

# What are participants of cow sharing arrangements actually sharing? A property rights analysis on cow sharing arrangements in the European Alps



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## ABSTRACT

Sharing seems to experience a fashionable renaissance nowadays. It appears as though we are constantly involved in sharing activities in our daily physical and digital lives. Images, feelings or thoughts are shared on social media platforms; we share cars (e.g. Zipcar), bikes, homes and beds (e.g. Airbnb and Couchsurfing), money and other resources (e.g. Wemakeit and Kickstarter). These different practices, their impact and adjoining conceptual frameworks are controversially debated within the Smart City Debate and the Sharing Discourse (e.g. tourism phenomena related to Airbnb). ‘Sharing’ emphasizes the utilization of underused resources and the shift from owning things or goods to sharing them. So far, less attention has been paid to ‘new’ sharing models or approaches in rural contexts. In this article we take a first step by mapping and comparing ‘cow sharing’ arrangements within the European Alpine Region as one of such rural and digitally mediated formats of sharing practices. 60 cow sharing arrangements in five countries (Switzerland, Germany, Austria, France, Italy) are mapped and investigated through the lens of property rights (Schlager and Ostrom, 1992) and the sharing paradigm. Farmers’ main motivation to enter sharing arrangements are the direct marketing of high-quality products and the intensified social relations with tourists and consumers. The analysis of the cow sharing arrangements shows two different types: (i) ‘authorized users’ and (ii) ‘withdrawal-focused crowding arrangements’, that illustrate new farmer-consumer (share giver-share taker) relations which are mediated by digital platforms. They share different bundles of rights, mainly withdrawal (e.g. milk, cheese, meat) or access rights (e.g. cow visits, exploring Alpine pastures/farm), while share takers hold all management, exclusion and alienation rights while also bearing the major risks and obligations within the sharing arrangement.

## 1. Introduction in cow sharing and other web-based farm animal-sharing arrangements

This research is inspired by the question of what participants in cow sharing arrangements are actually sharing. Cow sharing in this article means that farmers (share givers) ‘share’ — via the internet — a cow and cow-related goods or experiences with other individuals, who are generally non-farmers (share takers). Farm animal sharing arrangements in the digital age, which can involve sheep, goats, bees, cows or pigs, have emerged over the last ten years in different areas worldwide, including the European Alpine regions. These animal sharing initiatives promise consumer goods (i.e. dairy products, meat), and some also offer

on-farm visits or the participation in farm-related activities or activities on the seasonal Alpine mountain pastures. While Alpine pastures are in general publicly accessible (e.g., Switzerland) or at least accessible (restricted to) the path-system (e.g., Austria), non-farmers usually do not have rights to access cows or cattle herds in stables or barns.

Alpine pastures are traditional socio-ecological systems that provide societally much appreciated services, such as dairy products, pharmaceutical resources, renewable and mineral raw materials. They are genetic reserves of biodiversity and places of recreation for mountain dwellers and people from outside the Alpine regions (Huber et al., 2013). Furthermore, the small patterned and mosaic landscapes of the Alpine region are a crucial part of the European landscape and Alpine

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identity (Kühne, 2013), which is mediated - and alienated at the same time on many traditional paintings, clothes or advertisements for products such as cheese, milk or chocolate. However, changing conditions (e.g. economic, climate, institutional) are impacting the Alpine land-use system and consequently the capacity of Alpine ecosystems to provide such services (Huber et al., 2013; Schirpke et al., 2013). Despite various policies, strategies and development programs, such as the Alpine Convention (EUSALP), an EU cross-cutting macro-regional strategic policy agenda, or Alpine Space, a European transnational cooperation program financed by the European Regional Development Fund, land abandonment still is a pressing issue in several parts of the Alps. As a consequence of structural transformations in agriculture, demographic changes and aging farm populations, land abandonment can result in biodiversity loss, soil erosion, loss of cultural and/or aesthetic values, reduced landscape diversity, reduced provision of freshwater, and other undesirable environmental effects (Beilin et al., 2014; MacDonald et al., 2000; Rey Benayas, 2007).

While popular web-based sharing arrangements in urban contexts (such as car- or bike sharing, Airbnb) and their impacts have already been critically discussed in academic discourse (McLaren and Agyeman, 2017; Murillo et al., 2017; Stemler, 2016), there is a clear gap in literature regarding rural 'sharing economy' practices that emerged alongside this 'sharing economy' wave facilitated by new information and communication technologies. With this article, we are investigating one variety of 'animal sharing' formats: cow sharing. From a property rights perspective, we want to understand if cow sharing arrangements – on top of goods and experiences consumed by the share takers – support the provision and conservation of common assets, such as cultural Alpine landscapes as protected by Alpine treaties. Thus, the goal is to understand if cow sharing arrangements hold the potential of a sustainable resource governance system that supports the conservation of Alpine landscapes and their ecological and social functions. Therefore, our analysis of current cow sharing arrangements in the European Alpine regions is based on Schlager and Ostrom's conceptual framework of property rights (Schlager and Ostrom, 1992), which is an unconventional lens within the sharing discourse.

We aim to answer the following questions, following the rationale that accountable resource governance formats are based on the allocation of benefits and the participation in decision-making processes regarding the resource (Berkes, 2010; Lemos and Agrawal, 2006; Ostrom, 2015):

- i) How can cow sharing be positioned within the sharing discourse?;
- ii) Which (bundles of) rights, obligations and risks do cow sharing participants share in the different organizational arrangements and practices?;
- iii) Which cow sharing arrangements might hold the potential for resource governance systems that go beyond the exchange of consumption goods for money and foster the long-term provision of ecosystem services from Alpine grasslands?

We begin by discussing, linking and operationalizing the conceptual frameworks of sharing and property rights, and have a closer look at Alpine treaties and the ecosystem services they strive to protect. This is followed by a description of data collection and analysis methods in chapter 3. In chapter 4, we are presenting and discussing different types of cow sharing arrangements and their relation to the sharing paradigm and property rights. In the conclusion, we answer the question of whether cow sharing arrangements as new resource governance formats are supporting the provision and conservation of common Alpine assets.

## 2. Unfolding debates around sharing, property rights and alpine treaties

### 2.1. Sharing paradigm

Sharing needs at least two individuals or organizations that either simultaneously or sequentially use resources or goods (i.e. farms, pastures, grazing land, animals, water, cars, technology), spaces (i.e. common meadows, gardens, city spaces) or intangibles (e.g. knowledge, experiences, skills) (Belk, 2007; Milanova and Maas, 2017; Price and Belk, 2016; Rudmin, 2016). Pooling and 'sharing' resources is nothing radically new – on the contrary, it is a longstanding and ubiquitous practice all over the world, whereas the exclusive possession and use of resources has always been relatively rare (Rudmin, 2016). Pooling food resources, exchanging and sharing them among community members and between communities as every-day or festive practice are practices observed in various societies (Jehlička and Daněk, 2017; Marsoner et al., 2018; Mauss, 1954; Price, 1975). Sharing and pooling animals to common herds or pairs for ploughing and sharing the benefit and burdens related to the management of common pastures have been routines in present and past communities (Chomba and Nkhata, 2016; Ebersbach, 2012; Natcher et al., 2005). Also, lease and sharing arrangements are not entirely new. Herd sharing gained considerable popularity in the US. Selling and purchasing raw milk is prohibited in most states, however entering a herd sharing arrangement allowed one to obtain raw milk if one turned in to a cow-shareholder (Little, 2006; Mayer, 2015). Different variations of cattle or calf share agreements, cash-lease or crowdfunding arrangements exist (e.g. USA, Indonesia, South Africa), where ownership and management of a herd is shared by different parties and arranged via agreements that can cover immovable (e.g. pastures, dairy, farm buildings) and/or movable (e.g. cattle, calves) goods. Considered advantages are risk and profit sharing that allows new farmers to start or expand a herd, or in the case of upcoming retirement allows them to phase out or stop a herd. Coming to equity-based agreements is considered as an important part of those sharing arrangements (Berger, 2015; Livestock Wealth, 2019; Nono et al., 2018; Radke, 2018).

