



Commons in Transition

**INSTITUTIONAL SETTING IN CO-OPERATIVE
PASTORAL SYSTEMS IN EUROPE**

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Institutional settings in co-operative pastoral Systems in Europe

-First results from the LACOPE research project-

FOREWORD

Presentation of LACOPE research project:

Landscape Development, Biodiversity and co-operative Livestock Systems in Europe. Project supported by the European Union within the framework of Global Change, Climate and Biodiversity.

European biodiversity significantly depends on livestock systems. In most countries grazing is/was organised in permanent or seasonal co-operations (land-owner/land-user agents) and covered different landscape such as forests, pastures, mires or even arable land. The reason of such cooperatively resource organisation was to provide management unit to communities of landless farmers making the systems closely linked to specific property rights. Those co-operation forms are characterised by larger surfaces as areas of individual management. The commitment of biodiversity conservation of the EU-member states embraces to a large extent the care of landscape and regional development (e.g. AGENDA 2000, NATURA 2000). Large scale grazing systems maintain ecosystems and permit the creation of open habitats for species which are core targets of the European NATURA 2000 system.

As the traditional systems became unproductive in terms of modern economics, landscapes and habitats formed by continuous grazing diminished. Instead, agricultural intensification and private land management caused a segregation of the landscape, a separation of forest and pastures as well as abandonment of marginal sites. Thus, many of the species depending on open or semi-open landscapes are actually extremely endangered. This goes parallel with a regional segregation of Europe, resulting in intensively used, even overexploited regions on the one hand and marginal ones on the other. The large scale grazing systems have to be adapted to modern societies and economically organised.

The LACOPE project aims to stress in more detail the “co-operative corridor” in large scale grazing systems. This means the particular advantages of co-operative organisation forms to realise large scale grazing. (*LACOPE, 2000*). The main objective of the proposed research project is the improvement of the ecological and economic effectiveness of co-operative livestock systems which contribute to biodiversity conservation. Since large sector efforts of nature conservation have not stopped biodiversity losses in Europe’s open and semi-open landscapes, management methods have to be improved.

Research teams of seven countries (Norway, Poland, Switzerland, Spain, Germany, Portugal and Ireland) cooperate to analyse regions with complex pastured ecosystems and typical forms of CLS. The study is carried out regarding two inter-dependant aspects: ecological (flora and Fauna) and economical (socio-economy, resource economy and institutional economy). (*LACOPE, 2000*).

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I- Introduction

A first comparative analysis of the management of the pastoral resources in the participating countries was carried out. Due to the large differences in size, organisation form, used livestock, abiotic and biotic conditions of the investigated systems, this analysis was conducted on an abstract and theory focussed level. The investigated systems have in common that:

- a pastoral forage resource is used by livestock,
- the productivity per ha is comparatively low,
- the pastoral resource is either provided and / or exploited by a group of people,
- the group of people exploiting the resource is organised in a defined form.

The comparative economic analyses focused on three questions:

- Which type of good constitutes the institutions with respect to the pastoral resource?
- Which type of property constitutes the institutions with respect to the pastoral resource?
- Is the management of the pastoral resource co-operative?

After defining the economical terms of these 3 aspects in a general meaning, the paper introduces the four pastoral systems which differ significantly in their institutional framework and their environmental features. These systems are Reindeer husbandry in Fennoscandia, sheep grazing in Central Spain, cattle grazing in the Swiss Alps and sheep grazing in the Polish Tatra Mountains. Short extensions to the other core study site in Germany are given when appropriate. On the basis of the reference terms the comparison between the countries is then carried out. An overview is given to which extent the analyzed systems tackle the problems associated with joint provision or exploitation by the some means. Finally, observations are presented concerning the current management of the system in respect to the sustainability of the resource exploitation.

