

Who, when, how and how much: The transformation of common pool resource institutions in alpine farming

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Alpine pastures are a traditional common pool resource (CPR) in Switzerland and are mostly managed by community based institutions (communes, associations, corporations). If referred to the economic entity of alpine pastures, the term “alp” is used. Alps include summer pastures and the related infrastructure above 1,600 m a.s.l used for grazing animals during the summer months. The scientific interest in Swiss institutions managing common pool resources in general and alpine pastures in particular started in the seventies and eighties with the publications by Robert Netting (1981). In his anthropological research he describes the historical development of the mountain village Törbel, located in the western part of Switzerland, and the success of its citizens to sustainably manage the communally owned alpine pastures, forests and irrigation systems. Netting's research became internationally known when Elinor Ostrom used his findings to strengthen her theory on the ability of individuals to act collectively in order to establish institutions (norms, rules, and regulations) to limit and monitor the access to mobile and subtractable natural resources (common pool resources), and prevent an open access situation, in which overuse and hence Hardin's tragedy of the commons (Hardin 1968) would most likely occur. In his earlier publications, Netting describes the village of Törbel as a closed system of community based CPR management. He revised the picture later pointing out that channels of interaction with the outside world, such as migration and trade, were present since early times and necessary to maintain the CPR system (Netting 1990). However, when we look at the situation of the 70ies and 80ies, the interactions beyond the limits of the community, the heterogeneity of actors involved in the CPR management and the influence of the state agrarian policy were low compared to today. Despite the apparent and manifold changes in the environment of the Swiss CPR institutions, little research has been carried out since Netting's work that adequately addresses the aspect of increased state intervention and the changing social and economic conditions in Switzerland (Gerber et al. 2008). Literature dealing with Swiss alpine CPR institutions in transition mostly focus on policy analysis to describe the increasing state influence, structural adjustments and the ability and potential of CPR regimes to support environmental public policies (Rodewald et al. 2004; Reynard 2002; Gerber et al. 2008; Kissling et al. 2002). They observe that the services provided by and demanded from cultural landscapes (leisure area, biodiversity pool, cultural heritage etc.) as well as the heterogeneity of the actors involved in appropriation and allocation of the resource have increased over time. Furthermore, Bätzing (2009) and Tiefenbach et al. (2006) point to the devaluation of the direct products of cultural landscapes (socio-economic function) and the increased valuation of indirect products (ecological, cultural function). As a result, the alpine cultural landscape has become an increasingly valued public good (Tiefenbach et al. 2006).

The general assumption of policy analysts that CPR institutions eventually become less dependent on the resource, lose their function and eventually dissolve due to the socio-economic changes and new ecological objectives of the state policies (Gerber et al. 2008) is not supported by the case studies. The case studies prove that some CPR regimes are able to adapt to change and continue to survive. Their conclusion is that the more coherent the group of actors is and the better the multiple services are interlinked the more potential a CPR regime has to support public policies. Based on their empirical data they see CPR regimes as a viable alternative to state or private actors: Relying on CPR regimes has the potential advantage that the public policies may be translated to the specific conditions on the ground and may be implemented more efficiently due to social cohesion, local knowledge and low cost monitoring. However, public policies do not necessarily support the persistence of traditional CPR arrangements. Reynard (2002) for example describes decaying CPR

structures in the management of the *bisses* (water irrigation systems in the canton Valais) that have led to a shift from common property to public management. Kissling et al. (2002) observes regarding the management of alpine pastures on the Brischern Alp (canton Valais) that the formal CPR regime persists but that the traditional obligation of each member to do collective maintenance work in order to ensure the quality of the pastures has been abandoned leading to unsustainable ecological outcomes (shrub and forest growth). The overview of literature related to Swiss alpine CPR management shows different reactions to change and provides interesting insights regarding the embedding of CPR regimes in the Swiss governance system and adds to the current debates in common property research about polycentric and diagnostic approaches (Ostrom 2007, Ostrom and Cox 2010). Furthermore the results show striking parallels to the research carried out by Short (2008) on the English Commons. He similarly concludes that a successful integration of “new” services to provide public goods such as leisure areas or biodiversity in the traditional CPR structures depends on their ability to adjust to changing conditions; Key is the integration of the new function in the traditional institutional framework.

