RESEARCH ARTICLE

Toward an Integrated History to Govern the Commons: Using the Archive to Enhance Local Knowledge

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Communities that have used common-pool resources (CPRs) for generations often preserve a valuable 'institutional memory'. It can be understood as a subset of local knowledge concerning strategies, norms, and rules used by the community to deal with CPR problems (e.g. overexploitation) in different time periods. Scholars have argued that institutional memory is useful in two aspects of CPR governance: as focal point to encourage users to sustain and to undertake collective action, and as support knowledge to design new policies. However, institutional memory is constrained by personal and social memories, and therefore it must be considered not as fully cumulative but subject to a steady process of adjustment according to experience. When communities have recorded their regulations in writing, e.g. in village bylaws, it is possible to undertake a learning process to recover and take advantage of their institutional memory. One way is to carry out participatory workshops to compare the historical and present-day bylaws of the community. However, the comparison of these sources is not an easy task, because, on the one hand, they constitute a large body of rules and, on the other, they have been designed using different epistemologies (e.g. concrete vs. abstract) and linguistic forms (e.g. early modern vs. contemporary grammars). In this paper we use an approach based on the institutional analysis and development (IAD) framework to compare the historical and present-day bylaws of a community located in Cantabria (Spain). The utility of the IAD framework is verified. It enables one not only to undertake a systematic comparison of the bylaws, but also to easily display the results in participatory workshops. The use of the archive as a source of local information to enhance users' knowledge is an uncommon procedure among CPR scholars and practitioners, and therefore we dedicate a specific section of the paper to discussing this utility.

1. Introduction

Communities that have used common-pool resources (CPRs) for generations, such as pastures, forests, irrigation systems or fisheries, often preserve detailed knowledge about their governance history. Much of this knowledge is related to rules, norms and strategies used by the community in different time periods, and it has been called 'institutional memory' (Berkes et al. 2003). Scholars on CPRs have argued that this accumulation of knowledge is valuable in two aspects of governance. The first is to encourage users to sustain and to undertake collective action. If a community has had successful experiences in collective action, more positive attitudes towards cooperation are likely to emerge among its members: see the variable 'past successful experiences' in Agrawal's (2003) enabling conditions for sustainability on CPRs; similar concepts, such as 'history of use' and 'tradition in self-organization', can be found respectively in Ostrom (2009) and Gutiérrez et al. (2011).[1] The procedure argued by Baland and Platteau (1996: 325) is to

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[1] Institutional memory can be understood as a subset of the broader concepts 'past successful experiences', 'history of use' and 'tradition in self-organization'. As noted above, institutional memory has been defined to encompass a specific aspect of governance history, i.e. the set of rules, norms and strategies used by a community in different time periods.

spread these experiences by analogy from one domain of social life to another, or reinforcing a particular domain. The second aspect posed by scholars on the commons is that institutional memory can be valuable as basis or support knowledge to design new policies. For example, institutional memory includes a set of strategies designed by a community to deal with CPR problems (e.g. overexploitation) and, if we analyze these strategies from a wide-ranging perspective, it reveals us the nature of actions undertaken by a given community to deal with changes in its social (e.g. demography) and ecological (e.g. resource stock) context (see Hilborn 1992, Folke et al. 2003, Armitage et al. 2008).

However, institutional memory is constrained by personal and social memories, and therefore it must be considered not as fully cumulative but subject to a steady process of adjustment according to experience, e.g. rules that are employed over long time periods are established, whereas those that stop being used are discarded and forgotten. The loss of institutional memory will be more substantial if the users' knowledge is transmitted by word-of-mouth. However, this memory loss has occurred even when users have recorded their regulations in writing. For example, since late medieval times, many village communities in Europe have registered in bylaws (or statutes) the rules they used to govern CPRs. It was usual for communities to renew their bylaws periodically, as part of an adaptation to changes in their social-ecological context (see, e.g. Lana 2008, Warde 2013, De Moor et al. 2016). Nevertheless, this adaptation process has often involved a loss of institutional memory. The revoked bylaws were assigned to the village archive, and, over time, they became physically deteriorated or ended up being unintelligible to user communities because of their calligraphy and linguistic style. Furthermore, since the 19th century, many village bylaws were included in regional and state archives—'out of reach' of user communities.[2]

In addition, since the middle of the 18th century, an ideological and political movement began to alter the governance history of many user communities. Liberal economic thought was established in Europe, and the CPR regimes were attacked because they were considered to be inefficient from a productive point of view. Accordingly, many agro-forestry commons were enclosed (privatized), or they remained as open-access resources with weak or nonexistent governance (De Moor et al. 2002, Demélas and Vivier 2003, Congost and Lana 2007). For example, when liberalism was consolidated in Spain during the second half of the 19th century, those rules in village bylaws that referred to collective action were not abolished but highly criticized, e.g. those concerning the collective management of herds (García-Sanz and Garrabou 1985; Ortega 1989; Puente 1992: 286–295). It has been documented that, as a result, some villagers stopped complying with the regulations. An exponential increase in the number of judicial complaints, e.g. due to uncontrolled grazing in common pastures, has enabled us to identify this process (Corbera 2010: 193). Thus, a number of rules and management practices were ignored by user communities, and, over time, this caused a breaking point in their institutional memory.[3]

Nonetheless when communities have registered their regulations, for example in village bylaws, it is possible to undertake a learning process to recover and take advantage of their institutional memory. In a previous research conducted in the Rionansa valley concerning common pastures co-managed by the government and local resource users (Cantabria, northern Spain; Vázquez 2016), we found that a valuable exercise is to undertake workshops in which the historical and present-day bylaws of the community are systematically compared. This enables one to identify regulations of interest that can be analyzed among the stakeholders involved in CPR governance, contrast them with complementary data provided by scientific and user knowledge, and thus generate an arena that facilitates the coproduction of new institutional arrangements. However, we also found that this procedure is not an easy task because bylaws constitute a large body of rules. Moreover, historical and present-day bylaws are often written using different epistemologies (e.g. concrete vs. abstract) and linguistic forms (e.g. early modern vs. contemporary grammars).

In this paper we apply an institutional analysis approach to systematically compare the 1755 and 2008 bylaws of Obeso, a village located in the Rionansa valley: the first is the only bylaw preserved in the archives,

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[2] This process of institutional memory loss has been documented elsewhere (Vázquez 2016: 198–199). Another example, but concerning communities that have managed fisheries during the 20th century in the United States, can be found in Hilborn (1992).