II- Definition of reference terms

The economic key terms used in this article are defined as followed:

1- Type of goods

Problems associated with overexploitation and under provision of resources are often attributed to the fact that the institutions dealing with the resource exploitation are constructed in an inappropriate fashion or the resource has natural features making rational resource exploitation hardly achievable. These problems are generally discussed under the question to which class of economic goods belong a real world entity. Normally four general classes of economic goods are distinguished in literature. The distinction is based on two features. The first is the difficulty of excluding individuals from benefiting from a good. The second insists on the fact that benefits realized by one individual may reduce the potential benefits of another individual (additivity of benefits). These two attributes allow the delimitation of four different kinds of goods. These are public goods, common-pool resources, toll goods (club goods) and private goods (OSTROM et al. (1994)). A general classification of these types of goods is shown in figure 1.

		Additivity of the individual benefits	
		High	Low
Exclusion of potential beneficiaries	Easy	Private goods e.g. meat, car, clothes	Toll goods (= club goods) e.g. cable TV, fire protection
	Difficult	Common-pool resources e.g. fish in the ocean, the environment, air	Public good e.g. national defense, knowledge

Fig. 1: General classification of goods (based on (OSTROM et al. (1994))

2- Type of property

Whereas the type of good yields information on the legal and physical features of a defined entity the concept of property types focuses on the management principles of this entity. STEVENSON (1991) uses two sets of criteria to describe the rule system resulting in four different general management types (see figure 2). His criteria are the limitation of the number of potential beneficiaries and which rationale limits the extent of the individuals' resource utilization.

	<i>Property institutions</i>			
	<i>Private property</i>	<i>Common Property</i>	<i>Open access</i>	
			<i>Limited user</i>	<i>Unlimited user</i>
<i>Group limitation</i>	One person	Members only	Members only	Open to anyone
<i>Extraction limitation</i>	Individual decision	Common decision	Individual decision	Individual decision

Fig. 2: Property types (based on (STEVENSON (1991))

Only in the common property management the resource exploitation of each individual potential beneficiary is coordinated by a common set of rules utilized by the involved parties. In the other cases the level of his exploitation is on the behalf of the single appropriator. In open access settings, in contrast to private property, the appropriator has no exclusive entitlement to a defined amount of resources. This leads to huge discounting rates for future profits since the appropriator cannot be certain that resources saved today will be available to him tomorrow and will not be already exploited by others. Under limited user open access, property rights have been established for a limited number of users, but the property rights among these remain ill-defined (STEVENSON (1991; p. 52)).

3- Co-operative system

The third aspect, this paper deals with, is the question in which respect the resource management is co-operative. ARGYLE (1991; p.4) defines behaviour as co-operative when the involved party are "acting together, in a co-ordinated way in the pursuit of shared goals". Leasing and boarding at fixed prices are not considered to be co-operative unless the contracts include some cost or revenue sharing regulations, implying that both parties are sharing the risk of the undertaking - but not necessarily to the same extent.

III- Case studies

1- Sámi reindeer herding in Fennoscandia

In Fennoscandia reindeer herding is conducted over huge dimensions. Seasonal migration of several 100 km can be observed (BERGSLAND 1994). This migration is necessary because reindeer graze on the natural grassland of the alpine and arctic tundra in summer and the lichens stands in the forests of the boreal zone in winter (INGOLD 1980). This traditional form of animal husbandry is conducted by the Sámi. The bottleneck of the system is the availability of winter pastures and their susceptibility to grazing at inappropriate times (OKSANEN 1993 ; RISETH 2000). However, due to geographical features and to limitation of the free crossing of the national borders, reindeer herders in some regions need to practice year-around-grazing within a limited area.

The entitlement to graze is possessed by local groups of Sámi, is independent of the land ownership and is free of charge. The membership in a local group of pastoralists is based on kin's relation. The local groups of herders have acquired exclusive grazing rights from times immemorial, later codified by government decision. These rights acknowledge the needs of their traditional livelihood. On average the size of a unit managed by a group of herders is about 300.000 ha and the unit includes between 10 and 30 resource exploiters.

Some of the activities like herding and slaughtering are conducted by all members of a local management unit, but the animals remain within the private property of the individual herder. The revenues of a single pastoralist depend mainly on the meat produced by his animals. No sharing of revenues or mutual insurance for animal losses takes place making it from a single pastoralist's point of view quite sensible to go for larger herds. Technological innovations in the last decades further promoted this development.

