

Stakeholder interactions in Castile-La Mancha, Spain's cereal-sheep system

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Abstract Large tracts of European rural land, mostly in the less favored areas (LFA), are devoted to low-inputs and large scale grazing systems (LSGS) with potential environmental and social functions. Although these LSGS may provide harbor for a good part of European nature values, their continuity is facing contrasting threats of intensification and abandonment. These areas, however, may be characterized by particular grazing structures and social dynamics of change that should be unveiled prior to attempts to devise rural development strategies or to adapt policy frameworks in general. To wit, stakeholder interactions and legal and institutional processes are described and analyzed for the cereal-sheep system of Castile-La Mancha (CLM) in the central Iberian plain. Farmers and pastoralists still share the use of the land, but their roles and interests have changed over time, and particularly in the last 50 years. Arable farming, mainly cereal cropping, has followed an intensification path, partially tempered by the environmental constraints of the Castilian plain. Extensive pastoralism is still a secondary option of land use; in the main, sheep farmers depend on, and look to, the management practices of arable farmers. A mixed cereal and sheep operation may deliver environmental and economic benefits, but successful implementation of this strategy is only possible when the system serves the needs of both types of stakeholders. Paradoxically, the main drivers of change in the countryside overall are arrayed against this sensible and traditional agricultural system. We argue that the recent legal and institutional frameworks do not favor social

cohesion and that policy-support schemes of the European Union (EU) have been, and continue to be, devised without taking into account the particular structures and social dynamic of the farming system.

Keywords European Union policies · Low-input grazing systems · Landless tenure · Grazing rights · Policy schemes · Pastoral farming systems · Spain

Abbreviations

ADS	<i>Agrupaciones de Defensa Sanitaria</i> (Animal Health Associations)
CAP	Common Agricultural Policy
CLM	<i>Castile-La Mancha</i>
EU	European Union
JCCM	<i>Junta de Comunidades de Castilla-La Mancha</i>
LACOPE	Landscape Development, Biodiversity and Co-operative Livestock Systems in Europe
LFA	Less favored area
LGC	Local Grazing Commission
LSGS	Large-scale grazing system
MTR	Mid-term review of the CAP
PGC	Provincial Grazing Commission
RCMCP	Regional Council of Manchego Cheese Producers
RG	Regional Government
TAL	Total agricultural land

Introduction

Use of large-scale grazing systems (LSGS) across Europe has been the main subject of our most recent European Union (EU) research project (LACOPE 2002). The main objective of the project was to contribute to the sustainable

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use of LSGS by emphasizing economic and ecological synergies reached through co-operative management. Data were generated from seven study areas.

In the study area of south central Spain (CLM), arable farmers¹ and pastoralists share the same land units and operate them to effect a mixed cereal-sheep agricultural system. Landowner cultivators cannot maintain their own flocks of sheep due to the small size of most of their landholdings. In turn, mainly landless pastoralists rely for grazing on land rented from farmers. However, the unbalanced ratio of stakeholders (one pastoralist to about 40–50 farmers) makes co-operation and social consensus difficult (Caballero 2002b; Caballero 2003). The mixed agricultural system may deliver economic and environmental assets in the form of higher outputs per unit of land, suitable habitat quality for target European wildlife and conservation species such as great bustard (*Otis tarda*), and production of indigenous livestock products such as the Manchego cheese (Oksanen et al. 2006; Caballero et al. 2007). Consequently, proper institutional management is required to maintain the operation of the system into the future.

Successful agricultural development interventions, however, require many different regional and EU policy schemes that do not always reach their environmental, economic and social goals (Brouwer and Lowe 2000; Beaufoy et al. 2003; European Commission 2006; Kleijn et al. 2006). In this research we hypothesized that agricultural policies may create more divergence than convergence of interests between cultivators and pastoralists; and that non-participatory, top-down and sectoral regulations fail to incorporate existing socio-economic realities on the ground that could otherwise be harnessed to meet development goals. EU regulations, for example, are sectoral, but do not take into account the regional differences in pastoral systems within one particular sector (in this case, the sheep sector). The paper attempts to understand change with particular emphasis on legal and institutional processes in the cereal-sheep system of CLM. Within this context, detailed history of cultivator-pastoralist relationships over time is of paramount importance because conflicts have arisen historically over shared land. The paper will illuminate the causes and consequences of major changes, ending with a discussion of present problems and proposed solutions. This research can facilitate further co-ordination and common job within experts of grassland systems research.

¹ In Spanish, there is not a word that is neatly equivalent to “farmer”; and in Spain we make a distinction between the crop farmer (*agricultor*) and the livestock farmer (*ganadero*) with professional advice and administrative divisions serving both groups.

Specifically, the paper will try to clarify the user-structure of the LSGS concept, and the relationship between property type and institutional management of pastoral resources (Fernandez-Gimenez and Le Febre 2006). Relevant ideas on public goods and the theory of groups (Olson 1971; Ostrom et al. 1994) are employed to assist understanding of the differences between property-rights and user-rights in CLM.

Methods and procedures

The regional setting

Castile-La Mancha is the third largest region ($79.2 \times 10^3 \text{ km}^2$) within the EU and occupies the southern Castilian Plain (mean elevation 600 m). The Tajo and Guadiana Rivers drain the plain, which has a mean regional rainfall of 450 mm and a Mediterranean continental-type climate (mean of 30 days with frost per year).

The Total Agricultural Land (TAL) in 1998 was 7.6×10^6 ha, 70% of which is arable land (AL), mostly (95%) rain-fed arable land (RAL). Winter cereals, annual legumes, fallow, sunflower, olives and vineyards occupy 42, 6, 20, 8, 9, and 15% of RAL, respectively.

The traditional grazing feed resources included non-arable land [natural pasture, shrub-steppe vegetation (*eriales*), and Mediterranean forest], mostly located in the mountainous fringes of the plain; and agro-pastoral resources (cereal, legumes, and sunflower stubbles and fallow) located in the central part, where arable land dominates. Parcels with olives, vineyards, and irrigation are by law excluded from grazing use.