This new interpretation of 'sharing' is a trending topic, around sharing economy or sharing paradigm concepts that emerged along with the Smart City Debate (Alizadeh, 2018; McLaren and Agyeman, 2017; Zvolaska et al., 2018) and Sharing Economy Debate. In these debates 'sharing' is a container term addressing different economic activities that involve online transactions via web-based platforms (Taeihagh, 2017). Other scholars (Bardhi and Eckhardt, 2012) are taking a critical stance, they are stressing the social dimension of sharing among people who know each other, supporting community identities and putting less focus on economic advantages and profit. In their rational, 'sharing' turns into 'access' when the activities are market-mediated and participants do not know each other. We see that the proliferation of sharing practices, overlapping and ambiguously used terms and fuzzy and multifaceted academic discourses characterize the so-called discourses on 'sharing-turn' (Grassmuck, 2012; McLaren and Agyeman, 2017) or 'sharing economy' (Price and Belk, 2016). Morgan (2018) distinguishes two main clusters in the complex and asymmetric discourse: one which follows a commercial narrative of a sharing economy and the other, a social science related one, which draws on a solidarity-inflected narrative. Commonalities of both clusters are their accolade of economic agency to regulatory responses (Morgan, 2018). Sharing activities can be based on various forms of compensations reaching from monetary market exchange, bartering, tendering to gift giving (Belk, 2014a; Schor and Fitzmaurice, 2015;

Sundararajan, 2016).

### 2.1.1. Distribution of resources and access rights

Martin (2016) illustrates that sharing 'in the digital age' mainly addresses four major assets: (1) sharing accommodations; (2) car and ride sharing, (3) peer-to-peer employment markets and (4) peer-to-peer platforms for sharing and circulating resources (Martin, 2016). Thus, providing access to underused resources is a core argument in the sharing debate. But, intangibles are also shared. 1.47 billion daily Facebook users (Facebook, 2018) share "What's on your mind" updates, memories and more than 219 billion photos (Ionescu, 2012) — data — which Facebook turns into economic profit by commodifying such 'shared' information for marketing or other purposes such as political profiling (Cadwalladr and Graham-Harrison, 2018). The discourse illustrates that sharing emphasizes the (quick) access to resources and the allocation of associated access rights.

Sharing can be a permanent reoccurring practice, or it can occur just once as a single act. Traditionally, sharing was separated from market exchange (Martin, 2016). In the sharing economy discourse, scholars advocate that sharing and market-based exchange practices are no antagonists. They argue that a broad variety of hybrids of sharing formats emerge at the interstices of market and non-market economy (Jenkins et al., 2013; Scaraboto, 2015). Collaborative networks that are linking people who want to contribute to a transition towards more conscious consumption practices (Scaraboto, 2015) can, however, also be seen as a possible niche innovation that might transform the hegemonic economic regime (Martin, 2016) or a novel pathway to sustainability. Mozorov (2013) criticizes that "the advocates of the sharing economy invite us to imagine it as a feel-good-utopia that, while fully compliant with market logic, is driven by the altruistic spirit (...)". Following this interpretation, the 'sharing economy' might misappropriate traditional positive perception and the ethical dimension of sharing. Nevertheless, there is an increasing body of literature, especially from social scientists, exploring solidarity-inflected forms of sharing that address inequality and sustainability (Schor, 2017; Schor et al., 2016), intentional de-growth and togetherness (Jarvis, 2017).

### 2.1.2. Motivations to engage

Prior research shows that social concerns distinguish solidarity-inflected forms of 'true sharing' committed to societal and environmental justice from 'pseudo sharing' for mainly economic reasons (e.g. Mair and Reischauer, 2017 for accommodation sharing) (Belk, 2014b, 2014a; Mair and Reischauer, 2017). Sharing might establish, maintain or break up social ties between individuals and/or groups (Godelier, 2011; John, 2013; Mauss, 1954): 'sharing in' (within a group, family, peer group, friends) describes sharing within a community, while 'sharing out' refers to sharing practices that occur among strangers (Milanova and Maas, 2017; Parente et al., 2017). According to Ostrom (Ostrom, 2000, 1999), small homogenous communities with a high sense of community, social capital, mutual trust and dependency on the resource will more likely succeed in producing norms and institutions for collective resource use. The socio-cultural perception of sharing is rooted in a community's perception of values, benefit distribution and access to resources (Bardhi and Eckhardt, 2012; Chomba and Nkhata, 2016; Nkhata et al., 2008). This socio-cultural dimension is the basis for fostering relationships, community building and trust between the participants in sharing arrangements (Rosenbaum and Massiah, 2011). Martin (2016) supports this with his analysis, illustrating diverging and even conflicting 'bottom-up' and 'top-down' sharing narratives. In 'bottom-up' narratives, grassroots or niche actors advocate sustainable forms of consumption, socio-cultural and environmental values, justice and sustainability. Regime ('top-down') narratives put the spotlight on

commercial assets, economic opportunities and the perks of less- or non-regulated marketplaces. Those two perspectives might mark the two ends of a spectrum of different sharing practices and narratives. However, they might also be seen as conflicting approaches, given that especially the grassroots' narrative reprehends the commercialization and commodification of every aspect of life as a consequence of the sharing turn which creates new unregulated marketplaces with detrimental social effects (Mozorov, 2013; Murillo et al., 2017).

### 2.1.3. Technology and web-based platforms

A strong faith in technology and web-based solutions are common denominators in the sharing and smart cities debate (Bibri and Krogstie, 2017; Trindade et al., 2017) which are also – at least partly – encountered in cow sharing arrangements. The 'digital age' has introduced the internet and web-based platforms as new media for transactions and interactions between actors who do not need to know each other beforehand. The proliferation of web-based services, affordable digital services and digital appliances (e.g. smartphones) opened up new opportunities for online and offline formats on collaboration and interaction (Michelini et al., 2018), economic activities (Wittel, 2011) and connectivity that reaches beyond traditional territorial and community settings. Various digital non-commercial and commercial platforms and intermediaries are organizing and facilitating the contact between the involved individuals. A major advantage discussed in literature is the matching aspect of those platforms, which easily links individuals to find their appropriate counterpart. However, social qualities which inevitably occurred in 'traditional' sharing formats of the pre-digital age do not necessarily emerge in 'digital age sharing economy' practices. Digitally shared resources (i.e. distributed computing) do not establish or nurture any social ties or relationships between the involved individuals, even though they share resources (Wittel, 2011).

