

more systematic and cross-country data collection, which could encourage networking and innovation, stakeholder engagement, and CLOIs' recognition in contributing to the sustainable development goals.

1. Introduction

The sustainable use of natural resources is a dominant issue in a world facing the effects of climate change and ecosystem overexploitation. It has been evident for a long time that the sustainable use of resources can be achieved with adequate systems for resource access and use (Rosenberg *et al* 1993). Models for the sustainable use of natural resources are often found in the commons. A common can be understood as 'a natural resource or territory used by a relatively well-defined and territorialized local community that has some sort of degree of decision in the use, management or governance of the territory or resource, formally or informally'. Commons have existed on every continent since at least the first hunting and gathering communities (Ciriacy-Wantrup and Bishop 1975) and there is a large body of literature on them (Agrawal *et al* 2023). Discourse on the management of commons has shifted from a potential 'tragedy', suggested by Hardin (1968), to examples of sustainable local governance (Ostrom 1990, Soroos 2001). Specifically, European case studies display local participation in commons management and at the same time highlight Europe's role in shaping global capitalism and its impact on commons, particularly in developing countries (Capra and Mattei 2015, Haller *et al* 2019).

This paper focuses on European commoners' organizations who own, use, and manage land and land related common-pool resources (CPRs) as common property, as described in Ostrom's work (Ostrom 1990, Ostrom *et al* 1999). For the use and management of these resources and to regulate access, members of these organizations have crafted common property institutions, creating rules, regulations, as well as norms to govern and manage the land and land-related CPRs. Accordingly, local names for commoners' groups in different countries refer to the concept of 'organisations'. 'Institutions' refer to the rules and regulations for the use of land and related CPRs owned or governed in common by these organisations (North 1990, Ostrom 1992, Ensminger 1998). Due to the strong link between organizations and institutions, in this article we address their combination as common land organizations and institution (CLOIs) and we focus on traditional CLOIs in the Alps.

Historically, these CLOIs have evolved through the ebb and flow of numerous socio-political and economic transformations (Gatto and Bogataj 2015, Laborda-Pemán and de Moor 2016, Haller *et al* 2021). Commoners' land rights have existed since at least the Early Middle Ages on the European mainland, including the Alpine region (Kissling-Näf *et al* 2002, Petek and Urbanc 2007, Gatto and Bogataj 2015, Bannon 2017, Conte 2021). Lowland CLOIs were largely dissolved by the 19th century (Laborda-Pemán and de Moor 2016). However, many CLOIs persist in the Alps, such as the 2000 *Agrargemeinschaften* CLOIs registered in the Tyrolean land registry (van Gils *et al* 2014).

Alpine CLOIs have been studied from an institutional or local perspective (Pieraccini 2013, Landolt and Haller 2015, Haller *et al* 2021, Joye 2021, Galán *et al* 2022), but little is known about how CLOIs interact with EU policies at a higher level, such as the Green Deal or the Common Agriculture Policy in Europe (Wong *et al* 2020). In addition, their recognition and incorporation at a higher policy level is missing or, worse, CLOIs are side-lined for other purposes or to increase the power of state and international organisations at the expense of the local communities (Larsen 2024). In Slovenia, Premrl *et al* (2015) found that the legal framework is too rigid to re-establish agrarian commons and thus affects their efficiency in resource governance which leads to the decay of these historical organisations.

Due to their long existence, the enduring socio-ecological legacy that CLOIs represent is not merely a relic of the past but—as we argue in this article—it may play a pivotal role in the rural transformations in line with global and European Union policy including the 2030 Agenda for sustainable development (2015), the EU Green Deal (EC 2019), the Farm-To-Fork strategy (EC 2020b), the Biodiversity Strategy (EC 2020a), the Forest Strategy (EC 2021), the Alpine Convention itself (1995) and the recently passed European Nature Restoration Law (European Parliament and Council of the European Union 2024). As custodians of unique ecological and social knowledge (ICCA Consortium 2021), CLOIs can enrich our understanding of how to live sustainably and in harmony with nature (Brondízio *et al* 2019). Alpine CLOIs have been found to sustain valuable grazing systems as well as the associated cultural landscapes and ecosystem services (JRC 2007, Hrvatin and Perko 2008, Ringler 2009, Hribar *et al* 2015, 2023 a, 2023 b). Hribar *et al* (2023b) presented a case in which the main contributions included social aspects followed by non-material and regulating benefits, while material benefits were ranked last.

To correctly recognize CLOIs' importance and potential for being role models for sustainable

socio-ecological systems and democratic self-organization, information on their status and their characteristics should be made available, including the variety of arrangements under which CLOIs exist in different countries.

Globally these systems are being mapped and catalogued, however Europe has largely been forgotten in these efforts (Bebbington *et al* 2024), both in the academic literature (Garnett *et al* 2018, Dawson *et al* 2021) and conservation literature (LandMark 2018, WWF *et al* 2021, Stevens *et al* 2024). Though European land ownership has been mapped, with efforts dating back to the 1600s (Seifert and Salzmann 2022, Cetl *et al* 2023), current accessible knowledge on CLOIs in Europe is available only in a fragmented fashion. Information is most often found in national level literature, projects and databases, making it difficult to be accessed by the larger public, policy stakeholders and scientific community. This state of knowledge does not offer an overview of CLOIs' status in the Alps. Therefore, collection, systematization and analysis of available data and literature are the first steps to build a comprehensive view on the subject. In its common land study, EUROSTAT (2015b) concludes: 'Common land is a problematic characteristic when it comes to data comparability between countries and over time.' As 'commons' is a generic name for a vast range of locally used words (see appendix A in van Gils *et al* (2014) for a small selection), this greatly complicates mapping and cataloguing of these systems, needing collaboration with in-country commons specialists. Without such caution errors can quickly accumulate, such as in Bebbington *et al* (2024), who wrongly classified 'Communal Forests' as commons in France, when in fact *Forêt Communale* cannot be considered as a commons as they are owned, governed and managed by the municipality without direct participation mechanisms for the local population (i.e. a state institution).

Due to the lack of information, the societal relevance of CLOIs and their institutional specificities run the risk of not being adequately considered by EU policies for the ambitious goals of becoming the first carbon-neutral continent by 2050 (EC 2019), enabling the necessary transformative changes to make food systems fair, healthy, and environmentally-friendly by 2030 (EC 2020b), or legally protecting a minimum of 30% of the EU's land areas and launching an EU Nature Restoration Law (European Parliament and Council of the European Union 2024). This lack of recognition is evident in the absence of references to CLOIs in the CAP (Vivero-Pol 2017, Vivero-Pol *et al* 2019, Manzoni 2024). This lack of empirical data on Alpine commons (JRC 2007, van Gils *et al* 2014), and the diversity of national data collection methods (EUROSTAT 2015a, 2015b, 2024), are the main issues addressed by pooling context-specific expertise and national sources of secondary data.

This study aims to fill this gap by collecting and reviewing existing data on Alpine CLOIs and identifying their commonalities and specificities by bringing together fragmented data resources and overcoming language barriers in the availability of sources.

An international initiative by European researchers on the territories of commons was began to address the presented challenges. This study is the first outcome of the network.

This article provides the first review of Alpine CLOIs status through literature and data analysis across Austria, France, Germany, Italy, Slovenia, and Switzerland.

Specifically, the article aims to collect and display data availability, in terms of quantitative and qualitative knowledge, on the Alpine CLOIs, across the six countries by:

1. Identifying historical events and recent legislative milestones for CLOIs evolution;
2. Comparing and analysing the defining characteristics of the CLOIs according to legislation, differentiating CLOIs from other types of property or land management;
3. Comparing CLOIs extent and status across different countries (i.e. number and organisational types of CLOIs by legislation, surface covered by the CLOIs, main land use managed by CLOIs).

Based on these findings, this paper presents policy recommendations aimed at enhancing the visibility of CLOIs and supporting their sustained existence. Thus, the general objective is academic-, policy-, and practice-oriented.

2. Material and methods

2.1. Study area: the Alps

This study was conducted in the Alpine regions of Austria, France, Germany, Italy, Slovenia, and Switzerland. These areas were chosen due to their long-standing tradition of commons, providing a unique opportunity to investigate the dynamics, mechanisms, and outcomes of commons management. Moreover, the Alps have undergone significant social, economic and environmental changes in recent decades (Bender *et al* 2011, Gobiet *et al* 2014, Marot and Černič Mali 2014, Carrer *et al* 2020).

The study area is based on the Alpine perimeter as defined by the Alpine Convention (figure 1), excluding Liechtenstein and Monaco due to their limited areas.

The group of authors represents scholars from each country who are familiar with the situation in their respective countries. Authors from Austria

Figure 1. The map of the Alpine Convention area.

worked with data from all federal states, yet their analyses were specifically informed by their own research focus on Tyrol and Styria. Some of the data concerning forest CLOIs in Austria and Germany may apply also to land outside the area defined by the Alpine Convention as the respective data sets do not distinguish between mountainous and lowland regions of the country. The French authors analysed the CLOIs mainly in departments 74 (Haute-Savoie, Chamonix region) and 73 (Savoie, Maurienne valley). The German author analysed the area of Bavaria (administrative Districts of Upper Bavaria and Swabia). The Italian authors focused on the Alpine administrative Regions: Liguria, Piedmont, Aosta Valley, Lombardy, Trentino-Alto Adige, Veneto, and Friuli Venezia Giulia. The authors from Switzerland analysed specific regions in the German-, French-, and Italian-speaking cantons.

2.2. Variables and data collection

We carried out the data analysis using both quantitative and qualitative approaches. For the quantitative component, our approach focused on examining and comparing existing datasets to identify trends, commonalities, and discrepancies in the data. We examined the underlying themes and narratives in the qualitative data sources (literature, statistics, and legal documents).

A set of seven variables was selected to explore and pursue the specific objectives of the study (table 1). These variables were selected to comply with the heuristic and exploratory nature of the study. In our analysis, we focused on land that is either commonly owned or used, guided by community-established rules pertaining to user rights and land care responsibilities. We excluded the following types of land management systems: municipalities as owners without the residents having any direct property right (e.g. user rights), green spaces, allotment gardens, systems based purely on 'every man's rights' type of access and usage. New and more recent types of CLOIs, such as community gardens, were excluded too, to focus on traditional and historical CLOIs. Despite recognizing the importance of other resources managed by the CLOIs, such as water, in this paper we focused on CLOIs based on land management and collected data only on land use surface and categories. The data was collected primarily through a comprehensive literature review and an examination of secondary data sources, especially statistical information from national and regional surveys, often related to the agricultural sector (see table 2). Our methodology is consistent with previous research that supports the meaningful comparison of dissimilar cases, even when they show extreme differences (Abel *et al* 2006, Walker 2006, Gatto and Bogataj 2015, Paunović and Jovanović 2019). In our study, the conceptualization of variables was done in such a way that empirical data could be integrated alongside informed assumptions and intuitive reasoning, which was crucial due to the complexity of the variables. Consultation with experts played an indispensable role in this process, especially when it came to addressing and interpreting gaps or fragmented data.