Currently the grazing rights are challenged from two sides. On the one hand other activities like e.g. forestry, tourism and recreation activities or the construction of hydro-electric power plant compete for the land or at least interfere with herding. On the other hand in some regions Sámi herders are challenging each others grazing rights especially to winter grazing grounds. Since the (additional) feeding of his animals in the winter grounds is on the behalf of the single pastoralist aspects of maximum joint output are not taken into account implying the risk of overgrazing of the winter grounds.

2- Sedentary sheep grazing in Central Spain

In central Spain areas most of the land is used for non-irrigated cereal farming (CABALLERO 2001). The shepherds in this region use the cereal stubbles and Mediterranean shrub as their main forage resource (CABALLERO 1999). Both milk and meat orientated flocks can be found but they show great differences how the management is conducted (CABALLERO 2001). In winter the animals rely on hay and silage.

The land is the private property of the local farmers but the right to graze is owned by local community of landowners and shepherds (LEY 7/2000). The individual landowner can not deny the shepherd to graze his land but is compensated by fee. This fee is fixed by a joint committee formed by the representatives of the landowners and shepherds of a municipality. This grazing fee does not take into account the quality and quantity of the forage resource of a given site but is just a flat fee per ha (CABALLERO 2002). The fee is so low that it hardly has any impact on the way land-use is conducted. For the purpose of exploiting the pastoral resource the land is compulsory grouped into grazing polygons (*poligonos de pastos*) presenting great variation in quality and size, even within municipalities (CABALLERO 2001). On average a polygon is about 400 ha large with 60 landowners farming (CABALLERO 2001). For each *poligono* one shepherd receives the exclusive right to graze. Normally the pastoralists do not possess any land in the *poligonos*, neither leased nor owned. In former times these *poligonos* were auctioned among the pastoralists but nowadays the number of shepherds in any given municipality tends to decrease dramatically. Those who maintain the operation take the grants of those who abandoned. Those who rest, are operating with an oversupply of land that they don't use or under-use. The decline of utilisation of the *poligonos* is amplified by the fact that shepherds not living in the municipality can be excluded from the "market" by the local ones.

Most of the grazing polygons have the form of a wedge with the sheepfold situated near the village. As a consequence most of the land lies at a great distance from the sheepfold therefore its use demands a comparatively high labour input (CABALLERO 2002). This leads to a sharp gradient with overgrazing near the village and under grazing at the periphery. This is extremely pronounced with milk- oriented flocks since they have to be driven to the sheepfold at least once a day for watering and milking.

Grazing fees do not reflect market prices. This is indicated by the fact that only a comparatively small percentage of the large private estate – here the landowner has the right to directly bargain with the shepherd – is grazed (CABALLERO 2001).

In general, the current situation can be characterized by an oversupply of bulk forage (abandoned *poligonos*) and an under-supply of higher quality forage to meet the forage deficit occurring in periods of adverse climatic conditions.

3- Cattle grazing in the Swiss Alps

In the Swiss study area pastures of the mountain to alpine zone are grazed. These alpine pastures are grazed by heifers, dairy cattle, suckler cows and sheep (order of frequency) in summer and have a size of 50 to 300 ha. The animals graze in spring on privately owned pastures down in the valley and are fed in winter indoor with conserved food.

In the study area, there are 3 types of alpine organisation: (WERTHEMANN & IMBODEN 1982)

- private alpine,
- private law co-operation,
- public law co-operation.

In the private alpine organisation, the landowner of the alpine pasture is also the pastoralist. He brings the animals on his private alpine pasture and also takes care of them. The livestock is composed of own animals and mostly of animals from other farmers. The agreement between the landowner and the external farmers is based on private contracts in exchange of payment (fee/animal).