## 2.2. Property rights

Based on the information provided on web-based platforms, we conceptualize cows in cow sharing arrangements as a common pool resource. Common pool resources are characterized by two main traits: i) subtractability (the individual's resource subtracts from the amount available for others) and ii) difficulties in excluding others from using the resource (Acheson, 2011). Different combinations of rules, norms and strategies govern the management of resources. Rules are structuring interactions by allocating obligations and risks, changing pay-offs, opening or closing access to flows of resources and determining how and when they are harvested, captured or used. Managing common pool resources must involve rules to manage and control the access (without access boundaries it would be an open access good) and rules to govern the use and exploitation of the resource. McGinnis (McGinnis, 1999) emphasizes the importance of rules that must correspond with the physical environment and the community characteristics. Rules are crucial because every property right is emerging from rules or combinations of different rules and is linked to particular duties (Ostrom, 2003).

Schlager and Ostrom (1992) differentiate between two main groups of property rights (see Fig. 1): (i) Operational Level Property Rights and (ii) Collective Choice Property Rights. Property rights are independent of each other and can be allocated individually or in different combinations, so-called 'bundles of rights'. Individuals or communities that only hold operational level property rights are not involved in the collective choice and decision-making of the resource management (Ostrom, 2009, 2003; Schlager and Ostrom, 1992). The combination of different property rights establishes five different types of share takers:

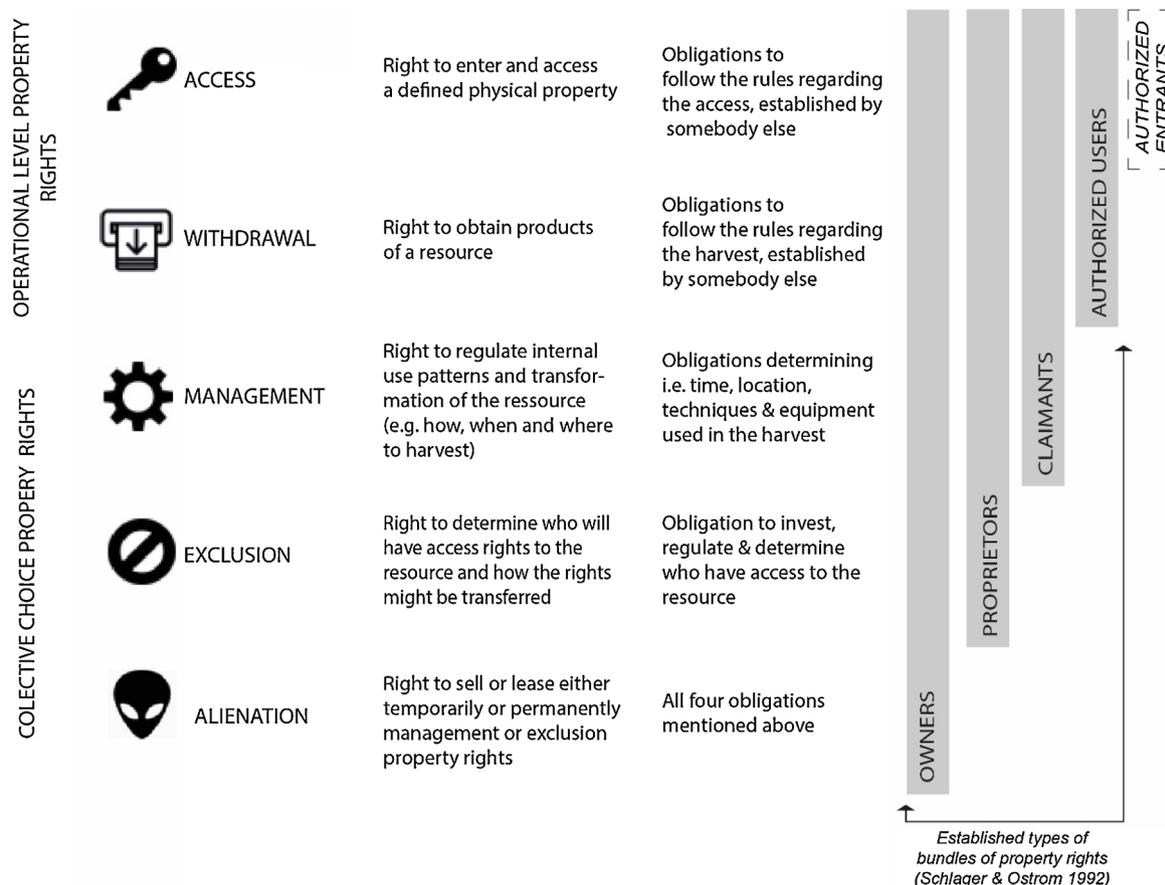


Fig. 1. Property Rights, related rights, obligations and types of property right holders (Ostrom, 2009, 2003; Schlager and Ostrom, 1992). With respect to the four established types from Schlager and Ostrom, the property that one cow sharing case might indicate a group of 'authorized entrants' that only have the right to enter and access a physically defined physical property and in the case of cow sharing access to a farm (farm visit) and/or cow herd.

Table 1

Policies and Programs for the European Alpine region mapped against the ecosystem services framework. The mapping is based on the Millennium Ecosystem Assessment Convention concerning the Protection of the Alps. Place of adoption: Salzburg, Austria; EU strategy for the Alpine region core document, EUSalp Action Plan, Alpine Space Program (Alpine Convention, 1991; European Commission, 2014; EUSalp, 2014; Millennium Ecosystem Assessment, 2005).

	Alpine Convention	EUSalp	Alpine Space
Provisioning services:			
Food	x	x	x
Fresh Water	x	x	
Fibre (including timber, fuel)	x	x	x
Genetic resources	x	x	x
Biochemicals, natural medicines, pharmaceuticals			
Regulating services:			
Air quality regulation	x	x	
Water regulation, water purification and waste treatment	x	x	
Climate regulation	x	x	x
Erosion regulation	x	x	x
Pest and disease regulation			
Natural hazard regulation	x	x	x
Pollination			
Cultural services:			
Recreation and ecotourism	x	x	x
Spiritual and religious values	x	x	x
Aesthetic values	x		
Education	x	x	x

(i) authorized entrants who have a right to enter the resource with an obligation to follow the rules – i.e. paying a fee for obtaining access rights) and (ii) authorized users who also have the right, based on the rules that were established by somebody else, to use the resource and obtain products of the resource. Claimants (iii) and Proprietors (iv) are also involved in the collective choice and decision-making of the resource. Claimants have decision-making rights on the regulation of internal use patterns and transformation of the resource, including the specification of withdrawal rights. The right to regulate access and transformation or the obligation to invest are added to the bundle of rights of the group of proprietors (iv). Owners (v) hold all four previously mentioned rights as well as the right to lease (temporarily or permanently) or sell one, some or all other rights (alienation). Exclusion and alienation rights establish strong incentives for investing in and conserving the resource in a long-term perspective. Claimants and authorized entrants and users have the right to use the resource to a different extent, but due to their exclusion from decision-making they have little reason and incentive to invest into the resource.