The main breed within the regional flock (some 3.5×10^6 breeding ewes) is the *Manchega* dairy sheep. Other minor sheep breeds are *Segureña*, *Talaverana*, *Castellana* and *Ojalada*. Milk-oriented flocks for the production of *Manchego* cheese are dominant in the plain and meat-oriented flocks in the foothills and mountainous areas.

Castile-La Mancha is divided into five administrative provinces (Albacete, Ciudad Real, Cuenca, Guadalajara and Toledo), 21 counties, and 916 municipalities. The regional size of landholdings is some 30 ha, but in the central plain of La Mancha, where the mixed cereal and sheep agricultural system is dominant, the mean size is much lower (some 5–10 ha, depending on the county) and property is frequently split into non-adjacent parcels.

Structure of Spanish grazing systems

Within each municipality, pastoral resources are grouped to form grazing land allotments (*poligonos de pastos*), and frequently the cereal and sheep operations are carried out in

these same land units. This structure has functioned to overcome the constraint of small parcels in maintaining flocks of adequate size.

The legal framework which regulates grazing management distinguishes three types of land units. Grazing land rented to landless pastoralists (*poligonos parcelarios*) occupy some 50% of TAL. Grazing land of large landholdings, segregated from grazing rights transfers (*poligonos segregados*), occupy some 30% of TAL. Finally, cropland with olives, vineyards, and irrigated parcels take up some 20% of TAL, where grazing is prohibited. This structure of the grazing system shows characteristics of agro-pastoral (e.g., it relies chiefly on agricultural residues for feed) and extensive systems (e.g., small stocking of the sheep operation in contrast with large and unfenced *polígonos*). The sheep flocks have to be managed constantly and carefully by shepherds because parcels with available pastoral resources and non-grazing parcels are frequently interspersed within the *polígonos*.

The difference between *poligonos parcelarios* and *poligonos segregados* is related to the size of the holdings and the system of grazing rights. Smallholdings are grouped in *poligonos parcelarios* and grazing rights are under the public domain (i.e., a public good) and a renting regime (small landowners cannot refuse the access by pastoralists). The *poligonos segregados* are large holdings (more than 200–300 ha), outside the renting regime, where the owner may or may not maintain their own flock. In some cases, large landowners who do not maintain their own flock may make arrangements with one pastoralist, and negotiate a grazing fee. In *poligonos parcelarios*, however, grazing fees are regulated for the Regional Government (RG).

Data collection

Within each municipality, a Local Grazing Commission (LGC) operates. This LGC is committee-like with seven members, and is composed of three cultivators; three pastoralists; and one representative of the villages' council, who acts as president. They keep agricultural records on grazing-rights for distribution to pastoralists, manage changes in grazing land units (*polígonos*), and control payments to cultivators. Each LGC reports to the corresponding Provincial Grazing Commission (PGC), which is under the scope of the RG. The RG keeps records on allocations of EU and regional subsidies to crop and sheep farmers, but the RG delegates the responsibility for grazing management to the LGC.

For the purpose of our study, local grazing records were requested from the five secretaries of the PGC; they were specifically requested to provide data on the rate of implementation of current legal regulations (JCCM 2000). Trends in the last 50 years were derived from records of

the now-abolished *Cámaras Agrarias* and local agriculture staff for EU projects previous to the demise of the *Cámaras Agrarias* (DIVOR-DEF 2002). Most of the recent data on grazing structure and land use were derived from the EU-funded LACOPE project, representing the situation in the year 2002. This was achieved by surveying and consulting with a random sample of sheep and crop farmers from the entire region. Details of sampling tools and procedures are provided in Caballero et al. (2005).

Sheep farmers were sampled using written standardized questionnaires. The objective and content of the questionnaires were explained during group discussions with the local Animal Health Associations (Agrupaciones de Defensa Sanitaria (ADS)). In the qualitative part of the questionnaire, the research team asked about the relationship between constraints, and proposals regarding regional pasture regulations, cultivator-pastoralist relationships, and agricultural policy support. At the end, 231 valid questionnaires were received from sheep farmers (a minimum of six and a maximum of 27 from each of the 21 counties) out of a population of some-6,000 sheep farmers in the region. Additionally, 92 pairs (crop and sheep farmers) of valid questionnaires were received from 73 municipalities out of a total of 916. Local Cadastre-base maps were provided by the RG. Over one of these maps (municipality of Casas de Juan Nuñez, province of Albacete), the local agriculture staff of La Higuera (Albacete), displayed data on grazing unit distribution and stocking rates corresponding to each *polígono*. Figure 1 was created with help of ArcGIS 9 software. Historical background of cultivator-pastoralist relationships was derived from available literature and from more recent comparative legal research on Spanish grazing systems (Sánchez 2004).