The private and public law co-operation function both on same basis. It is a community of landowners called “co-operators”. They own the alpine pasture land. Both law co-operations function on the principle of membership. They give their members using rights for the summer alpine pastures. The members are animal owners. A co-operator (landowner), if he owns animals, can also be a member. The members have to pay compensation pro animal for the utilisation of the summer pasture. A part of the revenues will be shared between the landowners as retribution and the rest is invested in the maintenance of the alpine pasture (including the shepherds). Non-member can also use the pastures, in case the allowed stocking density is not reached. However, they have to pay a higher price than the members. The difference between the two co-operations has a legal character. The private co-operation has tradable or inheritable rights whereas the rights from the public co-operation can only be bequeathed to the descendants.

The community of landowners is leasing out the land to one pastoralist, who is doing the daily management. The entire farm management from the grassland maintenance e.g. nutrient balance to the grazing regime, is conducted by the pastoralist in agreement with the steering

committee of the co-operation (it is mostly a team-work). The utilisation of the land (e.g. stocking density, grazing period) is however fixed by the Stocking Decision (authority control founded by the Alpine Land Register in 2000). Recently, the state bring his contribution in the Stocking Decision and is yet involved in the organisation of land tenure (duration of the alpine migration, number of animals pro alpine farm, ...). Revenues made by the co-operation of landowners (such as subsidies) are re-invested in the co-operation in the form of houses, roads, machinery, fences,.... In contrast to the Spanish system none of the landowner affects the level of available resources by his own decision. The facilities like huts are either owned by the community of landowners or the pastoralist. The pastoralist stocks the alpine pastures with own animals and those of the co-operation members. The pastoralist is an employee of the co-operation and he earns a wage (sometimes he can earn extra money through the utilisation of the milk for cheese production).

Problematic for the system is that due to the lack of competitiveness of the dairy farming enterprises in the region more and more farmers cease farming. Moreover, through the intensification of the breeding-farming (for milk cattle) the number of heifers grazing in the alpine pasture is decreasing continuously. This reduces the available livestock for alp grazing. Currently in the grazing of the alpine areas a shift of the used type of livestock from fattening to suckler cows can be observed. Indeed the labour is not so intensive and gives the alternative to work out of the farm.

Apart for the importance for the agricultural sector the presence of alpine meadows is of crucial importance with respect to tourism and landscape protection.

4- Sheep grazing in the Polish Tatra Mountains

In the Tatra Mountains grazing is mainly conducted with sheep. The currently management of the CLS is still achieved on a traditional pattern. Like in Switzerland the animals are conducted in the summer by a shepherd ("Baca") in the alpine zone.

The summer grazing areas of the case study have sizes from 5 up to 200 ha with an average of 50 ha (Kolowca, 1957 ; Ryszkowski, 1997).

The land in the alpine zone is split into privately owned parcels. A shepherd is bargaining with each landowner for the tenure of his land. The facilities are in the ownership of the shepherd. The livestock conducted by the shepherd is composed of own animals (about 10% of sheep of the whole herd belong to the 'baca') and partly of boarded animals from small family farmers living in the foothills of the Tatra (Kopczynska, 1962). The farmers keep the livestock in spring and autumn on their private meadows in the villages. During the winter

the animals are fed mainly on hay with small addition of grains. The farmers make benefits from the sale of the lambs, whose meat is particularly enjoyed on the Italian market. The maintenance of the herd in the Tatra mountains is 'payed' indirectly through the milk production. Indeed, the milk is entirely on the behalf of the 'baca.' Sheep milk is used to produce cheese with special regional identity called 'oscypek'. The cheese is sold mostly on regional market. For the past two years it has been also exported to the American market (Chicago).

Grazing pressure declined in the last years because the economy was based on wool production, which has become unprofitable in the 90s. This entailed a considerable decrease in the number of sheep. There were around 200.000 sheeps in the 80's whereas nowadays only 20.000 sheeps are left (Polish Organization, 2000).

Like in Switzerland tourism plays an important role in the rural economy. In the foothill of the Tatra agro-tourism becomes more and more popular.