[3] An in-depth explanation of how such a process occurs in the long-term can be found in Halbwachs' seminal work 'On collective memory' (1992). This author explains how collective memory (of which institutional memory can be considered a subset) is the origin of traditions. The community seeks to perpetuate those episodes of the past that give it its own identity, so that the time elapsed in which there have been no major changes is that which occupies the greatest place in its collective memory. But if, at a given time, an important number of elements are introduced, e.g. new management practices on the commons due to socio-political changes, a new memory will develop over time, which will only contain some fragments of what preceded these changes.

whereas the second is the bylaw-in-force in the village. Our aim is to recover part of the institutional memory of this community of users, which can then be used as support knowledge to coproduce new policy arrangements. The approach integrates core concepts of the institutional analysis and development (IAD) framework. This framework offers a conceptual map to conduct institutional analysis, and, particularly, it has proved very useful in understanding a wide variety of the institutional arrangements that characterize CPR systems (Ostrom 2005, Schlager and Cox 2018). We take as reference the IAD approach designed by Carter et al. (2016) to reveal the structural logic of a given policy document, which consists of: (1) deconstructing the regulations into their basic statements, (2) organizing the statements according to their aim, (3) structuring the statements according to the activities that they are intended to influence, and (4) structuring the statements through authoritative relationships.

A first section of the paper is dedicated to introduce historical archival sources, and to contextualize them within the set of conventional sources of knowledge in co-management. The use of the archive as a source of local information to enhance users' knowledge is an uncommon procedure among scholars and practitioners, and therefore we consider that it is opportune to carry out a general contextualization of this source. The study area is then presented. After the comparison of the 1755 and 2008 bylaws, we discuss the utility of the IAD approach to capture and display archival information in participatory workshops, but also the potential of this source of information to favor CPR governance. Concluding remarks highlight policy implications and methodological challenges to make the historical archive useful and accessible to scholars, practitioners and local resource users.

2. Theoretical Background
2.1. Sources of knowledge in co-management
Experience in many countries has shown the benefits of managing the commons at multiple levels, for example through institutional arrangements that promote the joint action of scholars, practitioners and local resource users (WCED 1987, WRI 2000, FAO 2006). Because of the social and ecological complexity of the commons, it is difficult for a single party to possess the full range of knowledge required. For example, local communities have a working knowledge of the state of the resource, because their direct contact makes continuous monitoring possible, while scientists and government actors can provide valuable tools and analytical techniques that, in general, are not accessible to users (see, e.g. Ribot et al. 2006, Berkes 2009, Biggs et al. 2015). The concept of co-management has been developed to address this approach, and it has been defined as 'a partnership in which government agencies, local communities and resource users, non-governmental organizations and other stakeholders negotiate, as appropriate to each context, the authority and responsibility for the management of a specific area or set of resources' (IUCN 1996; cited by Carlsson and Berkes 2005: 66).

But co-management practice is not easy, and it often requires the application of social interaction methods (e.g. participatory workshops) to provide arenas for building trust among actors and facilitate the process of knowledge coproduction. The lead outcome of such a practice has been called 'social learning', because it occurs 'when people engage one another, sharing diverse perspectives and experiences to develop a common framework of understanding and basis for joint action' (Schusler et al. 2003: 311). There are several examples focused on the specific case of common pastures, e.g. Borrini et al. (2007), Risvoll et al. (2014), Shimada (2015).

Thus, according to the actors involved in co-management, two sources of knowledge can be considered fundamental: 'user knowledge' and 'scientific knowledge' (Berkes, 2012). An elementary epistemological differentiation has been formulated, considering the relationship between the subject and the resource. User knowledge is mainly of the concrete type, i.e. it is based on personal experience with the resource. However, scientific knowledge is characterized by abstraction, making it possible to formulate statements without necessarily direct contact with the resource (Agrawal 1995, Berkes and Folke 2000, Miller et al. 2008). The way in which each of the main actors involved in co-management evaluates the quality of the meadows exemplifies this epistemological difference. Traditionally, local resource users have classified the meadows that they harvest in different qualities, e.g. in relation to a number of hay carts. This kind of classification implies a very detailed and precise knowledge of the resource, but only valid for a specific territory. Whereas technical advisors can evaluate the quality of the meadows indirectly, e.g. identifying the geology and the target herbaceous species present in representative plots of the whole.

Some communities of users have maintained knowledge that is the result of a long trajectory of cultural transmission. Thus, the terms 'indigenous knowledge' and 'traditional knowledge' have been defined as 'a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through

generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment' (Gadgil et al. 1993: 151). Etymological differences are implicit in each term. The first term focuses on the cultural component to refer to the knowledge of those communities of users that are further away from Western science, whereas the second considers the temporal dimension of knowledge and is also used in indigenous contexts (Warren et al. 1989, Alcorn 1993, Berkes 2012: 9).

However, it is usual that, at least at some point in their history, users have had a relationship with Western science. The term 'local knowledge' has been used to avoid conflicts over the uniqueness of users' knowledge. It does away with any reference to a historical-cultural continuity, with the intention that the term can also be used to refer to recent knowledge—as a mixture of user and scientific knowledge (Chambers 1983: 82–85; Olsson and Folke 2001; Griffith 2006).

2.2. Introducing the historical archive

A feature of the sources that have been defined in the previous subsection is that the data being collected is present-day knowledge, i.e. the knowledge-in-use and memory of the present-day users, compiled through interviews and direct observation (Huntington 2000). This is because, in general, user knowledge is based on oral transmission (Berkes and Folke 2000). But regarding the European agro-forestry commons, focusing on these sources means ignoring a large amount of information stored in archives, e.g. judicial sentences, cadastres, and bylaws. In recent years, archival research has proved very useful to discover the institutional design of the European agro-forestry commons, from medieval to contemporary times. Specifically, village bylaws are considered by historians as the richest and most abundant archival source for this purpose (see De Moor et al. 2016).

However, archival information has also disadvantages, mainly due to its written form and particularly when using village bylaws. Bylaws do not help us to discover informal agreements among users, and often it makes it impossible to state whether the rules were actually 'rules-in-form' (legally constituted) or 'rules-in-use' (actually applied). For example, in some cases, it is likely that the communities' intention was to promote rules that they considered suitable to achieve an appropriate use of the resource. However, it is probable that some rules would never be applied. Likewise, it is feasible that customary practices well-accepted among villagers would never be recorded. Thus, bylaws must be understood as a source of information containing a part of the management approach of user communities (see Thompson 1991: 100–101; Winchester and Straughton 2010; De Moor et al. 2016).

In addition, due to its written form, the archive provides 'fossil' information that belongs to a given context, and therefore we must understand it as fragmented information with a low temporal continuity. In comparison, user knowledge-in-use is dynamic because it is subject to a continuous process of adjustment to adapt to changes in the social-ecological context. Thus, the dependence of archival information of a given context makes its replicability problematic, even if used in local planning or with the community to which it belongs. Substantial changes in user communities and their environments have taken place over the centuries, and therefore some rules that were useful in the past are, perhaps, not totally applicable today. For example, the villagers working alternatively as shepherds of a community herd, a customary management practice in the past, is now unworkable in many European rural areas given the shortage of manpower.