2.3. Data sources

Table 2 provides an overview of the main data sources used for each country and examines the reliability and completeness of the data in terms of land management practices.

3. Results and discussion

The following section reports the results of our study with discussion on their characteristics, limitations, potential improvement and implications. Italics is used for CLOIs local names and specific references to CLOIs. Data availability, reliability, and the nature of

Table 1. The objectives and the variables to be analysed for each country, their description, their evaluation criteria and the source of the data.

Objective	Groups of variables	Content description	Type of a question/data	Source
1	1.1 Historical milestones	Historical overview and timeline with key events in the history of the CLOIs in each country driving their increase or decrease	Open question/descriptive	Literature
	1.2 Legislative framework and ongoing discussions beyond statutory measures	Review of legislation processes on CLOIs considering latest and upcoming laws; deliberation on prospective statutory enactments.	Open question/descriptive Close question/dichotomous choice	Legislation, literature
2	2.1 Key components of CLOIs	Types of resources that can be owned and managed by the commons; characteristics of the resources as defined by law; types of membership; entities that can own commons (private or public organisations); regional or state legislation regulating CLOIs.	Open question/descriptive	Legislation literature
	2.2 Different types of CLOI within a country	Types of CLOIs (public or private, difference in managing or owning institutions, open or closed membership, land use etc)	Open question/descriptive	Literature
3	3.1 Numbers of CLOI	Numbers of each type of CLOI (as identified in Objective 2)	Close question/ numerical; additional descriptive information	National statistics (e.g. agricultural census), literature
	3.2 Surface of each land use category of CLOI	Surface (coverage) of each land use category (in ha) in total; percentage of each land category (if possible) relative to its national total and compared to the total land surface of alpine CLOIs in each Country. Only data regarding owned land could be retrieved.	Close question/open choice (numerical)	National statistics, personal elaboration based on available data
	3.3 Types of land managed by the CLOI	Land use categories (e.g. arable land, pastures, grassland, forests etc)	Close question/open choice (descriptive)	Legislation, agricultural census, literature

land management practices vary widely across countries. The review aims to present a holistic picture of the dynamics and intricacies of how CLOIs are managed in the Alpine region and their status. Key issues in the data collection process were data gaps, fragmented information, and the use of different methods of data collection and processing in each country.

3.1. Historical and legislative evolution

We addressed the historical evolution of the CLOIs by identifying key events in each country in the study. The historical timeline (figure 2) considers the period before most Alpine countries existed as modern national states. We used the political borders of contemporary countries as a geographical reference for categorizing the key events. Historical changes in administrative boundaries have also led to some CLOIs being found across administrative and national borders today, such as the common of Mourex, France, spread in three villages (Smith 2020) or the *Bourgeoisie de Saint Gingolph*, which is divided by the French-Swiss border (Joye 2021, p 267).

Most CLOIs originated possibly due to the influence of the Holy Roman Empire which controlled most of the Alpine area (Casari 2007, Wilson 2016).

Since the 1740s, many European countries have privatised their common lands, which were viewed as 'wasteland', in favour of perceived increased agricultural production (Di Palma 2014, Vivier 2021). In Bavaria, the division of CLOIs and the reclaim

Table 2. Key sources for the data used in the current study by each country.

Country	Data source			Reliability of data	Completeness of data	Links and references to sources
	Official statistics	Research data	Other sources			
Austria	- Grüner Bericht (2023) - Waldbericht (2021) - Agrarstrukturerhebung (2020) - Almstatistik (2009);	PhD research project in social & cultural Anthropology at the University of Vienna with a focus on the federal states Styria and Tyrol (2021–2023);	Literature research; data published by the platform 'Almwirtschaft Österreich'	Reliable; partly dated and incomplete;	- The current extent of use-right-based pasture and wood commons are difficult to estimate: actual exercise of user rights is lower than legally valid (and measurable) entitlements. Possible overestimation; - Pastures held by public-law peasant corporations do not need to be formalized in Austria to be recognized as CLOIs. Unregulated corporations do not show up in statistics, however. Possible underestimation; - No satisfactory data on CLOIs in arable farmland, fisheries, and hunting grounds was found;	- BML (2023) - BMLFUW (2021) - Statistik Austria (2020) - BMLFUW (2009) - Almwirtschaft Österreich (2020) www.almwirtschaft.com/services/fachunterlagen-zur-almwirtschaft/

(Continued.)

Table 2. (Continued.)

France	- Open access database of the *Office National des Forêt* (ONF) - For *Sections de commune: Fichiers des parcelles des personnes morales Direction générale des finances publiques-DGFIP 2023, Régie de Gestion des Données (RGD).*	- Project COMON by Université Savoie Mont Blanc (2018–2022). - *Chaire scientifique 'Valoriser les communs fonciers' VALCOM, 2024*	- Literature on common properties. Personal observations;	Data collection by VALCOM is still in progress and numbers likely underestimate CLOIs;	- Underestimation. Focused on data from the Savoie and Haut Savoie Departments. Departments 38 (Isère), 83 (Var), and 84 (Vaucluse) were excluded because they do not fall entirely in the study area; - Underestimation forest data. ONF database only includes common forests with official management plans;	- ONF (2020) https://geo.data.gouv.fr/fr/datasets/fac934f5b6934af22dc56b1651e02f5dbda782c6
Germany	- Bavarian statistics (the most recent complete release was from 1976) for Alpine pastures data; - German forest survey (the last one with data on traditional CLOIs was in 1961) - Journal 'LWF aktuell' (ed. by the Bavarian State Institute for Forestry and Forest Economics) for recent forest data;	Scientific and grey literature and media article;	- Official newsletter 'Der Almbauer' of the Alpine farming association of Upper Bavaria; - Websites of the Bavarian State Ministry of Food, Agriculture and Forestry and the Bavarian forest administration; - Legal texts (plus court rulings);	Concerning the surface of the Alpine pastures, collective and individual data is mixed;	For the Alpine pastures, the number of CLOIs in 1976 is complete; for the forests, the number and surface of CLOIs include also the lowland areas of the governmental Districts Upper Bavaria and Swabia.	- (Englmaier *et al* 1978, Leitenbacher and Perfler 2009, Ringler 2009) - Statistisches Bundesamt 1966: Forsterhebung 1961

(Continued.)

Table 2. (Continued.)

Country	Data source			Reliability of data	Completeness of data	Links and references to sources
	Official statistics	Research data	Other sources			
Italy	- Agricultural Surveys (by ISTAT) (2010–2020); - National forest inventory (2015);	Scientific literature;	- Online Archive *of Centro studi e documentazione sui demani civici e le proprietà collettive;* - Website of *Associazione per la tutela delle proprietà collettive e dei diritti di uso civico;* - Regional and provincial websites for CLOIs;	Conflicting information between official statistics (ISTAT) and other secondary sources such as recognized associations working with CLOIs, scientific literature	Underestimation. civic uses (*usi civici*) surfaces are especially difficult to account for, as their recognition is an ongoing process with regional authorities. Official statistics possibly account only for CLOIs that are active and producing resources (e.g. timber, mushrooms etc) and registered as operating farms.	- *Associazione per la tutela delle proprietà collettive e dei diritti di uso civico* www.demaniocivico.it/aproduc/6-aproduc-chi-siamo/ - (ISTAT 2010, 2020, Gasparini *et al* 2022)
Slovenia	SiStat 2021 report by the Statistical Office of Slovenia, which covers agriculture, forestry, and fishery sectors	Personal correspondence with the Ministry for Agriculture, Forestry and Food (MKGP) in 2021 for mountain pastures in 2020	- Bibliography/literature from 2013 and 2023; - Personal correspondence by Petek 2021 (ha of commons forests on national level, data are from 2006)	Reliable, partly outdated and incomplete.	Lack of credible updated data on common forests and pastures except for one region documented by Kozorog and Leban (2023).	- https://pxweb.stat.si/SiStatData/pxweb/sl/Data/-/1516501S.px - (Bogataj and Krč 2023, Hrvatin and Perko 2008, Kozorog and Leban 2023, Ravtar 1941, Premrl *et al* 2015)
Switzerland	Sector statistics and reports	SCALES research project (Sustainable Commons Adaptations to Landscape Ecosystems in Switzerland; Haller *et al* 2021)	- Public policies - Interviews - Literature	Reliable; some approximations due to lack of quantitative data on commons	Lack of some quantitative data on CLOIs. Number of CLOIs available only for public corporations.	- (BFS 2020, BFS 2021, Haller *et al* 2021) - *Swiss Association of Citizens' Communities and Corporations (SVBK)* www.svbk.ch

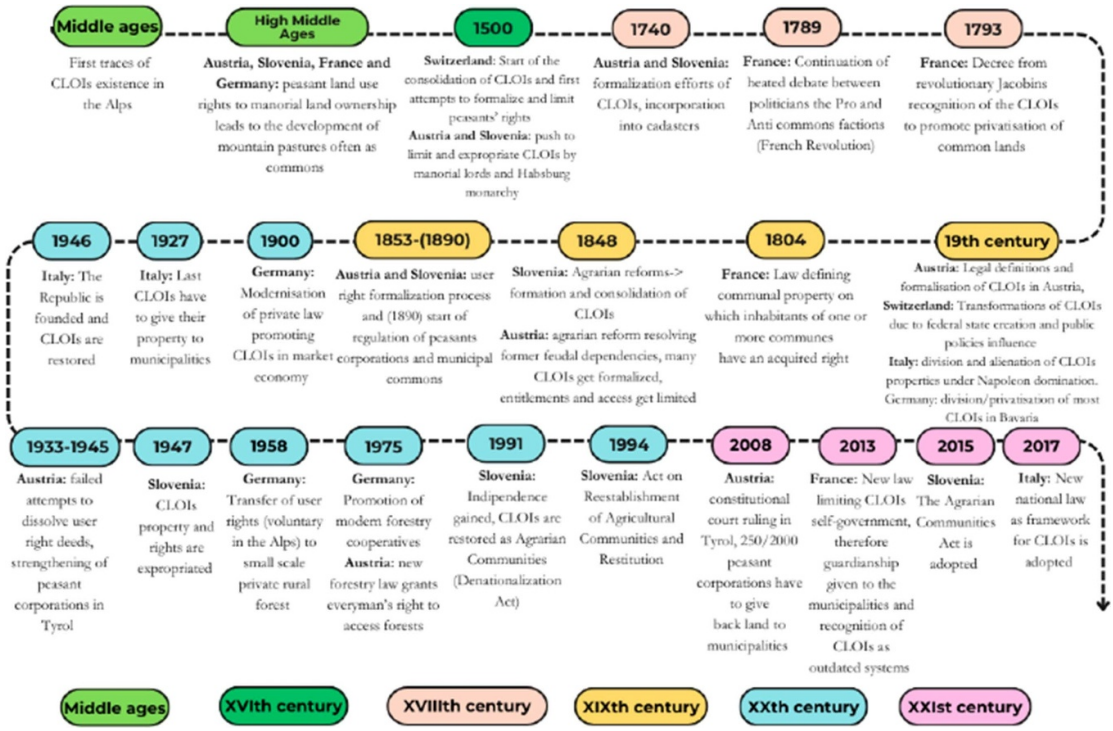

Figure 2. Timeline of CLOIs development and evolution in the Alpine countries with a focus on key historical events influencing the CLOIs.

of related easements was initiated by law in 1762; in particular, the division of community grounds was intended to serve the expansion of arable land, but it was always controversial, so that the legal framework was repeatedly changed, i.e. the privatisation made it more difficult or easier (Wismüller 1904).