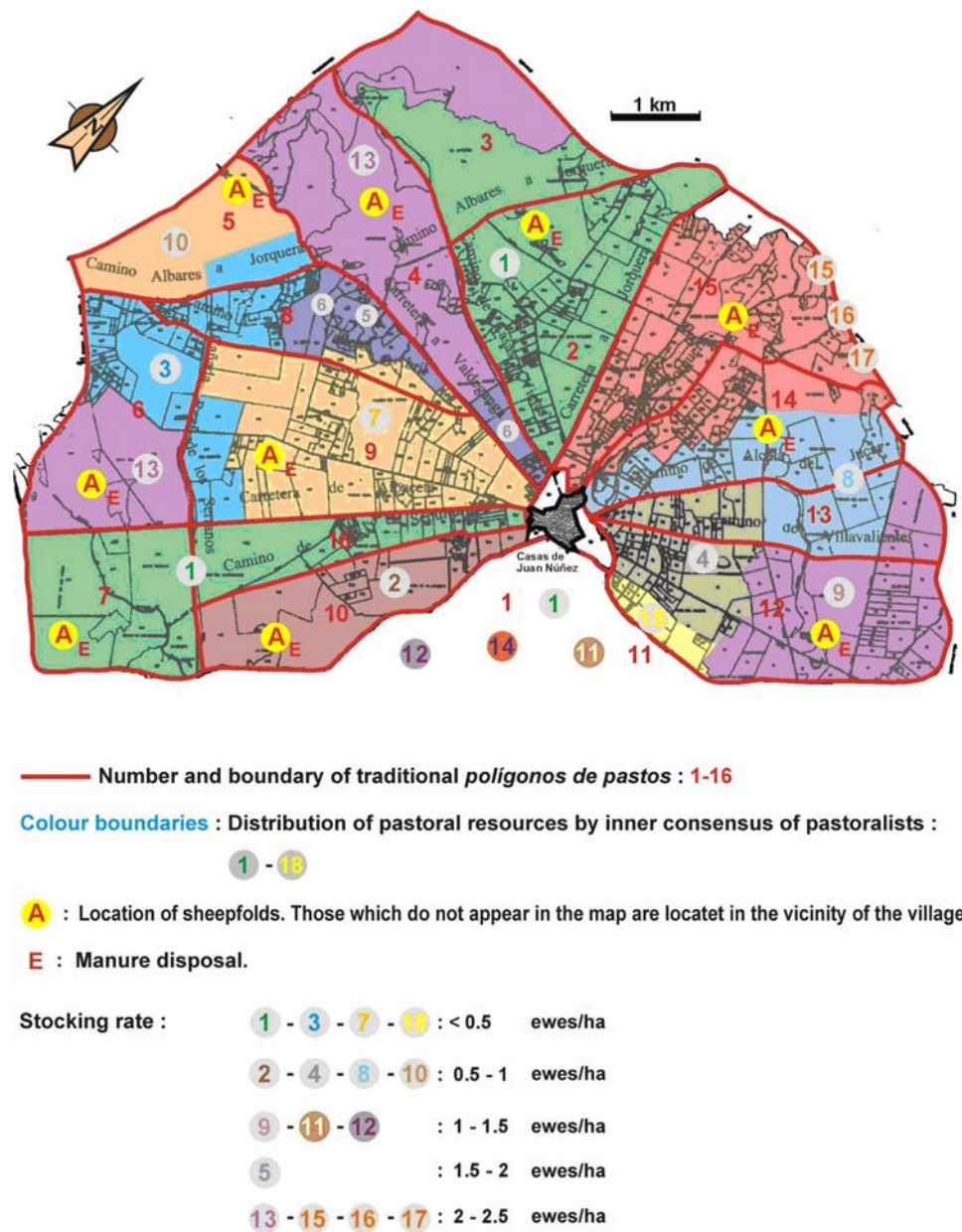
Results

Cultivator-pastoralist relationships over time

The system of grazing rights within the public domain dates from the Middle Ages. The *Mesta* system regulates distribution of pastoral resources between nomadic (*trashumantes*) pastoralists and sedentarian (*estantes*) pastoralists, the latter did not move their flocks long distances. Most conflicts in the history of the *Mesta* (1273–1836) have been between pastoralists themselves, related to access to grazing rights (Ruiz Martín and García Sanz 1998).

At the beginning, the *Mesta* was a pastoral organization of small-scale pastoralists intended to regulate of the *trashumance* system. Latter, the *Mesta* became dominated by owners of big flocks of the monasteries, the military brotherhoods, and nobility. At the height of its power, the

Fig. 1 Map of parcels and *polígonos de pastos* (sheep allotments) in the municipality of Casas de Juan Núñez (Albacete, Spain)



Mesta managed 3–4 million Merino sheep—and some monasteries (*Guadalupe* and *El Paular*) owned some 20,000–30,000 sheep. Between summer and winter pastures they moved the flocks long distances (up to 700 km) along regulated drove corridors (*cañadas* and *veredas*). The most affected province in CLM was Ciudad Real, where some of the most famous winter pastures were located (*Valle de Alcudia*), but the entire region was in the North-South pathway of the *trashumance* system. Because the *estantes* flocks of the region could not successfully compete with the *Mesta* flocks for the winter pastures, they developed complementary strategies for providing forage, such as sowing cereals (as greens) and annual legumes for grazing and haymaking.

With the disappearance of the *Mesta* and most of the *trashumance* system, conflicts became more frequent between cultivators and sedentarian pastoralists. Successive regulations since the nineteenth century favored one or the other depending on the political trends (more liberal governments typically favored cultivators). Some of the winter pastures utilized by the *Mesta* flocks fell to the plow (*rompimientos de pastos*). More recent regulations on grazing management dates back from 1938 (Pasture and Stubble Act, October 7) and its associated regulation (Decree 1256/1969 of June 6). This legal system upheld the status of grazing rights under the public domain and established that those landowners with holdings larger than 200–300 ha may segregate their land from grazing right

transfers. This provision has been upheld by the recent Regional Pasture and Stubble Act of CLM: Ley 7/2000, December 5 (JCCM 2000) under the assumption that large landowners may maintain a flock of regular size (*polígonos segregados*) outside the renting regime.

European Union considerations

After Spain joined the EU in 1986, additional policy schemes were considered. Direct payments still accounted for more than 80% of total subsidies. In the cereal-sheep system, direct payments to cultivators (per hectare) and to pastoralists (per head of sheep, “headage payment”) are awarded separately. Overall, the EU policy framework contributes more to divergence than the convergence of interest between the two social groups because is unable to recognize that both operations are carried out on the same land units (Caballero 2001a, b). What other options face the cultivators under EU regulations? The EU Rural Development Regulations (1257/1999 and 1750/1999) were transformed into Spanish law through Royal Decree 4/2001, BOE 13 January (M^o de Agricultura 2001). Amongst other measures, it provides for nine possible agri-environmental actions for cultivators (e.g., integrated pest management, organic agriculture, extensification or low intensity cultivation, water management, and erosion control). These schemes are derivation of the 10 agri-environment schemes developed under Regulation 2078/1992 (reforestation, bird sanctuary areas, water saving strategies, etc.). All of these schemes ran alongside actions for protecting wetlands (on RAMSAR sites) for the Natura 2000 network, for Natural Parks, and so forth.