The use of archival information in CPR governance is not a novelty. In fact, Ostrom's design principles—which synthesize core factors that affect the probability of long term survival of CPR institutions (Ostrom 2010: 653; see also Cox et al. 2010)—are based on the historical regulations of user communities in Switzerland, Japan, Spain, and the Philippines (Ostrom 1990: 61–88). However, the use of the archive as a source of local information to enhance users' knowledge is an uncommon procedure among CPR scholars and practitioners. Thus, we have dedicated a specific section at the end of the paper to discussing this utility. Our objective is not to raise the archive to the category of primary source in CPR governance, but as a source that can offer complementary information to that provided by conventional user and scientific knowledge.

3. The Case Study

We conducted our research in the valley and municipality of Rionansa, located in the autonomous region of Cantabria (in northern Spain, see **Figure 1**). It occupies an area of 11,804 hectares dominated by an Atlantic climate, which is characterized by an annual average temperature of 12°C and precipitation that exceeds 1,000 millimeters per year. Its wide altitudinal range (from 105 to 2,040 m above sea level), combined with a varied geology in which Jurassic limestone alternates with sandstones and conglomerates of the Lower Cretaceous, defines a complex mountain landscape with heterogeneous plant productivity (San Miguel et al. 2016). In 2015, the population census shows 1,091 inhabitants, who are distributed
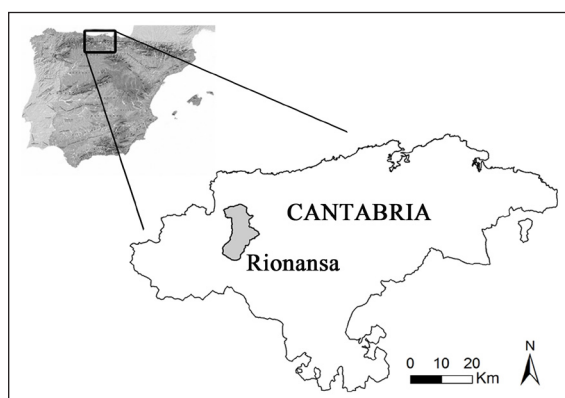
Figure 1: The Rionansa valley in Cantabria (Spain).

in 16 villages. The active labor force represents 30% of the total, due to a high rate of aging: 35.87% is the percentage difference between the over-65s and under-15s. The service sector is the main economic activity, occupying 62% of the labor force, followed by construction (16%), agriculture (14%), and industry (8%) (ICANE 2016).

3.1. Present-day users
The raising of cattle for meat production is the main economic activity of the primary sector, mainly oriented to the sale of young animals. A total of 76 farms are registered, which maintain 2,180 head of cattle. Many farms complement their meat production with horses, with a total of 1,065 head. A typical farm, composed of the owner with occasional help from relatives, has an average of 30 bovine and 20 equine units (ICANE 2016). According to official data, 89% of farms use common pastures, which occupy an area of 5,283 hectares (45% of the municipal area). The system is organized in a valley transhumance, whereby the high common pastures (during the summer) are combined with other common pastures and private hay meadows in the lowlands (the rest of the year). Thus, common pastures constitute the main nutritional contribution for livestock for several months of the year, generally between May and October (Puente 2013).

Municipalities and parishes are the owners of the commons, which are used collectively by the rights holders—the villagers. Presently, although many entities in Cantabria can be constituted as a village council, only a few exercise this form of representation (Gómez-Pellón 2002). Bylaws are commonly drafted by local authorities and subsequently they are publicized for comment by the villagers. After this period, bylaws must be approved by the regional government and published in the *Official Bulletin of Cantabria* (OBC). All bylaws have a generic format and content. The statements they contain are exactly the same; many come from regional legislation (law 4/2000), and others are agronomic recommendations to guarantee adequate use of the pastures. The exception is the calendar of use, which is established by local entities and therefore varies in each case (Puente 2013; Vázquez 2016: 277).

For some years, degradation of common pastures has been verified scientifically in the study area (Busqué et al. 2003). The bylaws in force are imprecise in their statements and, moreover, there is scarcely any control to guarantee compliance (Vázquez 2016: 302–311, 2019). Thus, common pastures have become open-access resources, and, as a result, many users act opportunistically pursuing their individual profit in the short term: e.g. introducing livestock into the pastures before the date established in the bylaws. On the other hand, it is very common for users to opt for a management based on free-grazing (i.e. without a shepherd), and this causes grazing areas often to be inadequate: e.g. livestock are concentrated in the most accessible pastures (or with favorable topography), while the less accessible ones (or those with steep slopes) are little visited by livestock.[4] Therefore, under- and overgrazing are combined resulting in a degradation of the resource with serious economic repercussions. But there are also environmental implications because, as in other European regions, many of these common pastures have been included in protected areas due to their high biodiversity (see, e.g. Berge 2006, Short 2008, Vandergeest and Peluso 2015).

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[4] This is a farmland process that has been also observed in other mountain areas of Europe: see, e.g. Tasser and Tappeiner (2002), Parolo et al. (2011), Graf et al. (2014), Orlandi et al. (2016).

3.2. Eighteenth-century users

In the middle of the 18th century, the economy of the Cantabrian valleys was focused on the sale of young animals for labor (oxen). Small livestock (sheep, goats, and pigs) were mainly used for self-consumption, and their products (milk and meat) supplemented those obtained from vegetable gardens, grainlands, and the food provided by other activities (e.g. hunting and fishing) (Lanza 2010: 67–150). The condition of the Cantabrian peasants was characterized by being small-holding owners (Domínguez 1996: 195–219). An average family farm, composed of four members, had livestock [in livestock units: bovine (7), sheep (4), goats (2), pigs (1)], and worked land [in square meters: vegetable gardens (300), grainlands (7,000), hay meadows (15,000)] (Vázquez 2016: 131–157). Livestock production was organized in a valley transhumance and, at all times, livestock were organized collectively and therefore large herds of each species were formed (Corbera 2010).

Municipalities, parishes, and the Crown were the owners of the commons, which were used collectively by the rights holders—the villagers (Baró and Pereda 2010). A particularity of the study area is that the commons were embedded in the local political organization. Thus, bylaws are presented as a list of rules covering all areas of daily life (e.g. economy, religion). It was usual that only a part of the villagers wrote the contents of the bylaws and later they debated them in the village council, involving the whole community. Then, bylaws were approved by the jurisdictional lords being usual that they modified the content of some chapters, e.g. those concerning the type and level of fines (Vázquez 2016: 329–337). The rules contained in these bylaws are varied (e.g. calendars of use, entry fees, decision-making procedures), and a number of differences in their specific content have been observed when studying bylaws from different villages, which indicates that an effort was made by communities to adapt them to their social and ecological context (Vázquez 2016: 311–337). In addition, it has been documented that non-compliance was punished at multiple institutional levels, which indicates that many rules were actually applied (Corbera 2010).