2.3. Policies and programs for the alpine region and ecosystem services

The ecological and socio-cultural assets and amenities of the Alps are considered so important that they are protected by several international treaties. The Alpine Convention (Art. 2) pursues "a comprehensive policy for the preservation and protection of the Alps (...) through the prudent and sustained use of resources" (Alpine Convention, 1991). The EU's macro-regional strategy for the Alpine

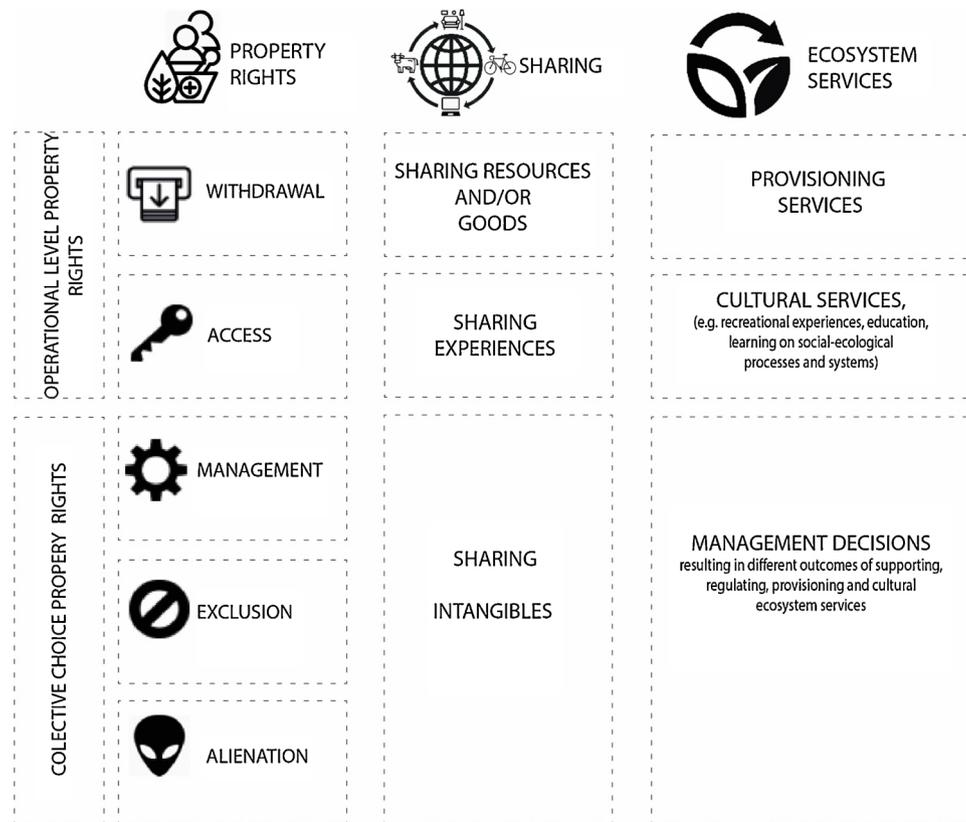


Fig. 2. Linking property rights, sharing and ecosystem services.

Region (EUSalp) advocates “an innovative and sustainable model of development that is able to conciliate the promotion of growth and jobs and the preservation of natural and cultural assets.” (EUSalp, 2014; EUSALP, 2009). The Alpine Space Program under the priority ‘Liveable Alpine Space’ focuses on “the unique natural and cultural heritage of the Alpine region and how to best valorize and protect it.” (European Commission, 2014). Table 1 provides an overview of Alpine ecosystem services (Millennium Ecosystem Assessment, 2005) which are supported and protected by the Alpine policies. An analysis of the Alpine Convention with regards to the ecosystem services identifies the diverse Alpine services protected by the Alpine treaties (Table 1).

Alpine areas provide provisioning services (freshwater, food and fibre), regulation services (erosion or natural hazard regulation and water purification) and cultural ecosystem services (recreational and learning experiences, aesthetic and spiritual experiences) (Anderson, 2015). Supporting services, such as soil formation or nutrient cycling, ensure the production of all the other ecosystem services (Anderson, 2015). As supporting services are not directly used by people (Millennium Ecosystem Assessment, 2005), they are not mapped in Table 1. The socio-ecological pasture systems differ regarding their context-specific practices, impacts, use of knowledge and resilience across the Alpine regions and farms. Anderson (2015) argues that participatory knowledge exchange and self-organization are key for the adaptability of socio-ecological food systems to pressures and changes, and that those that are adapted to local constraints and assets and that intentionally use and preserve ecosystem services result in lower environmental impacts.

We assume different links between the concept of property rights,

sharing literature and types of ecosystem services. Access rights allow for the sharing of experiences, awareness raising and learning on socio-ecological processes and systems (see Fig. 2). Dairy products are shared via withdrawal rights. Management, exclusion and alienation rights are about decision-sharing rights and thus intangibles which, however, can have impacts on physical resources. Sharing agreements do not only regulate rights, but can also allocate duties such as work (in the case of cow sharing: milking, cheesemaking, Alpine pasture mowing/clearing shrubs), costs (e.g. for feed or fencing) or risks (e.g. illness or death of cow). The rights and duties that are shared among which participants and for which duration can be defined in a written or oral contract (Nono et al., 2018).

### 3. Material and methods

In line with the goal of analyzing web-based sharing initiatives, the case selection and initial data collection has been based on a digital investigation (September-December 2017). Using the Alpine region as a case study area is owed to two facts: a) the management of Alpine pastures is a prerequisite for maintaining the Alpine landscapes and associated ecosystem services, b) Alpine regions based on the policy agenda provide a clear case study boundary within one mountain range, common trans-national policy frameworks with a significant cultural identity, including the culture of farming, cheese making and recreation/tourism. The internet-research focused on cases located in the area of at least one of the three European Alpine policies: (i) Alpine Space, (ii) Alpine Convention or (iii) EUSALP (see Fig. 3)