This befuddling and complex series of overlapping schemes, each with its own pattern of preferences, schedules, exclusions and regulatory bodies, adds to the technical difficulties of implementing a sensible strategy within the *polígonos*. The implementation of all these different actions on parcels within specific *polígonos* may effectively drive out sheep grazing altogether. Too many schemes operating within a system puts a burden on farmers and agriculture staff. They produce confusing strategies, are typically accompanied by an additional burden of paperwork, and the effects of single schemes are difficult to assess because of the complex interactions between them.

The cultivators-pastoralists divide in the last 50 years

The implementation of cereal and sheep mixed farming systems in CLM has been affected by changes in the Spanish business and social environments. In the 1950s and 1960s, landowner pastoralists dominated most municipalities but most still owned small flocks intended mainly for

family consumption. Farm machinery as a main replacement for labor in its first phase of implementation, and the number of tractors regularly utilized in 1960 was some 6% of their actual number. Most landowners used draft animals for cultivation and had an incentive to rotate cereal and legumes for animal and food consumption. The members of the family shared crop and sheep workloads full time.

In 1970, in 65% of the municipalities, landowner pastoralists and landless pastoralists were both present, although the second group dominated. The level of machinery utilization had increased to some 30% of current use. Cereal and sheep production became more market-oriented and the mean size of sheep flocks increased to some 150 breeding ewes. As the mean size of the land did not allow for the maintenance of such sizeable flocks, landowners concentrated on production of cereals, and the number of pastoralists started to decrease. More educated young farmers looked for job opportunities in alternative sectors of the economy, rejecting the hard-working conditions of the sheep operation.

In 1997, in 65% of municipalities, only landless pastoralists were present and this group owned 80% of sheep flocks in the entire region. The mean flock size had increased to some 230 breeding ewes in 1989 and some 320 breeding ewes in 1997. Farm machinery started to reach a plateau with full implementation (some 40 ha of cultivated land per tractor). Cultivation of cereals required some 10 h/ha × year or 300 h/year per an average 30 ha of cropland. Attending an average-sized sheep flocks of 300 breeding ewes required a year-long labor because the structure of grazing units and interspersions of pastoral resources left little profit margin for landless pastoralists to improve grazing conditions.

Current records from LACOPE (for 2002) still showed a divide between cultivators and pastoralists. At present, some 95% of sheep farmers rely on feed resources on the *polígonos*; but we have found that, progressively, a higher proportion of them may rent or own land parcels to provide complementary forage resources. The actual size of the sheep flock has increased to more than 450 breeding ewes but the regional sheep flock has not changed much, as the numbers of sheep farmers declined rate of 3–4% per year in the last 35 years.

Implementation of the regional law resulted in little success. A large majority of municipalities (85%) abided by the law in appointing a corresponding LGC, but only a minority (18%) had implemented mandatory grazing management plans, even after 5 years of establishment and enforcement of the law (Table 1).

Currently, the cereal-sheep system can be considered to be a modified form of a past traditional system dating from before the introduction of farm machinery in the early sixties. The cereal subsystem evolved in response to new

Table 1 Implementation of the regional grazing law (ley 7/2000) in Castile-La Mancha^a

Province	No. of municipalities	No. of municipalities with LGCs ^b	No. of municipalities with GMPs ^c
Albacete	87	74	23
Ciudad Real	98	71	23
Cuenca	234	226	13
Guadalajara	289	285	53
Toledo	204	122	50
Total	912	778	162

^a Data in December 2005 after 5 years of the law in force

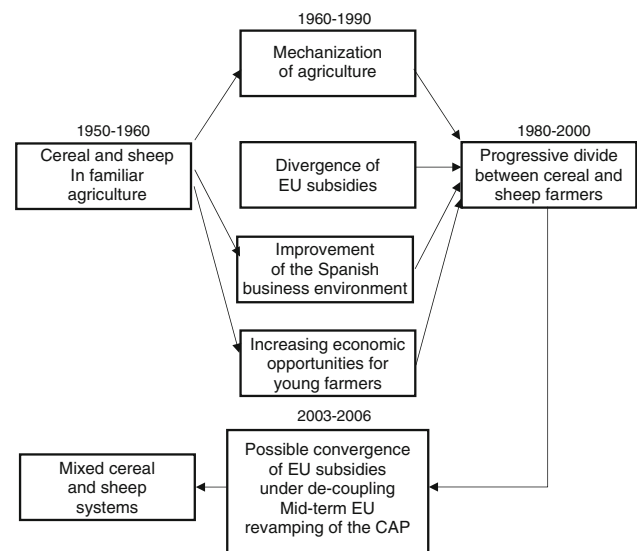
^b LGC: Local Grazing Commission

^c GMP: Grazing Management Plans (*Ordenanzas locales de Pastos*)

technologies (such as crop varieties, chemical fertilizers, and farm machinery) as a requirement for higher productivity, cutting costs and resulting in less labor-demanding operations. The sheep subsystem has changed less, reacting to productivity demands by increasing the size of the sheep flocks and responding to labor demands by lessening grazing-days and increasing indoor feeding.

The introduction of farm subsidies since the Spanish entry into the EU in 1986 exacerbated the divisiveness between cultivators and pastoralists, as they are now entitled to separate schemes of payments that do not take into account joint use of the land. However, changes observed in the system are probably more the consequence of rising incomes and structural changes in the Spanish business environment than of the vagaries of the Common Agricultural Policy (CAP). The successive reforms of the CAP (1992, Agenda 2000) did not bring any apparent change over the general trends of the system that we have summarized, and others drivers of change should also be considered (Fig. 2).