4. Methods

4.1. Archival sources

In this paper we systematically compare the 1755 and 2008 bylaws of Obeso, a village located in the Rionansa valley. As stated above, our aim is to isolate and classify a valuable part of the governance history of this community, which can then be used as support knowledge to coproduce new policies.

The first is the only bylaw preserved in the archives,[5] and it is representative of the early modern bylaws of the region due to the amount and type of rules that it contains. This has been verified in a previous study, in which 40 bylaws of Cantabria (from the period 1559 to 1844) were analyzed (Vázquez 2016: 311–337). Another value of this bylaw is that it includes an annex that we consider as an indicator that at least some of its rules were actually applied. The annex informs us about the initial opposition shown by some villagers, who considered two chapters of the bylaw contrary to the community interest. Several years later, in 1783, all the villagers signed an appeal to reduce the level of some of the fines; in addition, they modified the content of several chapters and included new ones (SML 432, 289–290).

The second is the bylaw-in-force in the village but representing a generic model widespread in the region. In 2000, due to a policy of sanitary and environmental control, the government of Cantabria began to request that the local entities draft bylaws for the use of common pastures. The bylaw of Obeso in force was published in 2008 (OBC 240, 16672–16674). With the aim of incorporating in the analysis aspects related to the competences of local entities and the regional government, higher-level legislation was consulted, particularly the law of Cantabria 4/2000 (OBC 223, 8195–8213), which subordinates some sections of the bylaws, e.g. the type and level of fines and the competences of local and regional authorities.

4.2. Data analysis

For the comparison of the bylaws, we used an approach that integrates multiple core concepts of the institutional analysis and development (IAD) framework. This framework has been defined as a multi-level conceptual map containing the key variables of 'the structure of the situations that individuals faced, and how rules, the nature of the events involved, and community affected these situations over time' (Ostrom 2005: 9; see also McGinnis 2011). We take as reference the IAD approach designed by Carter et al. (2016) to reveal the structure of policy documents, which is based on four IAD concepts: (1) the 'institutional grammar', (2) the 'rule typology', (3) the 'action situation', and (4) the 'levels of action'.

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[5] The 1755 bylaw is deposited in Santander Municipal Library (SML, manuscript 432: 280–292).

The first step is to deconstruct the bylaws by applying the 'institutional grammar tool', an extension of the grammar of Crawford and Ostrom (1995) developed by Basurto et al. (2010) and Siddiki et al. (2011). This tool enables us to identify the individual statements embedded in policies and sort them by restrictive level. By doing so, data are grouped into 'institutional statements' as units of observation, which can take the form of strategies, norms, or rules—referred to as a 'set of shared linguistic constraints and opportunities that prescribe, permit, or advise actions or outcomes for participants in an action situation' (Ostrom 2005: 137–138). Institutional statements can contain up to six components: (1) the 'attribute', which is the actor in charge of performing the action; (2) the 'deontic', which is the prescriptive operator indicating whether action is required, permitted, or prohibited; (3) the 'aim', which is the action itself; (4) the 'object', which is the receiver of the action; (5) the 'condition', which are the spatial, temporal, and procedural circumstances under which the action is performed; and (6) the 'or else', which is the punitive penalty resulting from nonperformance of the action. Thus, strategies include only the attribute, aim, and condition; norms contain the attribute, deontic, aim, and condition; and rules also include the 'or else' component and thus the complete syntax. An example of a rule contained in the bylaws herein analyzed shows the following syntax 'The mayor must hire a shepherd between 24 June and 29 September, or pay a fine': where the attribute is 'mayor'; the deontic is 'must'; the aim is 'hire'; the object is 'shepherd'; the condition is 'between 24 June and 29 September'; and the 'or else' is 'pay a fine'.

The second step involves the classification of the statements by their aim based on the Ostrom 'rule typology', and this allows us to organize the rules according to their immediate outcome (Ostrom 2005: 186–215). In this classification, there are seven categories: (1) 'position', which identifies the roles played by the participants (e.g. mayor, shepherd); (2) 'boundary', which identifies who is likely to occupy a position and what requirements must be met (e.g. pay an entry fee); (3) 'choice', which establishes what a participant who occupies a position should, should not, or can do (e.g. the mayor shall hire a shepherd each year); (4) 'aggregation', which addresses actions that require two or more individuals (e.g. the villagers must form a herd every morning); (5) 'information', which determines how information should flow among participants (e.g. the villagers must meet every Sunday to report infractions); (6) 'payoff', which assigns external rewards or sanctions relative to distinct actions (e.g. the villager who reports an infraction will receive a part of the fine); and (7) 'scope', which identifies required, desired, or prohibited results without necessarily referring to a set of actions (e.g. an area prohibited for livestock).

The third step is to classify the statements according to the 'action situation' that they are intended to influence. The action situations represent the focal units of analysis of the IAD framework, and they can be understood as the main areas of activity faced by the actors involved in the use and management of CPRs (Hinkel et al. 2015). Specifically, the statements contained in the bylaws of Obeso refer to four action situations: (1) 'Appropriation', which includes those activities concerning the extraction of resource units (e.g. villagers introducing livestock in common pastures). (2) 'Provisioning', which includes those activities concerning the maintenance and improvement of the resource (e.g. villagers repairing infrastructures such as fences and huts); within this action situation, we also included those statements concerning breeding and animal health (e.g. villagers using mastiff dogs to prevent wolf attacks). (3) 'Monitoring', which includes those activities concerning the control and assessment of the resource (e.g. villagers denouncing the entry of non-resident livestock). (4) 'Collective decision-making', which includes those activities in which individuals takes decisions jointly (e.g. users attending the village council).

The final step is to organize the statements through authoritative relationships, according to the operational, collective-choice, and constitutional 'levels of action'. This hierarchical organization gives us a nested arrangement of the action situations based on 'the scope of the activities conducted within them' (McGinnis 2011: 173): at the operational level, statements affect day-to-day decisions of users; at the collective-choice level, statements determine who can participate in the elaboration of operational statements and under what conditions; at the constitutional level, statements affect decision-making at the collective-choice level. Thus, the operational level contains the action situations 1–3 (appropriation, provisioning, and monitoring), while the collective-choice level includes the action situation 4 (collective decision-making). In the analysis we also considered those present-day statements at the collective-choice level included in higher-level legislation, i.e. law 4/2000, which establishes competences of local entities and the regional government (OBC 223, 8195–8213). Whereas the constitutional level is not incorporated in our analysis, and only secondary references are made to it. Present-day statements at this third level are included in higher-level legislation; in Cantabria, the functioning of local entities is regulated by law

6/1994 (OBC 162, 21910–21915), subject to national law 7/1985 (*Spanish Official Bulletin* 80). However, we found problematic to discover how the constitutional level was organized in early modern times, because it was usual the existence of overlapping competencies among multiple levels of governance (see, e.g. Dyson 2010).