The current political discussions on the objective of the Swiss agrarian policies 2014-2017 to significantly increase direct payments for ecological services and the increasing number of communes that address cantonal agricultural advisors because of irresolvable conflicts and major transformation processes they cannot cope with (expressed by representatives of the agricultural departments and authorities of communes) emphasises the relevance of discussing the embedding and the robustness of Swiss CPR institutions.

What is missing in the above presented literature is the question WHY some CPR institutions manage to adapt to changing conditions and others not (research gap also identified by Kissling et al. 2002). This question shall be addressed within this paper. The paper argues that both aspects are relevant: the multi-level institutional analysis but also the specific local mechanisms to create and transform institutions. As advocated by New Institutional approaches related to social anthropology and since rather recently also by different institutionalist scholars in common property research (Agrawal 2003, Nightingale 2011), bargaining power and ideology as a means to legitimize personal or group interests (Ensminger 1992, Haller 2010) have to be included in order to understand institutional outcomes on the local level. If we understand the drivers of change on the local level, we will also understand why local CPR institutions increasingly struggle to maintain their performance and why their aims may not necessarily correlate with the aims of the federal state policies. What services local CPR institutions provide and if those services can be maintained over a long period of time depends on their specific institutional arrangements and their robustness. In the case of common alpine pasture management in Switzerland, the institutional framework on the level of the communes (municipalities) and farmer’s associations usually includes written regulations containing constitutional, collective choice and operational rules. If and to what extent those regulations are adapted to the changing conditions depends on local negotiation and decision making processes taking place in yearly general assemblies on the level of the commune and the associations. Hence, local politics are crucial for understanding why and how CPR institutions change and why the outcomes may diverge from institutional developments on the higher governmental levels.

The paper critically analyzes the embedding and robustness of CPR institutions in the field of alpine pasture management in Switzerland by

- a) providing a historical overview of relevant macro-level institutional developments, by
- b) using ethnographic data to describe the institutional changes since the earliest regulatory documents in the mountain village Laax, located in the Canton of Grisons, and by
- c) comparing the institutional developments on the different levels to derive implications for public policy implementation and the discussion on institutional robustness.

The results are based on ethnographic research carried out in Laax comprising participate observation (working on the alp during 1.5 month in 2010 and by assisting the commune in administrative tasks during the alp seasons 2010 and 2011), informal interviews and focus group discussions while working on the alp, semi-structured interviews after the alp summer of 2010 with the local farmers at their valley farms (N=5) with farmers from neighbouring villages (N=4), which bring their cattle to graze on the alps in Laax since a long time and with local authorities of the commune. To observe interaction, communication, and discourses, I attended board meetings. I carried out interviews on local oral history with the oldest farmers of the village (N=3) and recorded, transcribed, and qualitatively analysed all interviews according to the research questions. Moreover, this research was linked to a working group consisting of a mixed expert team from the department of agriculture and the agricultural training and advisory centre of the Canton of Grisons, so that I was able to also integrate macro-level expert knowledge. Archival work has been added in order to find relevant historical data.

I first start with describing the theoretical framework and the concepts on which this research is based. Then I provide a short introduction on alpine pastures as a common pool resource in the Canton of Grisons and its traditional function. In a next section I describe historical and current institutional developments first on the federal state and cantonal level and then on the level of the village Laax. Based on those descriptions the institutional developments on the macro and micro level are compared looking for shared or diverging objectives. To find reasons for the institutional development in Laax I will then discuss relevant variables explaining the institutional outcome, and implications for policy making.