Under the last Mid-Term Review (MTR) of the CAP (summer 2003), subsidies have been partially or totally de-coupled from production under some land use rules—yet to be implemented. Facing the prospect of abandonment of marginally-cultivated lands and land use rules linked to extensive grazing strategies, mixed cereal and sheep systems may improve operational facilities. This scenario is considered as part of the extensification scheme, but may be altered if increases in world prices of cereal grain continue. Only some modeling scenarios within LACOPE have been devised to estimate the possible effects (Fernandes and Guiomar 2006). The best we can say is that policy-makers should be aware of how the system is presently functioning to establish land use rules that successfully favor cereal-sheep integration under revamped legal and institutional frameworks adapted to new economic conditions and trade globalization. This task

**Fig. 2** The cultivators-pastoralists divide over the last 50 years in Castile-La Mancha

is worthwhile because the traditional strategies of planting annual legumes and mixing cereal and sheep still make environmental sense (Table 2).

Access to grazing rights

The divergent views between cultivators and pastoralists were again revealed when the question was posed of whether grazing resources should be considered to be mainly a private or public good. The first alternative (private) would imply that access to grazing resources should be linked to land property ownership while the second (public) would consider grazing resources to be within the public domain. The present legal framework upheld past regulations on this essential provision.

The legal framework discriminates between small and large-sized land holders regarding the transference of grazing rights. The former group does not have the opportunity to link grazing right to land property (grazing rights in the public domain) as does the latter group. The current regional grazing regulation assumes that large landowners may more readily maintain sizeable flocks, but this social group is largely uninterested in the sheep operation (some 10% of flocks only in *poligonos segregados* and 90% using *poligonos parcelarios*). Under the current regime, large areas of grazing land are underused and regional stocking of sheep is concentrated in the rented land, where stocking in some six times higher than in non-rented land (Caballero 2002a).

Access to grazing rights can be achieved through three main channels. The first, and most usual, is a direct grant by the LGC in charge of the renting land (*poligonos*

Table 2 Potential environmental benefits of legumes cultivation and mixed cereal with sheep farming systems of the Mediterranean basin

Environmental benefits of legume cultivation	Environmental benefits of mixed cereal and sheep farming systems
Cereal yields stabilization and break-up of the cycle of pathogens when changing from cereal-fallow to cereal-legumes rotation (Romero 1988; Lacasta 1995; Pala 1997)	Raising land productivity by adding values of production of cereal and sheep in the same land unit (Caballero 2003; Fernandes and Guiomar 2006)
Raising cereal yields, soil organic matter, and the soil biota (Pimentel and Heichel 1991; ICARDA 1998)	Adding value to non-competitive and low-quality pastoral resources by obtaining high quality animal products (Caballero et al. 1992; Valiente 2004)
N fixation and CO ₂ sequestration (Papastilianou 1999)	Maintaining biodiversity of natural pastures by breaking vegetation succession to lower biodiversity of Mediterranean shrubby vegetation types (Ferrer et al. 2001; Gómez Sal 2001; Pineda 2001; SEEP 2001)
Quality forage for sheep and feeding and nesting habitat for steppe birds (de Juana et al. 1993; Caballero et al. 1996)	Increasing manure availability for improvements of low organic matter soils (Carlevaris et al. 1992; Bello 1993; Correal and Sotomayor 1998)
Better water-use efficiency of rainfall in relation to fallowlands (Lacasta 1995; Roman 1996; Yesilsoy and Ersahin 1997)	
Less grazing pressure on pastoral resources as complementary forage is available for structural non-grazing season (Arnon 1992; Caballero 1993)	

parcelarios). The second is constituted by special agreement between large landowners (who do not maintain their own flocks) and one landless pastoralist (*poligonos segregados*). Frequently and third, under low pressure for access to grazing rights, pastoral resources are distributed by informal consensus or decision making among interested pastoralists. As the number of pastoralists is declining, some municipalities may possess non-allocated *poligonos*. These are granted to outside petitioners, usually from neighboring municipalities, and remainder is unused. A non-competition principle is operating between cultivators (supply side) in the sense that grazing fees are fixed within a limited range of prices by the PGC, so there is no difference in grazing fees between *poligonos* within municipalities and very little between *poligonos* of neighboring municipalities.

The way the pastoral resources are managed resembles the problem associated with a “public good” in the sense that non-exclusion and non-competition principles are partially operating on the supply side. For small crop farmers, membership is compulsory and they must abide by the law in providing the grazing resources. This is in line with the idea of Olson (1971) on inclusive collective goods. On the demand side, however, landless pastoralists of particular municipalities have access-preference to the grazing *poligonos* over those of neighboring municipalities or outside petitioners, and most *poligonos* are linked to use by particular pastoralist over the years, to the exclusion of outsiders. The use of a particular *poligono* is usually transferred only when the flock is sold to a new operator (usually another landless pastoralist of the municipality or of a neighboring municipality). Pastoralists are thus operating with the exclusion principle under a “club good” situation.

Following the ideas of Olson (1971), a revamping of the system based on the majority principle would be difficult to

apply in the bargaining of grazing rights, because of the unbalanced size of the two groups. As the cost of self-exclusion under current grazing fees would be very low, even a minority of self-excluded cultivators would hinder the utilization of the *poligonos*. It should be taken into account that law already excludes parcels of olives, vineyards, and irrigated crops. Under recent EU Rural Development Regulations (1257/1999), parcels under agri-environment schemes (i.e. reforestation) are also excluded from grazing use.

The legal basis of the cereal-sheep grazing system has been questioned under the assumption of interference with property rights, but the consensus agreement has been operative for centuries (Nieto 1959). Landless pastoralists have customary use-rights (*derecho consuetudinario*) to pastoral resources, and most cultivators abide by the law under a sense of social responsibility, but neither see themselves as real stakeholders in the management of the system nor as receivers of comparative benefits. Most cultivators do not restrain the access of flocks to their grazing land, but they do not expect co-operative behavior for sensible use of the grazing resources.