The 19th century appeared to be the key century for the transformation of CLOIs. In northern Italy, the Napoleonic institutional reforms played a primary role in the reduction of CLOIs (Vivier 2021). In Austria and Slovenia, which had been part of the same state, first the Habsburg monarchy and later the Austro-Hungarian empire between 1867 and 1918, agrarian reforms occurred, causing rearrangements and reforming of CLOIs (Schiff 1899, Bauer 1925). In France, a law in 1804 reformed property: common property was defined as property to which the inhabitants of one or more municipalities had an acquired right. Generally, the 19th century saw forms of state and private property increasing and a stronger incorporation into the market economy and state governance. Such changes led to the privatization of the common lands with good soils (Jeanrenaud 2001), most often the lands in fertile lowlands, often outside of mountainous areas. On the contrary, in Switzerland, many CLOIs remained in place after the French and Helvetic Revolutions because of their relevance and role in the livelihood of the population (Stuber and Wunderli 2021).

During the 20th and 21st centuries, some key moments determining the current state of Alpine CLOIs were highlighted. In Italy, CLOIs were suppressed or limited during the Fascist Era and were fully restored after the end of World War II (WWII). Similarly in Slovenia, the expropriation of CLOIs and their nationalisation after WWII, was followed by the restoration of rights, but only in the decades after 1991 when CLOIs faced large-scale forest disturbance and municipal and state interventions for land management. Also, the main laws regulating agrarian communities in Slovenia changed several times in the 1990s, but this appears to have slowed down (Gatto and Bogataj 2015).

After 2010, the three laws regarding CLOIs were approved in France (2013), Slovenia (2015), and Italy (2017) respectively (figure 2). Furthermore, at the regional scale in Italy in 2022, a law in the Aosta Valley recognised their historical CLOIs, the *Consorterie*, with positive impacts on their subsequent reestablishment. In contrast, the French law (27 May 2013) modified the 1996 *Code général des collectivités territoriales* (General Code of Territorial Local Authorities), limiting the self-governance processes of a specific CLOI (the '*section de commune*') and classifying it as an outdated system (Joye 2021). However, in the French Alps, while there is a general decline of *sections de commune* and *communaux cultifs* due to the supremacy of the municipal power, this is not true for all

types of CLOIs. Indeed, there is a stable situation for 'free' or purely private CLOIs such as the *bourgeoisies* or the *consortages*, which are not threatened, since they are not monitored within administrative law, but rather private law (Joye 2021, 2024). Italian and Slovenian laws can be considered positive for improving definitions and supporting restoration processes of CLOIs. However, Slovenian CLOIs still face several challenges, mainly bureaucratic ones, that could threaten their existence. Historically unresolved issues (e.g. denationalization) complicate Slovenian CLOIs' functioning, i.e. municipal shares, pending inheritance proceedings, requirement for registration (in 1994), re-registration (from 2015 onward), state and municipalities interest, and others (Šmid Hribar *et al* 2015).

In Austria, the law that had framed user-rights based commons' legislation at the national level was suspended in 2020 (WWNGG 1951, BGBl.Nr. 130/1951). Since then, these user rights (*Einforstungsrechte*) are governed only by provincial law. Users' organizations fear that this might lead to the unequal treatment of user-right holders across provinces. Another recent legal change concerning the commons in Austria took place in Tyrol: Following a ruling by the Constitutional Court in 2008 (Zl. B464/07) 250 out of ca. 2000 peasant corporation-led CLOIs (*Agrargemeinschaften*) were retransferred into the custody of municipalities; former members, however, retained their user rights (Keller 2009, van Gils *et al* 2014). These transfers were fiercely debated and challenged. Some perceived the transfer as expropriation of former peasant corporation members; some perceived it as rightful re-generalization of formerly communal land property to the whole local population (instead of to the corporation members only). Despite these recent changes, the legislation governing the Austrian CLOIs is quite stable. This rigid legal security, however, also limits commoners' ability to adapt to economic, environmental, and socio-political changes (Rail 2024).

In Germany, during the last 50 years there have been moderate changes in the framework law and supported by organisational law, to some extent concerning the forest CLOIs (initiated by the Bavarian Forest Rights Act of 1958, Federal Forest Act of 1975), but mostly concerning new energy cooperatives (Renewable Energy Sources Act 2000, frequently updated).

The importance of renewed legislation in recent years can be explained due to its role in official recognition, which is the basis of the preservation and continued existence of CLOIs. An example of such lack of recognition emerged in our results: France is moving towards limiting and abolishing CLOIs. In some cases, many French CLOIs are no longer able to define many of their rules because they are now codified into law and are quite inflexible, possibly endangering the CLOIs. Finally, recent proposed laws, not validated yet, seek to abolish significant amounts of CLOIs (e.g. the *section de commune*) calling them 'old-fashioned' (Hymas *et al* 2021).

3.2. Defining characteristics of CLOIs across the Alps

One of the first issues in comparing Alpine CLOIs relates to ownership, membership, and the ability to self-define the rules of CPR governance. We aimed to identify traditional CLOIs and their comparable characteristics according to each country's legislation and CLOIs bylaws across the Alps. Key characteristics include the type of property rights, as explained by Schlager and Ostrom (1992), how the community of commoners is defined (membership), recognised primary land uses, and the private or public status of the CLOI.

We identified thirty-two types of CLOIs distinguished by their local names (appendix A) and subsequently analysed their key characteristics. Most countries have more than 4 types of CLOIs except for Slovenia, which has 2.

3.2.1. Property rights

In almost all countries, we distinguished the CLOIs based on 3 main types of property rights (figure 3). One type of CLOI within the same country can belong to multiple property rights arrangements, as defined by regional legislation.

Full property rights: the commoners have a non-material share in the entire property and are all entered individually in the land register as fractional owners and can only dispose of their ownership rights through joint decision-making (consubstantially). Full property rights are granted to 18 types of CLOIs in all the study countries.

In Slovenia, due to past nationalisation, the municipality can be a CLOI's shareholder and usually members are not joint but rather co-owners of CLOI land, despite belonging to the *Agrarne skupnosti* (agrarian communities), and only provisioning services (e.g. firewood, timber yield, etc) are fully provided to members. *Pašne skupnosti* (pasture communities) are similar, and sometimes overlap with, *Agrarne skupnosti* and own the land with full rights. However, sometimes *Pašne skupnosti* are informal communities renting land of *agrarne skupnosti* or municipalities.

In Austria, *Agrargemeinschaft* is a type of public-law corporation that grants full property rights to commoners, and it the most wide-spread form of CLOI. In Germany, the *Gemeinschaftsalmen* (community alpine pastures) and the *Genossenschaftsalmen* (cooperative alpine pastures) fit under the first type of ownership. In

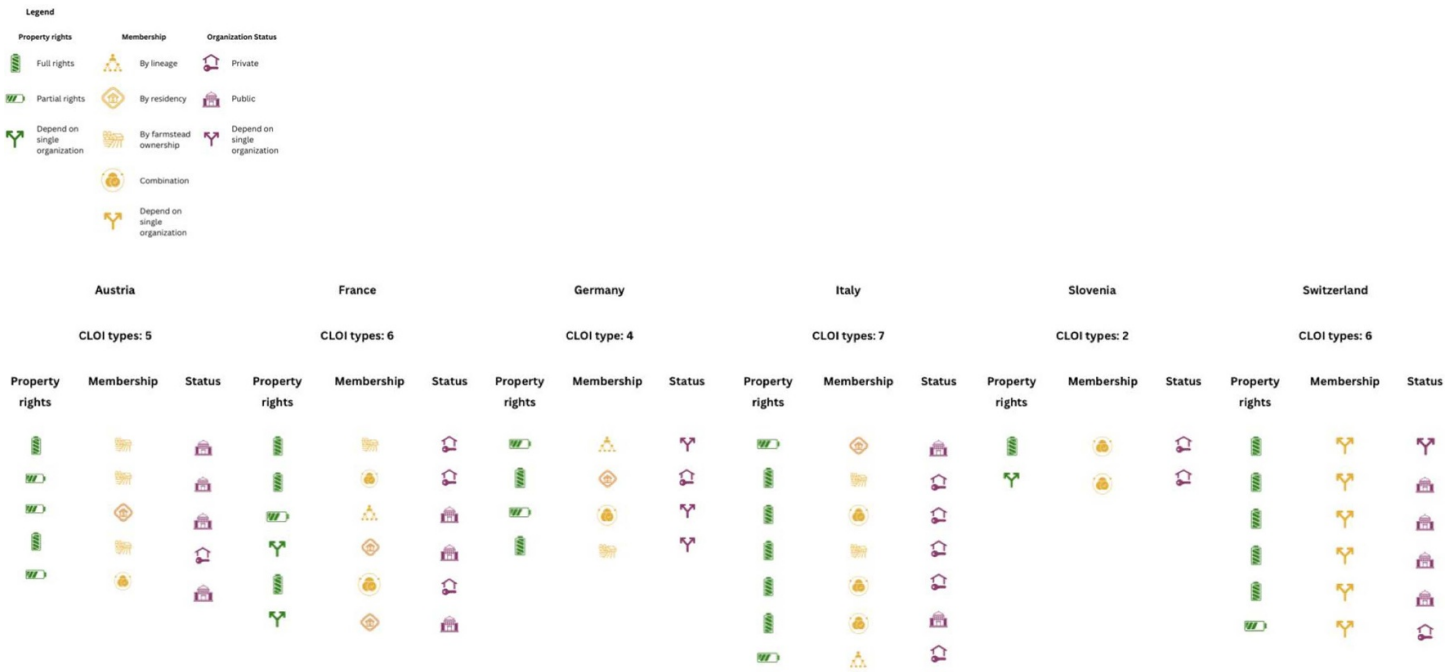

Figure 3. The heterogeneity of the different CLOIs arrangements. Colour identifies the category of characteristic (rights, membership and type of property). E.g. In Austria there are 5 CLOI types: four public, 1 private (in purple), 3 with membership based on farmstead ownership, 1 by residency and 1 by combination (in yellow), 2 CLOI types have full property rights, 3 have partial property rights (in green).
Icon credits: 'protection' icon Reproduced from Alice Design. CC BY 3.0, 'Municipality' Reproduced from Junaidi. CC BY 3.0, 'alternative' Reproduced from Coquet. CC BY 3.0, 'Farm' Reproduced from Zijlstra. CC BY 3.0, 'Residence' by Reproduced from IYIKON. CC BY 3.0, 'Battery' Reproduced from fauzin idea. CC BY 3.0, 'Battery' by fauzin idea CC BY 3.0, 'combination' by Reproduced from Suwarjo. CC BY 3.0, 'Inheritance' Reproduced from Hermawan. CC BY 3.0.

the case of the *Gemeinschaftsalmen,* like Austrian *Agrarmeinschaften*, the owner is not the local community, as in the case of cooperatives, but the pasture owners or corporation members entered the land register[17] (Ringler 2009, p 428ff). In fact, the co-owners cannot dispose of their property shares individually, but only by joint decision. Also, the *Regole* in Italy have full property rights, except for the alienation rights of land and specific infrastructures. It should be considered how full rights often does not include full right of exclusion, as in the case of forest in Slovenia and Italy.