IV- Discussion

1- Institutional environment

One important difference between the investigated systems is the way how their geographical borders are fixed. In Spain and Fennoscandia they are set by laws (e.g. Sámi Reindeer Management Area in Norway since the 1890s) and a centralized governmental decision. In Poland the borderlines of the systems are defined through the tenure and boarding contracts of limited duration and bargained between the shepherds and the landowners of the summer pastures. In the Swiss case the borders are limiting the extent of the law co-operation (numbers of participating landowners).

In Fennoscandia, Spain and Switzerland the internal structure of the systems are set up by rules as well. In Spain these rules are fixed by the Grazing commissions (national, regional and local) which distribute the land to the pastoralist and fix the fees/ha: Their respect is controlled by the commission of the joint committee of each municipality. In Fennoscandia, the rules concerning the management of the land (e.g. stocking densities, migration pattern) are fixed by the state or co-management bodies with strong herder representation. However, the systems are grounded on tradition and there are sometimes competition between the formal and the informal structure. In Switzerland, rules concerning the internal organisation

are set up by the type of co-operation (private or public). Land tenure e.g. stocking densities and grazing periods are set up by the decisions of each canton and the state.

These rules are or have been setting through the type of good and of property existing, they are indeed defining a specific-area management form.

2- Type of good

The economic analyse of the management of the resources in the different countries concentrates on the pastoral forage resource since the goal of this project is to study large grazing systems from an ecological point of view and further to assess their economic sustainability. Moreover, most other entities involved are mostly managed in the same way (as private goods) and are under a private property management in all national study areas. For example fodder conserves are produced on privately operated land and are in the private property of the animal owner in all areas.

For the further analyses two perspectives have to be distinguished (figure 3). The type of good can be classified differently considering the side of the resource provider (landowner) and the resource exploiter (pastoralist). This is an important feature to consider, indeed in none of the investigated system the pastoralist is the only owner of the land.

a- Owner of the resource

Despite the fact that there is principally competition for *in-situ* forage resources among the users, this competition does not create a market value for the forage resource in Spain and Fennoscandia. The revenues of the resource providers (landowners) are, according to the rules, independent of the quality and the quantity of the fodder they provide, therefore they have no incentives to take the needs of the users into account. In Fennoscandia the resource providers have no right of any compensation unless the reindeer grazing do not harm cattle grazing or crops. Further a single landowner can not exclude the potential user if the pastoralist has been granted a general right (members of local Sámi group / local shepherds who paid the grazing fee in Spain). In Switzerland the resource providers of the private or public law co-operation are organised in a community. The pastures of each co-operator are at the disposition of the members. The revenues issued from the exploitation of the land are distributed according to the internal rules in the form of wage to the pastoralist and in the form of retribution to the landowners. In Poland the single landowner can look for the best offer made by any pastoralist (either in the form of payment or land tenure).

	<i>Type of good</i>		<i>Management type</i>
	<i>Provision</i>	<i>Acquisition</i>	
<i>Poland</i>	Private Good	Private Good	Private Property
<i>Switzerland</i>	Public Good / Private Good*	Toll Good / Private Good *	Common property / Private property*
<i>Spain</i>	Public Good	Toll Good	Common property
<i>Fennoscandia</i>	Public Good	Common Pool Resource	Common Property / Limited user open access

Fig. 3: Identity of the pastoral forage resource as a good and the resource management type

* is related to the private alpine organisation

b- User of the resource (pastoralist)

From the point of view of the pastoralist the pastoral forage resource constitutes in Spain, Switzerland and Fennoscandia another type of good than from the perspective of the landowner. Pastoral forage is a toll good in Spain with no competition among the pastoralists but with the possibility to exclude other shepherds from their polygon. Apart from the private alpine organisation, it is also a toll good in Switzerland with no competition among the users of the resource (animal owners and pastoralist) but with the possibility to exclude the non-member.

In Fennoscandia a common pool resource is exploited in the view of the herders with competition for winter fodder clearly present. The exclusion of other users of a given amount *in-situ* resources is, due to landscape features, nearly impossible in some regions, but feasible in other ones.