Main problems of the present Regional Regulation on Grazing Management

The legal and institutional framework (Law 7/2000, December, 5) may fall short of expectations in three mayor issues: grazing rights, grazing fees and security of tenure. Grazing rights remain under the public domain, but the power of cultivators and pastoralists remains unbalanced. For the former, the sheep operation is only a secondary option of land use. Benefits and costs are not shared proportionately as this group only receives a low, fixed grazing fee. In the LACOPE project, we estimated the

farming income of cereal cultivation alone versus mixed cereal and sheep. The total farming income per unit of land was higher for the second option but the share of the cereal operation was 25% lower than with the first option (Fernandes and Guiomar 2006). It seems that cereal farmers should be compensated if co-operative behavior is expected. Under the current situation, large landowners have an incentive to maintain the status quo of exclusion and bargain the leasing of their resources with particular pastoralists. An important environmental implication is the heterogeneous distribution of regional stocking between *polígonos segregados* and *polígonos parcelarios*.

Grazing fees are fixed by the PGC within a limited range for bargaining in the LGC. Under the present legal framework, competition for access to grazing rights is almost non-existent. Landless shepherds, paying a low and fixed grazing fee, are motivated to use leased land but not to increase grazing days. The Pasture and Stubble Act does not tie leasing to a minimum use of grazing resources. The LGC does not have the incentive to offer better grazing infrastructure or provide extra services or resources to potential claimants. The differential quality of the *polígonos*, even within particular municipalities, in resources or infrastructures does not translate to prices. As a consequence, leased land farther away from the nucleus of the village is much less used with heterogeneous stocking at the municipality scale. Another important trend is the increase of indoor feeding operations. In the LACOPE sample, 65% of milk-oriented sheep farmers maintained the milking lot under indoor feeding conditions, with implications for the identity of the regional *Manchego* cheese. Under these conditions, sheep farmers have incentives to change to more productive but less grazing-adapted foreign breeds.

Security of tenure is, according to sheep farmers' responses, another important issue not properly addressed in the regional regulation. Grazing infrastructures would require technical expertise and long term capital. Landless pastoralists are not motivated to implement grazing infrastructures without security of tenure in the long run. The question of who is going to implement and maintain grazing infrastructures within the *polígonos* is also blurred and the LGC lacks of financial capabilities to do so. Most pastoralists do not own any piece of land, but a minority of them (25% in the LACOPE sample) owned or rented land within the leased *polígono*. This option greatly facilitates grazing management and sheep feeding. Under this option, sheep farmers have the chance to build grazing infrastructure within the *polígonos* and planting complementary forages, thus improving the energy efficiency of shepherding and reducing dependency on manufactured feeds.

In short, a mixed cereal and sheep operation may deliver environmental and economic benefits, but the successful

implementation of this strategy requires the willingness of stakeholders. Present regulatory and market-driven incentives (the recent increase of world prices for cereal grain, for example) work against implementation of less-intensive cultivation practices. Some environmental consequences are a lower contribution of organic matter of poor quality soils, and lower quality habitat quality for threatened wildlife species such as the steppe bird, including the great bustard (*Otis tarda*).

Discussion of proposals

Previous sections dealt with constraints, mainly the inability of grazing regulations to provide equilibrium of interests for the two stakeholders. In this section we discuss the feasibility of alternative proposals and amendments to the current laws and policies.

Common-pool resources

Management of pastoral resources faces problems of temporal and spatial distribution of grazing, under-use, and occasional overstocking. How should EU and regional regulations deal with these concerns?

Cereal-stubble, the main feed resource in arable-dominant landholdings, is available from early July to last August depending on the intensity of use and the quality of the resource (Valiente 2004). The length of the season can be prolonged, when not plowed, until November on what is called *ricial* (re-growth of unharvested cereal grain and adventitious warm-season species induced by early-autumn rainfall). Grain legumes and forage legume stubble (after haymaking) is of higher quality, but of much less acreage than cereal stubble. They are available, respectively, from May–June. Sunflower stubble is available in September–October. The other main resource from arable land is the utilization of fallowing under the traditional cereal-fallow rotation (near 1 million ha in CLM). After plowing the cereal stubble, or after the *ricial*, the lands rest during the fallow period until the following October–November autumn period. Sheep flocks can utilize this resource mainly during spring, providing that the cereal farmer does not intensively cultivate during the traditional fallow period (Caballero 2001a).

Temporal availability of fallow and stubble thus depend on management operations by farmers, but neither the regional nor the EU regulations are focussed on this concern. The former only states a minimum post-harvest period should be maintained before plowing the cereal stubble, but does not set rules for temporal grazing-rights interchanges between pastoralists. The current EU regulations (MTR and de-coupling of subsidies) set cultivators

free of implementing management alternatives under some environmental rules (cross-compliance).

EU and regional regulations focussing on the objective of cereal and sheep integration are thus lacking and the economic rationale for cultivators may stress the already-present divide. Present trends in intensive cultivation arable farmers are continuing, projecting a concomitant decrease in shepherding, favoring indoor feeding into the future. For the latter group, however, shepherding represents lower feeding costs, but lower costs can be realized only if pastoral resources are available and working conditions improved.

Regarding the spatial distribution of stocking, this point can be addressed at three levels. At the regional level, stocking on *polígonos parcelarios* can be higher than in *polígonos segregados* because many large landowners do not maintain their own flock. At the municipality level, stocking can differ between *polígonos*. Even in some municipalities, some *polígonos* can be under-utilized or left unused (e.g., not rented due to a lacking of claimant pastoralists). At the *polígono* level, stocking may differ between parcels located near a village (which may experience occasional overstocking) versus more distant parcels (typically under-utilized) because pastoralists tend to avoid long journeys, particularly for milking-oriented flocks.

Also on the issue of spatial grazing management, two problems should be differentiated: access and mobility. Access is something regulated by law. Pastoralists do not have access to parcels of vineyards, olive orchards, and plots under irrigation; and more recently and on the increase, to parcels under the jurisdiction of environmental schemes (i.e., direct sowing, organic agriculture, reforestation, environmental sunflower). Frequently, these parcels are interspersed within the *polígonos*. Mobility is the way to reach accessible or grazing-allowed plots. This is facilitated for a radial distribution of the *polígonos* towards the nucleus of the village (Fig. 1) and for keeping livestock traffic to mandatory drove-paths. Frequently, these paths disappear under intensive tilling. Access and mobility problems exacerbate each other, and spatial grazing management is plagued with problems—more than likely the pastoralists experiencing the worst of it.