5. Results

Appendices 1 and 2 show the primary results of applying the IAD approach. The results are presented in tables that include the total number of statements of the 1755 and 2008 bylaws, once they were grammatically deconstructed and classified by aim and action situation. This orderly representation revealed us the structural logic of the bylaws, and this facilitated us the task of establishing key areas of analysis to systematically compare the bylaws. First, the analysis was focused on the 'potential interests' of the actors, which is based on the quantity of the statements that each bylaw contains. Second, the analysis was focused on the 'restrictive level' of the bylaws, which is based on the form (norm or rule) of the statements. Third, the statements assigned to each of the actors were summarized, and this enabled us to identify their 'expected role' in relation to the type and quantity of actions that they must fulfill. Fourth, the 'institutional complexity' of the bylaws was analyzed, based on the diversity of statements they contain. Finally, the analysis was focused on the 'institutional epistemology' of the statements included in the action situation 'appropriation', i.e. the form (abstract or concrete) in which the statements are designed to influence the relationship between user and resource. This is because, in relation to this action situation, the 2008 bylaw includes a number of statements that clearly respond to an abstract epistemology, which noticeably contrasts with the statements included in the 1755 bylaw.

5.1. Potential interests

Table 1 shows the results of a frequency count of the institutional statements of each bylaw, categorized by action situation. The number of statements is similar in each bylaw, 33 and 36 respectively. However, there are important differences in their distribution according to action situations. In both bylaws, the action situation 'appropriation' has the largest number of statements, and there is proportionality among them: 15 and 16, respectively. There is also proportionality in relation to the action situation 'decision-making': 6 and 5 statements, respectively. However, there are important differences in relation to the action situations 'provisioning' and 'monitoring'. In the first case, the 2008 bylaw contains 10 statements and the 1755 bylaw only contains 2, whereas, in the second, the 2008 bylaw contains 5 statements and the 1755 bylaw contains 10.

Thus, a first indicator of the 'potential interests' of the actors shows us significant differences. It seems that present-day users are more concerned about the maintenance of the resource, while eighteenth-century users were more concerned about their monitoring. However, to assess such assertion it is necessary to consult the specific content of each bylaw in Appendices 1 and 2. In relation to the action situation 'monitoring' the 1755 bylaw includes more rich and detailed statements than the 2008 bylaw. However, according to the action situation 'provisioning' the 2008 bylaw is not really more complex. Most of its statements are related to two major concerns of present-day users and the regional government. On the one hand, the absence of shepherds to guide the livestock in the commons (e.g. villagers shall build fences). On the other hand, the proliferation of animal diseases such as brucellosis and tuberculosis (e.g. regional government shall remove sick livestock), now that their relationship with grazing in mountain areas has been demonstrated, as wildlife is a vector of contagion (Gortázar et al. 2007).

Table 1: Summarizing bylaw statements.

	1755	2008
Appropriation	15	16
Provisioning	2	10
Monitoring	10	5
Decision-making	6	5
Total	33	36

Table 2: Restrictive level of the bylaws.

	1755	2008
Norms	–	22
Rules	33	14
Total	33	36

5.2. Restrictive level

Important differences are observed in the 'restrictive level' of the bylaws. **Table 2** shows that all the statements that the 1755 bylaw contains are rules. The 'or else' operator is present in all cases, expressed by the punitive action 'or pay a fine'. However, this is not the case with the 2008 bylaw, where more than half of the statements are norms and therefore no punitive action penalizes noncompliance (see Appendix 1 and 2).

Concerning the action situation 'appropriation', several of the statements in the 2008 bylaw are recommendations that have been included by the regional government. In particular, two norms recommend hiring a shepherd and managing the livestock in herds, and four norms recommend an adequate use of the pastures (e.g. a heterogeneous use, avoid overgrazing). Nor do punitive sanctions appear in the regional law 4/2000.

Concerning the action situation 'decision-making' differences are explained by the fact that, nowadays, the village councils are optional for local entities if approved by two-thirds of the villagers, as established by law 6/1994 (OBC 162, 21914). Whereas in early modern times the councils were part of the day-to-day life of the villages (Blum 1971), and therefore different rules in the 1755 bylaw were intended to achieve a smoothly working assembly.

In the other cases in which the differences are significant, the statements of the 2008 bylaw are likely to be rules, particularly in the action situations 'provisioning', 'monitoring' and 'decision-making': e.g. regional government competences in grazing regulation, and regional government and local entity in the design and implementation of bylaws (see Appendix 2). As Siddiki et al. (2011) have stated, the absence of the 'or else' operator is not sufficient to conclude that there is a lack of punitive measures. It is common that there are nested policies, especially when dealing with entities with broad legal competences, as in this case.

5.3. Expected role of the actors

Table 3 shows an attribute frequency count of each bylaw. In both cases, the greater proportion of statements is directed at the villagers: 14 and 20, respectively. In the 1755 bylaw, the number is less than in the 2008 bylaw because it was usual for villagers to hire a shepherd to manage livestock on common pastures, or that they themselves acted in turns as shepherds of a communal herd, depending on the livestock they had (SML 432, 281). Presently, because livestock is managed individually, all the regulations are directed at the villagers. Consequently, there are no significant differences in the number of statements assigned to these actors.

New actors are incorporated in the 2008 bylaw (see **Table 3**). The main one is the regional government, with 9 statements assigned. This is due to the outsourcing of competences that took place in the mid-19th century (Corbera 2010: 189–203). External competences were common in early modern times, i.e. the jurisdictional lords were in charge of fixing the level of the fines (Vázquez 2016: 329–337), but not concerning the design of regulations about monitoring, infrastructure works, or the definition of grazing areas and stock thresholds. Because of the latter, the 2008 bylaw establishes that the government warden is the authority responsible for reporting infractions (see Appendix 2), whereas in the 1755 bylaw the monitoring is assigned to a local warden, in addition to the mayor and the villagers (see Appendix 1).

There are more new actors in the 2008 bylaw: the local entity (with 4 statements) and the outsiders' rights-users (with 1). The local entity simply replaces the mayor, and thus statements concerning the action situations 'provisioning', 'monitoring', and 'decision-making' are assigned directly to the local entity. But the latest actor is a novelty, and this is because the law 4/2000 states that bylaws must be drafted by outsiders with rights of use, in addition to the local entities. This is due to the persistence of customary arrangements between villages, which presently are embedded in the bylaws (Vázquez 2016: 310–311).

Table 3: Frequency of bylaw attributes.