In Poland, it is a private good. There is no competition between the pastoralists among the resource. Each pastoralist is bargaining individually with the landowners or the community of landowners for the resource.

3- Type of property

The property type found in Fennoscandia is basically common property (governmental regulations of utilisation of the resource), but it functions as a limited user open access type in some regions (regulations are not always appropriate and favour an individual exploitation of the resource). With the exception of Finland, where the resource is open to all inhabitants, only Sámi have the option to exploit the resource. The degree of limitation on individual herd sizes varies between the countries and to some extent also regionally within the Fennoscandia countries. In Poland resource exploitation is done on the principles of private property, with the Shepherd deciding how many animals he intends to stock on his tenured land. In Spain the

pastoralists manage the pastoral forage resource as common property. This common management is highlighted by two aspects, the joint negotiations with the landowners and the allocation of exclusive grazing areas to each pastoralist by consensus. Through the common property institutions a common pool resource with competition and non-exclusion for the *in-situ* resource is converted into a toll good. In Switzerland the management of the resource is strictly regulated by internal and/or external rules: the level of resource exploitation is fixed by the Stocking Decision and the state who establish the overall stocking densities and mandatory duties of the landowners and pastoralists.

Both the Spanish and the Swiss mechanism reduce the risk of overexploitation.

4- to which extent are the systems co-operative?

Considering the definition of ARGYLE (1991; p.4) given above, the action of co-operation could be identified in the different countries at four different levels. Co-operation can occur:

- between several landowners (resource provision),
- between several pastoralists (resource acquisition),
- between pastoralists and the animal owners,
- and between landowner and pastoralists.

N.B: The private alpine organisation in Switzerland is not taking into consideration in the following aspects.

a- Co-operation between several landowners

Figure 4 gives an overview which aspect of co-operative behaviour can be observed on the resource provision side. The concept of co-operative management is not applicable to Fennoscandia because in most parts there is just one landowner, the state. In Poland the landowners are acting independently. In Spain the pastoral resources are mandatory entered in a pool at the municipality level. The revenues of the single landowner depend on the average quality of the pastoral resource in the pool, since tenure per ha is the same for all landowners in a municipality. But the management of the single plot is based on the rationale of the individual farmer so co-ordinated action between landowners is restricted to the process of jointly bargaining the tenure with the local community of shepherds within the committee. In Switzerland the landowners are organised in a co-operation chaired by a steering committee, so co-ordinated action is clearly present. The co-operation gathers the land of the landowners for the disposition of the members. The landowner cannot affect the repartition of the land and the level of available resources by his own decision. A part of the revenues issued from

the exploitation of the land (member charges) are distributed in the form of retribution to the landowners and are used for the maintenance of the alpine pasture so revenues are also shared.

	<i>Common assets</i>	<i>Coordinated action</i>	<i>Shared revenues</i>
<i>Switzerland</i>	+	+	+
<i>Spain</i>	-	+	+
<i>Poland</i>	-	-	-
<i>Fennoscandia</i>	Not applicable		

Fig. 4: Realized aspects of cooperative behaviour between the landowners

b- Co-operation between several pastoralists

Figure 5 shows which aspect of co-operative behaviour can be observed on the resource-exploiter side. The concept of co-operative management is here not relevant to Poland and Switzerland because pastoralists are acting independently. Considering the profits no co-operation can be found between the pastoralists since in all cases revenues are not shared among them. In the Spanish case the setting of the grazing fees and the division of the resource is achieved through co-ordinated actions. In Fennoscandia some assets like corrals, fences and slaughtering facilities are owned by a group of pastoralist and some action like the herding on the summer range and defending the grazing ranges against other herders are achieved together.