Grazing management under the traditional system is thus a hard-working operation. The pastoralists must consistently monitor the flocks because the *polígonos* are unfenced and graze-allowed, and non-allowed parcels are contiguous and interspersed. Progressively, the pastoral use of the *polígonos* is becoming more and more complex as more parcels fall within the non-grazed status (such as new vines and olives plantation, reforestation and other EU-supported environment schemes). A trend towards sheep operations less linked to grazing resources and more in-door feeding is apparent. This trend is important during

winter and on milking-oriented flocks (particularly for the milking lot).

In the LSGS system of Castile-La Mancha, pastoral resources are a pool of cultivators' parcels (grouped by the law), but the main stakeholders regarding the use of these common-pooled resources are not the cultivators, but the pastoralists. Theoretically, a group of 40–50 cultivators (owners of a medium-size *polígono parcelario* of 400 ha) may maintain a sizeable flock operated collectively, with operators sharing costs and benefits. This situation is not operating well in Castile-La Mancha currently, probably because the number of actors is too high for collective action to be effective, and the potential shared return too low.

Complementary forage resources

Planting annual forage legumes for haymaking, as a trade-off lack of access to land coming out of fallow, is a rewarding strategy under current schemes (Fernandes and Guiomar 2006). Under this alternative, the forage deficit can be calculated through use of a mass-balance model taking into account livestock feeding requirements, the stocking rate, and anticipated hay yields (Caballero 1993). Stakeholders entering such an agreement or decision have different interests, but the potential for co-operation exists. Pastoralists are interested but, frequently, they do not own land for planting. Cultivators do not own the flocks and forage legumes are not supported under non-decoupled schemes of direct payments. The potential co-operation is not limited to a particular *polígono*. Cultivators may sell the hay to different pastoralists or even outside the region. In fact, there exists a limited but potentially lucrative market for annual legume hay.

Planting legumes represents an environmental advantage (Table 2) to cultivators (by fixing nitrogen and enhancing soil organic matter) and to society as a whole (environmental benefits for the soil biota and for steppe birds). There are no major technical problems associated with planting or haymaking of forage legumes (Caballero et al. 1996).

The identity of regional products

The Manchega sheep breed could be classified as a two-production objective breed of intermediate productivity. Pastoralists have other options regarding the sheep breed such as using other meat-oriented indigenous breeds such as Talaverana, Ojalada and Segureña or milk-oriented foreign breed such as Awassi or Lacaune. The latter option may represent important outcomes for the system. The use of a milk-oriented foreign breed is greatly related with more indoor feeding because these breeds are more

productive, but poorly adapted to take advantage of seasonal and low-quality pasture resources as is the locally-adapted Manchega breed. Another important outcome of the indoor feeding and mixed breed flock option is the identity of regional products. Those pastoralists choosing to raise foreign breeds cannot be affiliated with the Regional Council of Manchego Cheese Producers (RCMCP). The RCMCP provides regulations recognized by the RG (JCCM 1995) and the EU (EU Directive 1107/96), affects almost half the milk-oriented sheep farmers in Castile-La Mancha (some 1300 in 2005), and covers grazing land of some 500 municipalities. The regulations of the RCMCP emphasize maintenance of the Manchega breed, and make standards for milking, storing and cheese-making operations. For the purpose of our study, however, it is important to understand that provisions for the production system are not included. Manchego cheese, for both indoor and grazing-based operations, is sealed by the RCMCP. In this sense, the Council acts as a driving force in the maintenance of the Manchega breed, but not for land-based cereal and sheep integration.

Questions regarding sheep breeds and production systems are thus related. Sheep farmers are prone to change from the extensive-grazing and harsh-working conditions associated with the Manchega breed to the indoor-feeding, foreign-breed system that results in higher productivity and improved conditions for labor. This trend is consistent with standard economic theory (Naredo and Carpintero 2004). But the new pattern has consequences for the identity of Manchego cheese and may stall the potential environmental benefits of the mixed cereal and sheep grazing operation (Table 2). This paradox can be solved through the market or through compensatory payments. If markets can differentiate the price of the two operations (higher price for the identity of lamb meat and cheese products under grazing), sheep farmers may have an incentive to maintain the grazing operation. If not, the society as a whole may find that it may need to reward sheep farmers for maintaining the sheep grazing operation. Whether markets can differentiate by price is a question, as well as whether the current scheme of the EU payment may contribute or not to maintain the grazing operations.

Grazing rights and grazing fees

Recent research on comparative typology (Caballero et al. 2007) emphasizes the role of different actors as providers or users of land resources according to forms of organization. In purely economic literature the terms “public good” is associated with non-exclusion and non-competition principles (Olson 1971).

The non-exclusion principle does apply theoretically to cultivators because they cannot refuse to award grazing

right to pastoralists. Most of them abide by the law, but infringements can take many forms (i.e. plowing the stubbles before the pastoralists can use them) and impediments is the norm. The non-competition principle can be applied to the system as cultivators provide the pastoral resources at the same price and price or extra services cannot differentiate the offered resources. A public good situation in the supply side is found, although the willing co-operation of cultivators is a crucial ingredient (e.g., concerted action in common-pooled resources).

The non-exclusion principle does not apply to pastoralists within municipalities. Even pastoralists within a municipality may distribute resources by inner consensus with exclusion of outside claimants (Fig. 1). Pastoralists are operating on a “club or toll good” situation on the demand side. Exclusion of other potential claimants, however, does not apply to those municipalities where the existence of non-granted (free *poligono*) is becoming more and more usual.