The case selection was facilitated via three different web search

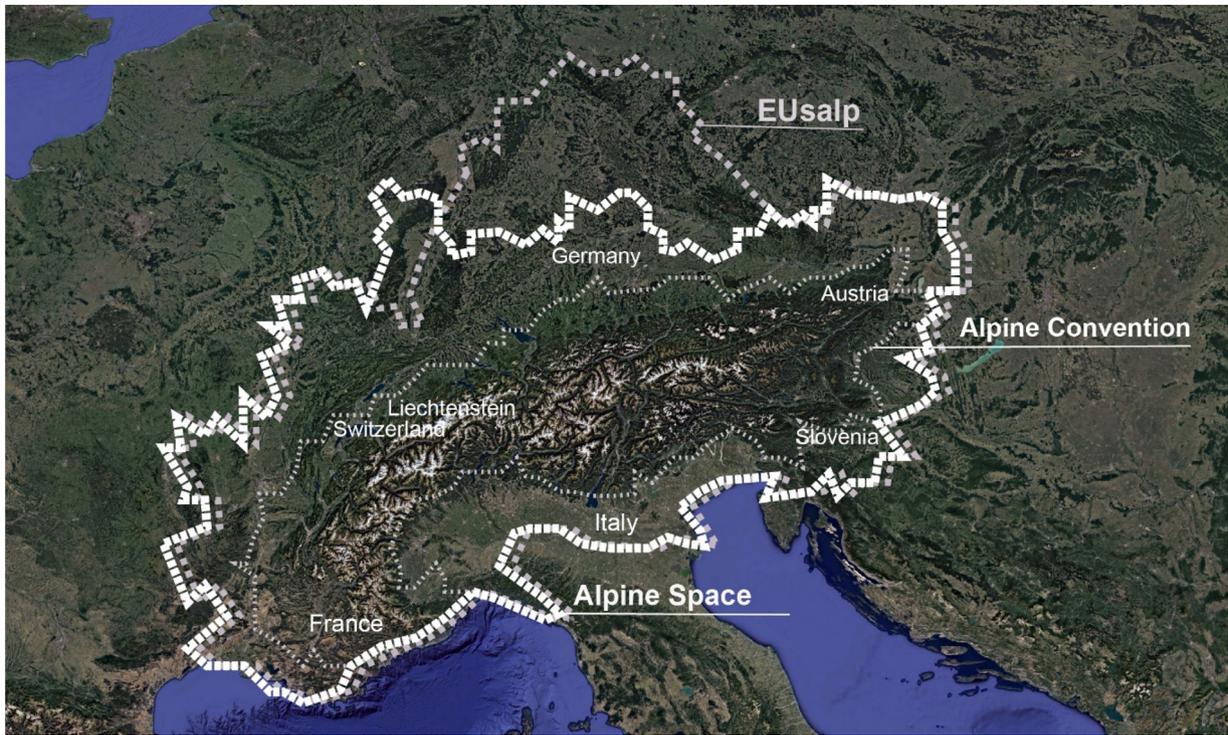


Fig. 3. Outline of the case study area including the delineation of the three core policy areas, EUalp, Alpine Convention and Alpine Space.

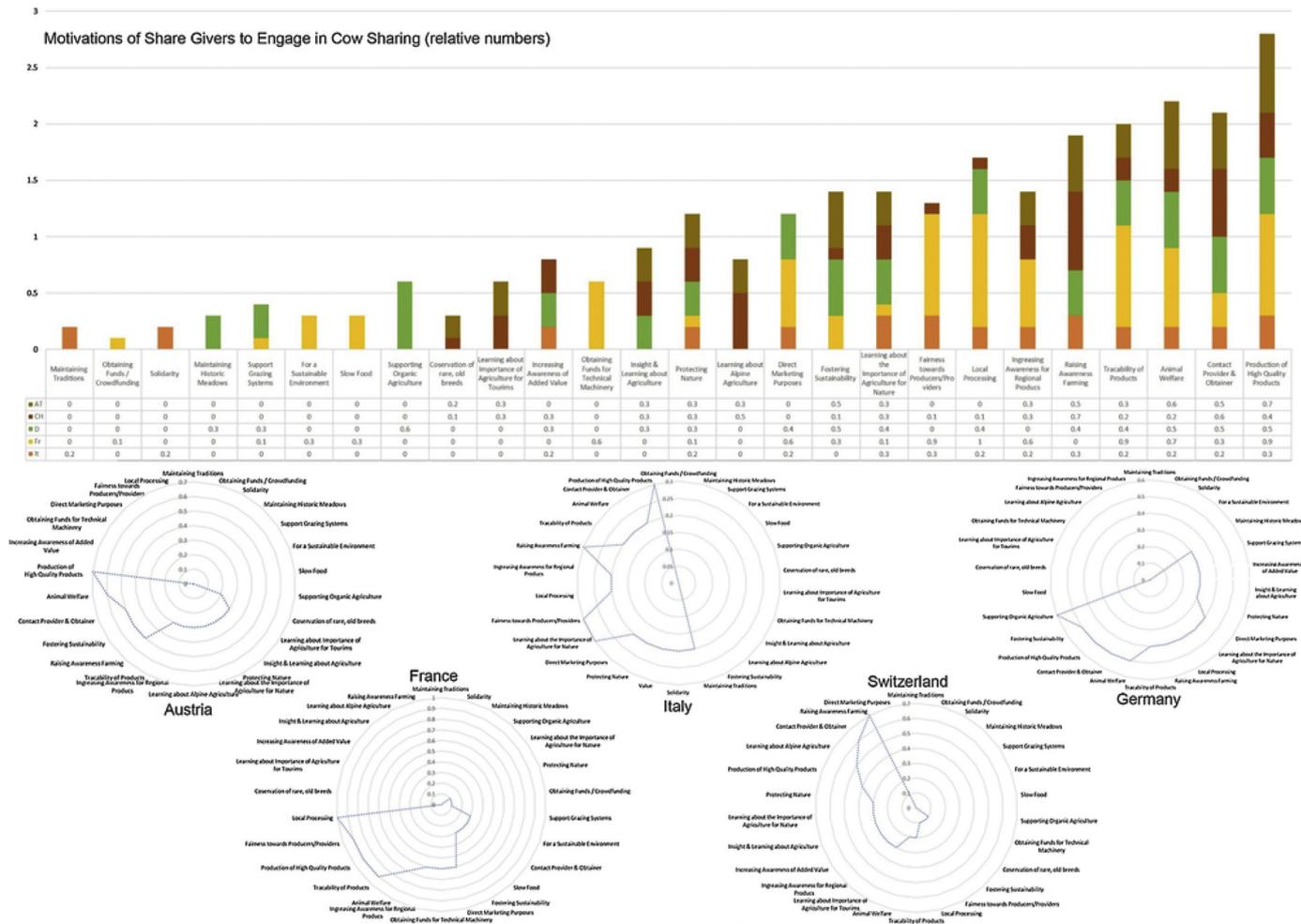


Fig. 4. Share-givers stated motivations to engage in cow sharing, & share of analysed cases (relative numbers).