Partial property rights: CLOIs with this type of property rights (9 cases) are often associated with municipalities. In this case the CLOI is a municipality-based organization that represents its shareholders, the commoners, who have user rights over the land owned at themunicipal level. In this case, user rights are managed separately from the ordinary administration of municipal property. In the Italian cases (e.g. *Amministrazioni separate Usi Civici*) in this situation, legally the land belongs to the resident community of the municipality, and it grants user rights for areas (i.e. pasture and meadows) and resources (i.e. fuelwood, NWFPs). Such user rights are based on long term residency and managed by a committee of the residents of the municipality where the CLOI land is located. Similarly, in Germany, the *Gemeindealmen* and *Rechtlerwald* CLOIs are owned by the municipality where they are located, but residents have partial property rights (individual private easements and servitudes) over land resources. German *Berechtigungsalmen*, municipality *Almen* and forests (*Rechtlerwald*) are not run (solely) as municipal land, or state forest in the first case, but they grant and regulate user rights for the members of the community. In Austria, *Gemeindegut* is a CLOI in which land is owned by municipalities, but institutionalised rights are granted to residents. In these cases, user rights are either based flexibly on demand or are tied to long-standing farmsteads. In France, the *Communaux cultifs* belong to this type, as they provide user rights to their members over specific resources on municipal land. Some forest and alpine pasture use in Austria is based on user rights called *Einforstungsrechte*. Titled farmsteads hold certified seasonal grazing rights as well as rights to annual shares in wood and other forest products; user-right holders to the same pasture or forests do not form a legally recognized collective or corporation.

There are 3 cases of CLOI types where the property rights vary case-by-case despite sharing the same name.

[17] 'Co-ownership of the cooperatives for the whole hand', joint or fractional ownership of several co-owners with non-material but numerically fixed share rights.

We analysed the characteristics of the property of CLOIs across the Alps in terms of protection of property rights by legislation. The rights linked to common lands are also quite similar across the Alps: indivisibility and inalienability are key features in Italian and French CLOIs. In Bavaria (Germany), inalienable share rights are typical only for traditional farms linked to *Gemeindealmen* (municipal alpine pastures) and *Rechtlerwald* (community forest). In Austria, the conditions for divisibility and alienability vary according to the type of CLOI and its statutes. Slovenia also had indivisibility and inalienability, however this generally changed after WWII when CLOIs were nationalised and still today inalienability is not granted. After independence in 1991, the lands were only returned to those CLOIs that claimed them and were able to provide evidence of user rights, as happened in Italy after WWII. In Switzerland, inalienability is not given, as CLOIs are allowed to sell their land.

3.2.2. Membership

Membership conditions vary according to the type of CLOI (figure 3, appendix A). All membership types are closed, meaning that one can obtain membership in a CLOI only through a process of registration, either in a lineage registry, through applying for municipality residency, or by owning any land property in the CLOI area. The lineage registry accounts for the original families that resided in the CLOIs since the registration started. Further differentiation can be identified for each country.

Membership by property ownership: this is the most frequent membership type (7 CLOI types), with a typical example of ownership of a farmstead on CLOI land. In Austria, user rights and peasant corporation membership can be farmstead based (tied to a *Liegenschaft*): membership in such a CLOI is often passed on through titled farmsteads, which can be passed on to non-relatives. Italian examples of farmstead membership are the *Consorzio Agrario-Vicinia* and *Consorterie* in Friuli Venezia Giulia and Aosta Valley Regions respectively. In Slovenia farmstead membership is one of the few mechanisms by which newcomers to become commoners of a CLOI.

Membership by residency: four CLOI types were identified with this criterion. This characteristic in CLOIs linked to municipalities. In such cases in Italy, in some CLOIs (e.g. *Amministrazione separata dei beni di uso civico*) membership is based on residence and the residence criterion is also applied in France in some cases. In Italy, in many cases only long-time residents (10–20 years) can access user rights, and these CLOIs recognized user rights in the form of households, not as individual residents (Dalla Torre *et al* 2024). This reflects the perception of the collective

resource as a scarce one, exposed to the risk of over-exploitation. Demand-based membership exists in Austria, in the case of cattle owners requesting access to common pasturelands, for municipal residency-based CLOIs.

Membership by lineage: we identified 3 cases with this sole membership criterion among the CLOIs. In most cases of the Italian *Regole, Vicinie* and the *Magnifiche Comunità*, in the French *Bourgeoisie* and *Consortages*, and in the *Berechtigungsalmen, Gemeindealmen*, and *Rechtlerwald* in Germany CLOI members can only be recognized by lineage. In Slovenia, membership is usually also linked to lineage but if there is no inheritance (for which procedures may be decades long), the state, through the municipality, gets a share. Tensions are ongoing about common land ownership in such cases. Even if the recent law calls for a return of shares to local inhabitants, this process is inhibited by slow bureaucratic procedures by the state and municipalities. In Switzerland, membership by lineage is the most common, even though some of the CLOIs are more open regarding new memberships and there are big differences to include or exclude newcomers. As a main rule, in many cases members have private property in the lowlands which then enables them to be hereditary members and thus have access to high pastures in the Alps (Haller *et al* 2021). In many instances however, membership in Switzerland depends on a case-by-case situation rather than a specific type of CLOI.

Mixed membership types: we identified 8 cases of mixed membership criteria. In Trentino Province, Italy, the *Regole* and the *Magnifica Comunità di Fiemme* recognize their members both by lineage (being listed in an ancestry register) and by residency (10–30 years) in the municipality where the CLOIs have their legal headquarters. The *Genossenschaftalmen/-forsten*, which are like cooperatives, have a mixed membership criterion: both open and regulated by the statute of the common itself.

In Slovenian *pašne skupnosti* (Pasture communities) nowadays, membership could also be based on demand. In fact, they are based on interest (due to herd ownership) and not land. A further exception, although extremely rare, occurs in Slovenia where newcomers are invited to join the *agrarne skupnosti*. In the case of Swiss CLOIs, mixed membership is prevalent. Even though most commonly the membership to many CLOIs is lineage-based, residents in the area owned or managed by the CLOI, especially if in economic need, can access some resources from the common lands, despite not being members of the CLOI.

Changes in membership criteria can also happen. In the past, membership in the German *Gemeinschaftsalmen/-forsten* could be obtained based on farmstead ownership on the CLOI surface. Nowadays, owners of former farmsteads are often still co-owners, even if they no longer practise farming or the manorial estates no longer exist (Ringler 2009, p 428).

Overall, CLOIs with the same name in each country can be counted in multiple categories, because their characteristics are often regulated by regional legislations that allow different institutional arrangements.

Regarding the diversity of names, it is of interest that these also reflect if membership is more lineage oriented like the Swiss German *Burgergemeinde* or the Swiss *Bourgeoisies* and Swiss Italian *Patriziati* or rather cooperatives based on specific tasks and collaboration among members which is reflected in for example the German *Genossenschaft*, the Italian *Consortele and Vicinie,* the Swiss *Geteilschaft*, the French *Section de commune* and the Slovenian *Agrarne skupnosti* with the emphasis on local communities. There is only one case of a French *Bourgeoisie*, which was the result of a *Bourgeoisie* split between Switzerland and France (Joye 2021, Ambrosio and Joye 2024).

3.2.3. Public versus private status of the CLOIs

The public and private nature of CLOIs organizations largely depend on the type of CLOI. The relevance of public or private status is linked to land tenure, recognition by public authorities, agency in management decisions, and even access to funding and taxation regimes.

Most states still recognize only the dualism of property in terms of public versus private ownership. Therefore, CLOIs are classified accordingly. In general, the distinction between the two areas of law has not been fully clarified in academia and practice (Wobst 1971, p 79ff). However, there is evidence about the increasing blurring of the boundary between public and private property rights, management, and responsibilities (Sikor 2008).

Most CLOIs are public institutions (figure 3). In Switzerland, as well as in Austria, CLOIs are mostly public (*öffentlich-rechtlich*), but partly also private (*privatrechtlich*). On the other hand, in Slovenia CLOIs are regarded as private but municipalities can have a share of the CLOI.

In Germany, land ownership of *Berechtigungsalmen/Gemeindealmen* is under the public law and in these cases, some user rights, such as servitudes and easements, are under private law. In Bavaria, in these cases, land use is regulated in the Bavarian Municipal Code. Legal entities are usually regulated by public law if they are entrusted with sovereign and public tasks. If it is only authorised to fulfil limited tasks, it belongs to private law, which is the case of CLOIs with partial property rights. However, the classification in Germany was a result of an arbitrary process, depending on time, federal state, and

the responsible authority. A public law character was often assumed if the state could thus grant itself a stronger supervisory position (Wobst 1971). The dichotomy of institutional arrangements of CLOIs between private and public is derived from the post Napoleonic processes (De Moor 2011). However, there is evidence of attempts to change such a dichotomy. For example, in Italy, CLOIs have been officially recognized as a third type of property (National Law 168/2017), between the recognized private and public property regimes. CLOIs are identified as primary legal arrangements and with statutory autonomy for the management of natural, economic, and cultural heritage, and configuring them as 'inter-generational co-ownership' belonging to the community. Its 'inter-generational' nature prohibits any act that could deprive future generations of an equal opportunity to use the given commons. Therefore, this recent law establishes a close connection between collective property of these traditional CLOIs on the one hand, and environmental protection, socio-cultural heritage of rural areas, and intergenerational solidarity, on the other.