Theoretical Framework

Through Netting's and Ostrom's research, the Swiss CPR institutions became known to be robust. The concept of robustness is related to Elinor Ostrom's design principles (DPs) which characterize CPR institutions that are capable to act collectively in order to adapt their institutional arrangements to maintain their services over time (Ostrom 1990, p.90). The design principles are: 1) clearly defined boundaries and clearly defined membership of use rights holders; 2) congruence between appropriation and provision rules and local conditions; 3) collective choice arrangements; 4) monitoring by appropriators or by monitors accountable to the appropriators; 5) graduated sanctions; 6) low-cost conflict-resolution mechanisms; 7) external recognition of self-organization, and 8) multiple layers of nested enterprises if the common pool resource is part of a larger system. Even though the relevance of multi-level management was already recognized by the design principles (DP8), the early commons research focused primarily on local isolated CPR systems, with low state influence. Later, concerns arose that the DPs are applied too rigidly without considering the wider political, economic and social environment or context specific variables such as social- and power relations (Agrawal 2003). Recent developments in common property theory move away from the DPs as a panacea and direct towards diagnostic approaches taking into account the complexity of local specificities and polycentric approaches recognizing horizontal and hierarchic relations within and across institutional levels (Ostrom 2007, 2009, 2010). Those trends fit well with earlier New Institutional approaches linked to the research on institutional change in social anthropology (Ensminger 1992), which have received comparatively little attention in the commons research. However, in the light of the recent developments in common property theory New Institutional frameworks such as Jean Ensminger's model of institutional change may contribute to the discussion about relevant variables affecting the robustness of CPR institutions. Jean Ensminger's model of institutional change (Ensminger 1992, 1998) considers the interaction between external (economic,

demographic, social-political, and technological) and internal factors (ideology, bargaining power, organization, and institution) and their impacts on distributional effects as well as the social, political, and economic behaviour of individuals (Ensminger 1992). Even though rooted in the New Institutional Economics with a strong economic variable (relative prices) influencing institutional change it does not blindly follow the rational choice concept. Ensminger's focus on interaction, history and local contextual variables such as power issues and ideology draws a picture of constantly negotiated and renegotiated institutional arrangements influenced by variables that do not necessarily lead to the most rational, benefit maximizing outcome. Institutions as perceived by Jean Ensminger represent legal norms, rules and regulations but also specific values and world views, defended by powerful actors (Haller 2010, Haller et al. 2013).

Jean Ensminger's approach allows the consideration of both, the analysis of the macro-level but also the specific local mechanisms to create and transform institutions. An aspect she doesn't address explicitly is the relation between different levels of governance. However, this is a crucial aspect when discussing the ability of local CPR regimes to maintain or integrate services which are part of public policies. To complement that aspect I draw on the research of Margherita Pieraccini (2013). She discusses the persistence of the *Regole d'Ampezzo*, an alpine CPR institution in Italy, combining an institutionalist perspective on law (legal pluralism) with the concept of resilience. Her hypothesis is that harmonic relations between the different legal orders enhance the resilience of the CPR system while disjunctures and contradictions hamper its adaptivity. She concludes that the supportive relation between the different institutional levels directly relate to the long term survival and resilience of the *Regole d'Ampezzo*. The notions of legal disjunctures and harmonic legal relations add an interesting aspect to the comparison of the multi-level institutional developments and allow relating those aspects to the robustness of the local CPR regime.

Alpine pastures as a common pool resource

In accordance with the local variability of ecological conditions, a high variety of CPR institutions to manage summer pastures were crafted by local communities in Switzerland that go back many centuries and were therefore crafted long before the Swiss state became into being. Only the collective use of the vast, higher altitude alpine pastures made the adaptation to the seasonally variable and hardly predictable availability of fodder units possible (Netting 1981, Stevenson 1991).

In the Canton of Grisons about 80% of the summer pastures are common land and 60% of them belong to the commune as lowest territorial, political and administrative level (LBBZ 2007). The commune is the owner of its common pool resources such as forests and pastures and its residents are the legal rights holders. Together they define the institutional framework for managing the community alps. In this context, institutions are understood as "sets of rules that define access, use, exclusion, management, monitoring, sanctioning, and arbitration behavior of users" (Schlager & Ostrom 1992, p. 244). Referring to the bundles of rights defined by Schlager and Ostrom (1992, pp. 250-251) the local farmers have the right 1) to have access to the summer pastures during a fixed period of time, 2) to withdraw products of the resource (grazing rights) within the limit of the sustainable yield 3) to define user rules within the limits of higher regulations, and 4) to exclude external users not resident in the commune. Rights cannot be sold, but the association can allow outsiders to bring their livestock in, in case that they are not able to fully stock the alp with local animals. Regulations to ensure those rights to all legal rights holders can be found since medieval times. If written down in statutes and regulations or orally transferred from generation to

generation they generally comprise the following rules (Weiss 1941; Netting 1981; Stevenson 1991):