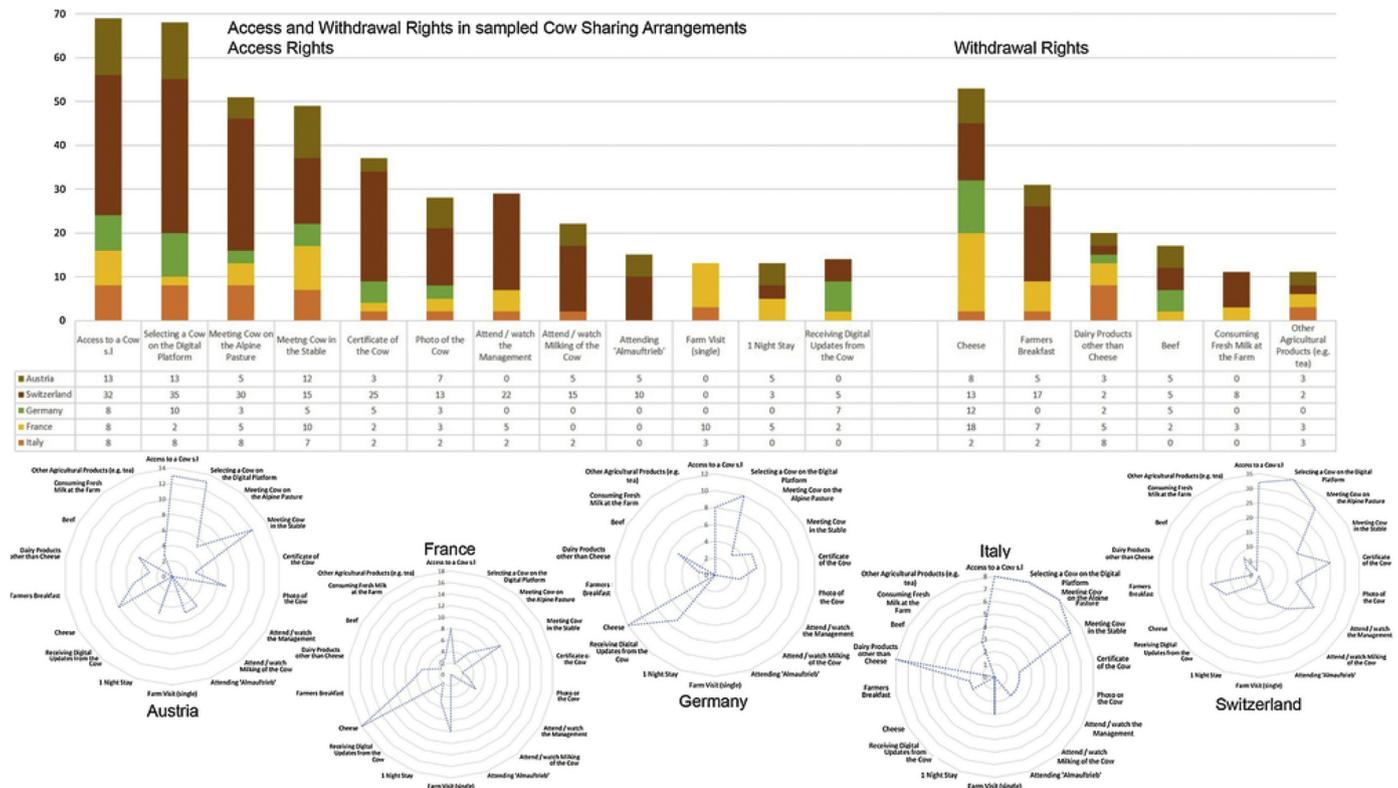


Fig. 5. Access and Withdrawal rights (100% represents all 60 cases analyzed).

engines (Google, Bing, Yahoo) using language specific key words: for Germany, Austria, Lichtenstein, German speaking regions of Switzerland and Italy (Kuh + mieten, kuhforyou, Kuh + Patenschaft, Kuh + Leasing, Crowd Cow, Crowd Butchering), for Italy and the Italian part of Switzerland (Adottare una mucca, Adozione a distanza), for France; Monaco and French part of Switzerland (Parrainage de vache, Devenir parrain d'une vache) and for Slovenia (deliti si kravo, najeti kravo, lizing krave). Based on these search words, we identified cow sharing platforms in all Alpine countries except three (Slovenia, Monaco and Liechtenstein).

Inactive or dormant initiatives with outdated websites were excluded from the sample, as well as initiatives that advertised themselves as sharing initiatives but turned out to be charity campaigns for animal sanctuaries. In the end, 60 schemes offered by 26 farms or intermediaries (such as tourism- or crowdfunding platforms) were included in the sample and related data was inserted into an excel database. The data collection included two consecutive steps:

(1) data provided by the service's share givers' website or web platform were mapped: a) general data (i.e. name, contact details, year of foundation, motivation for foundation, source of information – link to websites), b) share givers' motivations for engaging in sharing networks, c) bestowed property rights which was differentiated into access, withdrawal, management, exclusion and alienation, d) obligations and duties of the different share takers; e) risk sharing and f) contracts or other institutions that are outlining the distribution of rights, obligations and risks for the share takers;

(2) since the online information regarding e) and f) was very limited, all 26 farms and intermediaries were contacted via the platform or email in their local language. We approached the share giver 'incognito' without revealing our university background and asked for additional

information and contract samples in order to get a better idea on the general terms, rights, duties and responsibilities to enter a cow sharing arrangement. The return flow was very low: eleven initiatives responded to the request, of which three provided the requested information, while the rest referred to the web platform and did not provide any additional information even after a follow-up request. The mapped data were transferred into descriptive tables and in a second step into a contingency table, which was further processed in two ways: (i) frequency calculations were conducted via Pivot Tables, and (ii) sharing initiatives were sorted regarding common characteristics. Results from the sorting and Pivot-tables were analyzed, discussed and contextualized through the lens of property rights theory and the sharing framework.

#### 4. Results

##### 4.1. Characterization and comparison of mapped cases

The 60 cases identified are allocated across Switzerland (22), France (13), Austria (11), Germany (8) and Italy (6). Our sample shows that all share takers have the obligation to pay an access fee, which is either established for a certain time period (week, months, quarter of a year, etc.) or withdrawal-based (amount of goods to be withdrawn from the resource). The digitally established social relation between the share giver and individual share taker does not evolve into a networked community. The content analysis of the websites revealed various motivations for engaging in cow sharing. Most share giver emphasized the exchange of a possibility to produce high-quality products (also related to animal welfare) and the possible social relationships and interaction with share takers. Other than cow sharing arrangements in



direct ones and those mediated via an intermediary organization, start with the selection of a sharing arrangement and in a second step, the selection of the cow. Fig. 5 illustrates the access rights shared in these arrangements. They provide share takers with the temporary limited right to access the resource (farm, pasture, stable, cow) via arranged farm visits, working events, overnight stays, traditional meals or attending the traditional 'Almauftrieb' or 'Almabtrieb' (a festive traditional event at the beginning and the end of the grazing period on the Alpine pastures, where cows are decorated, embellished and guided in a festive procession to and from the pastures).

Access rights are often coupled with rights to attend, watch or practice different cow management and care activities (see Fig. 5). Apart from physical access, we also identified digital access rights, such as accessing the resource via webcams (limited to the stable) and receiving regular updates (newsletter, email) via the webpage or via email. Although the sharing paradigm is promoting digital services, relations and web-interfaces - aside from 'selecting' one's cow via the digital platform, additional digital access rights are rather rare (< 5% in the investigated sample). Those digital access rights might be crucial since only 30% of the investigated cow sharing arrangements foresee physical access to the resource (see also 4.2).

Withdrawal rights are regulated and communicated via the web-based platforms: cheese and other dairy products are the most common flow resources that authorized users can withdraw from their cow (stock resource). Farmers defined the number of products to be shared beforehand, thus the output is independent from the actual productivity of the cow. Therefore, possible output variability due to health or productivity of 'their' cow is not considered. Farmers do not share risks of reduced or stopped productivity. In case of any causalities and a lower production the share taker's share remains untouched. But in case the cow is more productive, the user cannot withdraw a higher amount of cheese. Withdrawal rights are linked to rules regarding the distribution and consumption of the products. While some cases arrange for direct on-farm consumption (i.e. fresh milk, farmers breakfast at the farm visit), processed dairy products (e.g. hard cheese) must be picked up from the farm or are delivered by postal services. In cases where meat or bones are shared, delivery services are used to ensure a swift and chilled delivery of the beef.

## 4.2. Cow sharing arrangements

All 60 cases were sorted according to the rights shared and the motivations stated on the websites. 59 cases could be grouped in two major types: 'authorized user cow sharing' Arrangements (Group A), and 'withdrawal-focused crowding' arrangements (Group B) (see Fig. 6). While the first one is characterized by a solid set of access and withdrawal rights, 'withdrawal-focused crowding' (B) shows closer proximity to equity-based or reward-based crowding models. The Italian case 'Adotta un Mucca APT Trentino' (case record 55) is fragmented and does not belong to the other two.