3.2.4. Scale of legislation regulating CLOIs

Legislation regulating CLOIs occurs at the national, regional (either regions or federal states) and local (municipal or other small-scale administration) levels, except for Slovenia, where it occurs only at the national level and by at least two acts (Act on Reestablishment of Agrarian Communities and Restitution of their Property and Rights, (1994); Agricultural Communities Act (2015)). For other countries, national legislation mostly provides a framework, such as defining CLOIs in general terms, but local specificities of each type of CLOI are regulated at regional or provincial levels, as well as at the CLOI level. For example, in Italy, each CLOI can self-define entrance rules such as a period of waiting upon relocation until either the single resident or the household is admitted as a commoner in the CLOI. In Austria and Germany, federal states and provinces play a major role in establishing the CLOI's legal framework.

3.3. Evidence on CLOIs numbers variability, trends and land use surfaces

3.3.1. Numbers variability and trends

According to official statistics, where available, recognized CLOIs in the Alps amount to at least 5785 units. However, other sources considered in the other countries are reliable as they come from research institutes and specific statistics involving CLOIs. By considering the combination of official statistics for Germany and Austria, which complement each other (appendix C) and the other sources for the other countries, including Italy, the total amount of CLOIs is 11 063 (table 3). Numbers of CLOIs vary considerably depending on the countries, ranging from at least 3299 in Austria to 638 in Slovenia (table 3).

Table 3. Number and comparison of Alpine CLOIs numbers in each country between official statistics and combinations of other sources (scientific literature, local/regional journals or other databases) and the years of data collection. Further details are provided in appendices C and D.

Country	Official statistics	Other sources
Austria	3046	253
France	No data	1274
Germany	1566[a]	453
Italy	1173	2183
Slovenia	No data	638
Switzerland	No data	1650

[a] Values for the total administrative Districts of Swabia and Upper Bavaria (the German Alpine Convention area is 40.2% of the total area of these Districts).

Official statistics on the number of CLOIs are available for Austria, Italy and partly Germany. While for Germany and Austria the numbers of the official statistics can be integrated with the other sources, that is not valid for the Italian case, where official statistics and numbers from other sources are inconsistent, therefore the total estimation can drop to 10 053 CLOIs if official statistics are considered for Italy (table 3).

In the German case, we excluded over 140 voluntary associations of private forest owners founded in Bavaria since changes in law after 1969. In fact, some of them replaced the traditional community forest and they are different legal forms (economic association or cooperative). Such voluntary associations own almost half of the forest surface in Bavaria (Leitenbacher and Perfler 2009) and are not included in the scope of the study due to their relatively recent emergence.

For France, only data for *sections de commune* was found. Statistics of Austria, Switzerland, and Italy on numbers of CLOIs are difficult to gather and possibly incomplete. It is possible that official statistics accounted only for the CLOIs that applied for EU subsidies.

The available data on Austrian CLOIs has notable gaps: the 3046 registered public-law peasant corporations (*Agrargemeinschaften*) do not include user-rights based, cooperative, or municipal CLOIs; the 253 reported user-rights based pasture CLOIs, in turn, do not include user-rights based forest CLOIs. Thus, the number of 3299 is an underestimation but the most precise data available. Switzerland only reports public law corporations.

Due to the lack of data across different years, it is challenging to estimate trends in numbers of CLOIs across the study countries. The only official registered increase of CLOIs was recorded in Italy, between two national agricultural surveys in 2010 and 2020, where the CLOIs in the Alpine regions went from 981 to

1173 (ISTAT 2010, 2020). In Slovenia, a significant number of *Agrarne skupnosti* (approximately 1000 and unofficially as much as 1500, while the land size is unknown) was lost in the period of 1947–1991 (Cerar *et al* 2011, cited in Hribar *et al* (2015)). After their revival in the nineties (Bogataj and Krč 2014), their activity has slowed down, and the data only exist for one of regional entities containing the Alps (Kozorog and Leban 2023). Data on the trend of numbers of CLOIs in Austria is contradictory: the last survey on CLOIs for pastures showed a slight decrease between 2000 and 2009 (BMLFUW 2009, p 24), yet the last general report on the state of agriculture showed a marked increase of CLOIs for pastures between 2000 and 2022 (BML 2023, p 64). The figures in the latter survey concern the number of CLOIs applying for EU subsidies, so the increase is probably not due to an increase in the number of CLOIs, but only to an increase in CLOIs' applications and therefore identification. It should be noted that while these figures look promising on the surface, in the research sample of one of the authors, all CLOIs are struggling with a decline in active members; the total number of CLOIs in Austria is stable, but many are being thinned out internally. In Switzerland, CLOIs seem to be decreasing, because some CLOIs are losing their function and are thus dissolved, or their responsibilities are transferred to the municipalities (Haller *et al* 2021). In France, in the Savoie and Haute Savoie Departments, there has been a decrease of the *sections de commune* over one century. This decrease notably concerns the CLOIs which are under the control of administration and so are threatened (Bonnemains 2021). In Germany, the lack of data made it impossible to estimate increasing or decreasing numbers of CLOIs.

3.3.2. Land use categories and surface

The Alpine Convention area is 19.071 700 ha. CLOIs in the Alpine Convention area own approximately 10% (1889 939.37 ha) (table 4). Specifically, Alpine CLOIs own 0.36% (2339 ha) of arable lands and permanent cropland, 13% (730.117 ha) of pastureland and grassland and 13.12% (1167 482.56 ha) of forest of the Alpine Convention area (table 4).

The surface share under CLOIs property in each country varies widely depending on country and land use category (table 5), ranging from 26% in Switzerland to 0.05% in France. It should be considered that the lowest percentages come from the countries with the largest data gaps (France, Germany and Slovenia) and oldest data (Germany).

Results on land use surfaces are in most cases an underestimation, and in few cases, it could be an overestimation. CLOIs mainly own and manage forests and pastures but also some arable land, especially in the case of Italy (table 4). No data was available on arable land for the other countries. A limit to be considered in such estimates is that data for land use of CLOIs are sourced from different years. While forestry data could be considered for comparison, as most data stems from 2015–2021, data on pastureland is from 2009–2020, depending on the country. In the case of Germany data for forestry are largely outdated, being from the 1960s (appendix D).

In Austria, the latest data available showed that close to 60% of alpine pastureland was held by diverse types of CLOIs in 2009 (BMLFUW 2009). Since then, the surface of Austrian alpine pastureland has decreased in statistics, partly because of a decline in use, but also because of changes in calculation methods. However, alpine pastureland shares of CLOIs in Austria should roughly have stayed the same in the past 15 years (Almwirtschaft Österreich 2020, p 25,32). In Italy, 7% of the national surface of pastureland is owned by Alpine CLOIs. No data on pastureland for France and Germany were available.

The most accurate data were available for forest, even though it should be considered that in some cases, such as France, the reported data are an underestimation, and in Germany data is outdated. The large forest share owned by the CLOIs make them relevant forest owners to be involved in ecosystem services management decisions, such as in carbon sinking strategies (Gren and Zeleke 2016, Khanal *et al* 2017, Karppinen *et al* 2018).

Overall, land use categories that retained their collective management are those that are more suited to collective management due to difficulties in accessing alpine pastures and forest. Meadows at lower altitude and agricultural land became privatised as they were easily accessible and enclosable, more easily manageable by single families, and more profitable (Jeanrenaud 2001). This is possibly true also for arable land. It is possible that the arable land surface owned by alpine CLOIs is negligible due to earlier privatization in the 19th century due to its higher profitability (Jeanrenaud 2001).

Despite almost 10% of Alpine land owned by CLOIs (table 4), especially in some countries such as Switzerland and Austria (table 5), it is striking that some policy creation and implementation only partly included commoners and their CLOIs, i.e. payments of agrarian subsidies, which go to farmers and not directly to the commoners' organisations (Haller *et al* 2021). This is often true also for the other countries, due to the structure of the Common Agricultural Policy subsidies provision that go to the actual farmer and not the landowner, even though the CLOIs, as landowners, are most often active land managers. This is also evident from the work of Manzoni (2024).

Databases and their integration at European scale, through EUROSTAT, could provide stronger evidence to support CLOIs by highlighting their importance both in terms of surface and land use, but also structure and diversity of their governance. Also, spatial information can provide key support in the

Table 4. Surface of Alpine CLOIs for the three main land uses, arable land, forest and pastureland compared against national surfaces and Alpine Convention surfaces. All data sources are available in appendix D. Arable land and pastures for the Alpine Convention area are sourced from Permanent Secretariat of the Alpine Convention (2011), forest surface is sourced in Elmi and Streifeneder (2018).

	Arable land					Forest					Pastureland				
Country	CLOIs surface (ha)	Surface at national level (ha)	% (on national surface)	Alpine Convention (ha)	% (on Alpine Convention surface)	CLOIs surface (ha)	Surface at national level (ha)	% (on national surface)	Alpine Convention (ha)	% (on Alpine Convention surface)	CLOIs surface (ha)	Surface at national level (ha)	% (on national surface)	Alpine convention (ha)	% (on Alpine Convention surface)
Austria	No data	Not applicable	/	648 437.8	/	482 652	4000 000	12.07	8897 265	5.42	268 518	449 981	5967	5545 506.2	4.84
France	No data	Not applicable	/		/	2019	17 500 000	0.01		0.02	No data	Not applicable	/		/
Germany	No data	Not applicable	/		/	73 386	11 419 000	0.64[b]		0.33[c]	No data	Not applicable	/		/
Italy	2339.81	9398 445[a]	0.02		0.64	118 880	11 400 000	1.04		1.34	244 981	3136 555	7.81		4.42
Slovenia	No data	Not applicable	/		/	28 545.56	1177 244	2.42		0.32	7143	8 164.1	87.5		0.13
Switzerland	No data	Not applicable	/		/	462 000	1240 000	37.26		5.19	209 475	465 500	45		3.78
Total	2,339.81	9398 445[a]	/		0.36	1114 888.56	46 736 244	/		12.53	730 117	4060 200.1	/		13.17

[a] Only utilized agricultural area (UAA, minus the pastureland surface) for Italy was reported, due to CLOIs agricultural data availability only for Italy.

[b] CLOI Values from 1961 for the total of Swabia and Upper Bavaria Districts.

[c] Estimate based on the fact that the Alpine Convention area is 40.2% of the area of Swabia and Upper Bavaria Districts.

Table 5. Data on Alpine CLOIs surface in percentage compared to national area in the Alpine Convention. Data source for National surfaces within the Alpine Convention: www.alpconv.org/en/home/organisation/contracting-parties/.