Attribute	Frequency
1755	
Villagers	14
Mayor	8
Shepherd	9
Nonresidents	1
Denouncers	1
2008	
Villagers	20
Regional government	9
Local entity	4
Nonresidents	1
Outsiders' rights-users	1
Government wardens	1

5.4. Institutional complexity

Tables 4 and **5** show the results of a basic frequency count of the types of institutional statements by aim and action situation. The following analysis is not only based on Appendices 1 and 2, but also on specific contents of the bylaws (SML 432, and OBC 240).

Concerning the action situation 'appropriation' important differences are observed between bylaws. Both bylaws include a position statement concerning the shepherd. The 1755 bylaw includes a rule that establishes the conditions under which the shepherd is selected, while the 2008 bylaw include a norm that refers to the suitability of his hiring, i.e. 'preferably, villagers should use the services of a shepherd' (OBC 240, 16672). The 1755 bylaw also includes an aggregation rule concerning the obligation of forming collective herds (among neighbors or relatives). In addition, a boundary rule that defines the season of the year in which livestock may be purchased (or leased) is included, in order to form collective herds (SML 432, 221, 281). However, the 2008 bylaw only includes a choice norm that addresses the suitability of managing livestock in herds.

Both bylaws include a large number of choice statements concerning the way in which pastures should be grazed. Nevertheless, it is necessary to look at Appendices 1 and 2 and the original texts, and to compare the content and form of these statements. The 2008 bylaw includes 4 choice norms that are recommendations: practicing 'mixed grazing' (i.e. diversity of livestock species), use the pastures heterogeneously, avoid overgrazing, and start using low-altitude pastures. Only one rule is included concerning the use of pastures, a choice rule for compliance with stock thresholds, which are defined in units of livestock per hectare (OBC 240, 16673). In addition, there are 3 choice rules that define grazing areas that, however, include the same calendars of use—between May 1 and November 30. Furthermore, a choice rule establishes the prohibition to use those grazing areas that have been bounded by the regional government: e.g. those affected by fires (OBC 240, 16673).

The 1755 bylaw does not include any statement regarding the specific manner in which livestock should be managed on the commons. However, it includes several choice rules which establish a complex zoning of the commons in eight grazing areas (see Appendix 1). The definition of some areas is explained by the diversity of livestock species (cattle, sheep, and goats) and types (e.g. oxen, suckling calves); however, most of the areas respond to a seasonal zoning (basically, spring, summer, and autumn). Furthermore, the calendars of use included in the bylaw are not fixed, and in most rules, it is explicit that the mayor (or the villagers) can proceed annually to their modification (SML 432, 281–292).

Finally, both bylaws include boundary rules aimed at preventing nonresident livestock from using common pastures without a license. In both cases, the license can be obtained by paying an entry fee (SML 432, 282; OBC 240, 16672). Nevertheless, a novelty in the 2008 bylaw is the establishment of a fee for the villagers, although it has a symbolic character (one euro per livestock unit). The payments must be used for financing infrastructure works and improvements in pastures, and the local entity may modify the amounts according to law 4/2000 (OBC 223, 8208).

In the action situation 'provisioning' a singularity of the 1755 bylaw is the inclusion of a choice rule concerning the obligation to have mastiff dogs to prevent wolf attacks, a threat to livestock also today

(Cayuela 2004). This problem was not addressed in the 2008 bylaw, which, however, includes two new areas of regulation: one directed at the control of sick livestock, and the other concerning infrastructure and improvements. In relation to the former, as stated above, this shows the administration's current preoccupation with animal diseases such as brucellosis and tuberculosis. The second area of regulation is because the regional government is in charge of financing infrastructure works (e.g. tracks, troughs) and improvements in pastures (e.g. fertilization, shrub clearing). The villagers should contribute to the infrastructure works, depending on the number of livestock they have (OBC 240, 16673). Particularly, pasture burning is treated through a choice rule, due to the problems that this practice is causing. Presently, it is common for users to reduce the proliferation of shrubs by uncontrolled burning (Carracedo et al. 2006).

Concerning the action situation 'monitoring' there is an important difference between bylaws. In the 1755 bylaw an internal monitoring is established and therefore two positions are included: the shepherd advisor and the livestock censor. The latter is entrusted with the task of making a census to organize the herds and to distribute the charges (e.g. labors, payments) of each villager. The mayor must select the livestock censor as well as formalize and update the census annually. Other competences of the mayor are to ensure compliance with the bylaw and keep a record of the fines and announce them in the village council (see Appendix 1; SML 432, 285). With regard to the villagers, the 1755 bylaw establishes that they shall comply with the bylaws and monitor the pasture area closest to the village, a rule that the villagers included in the 1783 claim (SML 432, 290). To encourage monitoring, at the beginning of the bylaw, it is established that individuals who report an infraction will receive, as a reward, one-third of the amount of the fine (SML 432, 280).

However, in the 2008 bylaw an external and nested monitoring was established. The local entity and the regional government, through the service of wardens, share monitoring tasks—without any responsibility being placed on the villagers. Two generic statements on monitoring are included (i.e. enforcing and implement the bylaw), as are some specific ones, i.e. to supervise infrastructure works, and to implement the fines. Thus, it seems that the nested competences have been devised to promote a higher level of success in monitoring (see, e.g. Ostrom 2005: 269–270).

Finally, there are major differences in the action situation 'decision-making'. The 1755 bylaw includes different information rules for the villagers to participate in decision-making (see **Table 4**). In particular, there is one rule aimed at achieving high attendance at the village council, another which regulates the procedure to request items for discussion, and two others aimed at regulating the behavior of the participants. Furthermore, an information rule states that the mayor shall read aloud the bylaws in the village council annually (Appendix 1). However, the statements are not as restrictive as the Appendix suggests. Although it is established that the villagers must attend the council, two exceptions are allowed: being occupied in agricultural tasks (e.g. ploughing, harvesting), or being far from the village—both exceptions were included in the 1783 claim (SML 432, 289).

Presently, as stated above, village council meetings are optional for local entities, and therefore the 2008 bylaw does not include information statements (see Appendix 2). However, because of the outsourcing of competences, a number of choice statements about decision-making are included, i.e. regional government in the definition of grazing areas and stock thresholds and in the approval of bylaws, and the outsiders' rights-users in the drafting of bylaws. Whereas the choice statement 'the local entity shall write the bylaw' is implicit in the 1755 bylaw, due to a royal prescription of 1423 (New Compilation of the Spanish Laws, book 7, title 3, law 1).

Table 4: Types of statements by action situation (1755).

	Position	Boundary	Choice	Aggregation	Information	Payoff	Scope	Total
Appropriation	1	3	10	1	–	–	–	15
Provisioning	–	–	2	–	–	–	–	2
Monitoring	2	–	4	–	3	1	–	10
Decision-making	1	–	–	–	5	–	–	6

Table 5: Types of statements by action situation (2008).