### 4.2.1. Authorized user cow sharing arrangements

These involve 43 cases covering Germany, Switzerland, France, Austria and Italy (see Fig. 6: group A, sequence numbers 1–43). Two or more individuals share access and withdrawal rights (mainly cheese) to the same cow over the same time period (simultaneous sharing) or in consecutive periods (sequential sharing). The group is characterized by a set of access rights: individuals can obtain (general) information about different cows and, depending on availability, select one or more cows of their choosing. Visits to the cow in the Alpine pastures provide farming experiences and strengthen the social relationship with the farm family. Hence, while the farmer-consumer relationship is set up

online, it can be strengthened by non-digital personal interaction and experiences. However, the cases also show that these platforms establish loose temporary cow sharing communities as the different share takers are not networked among themselves, but are only connected via the central hub of the share giver.

Two subgroups can be distinguished by their core motivations: traceability, high-quality products, animal welfare and fairness for farmers are motivations stressed by subgroup (A1) (cases with sequence number 1–21 from France, Switzerland and Italy). For the French Cases, 'Slow Food' and 'sustainability' were two additional motivations mentioned on the internet platforms. The second subgroup (A2) resonates with motivations of awareness building and subsequently appreciation and capacity building regarding agricultural production. Cases with this territorial and agricultural management motivations are spatially focused on Alpine pastures in Austria and Switzerland (sequence number 22–43). Share takers can visit 'their' cow(s) on the Alpine pastures, attend and/or participate in different activities with the cow (e.g. milking, cheese making, Alpine pasture clearing). In the subsample of A2a (sequence number 35–43), motivations more specifically include the establishment of consumer-producer relationships, evoking awareness of the production of high-quality and regional agricultural/dairy products, capacity building and learning about Alpine agriculture's importance for conservation, nature and the produced added value. Access rights such as attending the traditional 'Almauftrieb' and 'Almabtrieb' provide share takers with experiences of cultural traditions of the Alpine Region. Intermediaries such as farming communities or cooperatives are the link between the farmer and the user.

### 4.2.2. Withdrawal-focused crowding arrangements (Group B)

Withdrawal-focused crowding arrangements consist of 16 cases (consecutive numbers 44–59 from France, Germany and Austria) and can be described as arrangements focusing on crowdfunding and crowdsourcing and 'withdrawal'. There is only limited or no physical access to the resource. All those cases are related to crowdfunding and crowdsourcing formats: different cows are offered on platforms where the users can choose different packages, either in form of beef (B1) or more 'traditional' alternative goods (e.g. butter), services or experiences related to the crowdfunding investment that is chosen (Fig. 6). The research suggests that sharing property rights is taking a backseat whereas the sourcing of resources is taking the driver seat. Hence, the data suggests that those cow sharing arrangements are close to reward-based crowdfunding arrangements (reward-based crowdfunding involves individuals with different but rather small financial contributions in return for a reward, which normally reflects the extent of contribution; rewards can range from simple thank you notes to a version of the crowdfunded product) and thus embedded in sharing economy frameworks. Digital commercial platforms facilitate the exchange between the share giver and the share taker. The stated motivations of this group's share giver resonate around the topics of fairness towards the share giver, improved traceability of the products and the perceived importance of local processing. Subgroup B1 consists of crowdbutchering arrangements. The share taker can purchase a physical share of a cow of their choosing on the web platform. The moment that all shares are taken, the cow goes to the butcher. The focus is on withdrawal rights in the form of beef, while the access rights are limited to selecting a cow. Record number 54 represents an interesting case of a crowdsourcing format, in which the share taker receives the right to financial annual interest based on the number of shares, which is related to equity based crowdfunding schemes. Subgroup B2 illustrates an even stronger emphasis on collaborative sourcing of financial funds and commercial aspects regarding the setup and equipment for a sustainable resource-oriented production of high quality and regional

**Table 2**  
Relation of cow sharing initiatives to the sharing framework and their possible contribution to Alpine policies and programs.

Property Rights	Sharing Paradigm	Ecosystem Services	Contribution to the objectives of Alpine policies and programs (see also table 1)	Examples from the 60 cow sharing cases identified and analyzed in the European Alps
Withdrawal	Sharing goods/resource flows	Provisioning Service: Food	Alpine Convention, EUsalp, Alpine Space Program	Meat, milk, cheese, yoghurt, raw milk, and drink-yogurt
Access Rights	Sharing experiences	Cultural ecosystem services, recreational experiences, education, learning on socio-ecological processes and systems	Alpine Convention, EUsalp, Alpine Space Program: recreation and tourism, education,	Farm visits and access to a cattle herd or access to a cow, recreational experience, education and learning on the relations between agriculture and nature, learning on the interaction between agriculture and tourism, raising awareness for regional products and mountain agriculture, agriculture in general, maintaining traditions
Management, Exclusion, Alienation	Sharing decisions	Management decisions resulting in different outcomes of supporting, regulating, and provisioning cultural ecosystem services		Sharing experiences, memories, photos, thoughts, feelings, etc. on the initiatives' Social Media Channels such as Facebook, Twitter, Instagram The share takers are not involved and have no rights regarding decisions on the management of the cows, feeding or farming, etc.

agricultural products.

From a property rights perspective subgroup B1 is a particular one, due to the limited availability of the resource based on the lifespan of the cow (share takers are depleting the resource by eating the cow). The withdrawal of meat turns sharing into a single act, due to the discontinued availability of the cow. The analysis suggests that the intermediary platform connecting share taker and share giver is one-directional (providing information for the share taker), and performs the matching function by finding appropriate counterparts for a particular good (e.g. 'Deluxe' beef, organic beef). While the motivations resonate with the group A, access rights are already limited to selecting the cow, from which the meat is to be shared among a group of anonymous share takers. While the set of shared motives is established, the group affiliation of group B (subgroup B1) illustrates an even greater fragmentation of property rights (e.g. access rights). Limited access rights to the animals or the farm are decreasing the potential for delivering cultural ecosystem services such as personal learning or recreation. However, crowdfunding schemes also bear the capacity to deliver cultural ecosystem services indirectly, such as supporting the maintenance of rare or old breeds or the upkeep of traditional pasture system.

## 5. Discussion

### 5.1. Cow sharing through the Lens of sharing theory

Morgan (2018) distinguishes between two main clusters in the complex and asymmetric sharing economy discourse, one following a commercial narrative of a sharing economy and the other, a social science related one, drawing on a solidarity-based narrative. Regarding the narratives transported via the web platforms, the 60 cow sharing arrangements identified in the European Alps align with characteristics of solidarity-inflected forms of sharing. Stated motivations are strongly linked to solidarity, environmental and social concerns. However, different from traditionally non-commercial exchange practices in rural areas, all the web-based cow sharing arrangements are based on a fixed financial contribution by share takers. Whether the cows were indeed underutilized resources prior to the sharing arrangements, which is a foundation of many urban sharing arrangements, seems questionable to us but remains unclear based on the investigated material.

All 60 cases use web platforms for establishing sharing relations among not familiar users (Milanova and Maas, 2017; Parente et al., 2017) and thus can be characterized as intermediated relationships (McLaren and Agyeman, 2017). The digital platforms allow connecting and establishing new farmer-consumer relations that exceed traditional territorial scales of resource governance systems (e.g. regional). However, starting as an anonymous interaction, only a few cow sharing cases offer the opportunity for share taker or share takers to meet in person, either at open days or farm visits. Consequently, regarding evoking and establishing a sense of community, the cow sharing arrangements might fall short since they are only limited options for the share taker to actually share experiences, involvement or knowledge creation in a trans-regional sharing community.