Country	National surface in Alpine Convention area (ha)	CLOIs surface in Alpine Convention area (ha)	CLOIs surface in the national Alpine Convention surface (%)
Austria	5473 577.9	751 170	13.72
France	4081 343.8	2019	0.05
Germany	1106 158.6	74 000[a]	6.70
Italy	5206 574.1	366 200.81	7.03
Slovenia	667 509.5	35 688.56	5.35
Switzerland	2517 464.4	671 475	26.67
Total	t19.071.700	1889 939.37	CLOIs surface in the Alpine Convention area (%)
			9.96

[a] CLOIs 'values in 1961 for CLOIs 'forests in Swabia and Upper Bavaria Districts (40%of the area of these Districts make up the German Alpine Convention area); 35.6%of the German Alpine pastures (125 181 ha, appendix C) were CLOIs 'land (exact surface is not known).

recognition of CLOIs role in conservation and active management of rural areas. The importance of mapping and monitoring common lands, especially due to their role in nature conservation and equal access to land rights, has been highlighted in other studies both for Europe (Bebbington *et al* 2024) and Asia (Agarwal *et al* 2017, 2022). Transparent and accessible mapping of common lands can empower communities to assert their rights, prevent enclosure or privatization, and facilitate participatory governance and planning (Mccall and Dunn 2012). Scientific research making information about collectively managed lands visible, can support movements toward greater eco-social justice and reinforce the role of CLOIs in sustainable land management and conservation. Ensuring that databases reflect diverse perspectives and local knowledge is essential for preventing the exclusion of less dominant voices and fostering a more equitable recognition of collective land rights (Peluso 1995, Mammana 2024).

3.3.3. A glance at other key resources

Besides land, other material heritage of CLOIs exists in the form of communal buildings, infrastructure, and collectively used equipment (e.g. bread ovens in Bassignana and Volpato (2024)). These forms of common pool resource refer to a certain Alpine lifestyle where sharing was and remains an essential way of life. Such infrastructures can include communal buildings, used for meetings, communal cheese making facilities, agricultural buildings used for storage of machinery or resources, or for processing (milk production, bakery, etc) and living (e.g. shepherd's huts in the Slovenian or Austrian context). In some cases, such as Switzerland and Austria, some CLOIs own relevant tourism infrastructures, such as ski lifts and restaurants, or real estate. In France, CLOIs typically own buildings, including houses for public assembly, water fountains, bread ovens, etc. Also commonly owned or used movable agricultural equipment represents an essential part of the CLOI property, as represented in the Maurienne Valley in France (Grosinger *et al* 2021). Expensive equipment, which allows traditional practices for land management, would not be affordable without the existence of CLOIs in these contexts, such as the Alps, where economic conditions, due to terrain and remoteness, would not be favourable for development. In most countries, CLOIs own summer farms and mountain huts which are also used for tourism purposes.

Also, quarries can be owned, such as the case of Austria, Switzerland, France and Italy. Despite not being addressed in this paper, legal rights to fish and hunt are, and have been, also common in CLOIs bylaws (Gueydon and Hoffmann 2006, Casari and Lisciandra 2016).

Commonly owned land and infrastructures are increasingly significant as recreational and relational assets for community members and other local inhabitants of the area (e.g. forest for hiking and biking, collective huts for community gatherings) to increase physical, mental, and relational wellbeing (Nieto-Romero *et al* 2021, Rail 2024). Important benefits refer to social aspects, especially trust and reciprocity between members (Costa *et al* 2023, Hribar *et al* 2023b). If the relational aspect is not considered, CLOIs—as social infrastructures for supporting community needs and wellbeing—would lose their relevance (Mies 2014). Such a move beyond material perspective underlines shared decision-making and joint management that complement individual living, an aspect that has also been pointed out in the principle of nesting in Ostrom´s design principles fostering long-term persistence of commoners' organizations.

These and other relational issues were examined and found not only among members of CLOIs but also between CLOIs and land (e.g. use rules) and between a CLOI and society (Lawrence *et al* 2021). Furthermore, the ability of CLOIs to adjust rules to economic, political, and other changes mentioned by Gatto and Bogataj (2015) informs their agility, like the case of concerted and efficient response to large-scale forest damage in a Slovenian region, which was attributed to traditional ecological knowledge and local social norms (Bogataj and Krč 2023).

Alpine CLOIs are valuable for the relational value that binds humans to the resource, and humans as a community around the resource they care for. This is often related to the notion of maintaining the communally owned areas with all its elements for the future generations, as it was handed down from previous generations.

Besides the importance of non-material resources (e.g. knowledge transmission systems, conflict resolution mechanism, and democratic governance), evidence on land use categories (table 4), mostly forests and pastures, of the CLOIs leads to considerations on their role in biodiversity and landscape conservation in the Alps. The land management of CLOIs across the centuries modelled the landscape and its heterogeneity we see today. Due to the long existence of CLOIs in the Alps, such as the *Regole* in Italy (Gatto and Bogataj 2015), it is implied that in the existing cases a sustainable approach to land management and governance of the socio-ecological system was applied. However, there is limited research on links between CLOIs and biodiversity conservation: examples are mentioned by Short (2008), Guadilla-Sáez *et al* (2019), Parra *et al* (2025) and Dominguez and Benessaiah (2017).

Furthermore, our study focuses on CLOIs land resources, but there is ample evidence that most CLOIs manage, or affect (Skulska *et al* 2020), water resources as well, such as irrigation canals (Crook and Jones 1999, Lestournelle *et al* 2007) and even drinking water (Pipan *et al* 2023).

3.4. Challenges and potential of CLOIs

Qualitative strengths of the Alpine CLOIs may be found in their robust institutional setting that has survived centuries of changes (figure 2). It can be assumed that the long-term survival of CLOIs in the Alps would have been impossible without adjustments to the dynamics of nature and societies. Not only was innovation needed but also skills and flexibility to adjust, and an attachment to the Alpine culture and its landscape. The diversity we found is a testament to the ability to adapt, to persist, and ensure continued existence throughout socio-political changes in history.

Nowadays, CLOIs face new challenges, mostly related to their institutional arrangements within current societal changes, but also climate change, which is redefining the balance between human societies and natural resources. Thus, maintaining internal dynamism is still key to persist and adapt (Bogataj and Krč 2023).

Challenges in terms of institutional arrangements are exemplified by the case of France. In some cases, in France, communities of commoners are not able to define many of their rules anymore, because the codifying laws are less flexible and possibly put CLOIs' existence itself at risk. For example, since 2013, most *sections de commune* cannot have a governing body, and this reduces their ability to manage their resources or to arbitrate conflict. The transfer of water governance from the municipality level and away from CLOIs (Locatelli *et al* 2025), a topic hotly contested by the 'Elected officials of the Mountain' (ANEM 2023), further exacerbates the situation. Other societal changes include transition from agricultural to service-based economies in rural areas, represented e.g. by building solar- and wind-power infrastructures and introducing large-scale profit management instead of small-scale measures that account for local people and natural conditions. Demographic declines also represent an ongoing and vital issue (Ferrario and Price 2014).

Challenges related to climate change are linked to increases in occurrence and intensity of natural disturbances, which can lead to the exacerbation of land conflicts and reduction of resources and ecosystem services provision, as the Alps' case shows (Gobiet *et al* 2014). The loss of CLOIs, be it due to demographic decline or policies, could lead to landscape changes and changes in ecosystem services provision.

One such benefit granted by CLOIs' active land management is the conservation of biodiversity (ICCA Consortium 2021). While the link between the two has long been understood (Zhang *et al* 2023), it is only recently that this link has become recognised as counting towards conservation targets. Global mechanisms such as other effective conservation measures (OECMs) (IUCN WCPA 2018) and ICCAs (Jonas *et al* 2017) have been put into place to recognise systems such as CLOIs and record them in UN databases like the protected planet database.

However, there are two major barriers to such recognition by European states: first, there has been a historic predisposition to value land as a market commodity, where CLOIs were considered as obstacles to the legitimate appropriation of goods (O'Neill 2001). In turn, this links to the second major barrier, that is the spatial dimension of environmental justice that sees environmental policies and laws principally benefitting urban populations at the expense of rural populations (Brown *et al* 2024). The case of OECMs

is particularly telling as, while OECMs should be a 'whole of government and whole of society' approach to conservation, the majority of declared OECMs are government-based, with few society-based OECMs (UNEP-WCMC and IUCN 2024, p 50, Jonas *et al* 2024).

CLOIs' forms of land use related to identity and care are not primarily following market-based logics or neomercantilism discourses contrastingly to the European trend (Fiala *et al* 2024). On the contrary, CLOIs involve a more generational orientation and the long-term input of labour and money instead of short-term profit calculation. This is especially explainable in the cases of CLOIs with community membership based on lineage.

Innovation can be a way to counteract the decline CLOIs are facing due to internal and external factors. In a few cases in Slovenia, CLOIs started distributing the income of co-owners among the entire local community to enhance local sustainable development and to contribute to community building and cohesion (Urbanc and Šmid Hribar 2021). While CLOIs also claim to contribute to the support of social security systems, new issues such as energy and biodiversity are now taken up by CLOIs in Switzerland, and they are testing several forms of networking and collaborations, i.e., coordinating and sharing forestry tasks and expenses, innovations in milk and cheese production, biomass district heating systems, new forms of tourism. Other examples of innovations born in CLOIs in other countries also exist (Barlagne *et al* 2021, Bonnin *et al* 2021, Nieto-Romero *et al* 2021, Brossette *et al* 2022, Dalla Torre *et al* 2022).

4. Conclusions

The article sheds light on the scattered, heterogeneous, and at times inconsistent, data on Alpine CLOIs, acknowledging them as dynamic institutions that might play a key-role for sustainable transformations in the Alpine region.

This is the first study on the CLOIs at a European regional scale and with this review we have identified and highlighted several scientific gaps for future but urgent research on Alpine CLOIs. Moreover, we put under the spotlight the status of CLOIs in the Alps and provided advice to strengthen knowledge about and the role of CLOIs in European and national policies.

Our methodology was based on the analysis of legislation, statistics, the scientific and grey literature about CLOIs across the 6 countries.

Our analysis revealed that the European Alpine region is characterised by heterogeneous CLOIs owning, using, and managing different shares of Alpine land surface, with different degrees and modalities of recognition at the national legislative level. CLOIs are known locally by various names and formalized through a multitude of governance structures. Such variation is not just evident across the different countries but can also vary from one valley to another. Their complexity showcases the blurred lines between private, state, and common ownership regimes that resist simplistic categorizations and definitions. The relative lack of information on them can be partially linked to such complexity in identifying and analysing them.

The results clearly depict a lack of consistent, complete, and updated data, both within and between countries and consequently also at EU level. Also, the different cultural and legislative contexts of CLOIs limits the comparability of their institutional arrangements. These gaps underline how these reservoirs of ecological and social resilience lack fundamental recognition and support, putting them in an unfair bargaining position compared to capitalist markets and agro-industry, especially in a context of globalisation, land abandonment, and demographic challenges. Instead, our findings in terms of land coverage and land use by CLOIs suggest that commoners did and can play a critical role in preserving cultural landscapes, which in turn support biodiversity and act as a buffer against climate change-related effects as well as energy and food security challenges.

Future lines of research should extend this analysis to water-based common institutions, more recent types of organizations (energy cooperatives, urban orchards, etc) and how CLOIs can be seen as laboratories of innovations and play a role in conservation, ecosystem services provision and maintenance.