	Position	Boundary	Choice	Aggregation	Information	Payoff	Scope	Total
Appropriation	1	4	10	–	1	–	–	16
Provisioning	–	–	10	–	–	–	–	10
Monitoring	–	–	5	–	–	–	–	5
Decision-making	–	–	5	–	–	–	–	5

5.5. Institutional epistemology

Many of the statements in the 2008 bylaw concerning the action situation 'appropriation' are based on an agronomic approach, included by the government services, while calendars of use have been designed by the villagers themselves. Thus, we can consider the 2008 bylaw an institutional mix based on scientific and user knowledge. Nevertheless, the 1755 bylaw is based exclusively on user knowledge.

An indicator of this difference is the 'institutional epistemic approach' of each bylaw, i.e. the form (abstract or concrete) in which their statements are designed to influence the relationship between user and resource. If statements in the action situation 'appropriation' are compared, we can observe a clear correspondence with each of the epistemologies. The statements of the 1755 bylaw are concrete, e.g. 'a shepherd may not use sector A [under certain conditions], or must pay a fine' (see Appendix 1). Nevertheless, the statements of the 2008 bylaw are totally abstract, e.g. 'the villagers shall use pastures heterogeneously [at all times]' (see Appendix 2).

The present bylaws of Cantabria have been conceived in a universalistic way, and this is reflected in a high degree of abstraction. Due to sanitary and environmental requirements, in 2000 the regional government demanded that local authorities draft bylaws. The challenge was quickly addressed, and general recommendations on pastoral land use were established. This made it possible to spread a model of bylaw that could be adjusted by local entities, through the design of calendars of use.

Nevertheless, the 1755 bylaw seems to respond to an adaptive design. The bylaw shows us pastures with a complex zoning in relation to periods of the year (basically spring, summer, and autumn), and species (cattle, sheep, and goats) and livestock categories (e.g. oxen, suckling calves). Some of the areas are delineated using a large amount of toponymy, i.e. 54 place-names (SML 432, 280–292). Thus, it seems that the zoning would be the result of a long period of adjustment based on the relationship of the user community with the resource. In fact, it was a zoning that was continually redefined, e.g. changes in the calendars of use are observed if we compare the original text (1755) and the 1785 claim.

6. Discussion

This section is organized in two parts. The first highlights the utility of the IAD approach to systematically compare historical and present-day bylaws, and how this process enables one to isolate and classify a large body of archival information which belongs to a given user community. The second part summarizes the potential of this source of information to favor sustainable CPR governance. We hypothesize that archival information can generate two interacting mechanisms that promote social interaction and knowledge coproduction: (1) linking institutional epistemologies, i.e. the way in which the stakeholders make statements about CPR governance, and (2) promoting and providing knowledge to coproduce new policies. For this task, the IAD approach is also useful, because it facilitates the codification and classification of archival information, and therefore its display and analysis in participatory workshops.

6.1. Utility of the IAD approach to compare historical and present-day bylaws

The IAD approach designed by Carter et al. (2016) enabled us to identify a number of differences between two village bylaws written, respectively, in 1755 and 2008. Specifically, it enabled us to isolate several regulations of interest, which refer to four canonical action situations that commonly structure CPR regimes: i.e. appropriation, provisioning, monitoring, and collective decision-making. These results are particularly useful if one takes into account that these village bylaws have been written using different epistemologies and linguistic forms.

The first step, that is, applying the institutional grammar tool, enabled us to isolate the basic statements contained in the village bylaws. We found that this step is also useful in the process of linguistic homogenization of the bylaws, because the 1755 bylaw was written using the linguistic style of early modern times, and therefore it includes morpho-syntactic structures as well as latinisms and legal formalisms of a given discursive tradition (see Kabatek 2004). To carry out this process of homogenization, it is necessary that the coder is familiar with the linguistic particularities of early modern times. Even so, we found that the degree of 'intercoder reliability'—i.e. disagreements between the result obtained by the coders (see Basurto et al. 2010)—can be low when one codes historical regulations. In this case, the task was performed by a single coder, and therefore we lack data to measure this feature. Thus, we consider that one more step has to be taken in this direction, in order to quantify the potential incidence of such a problem. This requires that several coders to apply the institutional grammar tool on the same bylaw, in order to measure the variability of the results obtained.

Then, once the bylaws were deconstructed and their statements were systematically structured by aim and action situation, we defined five major areas of analysis: (1) potential interests of the actors, (2) restrictive level

of the bylaws, (3) expected role of the actors, (4) institutional complexity, and (5) institutional epistemology. The organization of the analysis in these five areas enabled us to make an in-depth comparison of the bylaws, because it involves a large spectrum of their structural logic. However, we consider that the fifth area of analysis (i.e. institutional epistemology) responds to a particularity of our study case. We find that the regulatory model on which the 2008 bylaw is based, conceived at a regional scale, and largely abstract, is part of a political task that is still open. Thus, we hope that future efforts will be made by the regional government in order to design a more complete regulatory model or to encourage local entities and resource users to design bylaws adapted to their social-ecological contexts.

6.2. Utility of archival information in CPR governance

The comparative analysis enabled us to isolate and classify a large body of archival information which belongs to a given user community. But, what can we do with this information? Can it contribute to the sustainability of the resource co-managed by this community? In the following subsections we try to answer this question. We hypothesize that the historical archive can favor CPR governance through two interacting mechanisms that promote social interaction and knowledge coproduction: (1) linking institutional epistemologies, and (2) promoting and providing knowledge.

6.2.1. Linking epistemologies

Differences in the institutional epistemology used by the stakeholders involved in co-management, i.e. the form (abstract or concrete) in which they make statements about the management of the resource, are a usual source of problems, as these contribute to a lack of understanding among them (see, e.g. Reid et al. 2006).

Generally speaking, in the area of common pasture management, there are two main sources of scientific knowledge that technical advisors use as reference: on the one hand, institutional theories of common property (e.g. Ostrom's design principles (Ostrom 2005: 259); see Cox et al. 2010) and, on the other hand, theories taken from agronomy and pasture ecology (e.g. Plachter and Hampicke 2010). As noted above, institutional theories are based in part on archival information (Ostrom 1990: 61–88) and, consequently, there are focal points that coincide in both sources.

Thus, we propose to use both sources in a combined way, e.g. the design principles as a reference guide for governance analysis and, if possible, the historical regulations of the user community being targeted. This enables one to make use of the broad epistemological spectrum that exists between both sources— from the most abstract forms (the design principles) to the most concrete or site-specific ones (historical regulations). By doing so, one can bridge the different institutional epistemologies that the main parties in co-management employ to make statements about the commons. Appendix 3 illustrates this proposal through an example in which the first four design principles—those targeted at the lower level of governance and directly related to the elaboration of rules (Ostrom 2005: 271)—are confronted with some rules of the 1755 bylaw of Obeso.