- Limits of the common resource and ownership
- Restrictions in use: The use of the communally owned alpine pastures was usually restricted to the local animals that could be fed over the winter month with fodder from private meadows.
- Membership: Clear definition of the legal rights holder
- Organs of the association: Usually the general assembly, a president, a secretary, a treasurer and an alp master
- Terms and duties of the board members
- Communal work (*Gemeinwerk*): Working hours (hours per livestock) owed by every user for maintaining the pastures
- Rules on access rights: who is allowed to use which grazing area, with what type and what number of animals during a defined time period
- Decision making rules: voting rules in general assemblies
- Sanctions implied if rules are abused
- Distribution of costs and benefits

Two general principles characterize the community based management and the rules they create: Economic proportionality (faire distribution of costs and benefits) and political equality (collective decision making within meetings and general assemblies) (Head 1995). Also the investments for allocating the resources are proportionally distributed. The more animals a farmer sends to the alps the higher is the work duty. The activities carried out within the communal work depend on the local conditions, but generally comprise fertilizing, clearance of the pastures from stones, weed and shrubs, measures of protection against soil erosion, and minor repair works on the infrastructure. Hence, the quality of the communal work plays a major role in determining the ecological outcomes of the CPR institution and a central aspect discussing the CPRs ecological services. The communal work is one component of the traditional function of the CPR system, which I will present next.

The traditional function of the alpine pastures as a CPR

The traditional function of the alpine pastures is strongly related to the subsistence economy and integrated in the pastoral and agricultural cycle of the mountain farmers (see table 1). During spring the animals grazed close to the barns on private pastures. As poorer households did not have sufficient land to graze on their private land, many communities practiced the communal grazing (*Gemeinatzung*) in April (before planting): all private and lower common land was opened to all livestock (often limited to the small livestock) of the local farmers. During mid may until the ascent to the alps in mid June the farmers moved with their animals to the *Maiensäss* (smaller private barn and surrounding land at an altitude of around 1200 to 1600 m) for grazing. In case the commune possessed pastures at valley level, the so called home pastures (*Heimweiden*), they were used during spring and fall by households not owning a *Maiensäss*. During the summer month, usually from mid June until mid September, the animals graze on the alpine pastures under the supervision of employed herders and cheese makers (in the case of dairy cow alps), while on the valley floor and the *Maiensäss* the pastures were harvested for hay. In mid September the animals returned from the alps to the *Maiensäss* or the home pastures. Also the communal grazing was repeated after the harvest in fall (October). When the winter arrived, the animals were stabled in the valley barns and fed with hey. Households, which harvested hey on the *Maiensäss*-level usually staid with some of their animals at the *Maiensäss* barn to feed the hey on site instead of transporting it to the valley barn. This was a common practice in the past as the means of transportation and the

access to the *Maiensäss* were limited (Weiss 1941, Netting 1982, Stevenson 1991). The traditional pastoral cycle has changed in the context of modernization. At this point I only describe the traditional function of the CPR system but will discuss the transformation of practices and functions later on in the case study.

The system of seasonal transhumance has primarily an economic function: Using the alpine pastures the number of livestock held by a farmer may be enlarged by around 25% compared to if the farmer only utilized the private pastures in the valley and on the *Maiensäss* (LBBZ 2007). Furthermore, driving the livestock on the alps during the summer months enables the farmers to free time to harvest hay from their private fields to feed their livestock during the winter time. However, the use of the CPRs was not for free. Communal work had to be accomplished to assure the maintenance of the CPR's productivity. Later user taxes were introduced, which were the commune's only source of income for a long period of time. Hence, the economic function is related to the individual as well as to the communal level.

The traditional system also shows socio-economic functions: The farmers without a *Maiensäss*, and hence the less privileged, were allowed to use the home pastures during spring and fall. Furthermore, the communal grazing enabled the poor households with little or no land to hold a goat or two to secure their livelihoods. Depending on the commune further poverty relief rules were established (Weiss 1941, p. 198).

It can be concluded that the traditional CPR system interlinked private and common property by exposing privately owned lands to community regulations and communally owned lands to certain individual user rights (Berthoud 1972, p.186). Collective action was needed in order to get the most economic benefit out of the widely spread and vast alpine pastures, but also to ensure the survival of all members of the community. In the light of the primary economic and social function, the maintenance of the cultural landscape, biodiversity, or the protection against natural hazards such as mud slides or avalanches were only side products.