Infringements can be settled before the LGCs, but the uncooperative performance of a few cultivators within a *poligono* may hinder severely the overall development. For now, the best the LGCs can do is to issue a warning and try to cajole cultivators and pastoralists into cooperating and following the rules. Infringement proceedings are rare because most infractions are considered to be minor, but the law had established proceeding and sanctions for uncooperative actors (most of the time cultivators, but also pastoralists) to be taken to the PGCs or to ordinary courts in the case of major infractions. Most common infractions by cultivators consist of hindering access by pastoralist to approved use parcels, plowing stubble before the allowed date, or setting barriers to easy transit of flocks. Most common infractions by pastoralists are the introduction of flocks in segregated land, grazing a higher than allowed stocking rates, or grazing non-allowed lands. In short, the LSGS in CLM is essentially non-cooperative, but actors are forced by law to co-operate.

Because there are few incentives, shared values, and or trust, among the social actors of the system, the institutional and legal frameworks themselves not been devised by collective action or co-operation (Ostrom et al. 1994) but by government intervention (Olson 2000). Normative actions, however, may provide better results if consensus between actors had been reached on the way to amending the system (Caballero and Gil 2008).

The behaviorist paradigm (Kahneman and Tversky 2000) stresses the distinction between normative versus positive behavior (i.e., how people should make decisions versus how they actually do so). While the law (normative) presumes co-operation, cultivators have little incentive for co-operation. They may be acting under a rational decision-making paradigm (neoclassical economic theory) of

attending closely to opportunity costs incurred by co-operation (i.e., the cost of losing agri-environment subsidies or the income losses under low-tillage practices). The main failure of the behaviorist paradigm is that it assigns to the normative and cohesion paradigms a big role in actual decision making. What this study shows is that either normative (pasture law) or cohesion between stakeholders is important issues, but people are more driven by rational choices or positive behavior caused by a changing business environment.

The same applied to normative EU regulations. The continuous and declining trend of the shepherding operation in CLM is unrelated to the vagaries of the CAP since the Spanish entry in the EU. Comparative research with others EU extensive systems (Kleijn et al. 2006; Caballero et al. 2007) stresses the mixed results of EU regulations. Because there is a wide variety of LSGSs across Europe (Holz 2005), policy makers may not wait for each and every one of these systems to be analyzed and evaluated before devising policy schemes. In this sense, a short-cut route may deliver a never-ending process of CAP policy reforms.

In CLM, the question of property jurisdiction is targeted to individual user-rights, not collective user-rights. The current law distinguishes between property rights (to the cultivators) and user-rights (to the pastoralists) on the basis of customary use-rights (*derecho consuetudinario* in Spanish) that have been operative for centuries. Any institution determines property type. However, property type determines the institutional management of the pastoral resources because large landowners (*polígonos segregados*) are segregated from the renting regime regulated by the institutions. The current normative framework is failing to promote co-operation between stakeholders because both groups are driven by divergent external incentives.

Because they are not able to set their own fees, thus differentiate themselves from each other, the LGCs do not have the incentive to offer better grazing infrastructure or provide extra services or resources for potential claimants. Even within a particular municipality, the variation of type and distribution of resources between the *polígonos* can be high and it seems senseless to set a fixed grazing fee for all. Amending the system of setting grazing fees can be controversial, and the LGCs lack managerial and technical support to provide a more open system. If this would be the case, a system to grant grazing rights to claimants under a sealed document of conditions (environmental conditions included) may represent an alternative. The regulation does not set a different price cap according to the quality of the resources on offer of specific *polígonos* and assess the reaction of claim pastoralists. A more market-oriented approach would be to set grazing fees by an open auction of pastoral resources.

This latter option is included in the law as an alternative to direct internal grants and fixed grazing fees; but in practice very few, if any, pastoralist are awarded grazing rights by this scheme.

In conclusion, formal institutions and laws regulating pastoral land-use are affected by the larger political and economic setting in which they exist. The cereal-sheep system of CLM is a system in transition from subsistence pastoralism to market-oriented livestock production. The management goal is changing from subsistence to profit maximization. Management strategies, policy reforms and formal institutions should take into account the general Spanish business environment and the convergence of interests of main stakeholders (cultivators and pastoralists). In particular, trends towards intensified agricultural production, driven by the EU scheme of subsidies and the recent scaling of cereal prices may have a devastating impact on the viability of pastoral institutions and the management practices they support.

Recommendations

This research provides an overview of the social dynamics in the LSGS in Castile-La Mancha, and an unveiling of the main limiting factors and their nature (whether these factors are social, structural or technical). It depicts the evolution of the system over time and how changing business environments have altered the relative bargaining force of the main stakeholders. In the future, it would be worth testing the reaction of farmers to the more recent EU regulations (MTR and de-coupling). In the present circumstances, a list of limiting factors and recommendations can be drafted that would require a consensus by main actors for implementation.

The mixed cereal-sheep farming system is at present uncompetitive and structurally unfeasible for cultivators as they face other alternatives for crops and agri-environment subsidized schemes. However, the sheep operation adds value to seasonal and low-quality pastoral resources. If a mixed cereal-sheep farming operation is looked for, cultivators should be lured with specific incentives. This can be addressed by devising an area-specific payment scheme that takes into account the interests of the two key social groups.

Grazing infrastructure should be enhanced to improve spatial and temporal distribution of grazing and to improve inconvenient, harsh working conditions endured by some pastoralists. Particularly, grazing plans should provide incentives for moving the sheepfolds within the awarded *polígonos*. Young Castilian farmers are uninterested in the sheep operation because of the current harsh working conditions, and family farm succession is not assured.

The labor factor is probably one of the most limiting present circumstances. One recommendation would be to implement “shepherd schools” with the aims of raising professionalism, increasing the social status of the shepherd’s job, and improving the overall capacity of migrant workers.

The forage deficit during wintertime is a structural factor that can be addressed. Alternatives to meet the forage deficit (i.e. introducing annual legumes into the crop rotation) should be posed and factors detracting farmers from implementing unveiled.

Legal and institutional factors may hinder the sustainability of the LSGS in Castile-La Mancha. The interests of cultivators, access to grazing rights, and empowerment of the LGCs with technical and managerial support are probably the most concerning factors.

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