Aligning with Bardhi and Eckhardt (Bardhi and Eckhardt, 2012), our current knowledge almost suggests that the cow sharing practices are focusing less on sharing than on access to a certain resource. Some share givers, however, host or at least participate in social media platforms such as Facebook (e.g. cases 7–9, see appendix), Twitter and Pinterest (e.g. cases 29, 30, 36, 37). Thus, one might argue they are providing at least a digital platform where share takers have the opportunity to connect and share thoughts, experiences, images etc. Nevertheless, cow sharing arrangements that include access rights, such as visiting ones' cow at the farm or Alpine pasture or at open days, establish personal contacts and ties between share giver and share taker (Martin, 2016; Scaraboto, 2015).

## 5.2. Cow sharing through the lens of property rights theory

Table 2 shows that the sampled cow sharing arrangements entail access and withdrawal rights, while management, exclusion and alienation rights usually are not shared. From a property rights perspective (Acheson, 2011; Ostrom, 1996; Schlager and Ostrom, 1992), the share takers identified and analyzed in the European Alps are ‘authorized user’ (access and withdrawal rights), while the smaller group ‘withdrawal-focused crowding arrangements’ show a prevalence of withdrawal rights. Thus, our data provide limited evidence, that cow sharing would fit well into the property rights approach focusing on resource management systems: only one group as ‘authorized users’ could be documented by this research. However, the limited success in that research does not mean that there are other sharing formats. Outside of the study area, other projects such as the ‘Hutanger Project’ at the ‘Hersbrucker Alb’ close to Nuremberg (Germany) involve share takers in the management where share takers are ‘claimants’ (Schlager and Ostrom, 1992) who take care of and feed the herd, check the fences and are involved in the decision-making regarding the management of the cow. One outlier case (record 45) might hint towards a group of ‘authorized entrants’, which would be an additional category in the Schlager and Ostrom’s (1992) typology, in which share takers only have the right to enter and access the resource (e.g. a farm visit) (see Fig. 2). However, given the emphasis on services and the general accessibility of Alpine pastures, gaining access rights and personalized guidance to cow herds and cows supporting general experiences and experiential learning might be of particular importance in such cow sharing arrangements.

In Group B1 we see examples (sequence numbers 44–48) where the focus on the exchange of goods (money, product) appears even more in the forefront. Cows are shared, products are dispatched by postal services and the interaction between share giver and share taker is limited, stopping at the intermediary crowdbutchering platform. With their focus on exchange of products versus money, they might be coined as crowd-farming arrangements in the future, due to their close relation to crowdfunding and crowdsourcing formats instead of resource governance systems. The sourced funds are used for investments in technical machinery or direct marketing (cases 41, 43–47,49). However, the same group is also concerned by solidarity-based narratives on social and environmental concerns (e.g. fairness towards producer, traceability of products).

## 5.3. Cow sharing arrangements’ contribution to the ecological and social assets in the alpine region

The vulnerability of Alpine agro-ecosystems threatened by land abandonment and climate change encourage rural actors to experiment with new food provisioning and resource governance arrangements. Cow sharing arrangements can be understood either as novel pathways to conserve traditional and sustainable agro-food systems (Ermann et al., 2017) or as a commodification of aspects of life that were initially not in reach of marketplaces (Lozano, 2007; Martin, 2016).

Table 2 shows that cow sharing arrangements are supporting the implementation of Alpine policies and programs by delivering provisioning and cultural services. A notable characteristic is connecting individuals and producers into small resource management networks linked to the provision of food and agricultural products. Those web-based platforms might offer low-threshold entry points to trigger interest in increasing awareness of agricultural production and provide an initial link between consumer and producer, while also crossing longer distances. The arrangements start on web-based platforms with initial contact and little responsibility for the share takers. However, for those that include the opportunity to participate in on-farm activities, engaging with landscape, animals and people, additional opportunities for building relationships and community building might open up. The current legal situation provides general public accessibility (with some

different limitations and gradations, e.g. the restriction to remain on the path) of Alpine pastures. More recently, debates stressed the restriction of the general access to Alpine pastures or to propose guidelines that explicitly recommend avoiding contact with livestock on Alpine pastures as a result of a number of incidents and unclear situations regarding farmers’ liability in the case of accidents between livestock and users (BMNT, 2019; Landwirtschaftskammer Tirol, 2019). If such restrictions should restrict access rights to pastures and cattle herds in the future, cow sharing arrangements might become more prominent and important.

On the web platforms, the share givers emphasize the benefits of cow sharing by advocating conscious consumption practices that are beneficial to the conservation of Alpine pastures, traditional breeds and animal welfare, the sustainable production of high-quality food and experiential learning about agriculture and nature. However, due to the short-term interaction on the platforms and the rather limited learning event (farm/pasture visit; access to cow/herd), we remain skeptical regarding long-term learning effects or the upscaled behavioral change. ‘Withdrawal-focused crowding arrangements’ (Group B) provide significantly less access rights, associated experiences, social relations and learning opportunities than Group A. Thus, the delivery of cultural services such as learning from human-nature-animal interaction might remain limited. However, via supporting the income of Alpine family farms, these arrangements can contribute to the conservation and up-keep of Alpine pasture systems as traditional land and landscape management or the conservation of historic and local breeds adapted to Alpine pasture systems (other than high-yielding breeds) (Marsoner et al., 2018). The geographical focus of cases showcasing photos of traditional breeds or highlighting traditional breeds elsewhere on their website matches the traditional hotspots of breeding in the Eastern Alps (Marsoner et al., 2018). Due to the limited number of cases and their early stage in existence, it remains unclear if and to what extent cow sharing arrangements have the capacity to establish collaborative networks that support the long-term provision of ecosystem services, and to which degree they are implementing Alpine policies and programs such as the Alpine Convention.

## 6. Conclusions

The capacity of resource governance systems adapting and innovating to changing markets and consumption preferences will support the maintenance of Alpine farming practices. The research shows that certain cow sharing arrangements carry the capacity for supporting the adaptability and long-term support of Alpine agro-ecosystems by granting physical access and associated experiences, personal and group relationships and learning opportunities. Cow sharing arrangements that are offering and supporting such opportunities might indeed establish sharing formats that reach beyond the mere access to a resource (Bardhi and Eckhardt, 2012; Jarvis, 2017).

Our work illustrates that researching platform-based animal sharing economy in rural and landscape context is just the beginning. The analyzed cases demonstrate only the modest sharing of property rights, mainly access and withdrawal rights. Due to the geographical limitation of this research to the Alpine region we have missed cases such as the Hutanger Project at the Hersbrücker Alb (Germany), in which sharing of property rights reach beyond ‘Operational Choice’ property rights and include sharing of ‘Collective Choice Property Rights’ (Schlager and Ostrom, 1992). Consequently, the way forward should include an in-depth investigation of such cow sharing cases, including their capacity for the delivery of ecosystem services.

As this study was mostly restricted to data collected from digital cow sharing websites, more research is needed to explore actual relationships between share giver and share taker (community building) and an evaluation to which degree the sharing arrangements are actually contributing to the ecological and social objectives protected by Alpine treaties. Indirectly, cow sharing activities might support the



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