Table 1 Traditional pastoral economy and related property rights

	Location of animals	Resources used	Property right	CPR regulations
January	Valley barn	Hay harvested during summer	Private	No
February	Valley barn	Hay harvested during summer	Private	No
March	Valley barn	Hay harvested during summer	Private	No
April	Private pastures in the valley	Private pastures	Private	Yes
May	<i>Maiensäss</i> , home pastures	Private or common pastures	Private or common	Home pastures: yes <i>Maiensäss</i> : no
June	<i>Maiensäss</i> , home pastures	Private or common pastures	Private or common	Home pastures: yes <i>Maiensäss</i> : no
July	Alp	Common pastures	Common	Yes
August	Alp	Common pastures	Common	Yes
September	Alp	Common pastures	Common	Yes
October	<i>Maiensäss</i> , home pastures	Private or common pastures	Private or common	Home pastures: yes <i>Maiensäss</i> : no
November	Valley or <i>Maiensäss</i> barn	Hay harvested during summer	Private	No
December	Valley or <i>Maiensäss</i> barn	Hay harvested during summer	Private	No

Source: based on own data

Institutional developments on the macro-level affecting the local CPR regime

Expanding services and financial hardship of the neighborhoods (*Nachbarschaften*, later became the communes): The federal state *Freistaat Gemeiner III Buende*, that later developed

into the Canton of Grisons, became a canton of the Helvetic Republic in 1803. At the beginning of the 19th century the cantonal government assigned more and more social and administrative responsibilities to the neighborhoods enlarging their competencies, but also increasing their expenditures. As the CPRs (alps, forests, pastures) were the only sources of income taxes had to be raised in order to fulfill the responsibilities.

Protection of the CPRs by law: Financial hardship drove the neighborhoods to allow citizenship for money, to sell alps and forests, and to increase taxes. To secure the availability of CPRs a federal law was introduced in 1848 prohibiting the use of communal and cooperative goods for private purposes (Liver 1968, p.207). The protection of the CPRs also included the forest, which became increasingly protected by federal and cantonal law from the 1840ies on (Zimmermann 2004, p.39).

Extension of legal rights holders: With the constitution of 1854 the *Freistaat Gemeiner III Buende* became the Canton of Grisons of today. Three years before, the federal state was restructured into cantons, circles, districts and communes. Until 1874 the access to CPRs in many communes was limited to the citizens (original residents) only and not to all residents. In 1874 the cantonal law on the settlement (*Niederlassungsgesetz*) was released extending the CPR user rights to all residents of a commune (Strüby 1919, p.59).

Financial support yes, legal interference no: When it became clear that the industrialization of the 19th century opened the market for cheap agrarian imports and that the local production could not compete, a federal law to support the agricultural sector (*Gesetz über die Förderung der Landwirtschaft*) was released in 1893. In alpine farming it subsidized soil amelioration and the construction of alp infrastructure (Werthemann 1973, p.137). However, those first efforts to develop and modernize alpine farming had little impact. A modern cantonal law on alpine farming, as introduced in many other Swiss cantons, was not known in the Canton of Grisons. An attempt was made to release a cantonal law on alpine farming in 1880, but it was opposed by the people (Steinhauser 1993, p.47). In the draft of the Communal Law of the Canton of Grisons in 1945 regulations were proposed also regarding property rights and the management of the CPRs. But also this law was rejected by the communes. The people did not want the canton to interfere in their traditional affairs (Condrau 1958, p.69).

Legal confirmation of local institutional arrangements: The Communal Law (*Gemeindengesetz*) of the Canton of Grisons got finally approved in 1972. It primarily confirms already existing practices: The duty of the communes to secure the use of common pastures for the local farmers (Art. 30) and also to maintain them (Art. 41); the citizens and residents as the legal rights holders (Art. 30: 2); and the limitation of the grazing rights to the cattle fed during the winter with fodder harvested on the territory of the commune (Art.31: 1).