Drawing upon the results and in line with the purposes of this paper, the authors provide a set of recommendations that could enhance the role of the CLOIs for more ecological, sustainable, and resilient rural areas in the Alpine region. Potentially, this policy advice aligns with global advice (Zanjani *et al* 2023) and can be extended to similar cases outside the European Alps:

1. **Systematically map and quantify the extent of common lands.** A systematic census of CLOIs, meaning not just common organizations and institutions but also commonly managed and commonly used lands, is needed at the national and European levels. This mapping would not only account for the number of hectares, but also the number of people involved and the economic value stemming from agricultural production of these lands to account for both their economic and social relevance. For this task, the elaboration of a systematic methodology accounting for

the high degree of variety in CLOIs' experiences is required[18].

2. **Foster networking, knowledge, and innovation exchange**. Foster collaboration and partnerships amongst collective landowners, private sector actors, civil society organisations, and government agencies to promote inclusive and equitable agricultural development. This could be done, for example, by drawing upon the framework of the recently launched EU CAP Network (incorporating the stakeholders from the previous European Network for Rural Development (ENRD, https://ec.europa.eu/enrd/about_en.html) and EIP-AGRI (https://ec.europa.eu/eip/agriculture/en/node.html). Notably, regarding the ENRD, the EU CAP could promote commoning initiatives drawing upon the positive synergies represented by the LEADER approach (*Liaison Entre Actions de Développement de l'Économie Rurale* or links between activities for the development of rural economy) and its local action groups[19]. Local CLOIs initiatives could also foster fruitful interconnections and networking with other similar experiences across Europe and the globe, for an enhanced cross-fertilization of practices and feedback, which can support market economy challenges.
3. **Ensure enhanced stakeholders' engagement and consideration of commoners as equal partners in decision-making over land use policies**, at a regional and transnational level, ensuring that they are provided with adequate information, their perspective and voices are included from an early stage of policy development, and their traditional knowledge is integrated with scientific knowledge. This means favouring co-production processes to ensure a more inclusive rural spatial planning and a fairer playing field for mountain farmers competing with agro-industry, with a view to foster more equitable outcomes, as also recognized by the Declaration on the Rights of Peasants and Other People Working in Rural Areas (UN Assembly General 2018).
4. **Recognize the role of CLOIs in reaching internationally established objectives and sustainable development goals.** Better understand the role of CLOIs in various national, EU, and international policies and treaties. For instance, Article 8 j of the Rio convention on Biological Diversity (UNEP 1992), Articles 6 and 7 of the Paris Climate Agreement (UN 2015), Goal B and Targets 3, 9–14, 16 and others of the recent Kunming–Montreal global biodiversity framework (UNEP 2022), Targets 2.2.2. 'Bringing nature back to agricultural land that recognises the importance of involving farmers' or '2.2.4. Increasing the quantity of forests and improving their health and resilience' or '3.3. Building on an integrated and whole-of-society approach', the Universal Declaration on Cultural Diversity (UNESCO 2011), the EU Biodiversity Strategy for 2030, but also the Agenda 2030 and the more recent EU Restoration Law (2024).

[18] On this regard, the 'Territories of commons in Europe' research network has been working on developing a systematic methodology for the collecting of qualitative and quantitative data on the European commons. The latest developments of this work have been presented at the XIX IASC Biannual conference held in Nairobi, June 2023. Cfr. https://2023.iasc-commons.org/panel/1-3-territories-of-commons-in-europe-a-european-research-network-to-unveil-the-invisible-reality-of-the-european-commons/.

[19] Cfr. https://ec.europa.eu/enrd/leader-clld_en.html.

Data availability statement

Data used for the analysis are public data available in national surveys and databases listed in the References.

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CRediT Roles

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Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethics statement

This paper does not involve human subjects, human data or tissue or animals. No ethics concern is raised by the topic of study. All data was sourced by secondary sources and literature.

Appendix A.

Table. CLOIs key characteristics by country. *Full references available in table in appendix B.

			Property rights		Membership			Status of the organization			
Country	Original CLOI name	Geographic ref.	Full ownership of the CLOI by the community	Partial property rights over the land by the CLOI community	Membership by lineage	Membership by residency	Membership by ownership of property on CLOIs land (or other)	Private law	Public law	Land use (Agricultural land: A; Forest: F; Pastureland: P)	Reference used to classify
Austria	Agrargemeinschaft	All regions	X				X		X	P, F	(Kohl *et al* 2010, Siegl 2019, van Gils *et al* 2014)
	Einforstungsrechte	Salzburg, Tyrol, upper Austria, Styria; to a lesser extend also Carinthia & lower Austria		X			X		X	P, F	(Bauer 1925, Gallor 2019, Holzer 2013, Schiff 1899)
	Gemeidegut	All regions		X		X			X	P, F	(Siegl 2019, van Gils *et al* 2014)
	Gemeindegutsagrargemeinschaft	Tyrol		X		X	X		X	P, F	(van Gils *et al* 2014)
	Genossenschaft, Verein	All regions; alpine pastures formalised as Genossenschaften are especially widespread in Vorarlberg	X				X	X		P, F	(BMLFUW 2009, Burmeister 1994)

(Continued.)

Table. (Continued.)

France	Biens non délimités (BND) (unlocalised private ownership with common governance)	Everywhere, prominent in Auvergne	X					X	X		P, F	(Joye 2021, Vern 2023)
	Bourgeoisie, sociétés foncières	Haute-Savoie/ Swiss border	X		X			X	X		P,F	(Joye 2021)
	Communaux cultifs	Maurienne region		X	X					X	P,F	(Joye 2021)
	Communaux ou biens communaux		X	X		X				X	F	(Joye 2021)
	Consortages	Chamonix region	X		X			X	X		P	(Ambrosio and Joye 2024)
	Section de commune (biens de section, communaux ou biens sectionaux)	Everywhere, esp. mountainous regions (e.g. Massif Central, but also Alps, Jura)	X	X		X				X	F	(Joye 2021)

(Continued.)

Table. (Continued.)

Country	Original CLOI name	Geographic ref.	Property rights		Membership			Status of the organization		Land use (Agricultural land: A; Forest: F; Pastureland: P)	Reference used to classify
			Full ownership of the CLOI by the community	Partial property rights over the land by the CLOI community	Membership by lineage	Membership by residency	Membership by ownership of property on CLOIs land (or other)	Private law	Public law		
Germany	Berechtigungsalmen	Bavaria (only Alpine region, mostly Eastern Bavarian Alps)		X	X			X	X	P	(Englmaier *et al* 1978, Ringler 2009, p 428ff)
	Gemeinschaftsalmen/-forsten (community Almen/forests)	Bavaria (Almen only Alpine region)	X			X		X		P,F	(Englmaier *et al* 1978, Wobst 1971, Ringler 2009, p 428ff)
	Gemeindealmen/ Gemeindewald = Rechtlerwald/ (municipal Almen and forests)	Bavaria (Almen only Alpine region)		X	X	X		X	X	P,F	BayGO, WGV; (Englmaier *et al* 1978; Ringler 2009), 423ff.
	Genossenschaftsalmen/-forsten (cooperative Almen/forests)	Bavaria (Almen only Alpine region)								P,F	BWaldG; (Englmaier *et al* 1978, Ringler 2009), 432ff.

(Continued.)

Table. (Continued.)

Italy	Amministrazione frazionale usi civici, Amministrazione separata dei beni di uso civico, consorzio gestione demanio civico,	Veneto, Friuli Venezia Giulia, Piedmont, Liguria, Provinces of Trento and Bolzano		X		X			X	F,P,A	Bylaws and regional/provincial legislation
	Associazioni agrarie (Interessenze/Vicinie)—Agrargemeinschaften (Interessentschaften, Nachbarschafte)	Province of Bolzano	X				X	X		F,P	Bylaws *
	Consortele	Province of Trento	X				X	X		F,P,A	Consortele *
	Consortili	Piedmont (Val Germanasca, Pinerolo)	X		X		X	X		F,P	(Barale and Valcanover 2021)*
	Consorterie	Aosta Valley	X		X		X	X		P, F	Regional Law n. 19 (2022); (Louvin and Alessi 2021) * Bylaws *
	Consorzio agrario comunioni familiari (or Consorzi vicinali)	Friuli Venezia Giulia, Province of Bolzano	X				X	X		F,P,A	Bylaw* (Daici 2021)
	Magnifica comunità	Province of Trento, Veneto	X		X	X			X	F,P,A	Bylaw (Fiemme) * Bylaw (Cadore) *
	Regole	Veneto, Province of Trento	X		X	X		X		F,P,A	Bylaws*
	Vicinie	Lombardy, Province of Trento, Friuli-Venezia Giulia, Veneto		X	X			X			(Vicinia di Vico and Vicinie Valcamonica (Lombardy) Short history of Vicinie *

(Continued.)

Table. (Continued.)

Country	Original CLOI name	Geographic ref.	Property rights		Membership			Status of the organization		Land use (Agricultural land: A; Forest: F; Pastureland: P)	Reference used to classify
			Full ownership of the CLOI by the community	Partial property rights over the land by the CLOI community	Membership by lineage	Membership by residency	Membership by ownership of property on CLOIs land (or other)	Private law	Public law		
Slovenia	Agrarne skupnosti (regional terms: jus, srenja, gmajna, korporacija…)	All regions which include Alpine, Mediterranean and Dinaric regions	X		X		X	X		Mostly F, P, A	Act on agrarian communities 2015; (Kozorog and Leban 2023, Premrl 2013)
	Pašne skupnosti	Alpine, Mediterranean and Dinaric region	X	X	X	X		X		P	(Lozej 2022)
Switzerland	Bäuerten, Bergschaften and others	Multiple regions, but mostly in alpine areas	X		X	X	X	X	X	F,P, partly A	(Haller *et al* 2021)
	Bourgeoisies	French speaking cantons	X		X	X	X		X	F,P, partly A	(Haller *et al* 2021)
	Bürgergemeinden	German speaking cantons	X		X	X	X		X	F,P, partly A	(Haller *et al* 2021)
	Patriziati	Italian speaking cantons	X		X	X	X		X	F,P, partly A	(Haller *et al* 2021)
	Korporationen	Multiple regions, but mostly in alpine areas								F,P, partly A	(Haller *et al* 2021)
	Privatrechtliche Körperschaften (Flur-, Bach-, Alp-, Meliorationsgenossenschaften, Geteilschaften in the Valais)	Multiple regions	X	X	X	X	X	X		Partly F, P and/or A	(Haller *et al* 2021)

Appendix B.