	<i>Common assets</i>	<i>Coordinated action</i>	<i>Shared revenues</i>
<i>Switzerland</i>	-	-	-
<i>Spain</i>	-	+	-
<i>Poland</i>	-	-	-
<i>Fennoscandia</i>	+	+	-

Fig. 5: Realized aspects of cooperative behaviour between the pastoralists

c- Co-operation between pastoralists and animal owners

In the Swiss and Polish case where the pastoralist is not the only livestock owner a co-operation between pastoralists and animal owners can be observed. The pastoralist contributes labour, knowledge and capital in the form of forage resource, livestock management and facilities to the joint undertaking whereas the livestock owner contributes capital in the form of livestock and revenues. The pastoralists coordinate the actions of the animal owners in order to maximize the overall revenues of the undertaking. The aspect of common assets is amplified by institutions stating that animal losses during the grazing period have to be compensated by the pastoralist and so indirectly by all animal owners.

d- Co-operation between landowners and pastoralists

The last level where co-ordination could be observed is between the landowners and the pastoralists. In all observed cases the criteria of shared revenues is not fulfilled, since the tenure is at least in the short run independent of the economic success of the pastoral undertaking. Nevertheless in Spain and in Switzerland are aspects of common assets and co-ordinated action detectable. In Spain the pastoral forage resource is without any doubt a common asset since neither the shepherds can use the resource without the agreement of the landowners nor can the landowner lease the land to non-local shepherds. Co-ordinated action is rudimentary and restricted to bargaining and the prohibition of either group to destroy the resources of the other. In Switzerland these aspects are much more pronounced. With the landowner as well as the pastoralist providing the needed facilities for grazing, common assets are clearly present. Co-ordinated action is realized through the tenure contracts and traditions fixing the mutual rights and duties considering the proper management of the alpine pastures.

In Poland no co-operation between the two parties exists. The contracts assigned between them are purely based on bargaining agreement. No co-ordinated actions are forwarded. In Fennoscandia a co-operation is here not applicable. The state has set up rules concerning the rights of the pastoralists. Those are acting on the basis of these rules.

In none of the national studies could co-operation between several management units be observed.

V- Conclusions

The different systems realized a variety of different ways to tackle the problem of exploiting a regenerative resource by several persons. This is extremely pronounced in the case of exploiting alpine pastures, where in Poland, Switzerland and Germany – not presented - completely different institutional settings are or were realized although the environmental conditions are quite similar.

Moreover, in Spain, Fennoscandia, Switzerland – and Germany - governmental involvement plays a significant role.

Another observation is that in no case landowners were included in a cooperative management, if they did not also participate in the undertaking in another function, e.g. animal owner or pastoralist.

Apart from the point that this paper has been concentrated on the analysis of pastoral forage resource only, it appeared that in every study area, co-operative management was in no case extended beyond the grazing range. Even in systems where economic benefits could definitely be realized, e.g. co-operative use of machinery for winter fodder provision.

Finally, a very important feature has been observed through this first investigation. It concerns the sustainability of resource exploitation. Problems with an appropriate level of resource provision and exploitation could be observed in system constructing the pastoral forage resource as a private good as well as in systems constructing it in another fashion. An example of this problem in a private-good setting is the overgrazing of the mountain pastures in Poland during a boom period in the nineties. Examples for the later are the overgrazing of the lichen grounds in Fennoscandia and the under-provision of high quality forage in Spain. In the reindeer husbandry system the reason for the over-exploitation might be that technical innovation in the last decades allowed a dramatic increase of the herds. This transformed a *de-facto* public-good resource, with no competition for forage present into a common-pool-resource. It seems that the adaptation of the institutional setting could not keep up with this change. In the Spanish systems the low profitability of sheep farming and its hard working conditions lead to a sharp decline in the number of shepherds. This leads to the current absence of competition between shepherds. Considering the landowners, technical innovations and subsidies increased the number of economical feasible options (formerly only rain fed cereals, now forestry, irrigation fields, winery, ...). The latter increased the likelihood of diverging interests between the cereal farmer and the shepherds.

This last observation indicates clearly that problems considering sustainable resource-use seem to be stronger related to the occurrence of revolution in the environmental, social, technical or legal setting in which the system operates than with the way people are constructing their resources. The systems are dynamic and evolve according to the trends of the socio-economic development: rules have to be correspondingly adapted!

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