Shifts in the direct payment system: Due to the increasing costs to manage the alps and the increasing protests of the farmers the federal state started to subsidize the alpine grazing in 1980. The protectionist approach did not last long mainly due to international pressure to abstain from price regulations. A fundamental agrarian reform took place in 1992. Direct payments became bound to ecological services, while price guarantees were continuously reduced (BLW 2000). The development since the 1990s shows a dual role of the state: the federal state is obliged to open the markets and to make the agricultural sector more competitive, while it is at the same time responsible for the conservation of the cultural landscapes, the biodiversity and the sustainable use of the alpine pastures. Regarding its later obligation, the former ordinance to support alpine farming was revised and replaced by the ordinance on summer pasturing payments (*Sömmerungsbeitragsverordnung*, SöBV) in 1999. The SöBV requires the definition of the maximum sustainable yield (MSY) for each alp according to the productivity of the pastures. The MSY (number of animals allowed to graze on an alp during 100 days) was determined by the canton but it was based on the local grazing practices of the year 1998 and earlier. Each alp has to remain within the range of 75% to 110% of its MSY in order to get full direct payments. Each commune is required to register

all animals admitted to the alpine pastures in a national database enabling efficient monitoring. Furthermore, the SöBV provides sustainability rules such as the protection of the pasture against scrub and forest encroachment, an adapted and biodiversity enhancing fertilization of the pastures, the control of weeds and the maintenance of alp buildings and infrastructure. The rules basically describe the traditional objectives of the communal work on the alps presented earlier. However, the implementation and monitoring of the sustainability criteria turned out to be difficult because of the wide margins of interpretation, for example regarding natural regrowth or erosion (Schulz 2011, p. 90).

Fundamental reforms of the agrarian policy 2014-2017: It is planned to base the direct payments on the land a farmer cultivates and not until now on the amount of animals a farmer is able to feed. The payments for ecological services provided on the individual level (see Glasenapp and Thornton 2011) continue, are increased and expanded also to the alpine level. The reform is a further shift towards the valuation of non-market services such as the protection of cultural landscape and biodiversity.

Despite the increasing legal density on the federal state level affecting the cantons and communes, the lower governance levels and particularly the communes maintain significant room for maneuver in relation to the CPR management. This is due to the principles of federalism and subsidiarity, which developed out of the step by step constitution of the federal state and the traditionally high autonomy of the communes: Subsidiarity implies the shift of policy competencies to the lowest possible institutional level and allows state intervention only in case local efforts do not suffice to reach goals. Federalism strengthens the idea of subsidiarity by handing over the responsibility of implementing federal programs and decrees to the cantons and their communes bequeathing them with a considerable scope of interpretation and action (Thomi et al. 2008, p.228). Hence, public policies concerning alpine pastures continue to depend on the local CPR institutions. The question is if they are able to maintain or reintegrate the ecological aspect of their traditional function in order to meet the “new” demands of public policy to provide ecological services.

Institutional development on the local level: The case study of Laax

Formal institutional development

In the literature the origin of community alps is mostly referred to *Talmarkgenossenschaften*, a loose “community association” mostly defined by the natural limits of a valley. The common resources the valley provided were shared without restrictions (open access). With a growing number of residents and increasing cooperative activities in economic and military affairs, political and juridical entities were formed and communal borders and possessions clarified in order to defend them against non-citizens and neighboring villages (Netting 1981, p. 64; Stevenson 1991, p. 115; Weiss 1941, p. 167). The CPR management system in Laax can be traced back to documents of the 16th century, which do however not reveal its institutional roots. At that time, the neighborhoods of Laax and Sagogn managed CPRs (such as common pastures and forests) within a joint association. Furthermore, the two villages were judicially unified as the *Gerichtsgemeinde* Laax-Sevgein (judicial community). As in many villages, the first documentation about CPR regulations started with judicial decisions. Disputes arose regarding the use of the CPR and the borders between the neighborhoods leading step by step to the clarification and legalization of property rights but also to a legal separation of the two communities. At the beginning of the 17th century, they both established individual neighborhood regulations regarding settlement rights (*Niederlassungsrechte*). In 1645 Laax released community regulations (*Dorfrechte*) comprising rights regarding the households, the private fields and meadows as well as the common pastures and forests (Collenberg 2012,

pp.987, 1079). They are revised in 1657 and confirmed again in 1724. The rules mainly regulated the use of the common grazing grounds on the Maiensäss-level, which were jointly used with Sagogn. One grazing area was exclusively open to oxen and calves and all users had to pay a certain tax per animal to use it in spring, summer or fall. Further rules concern the private meadows between the valley and the alps (1300-1600 m), which were subject to common rules: During spring and fall those meadows were open to all small livestock of the community (communal grazing). Offenders had to pay additional taxes in case of abuse. Civil control was an important instrument to detect offenders. Several articles allow denunciators to be rewarded with at least half of the fee the offence demanded.