Country	Original CLOI name	Reference used to classify
Austria	Agrargemeinschaft	(Kohl *et al* 2010, Siegl 2019, van Gils *et al* 2014)
	Einforstungsrechte	(Gallor 2019, Holzer 2013, Schiff 1899, Bauer 1925)
	Gemeidegut	(van Gils *et al* 2014, Siegl 2019)
	Gemeindegutsagrargemeinschaft	(van Gils *et al* 2014) www.tirol.gv.at/landwirtschaft-forstwirtschaft/agrar/agrarrecht/agrargemeinschaftliche-grundstuecke-und-agrargemeinschaften/
	Genossenschaft, Verein	(BMLFUW 2009, Burmeister 1994)
France	Biens non délimités (BND) (unlocalised private ownership with common governance)	(Joye 2021, Vern 2023)
	Bourgeoisie, sociétés foncières	(Joye 2021)
	Communaux cultifs	(Joye 2021)
	Communaux ou biens communaux	(Joye 2021)
	Consortages	(Ambrosio and Joye 2024)
	Section de commune (biens de section, communaux ou biens sectionaux)	(Joye 2021)
Germany	Berechtigungsalmen	(Englmaier *et al* 1978, Ringler 2009, p 435ff)
	Gemeinschaftsalmen/-forsten (community Almen/forests)	(Englmaier *et al* 1978, Ringler 2009, p 428ff, Wobst 1971)
	Gemeindealmen/ Gemeindewald = Rechtlerwald/(municipal Almen and forests)	BayGO—Bayerische Gemeindeordnung (Bavarian Municipal Code), WGV—(Bayerische) Verordnung über Waldgenossenschaften (Bavarian Ordinance on Forest Cooperatives); (Englmaier *et al* 1978, Ringler 2009, p 423ff)
	Genossenschaftsalmen/-forsten (cooperative Almen/forests)	BWaldG—Bundeswaldgesetz (German Federal Forest Act); (Englmaier *et al* 1978, Ringler 2009, p 432ff)

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Country	Original CLOI name	Reference used to classify
Italy	Amministrazione frazionale usi civici, Amministrazione separata dei beni di uso civico, Consorzio Gestione Demanio Civico,	Bylaws and regional/provincial legislation
	Associazioni agrarie (Interessenze/Vicinie)—Agrargemeinschaften (Interessentschaften, Nachbarschafte)	(Bylaws) https://agricoltura.provincia.bz.it/it/associazioni-agrarie-interessenze-vicinie
	Consortele	www.comune.rabbi.tn.it/Territorio/Informazioni-utili/Associazioni-e-Gruppi/Consortele
	Consortili	(Barale and Valcanover 2021)
	Consorterie	Regional Law n. 19 (2022) (Louvin and Alessi 2021, Daici 2021) (Bylaws) www.consorterie.vda.it/consorterie/consorteria-blavy/
	Consorzio agrario comunioni familiari (or Consorzi vicinali)	Bylaw of Consorzio agrario https://viciniacamporosso.wordpress.com/about/statuto/ (Daici 2021)
	Magnifica comunità	Bylaw (Fiemme) www.mcfiemme.eu Bylaw (Cadore) www.magnificacomunitadicadore.it/cadore/presentazione-storica.html
	Regole	Bylaws
	Vicinie	(Vicinia di Vico and Vicinie Valcamonica (Lombardy) www.academia.edu/38241367/Vicinie_breve_storia_pdf
Slovenia	Agrarian communities (regional terms: jus, srenja, gmajna, korporacija…)	Act on agrarian communities 2015, (Kozorog and Leban 2023, Premrl and Udovč 2015)
	Pasture communities	(Lozej 2022)
Switzerland	Bäuerten, Bergschaften and others	(Haller *et al* 2021)
	Bourgeoisies	(Haller *et al* 2021)
	Bürgergemeinden	(Haller *et al* 2021)
	Patriziati	(Haller *et al* 2021)
	Korporationen	(Haller *et al* 2021)
	Privatrechtliche Körperschaften (Flur-, Bach-, Alp-, Meliorationsgenossenschaften, Geteilschaften in the Valais)	(Haller *et al* 2021)

Appendix C.

Country	N° of CLOI	Main land use for owned/managed land	Land use categories and surface		
			Agriculture	Forest	Pasture and meadows
Austria	1) Official Statistics a) 3046 registered public-law peasant corporations (no differentiation according to land use) (Statistik Austria 2020) b) 2654 pasture CLOIs (2375 alpine, 279 non-alpine) (BML 2023); these partially overlap with the 3046 public-law corporations 2) Other sources a) 253 user-rights based pasture CLOIs (Almwirtschaft Österreich 2020); these overlap with the 2654 pasture CLOIs but not with the 3046 public-law corporations Unknown number of - unregistered public-law corporations - of CLOIs not applying for EU subsidies - cooperative and municipal CLOIs - user-right based forest CLOIs	- Pastureland - Forests - Land above the treeline	No data found on common ownership/use of arable land	388 152 ha owned by CLOIs, 94 500 ha owned as *Gemeindegut* = 482 652 ha (excluding forest owned by the Austrian state or other public entities that are not the local municipalities), 12.86% of total forest cover (data from 2021)	*Data on CLOI ownership in alpine pastures from 2009* (BMLFUW 2009): 268 518 ha common alpine pasture = 59.7% of all alpine pasture in 2009 (449 981 ha)

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Country	N° of CLOI	Main land use for owned/managed land	Land use categories and surface		
			Agriculture	Forest	Pasture and meadows
France	No official statistics. Estimations only for one category of commons (*sections de commune* for all of mainland France): 30 852, representing more than 300 000 ha; in the alpine departments alone: 1274 *section de commune* (DGFIP, 2023; VALCOM, 2024)	- Pastureland - Mainly forests and woodlands - Agricultural land - Quarries	No data available for the French Alpine space of collectively governed arable land.	2019 ha (sections de commune's forest); 0.13% of forest surface in the northern Alpine region (ONF, 2020).	No data available
Germany*	Official statistics: 1535 units of Gemeindewald (municipality forest) of which 922 are in Swabia District, 613 are in Upper Bavaria District; 41 Gemeinschaftsforsten (community forests) of which 29 in Swabia and 2 in Upper Bavaria Districts (official statistics 1961 for total Bavaria, published by Statistisches Bundesamt 1966); Other sources: 453 units of Almen/Alpen (all in the Alpine area) of which 31 are Gemeindealmen/-alpen (municipal and community alpine pastures), 81 Genossenschafts-Almen/Alpen (cooperatives), 194 Gemeinschaftsalmen (Community Almen/Alpen) (official statistics 1976, published by Englmaier *et al* 1978)	- Pastureland - Forests	No data available	Gemeindewald (municipality forest): 46 913 ha in Swabia and 17 179 ha in Upper Bavaria, Gemeinschaftsforsten (community forests): 9236 ha in Swabia, 58 ha in Upper Bavaria ha (official statistics 1961 for total Bavaria, published by Statistisches Bundesamt 1966);	No data specifically on Almen/Alpen CLOIs (the total number of all private, state owned and CLOIs Almen/Alpen was 1258 with 125 181 ha). An estimate considering that 35.6% of the number of Almen/Alpen were CLOI is that at least 45 000 ha of the pastureland are CLOIs'. CLOIs often own larger areas than private owners (cf. Ringler 2009, 429).

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Italy*	Official statistics: 1173 CLOIs (ISTAT 2020). Secondary data: 2183 CLOIs.	- Pastureland - Forests - Agricultural land - Quarries	2339.97 ha (arable land), 1.92% at national agricultural land	118 880 ha (National Forest Inventory, 2015, category 'Other private agencies'-'forest area'), 1.3% of the national forest area	244 981.16 ha (ISTAT, 2020), 7.81% of national pastureland
Slovenia	No official statistics 638 (estimation based on Premrl 2013). 121 entities documented specifically for the alpine and mediterranean regions in 2023.	- Forests - Pastureland - Agricultural land	No data available	28 454.56 ha 2.4%–3% of national forest surface (correspondence with Petek in 2021), regionally it could be over 20% (Kozorog and Leban 2023)	7143.59 ha; 87.5% of pastures surface at the national level (Ministry of agriculture forestry and food of the republic of Slovenia—MKGP)
Switzerland	No official statistics about 1650 public-law corporations (estimation based on a survey of the SVBK in 2023)	- Pastureland - Forests - Agricultural areas	No data available	462 000 ha; 35% forests at national level WaldSchweiz (2021)	209 475 ha; 45% at national level (rough estimation, since 45% of the stocking (livestock units) is allocated to cooperatives, simple partnerships and public-law corporations

Appendix D. Number of CLOIs, land use surface of CLOIs compared to national land use categories, organisational types and main harvested resources are displayed for each analysed country. Land use categories are based on the land use categories of the CLOIs. *It was not possible to differentiate statistics for mountain and lowland areas in Italy and for the German and Austrian forest areas. Further details are provided in appendix C.

Country	N° CLOI (official stat)	Type of CLOI	Year	Source	N° CLOI (other sources)	Type of CLOI	Year	Source	Arable land			Pastureland			Forest			Total (ha)
									CLOIs surface (ha)	Year	Source	CLOIs surface (ha)	Year	Source	CLOIs surface (ha)	Year	Source	
Austria	3046	registered public-law peasant corporations	2020	Statistik Austria (2020)	253	user-rights based pastures	2020	Almwirtschaft Österreich (2020)	No data	/	/	268 518	2009	BMLFUW, Almstatistik	482 652	2021	Waldbericht	753 179
France	/	/	/	/	1274	Sections de commune	2023–2024	DGFIP, VALCOM	/	/	/	/	/	/	2019	2020	ONF	
Germany	1566	Gemeindenwald and Gemeinschafts forsten	1966	Forsterhebung 1961 (Statistisches Bundesamt 1966)	453	Alemn/Alpne	1966	Almerhebung 1976: Englmaier 1978, 28 and table 1; Ringler (2009), 417ff.)	No data	/	/	/	/	/	73 386[c]	1961	Forsterhebung 1961 (Statistisches Bundesamt 1966)	73 386[c]
Italy	1173	All	2020	ISTAT	2183	All	Multiple	Literature (Regional offices + sci-entific literature)[b]	2339	2020	ISTAT	244 981	2020	ISTAT	118 880	2015	National Forest Inventory	370 240
Slovenia	/	/	/	/	638	All	2013	Premrl paper	/	/	/	7143	2021	Ministry of agriculture, forestry and food of the republic of Slovenia—MKGP	28 454	2021	Comm. Petek	41 213
Switzerland	/	/	/	/	1650	public-law corporations	2023	SVBK	No data	/	/	209 475	2020	BWL (estimate)	462 000	2021	WaldSchweiz	671 475

[a] Includes arable land.

[b] (Moneta and Parola (2014), Daici (2021), Barale and Valcanover (2021), (Associazione provinciale delle Amministrazioni Separate di Uso Civico 2021), (Provincia Autonoma di Bolzano 2024), Louvin and Alessi 2021, (Regione Lombardia 1997), Veneto Agricoltura (2020)) www.provincia.bz.it/agricoltura-foreste/bosco-legno-malghe/bosco-in-alto-adige/categorie-di-propriet.asp.

[c] Value for the CLOI forests in the administrative Districts of Swabia and Upper Bavaria (40% of the area of these Districts make up the German Alpine Convention area).

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