6.2.2. Promoting and providing knowledge

We find that the archive is useful to enhance users' knowledge at two broad levels. The first level is to use the specific content of the institutional statements that the community employed at a given time. The second level is to use the information that results from analyzing a set of institutional statements that the community used to deal with changes or crises, not only in a premeditated way but also as part of a strategy that makes sense in the long run.

The first level is particularly problematic. The specific content of institutional statements was conceived in respond to specific local conditions, which are constantly changing both in the ecological (e.g. climate, forage stock) and social (e.g. demography, markets) components. But keeping this in mind, we find that differences in the intensity of the social-ecological transformations can suggest two ways of using the specific content of institutional statements: (1) as focal point to promote policies in CPR governance areas of interest, which require a middle-range abstraction of the source, and (2) as a source of information *sensu stricto* by maintaining as many local particularities as possible.

In relation to areas where there have been intense social-ecological changes, we find that institutional statements must be abstracted and used as reference to promote policies in major areas of CPR governance, in the same way that Baland and Platteau (1996: 325–326) have conceived the utility of the past experiences of user communities, i.e. to extend them by analogy from one domain of social life to another or reinforcing a particular domain. For example, statements of the 1755 bylaw concerning decision-making

and monitoring were written in a context of high community cohesion (e.g. villagers denouncing each other as a strategy of internal monitoring), and, consequently, their replicability is difficult because of the rural abandonment that occurred in the study area (Reques 1997: 117). However, the same statements in their abstract form (i.e. monitoring) can be presented in participatory workshops to encourage users to undertake collective action in this key area of CPR governance. As mentioned above, many common pastures in the municipality are currently open-access resources due to a lack of monitoring. Nevertheless, we find that is important to maintain institutional statements at a middle-range abstraction in order to preserve their local particularities (e.g. toponymy, calendars of use, protagonists). If we deprive archival information of these particularities, we will lose the anchor points that link users with this source, and therefore it will be difficult to build trust among stakeholders and to establish bridges between the institutional epistemologies used by them.

But concerning those areas in which social-ecological changes have been minor, we find that institutional statements can be useful in its concrete or site-specific form, i.e. as a source of information *sensu stricto* by maintaining as many local particularities as possible. For example, in the study area, recent research based on toponymy indicates that grazing areas in the higher (summer) commons have hardly changed since the mid-18th century (Corbera 2010: 137; Vázquez 2016: 337–356). Thus, the rules of the 1755 bylaw on livestock management, specifically those concerning the zoning of pastures, as well as promoting new collective action, can be taken as a source of information per se. There are nine rules that deal with a temporal and spatial zoning of common pastures according to livestock species (cattle, sheep and goats) and categories (e.g. pregnant and young animals), which is consistent with agronomic approaches aimed at achieving efficient use of common pastures (Plachter and Hampicke 2010). Basically, this makes it possible to take advantage of each area of pasture according to its best phenological state and, at the same time, to complement the diets of each livestock species. Of course, it is totally inadvisable to replicate this zoning by considering exactly the same areas as were defined in the 1755 bylaw, mainly due to changes in the livestock censuses. However, an experimental reconstruction of this zoning could serve to identify the specific criteria that were employed, and to use them as support information to design a new one. This can be addressed in a workshop through a Geographic Information System, for example following the methodology of 'participatory mapping' whereby stakeholders analyze management alternatives through geographic information (see, e.g. Rocheleau 2005).

The usefulness of archives at the second level, or to provide strategies for dealing with changes and crises, is certainly less problematic. This is because these strategies are presented abstractly, as they are a synthesis of a set of institutional statements designed with a shared objective and repeated in bylaws (and other archival sources) from different historical periods. Unfortunately, our study case does not enable us to do this type of analysis, because, as stated above, a single bylaw from the village of Obeso is available in the archives. However, such an analysis has already been addressed by other authors. For example, using historical records of religious ceremonies from the period 1577–1956, Gómez-Baggethun et al. (2012) have collected the reactions of a Spanish rural community to extreme climatic variations (mainly droughts), e.g. strategies such as transhumance-based mobility, storage of resources, and consumption restrictions (see also Endfield 2012, Grau-Satorras et al. 2016). There are also case studies concerning socioeconomic changes. For example, through an analysis of European village bylaws from the period 1300 to the present, De Moor et al. (2016) have concluded that one of the greatest efforts made by communities was that of adjusting rules on consumption restrictions (e.g. entry fees) to address demographic and market changes (see also Baur and Binder 2013; De Moor 2015: 121–151).

7. Conclusion

Archives can contribute to generate two interacting mechanisms that promote social interaction and knowledge production in co-management practice: (1) linking institutional epistemologies, i.e. the way in which the stakeholders make statements about the management of the resource, and (2) promoting and providing knowledge to coproduce new policy designs. In relation to the later, we identify two levels of using archival information. The first level is to use the specific content of the institutional statements that the community employed at a given time, whereas the second level is to use the information that results from analyzing a set of institutional statements that the community used to deal with changes or crises. But, in both cases, a key factor is to understand archival information as a source that can offer basis or support information, that is, complementary to that provided by conventional sources of scientific and user knowledge.

Our study case has focused on co-managed common pastures, however, we find that archival information can also be useful in the broad context of CPRs (e.g. forests, irrigations and fisheries) and in both community- and

state-governed resources (Kooiman 2003). Thus, we claim archival information as an institutional heritage that governments, scholars, practitioners and CPR users should value and take into consideration for policy design. However, it is timely to recognize that more empirical studies are necessary to advance in this direction. In this paper, we show that it is not difficult to include archival information into participatory methodologies, and therefore we think that more scholars and practitioners can be involved and contributed to this proposal.

Particularly, we identify one direction in which progress is needed, i.e. the design of a methodology that makes archival information accessible to users and technical advisors. In general, historical documentation is foreign to users and technical advisors, because they cannot interpret it or simply because it is not at hand (e.g. in regional and state archives). This paper has taken an initial step to achieve this purpose. The utility of the institutional analysis and development (IAD) framework has been tested, taking as reference the approach designed by Carter et al. (2016). We consider it very suitable when one has to confront policy designs written using different epistemologies (e.g. concrete vs. abstract) and linguistic forms (e.g. early modern vs. contemporary grammars). It enables one not only to undertake a systematic comparison of these policies, but also to easily display the results in participatory workshops, because their codification and classification facilitate their interpretation.

Additional Files

The additional files for this article can be found as follows:

- **Appendix 1.** Syntax coding and categorization of the statements contained in the 1755 bylaw. DOI: https://doi.org/10.5334/ijc.989.s1
- **Appendix 2.** Syntax coding and categorization of the statements contained in the 2008 bylaw. DOI: https://doi.org/10.5334/ijc.989.s2
- **Appendix 3.** Combining Ostrom's design principles (2005: 259) with some rules included in the 1755 bylaw of Obeso. DOI: https://doi.org/10.5334/ijc.989.s3

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Competing Interests

The authors have no competing interests to declare.

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