In a protocol from 1726 the community assembly decided to rotate the position of the village head (*Dorfmeister*) every year following the alignment of the households. Hence, the power but also the duties that come with this position were equally distributed among the members of the neighborhood.

The CPRs were the only economic assets of those early communities and hence their main concern. This is reflected in the community constitution (*Gemeindeverfassung*) of 1879, which is based on the revised versions of the community regulations of 1724 and 1868. Several articles relate to the income of the commune: Taxes related to the use of the CPRs were introduced as the only revenues to cover the expenditures of the commune. In case they were not sufficient they had to be raised (Art.17). Despite the financial constraints, it was prohibited to sell CPRs in order to fill financial gaps (Art.18). The increasing demand for building and maintaining roads, bridges and infrastructure could only be met by introducing the public communal work, which obliged each household to contribute their labor force (Art.20). The burdens (taxes, work duties) but also the benefits from common goods followed the principle of equality: all citizens, and in case of sufficient capacity, also the residents had equal access rights to the CPRs (Art.12). While the most common rules regarding the limitation of the number of animals and the duty to do communal work to maintain the alpine pastures were not mentioned in this version of the community constitution, the earlier version of 1868 does contain such rules: the access to the alpine pastures was limited to the local animals fed during the winter with own fodder and the users were obliged to do maintenance work on the alps (in proportion to the number of animals per household) in order to increase the productivity of the pastures. On the other hand, the grazing of foreign cows on the dairy alp was explicitly permitted indicating decreasing competition and free capacities on the dairy alp. The excessive supply of alpine pastures might explain why restricting rules have not been mentioned in the later version. Another reason could be that at around that time the management of the alps shifted from being a public affair to an affair of the farming population only. Unfortunately it is not possible to exactly determine the handing over of the alp management to the farming population, i.e. the alp association in Laax. Weiss (1941, p.257) relates the shift of the alp management to alp associations and the supervision to the commune council to the restructuring of the communes in 1854. In the first community alp regulations established in 1913 the commune council and the alp reeve (*Alpvogt*) are indeed mentioned as the supervisors of the alp administration. They were elected by the community assembly. Also for the first time the limits of the dairy cow pastures belonging to the alp Nagiens and the young cattle alp Uaul Curtgani were specified by the traditional field names of the pastures. The number of cows was limited to 140 heads as a maximum and 130 heads as a minimum. Calves from local farmers were allowed to graze on the dairy cow alps without restricting the number (however, calves for trade were explicitly excluded). The young cattle alp was limited to 60-70 one year old cattle. No further alp regulations were established after 1913. The community constitution of 1921 does not contain any rules related to the alp management besides the income generated by alp related taxes. On the other hand the constitution introduces new taxes such as head and income taxes.

The formal institutional framework shows that there is no consistency or chronological order in the development of rules. Neither seem the regulations to be complete. What lacks is the knowledge about customary law, which must have played a major role in the alp management in Laax. What the regulations show is the development of the CPR system from a neighborhood overarching institution to an institution bound to the boundaries of the commune and its citizens and residents as the legal rights holders. It also clearly demonstrates the traditional economic function of the institution related to the subsistence economy of the population and the development of the community. The social cohesion of the population must have played a vital role as a monitoring instrument. The communal grazing is present delivering the socio-economic function. The decline of the dependency of the commune on the CPRs remains a hypothesis supported by the probable shift of the alp management from the community to the alp association, the free capacities on the dairy alp and the introduction of other taxes. The following institutional developments and the oral history will provide more insights on those aspects.

Institutional developments since 1921

Usually, when the commune outsourced the management of its alps to an alp association, an alp and pasture law was established on the level of the commune and statutes and regulations on the level of the association. However, in the case of Laax no further alp regulations have been released since 1913, neither on the communal nor on the level of the alp association. The user rights within the community of Laax and the alp association became based on oral customary law (Maissen 1978, p. 81). An old farmer from a commune close by, whose family sends their dairy cows to Alp Nagiens since the time of reformation explained this fact with the low amount of local animals compared to the vast alpine pastures. Apparently the competition was low and regulating access not a primary concern (see Mathieu 1992).

The alp association was headed by an alp master, who was in charge of all operational tasks. Until the end of the 1960s, a rotational system was in place, according to which the position of the alp master passed from one member of the alp association to the next as it used to be for the village head. This system was abolished in 1969, when farmers started to refuse the position and the ones in charge were not committed to managing the alp sustainably due to the short terms of office. Around that time further transition processes started:

- Early transition to a service society: The number of overnight stays in Laax increased from 20,000 in 1960 to 129,000 in 1975, to 525,210 in 2010 (communal statistics) demonstrating the fast development of tourism.
- With tourism land speculation began and gave the farmers the option to sell their land. The price for construction land increased from about CHF 60 per square metre in the 1960s up to 500–1,000 Swiss Francs per square metre in 2011 (according to the *Schätzungsamt*, the cantonal office in charge of estimating the value of land). The selling of land is one major reason for the reduction of farmers from 27 in 1930, to 10 in 1977 (Maissen 1978) and in 2011 only five remain in the alp association.
- The communal work became a burden because the reduction of farmers caused a significant reduction of labor force while the workload to maintain the pastures remained the same (see also Werthemann 1969, p. 126). In the literature social and economic reasons are mentioned: Weiss (1941, p. 249) observes that the commitment to accomplish communal work has decreased. He derives this development from the delusion of the sense of community due to the economic boost and the capitalist thinking of the post War era. For the 1960s Werthemann (1969, p. 130) equally notices a general loss of interest in the communal work relating it to the raising costs: While the value of labor increased by 250% the price for milk increased only by 50% during the same time period. In Laax relative prices certainly played a role: The salary of the cheese maker rose from around CHF 500

before 1954 (Maissen 1978) to CHF 1,780 in 1959, to CHF 4,700 in 1972, to CHF 8,000 in 1989 up to CHF 15,000 (data from alp accounting books). As a consequence, hiring alp staff and the working hours for accomplishing the communal work became more and more expensive. The total expenditures of the alp association rose from CHF 8,472 in 1959, to CHF 48,913 in 1980 up to CHF 83,500 in 2011 (data from alp accounting books). Only the substantial direct payments for summering animals since 1980 enabled the farmers to cover those expenditures. The alps became also a financial burden to the commune. The analysis of the annual accounts of the commune going back to 1945 show that the alp management generated income until 1960. From 1970 onwards, investments in the alp infrastructure became necessary so that the expenditures began to exceed the income from alp taxes and the state subsidies, which started in 1980. The financing of those deficits were only possible thanks to the increasing income generated from tourism and other taxes.

- The communal grazing was abandoned in 1970 for several reasons: The engagement of children for herding the freely grazing animals was essential for maintaining this function of the CPR system. When the cantonal school law extended the school year from 26 weeks before 1961 to a minimum of 40 weeks in 1972 (Marti-Müller 2007, pp. 287-289), the summer holidays, which originally were adapted to the alp season (starting in April with the communal grazing and ending at the beginning of October after the second communal grazing) were reduced leaving the communal grazing without herders. But also the option to buy land free from communal grazing and the introduction of the low cost electric fences reduced the interest in the communal grazing. The last testimonies of the communal grazing is a document dated from 15.09.1967 declaring a rule abuse regarding communal grazing and a document from 1970 confirming the protection of a private land parcel on the *Maiensäss*-level from the communal grazing.
- Without the option for communal grazing, and with the increased protection of the forest, the availability of milk in the store, and new opportunities to support their livelihoods the number of goats and sheep dropped from 575 in 1955 to 414 in 1965 to 145 in 1983 (data from the Swiss Federal Statistical Office). As a consequence the sheep alp Muladera, which has not been mentioned in the early written regulations, was abandoned. The good pastures became part of the young cattle alp, the others were abandoned. The sheep and goats also grazed on the home pastures of the commune located at the upper *Maiensäss*-level. With their disappearance those pastures were lost to shrub and forest.
- The number of livestock generally decreased from 1,071 heads in 1956 to 876 heads in 1966 to 597 in 1983, and since 2003 the numbers remained stable at around 470 heads (from the Swiss Federal Statistical Office). It became more and more important to find foreign animals to sufficiently stock the alps. But besides the number, also the physical condition of the animals and particularly the cows began to play a role for pasture management.
- Driven by the pressure to increase production, the cattle breeding aimed at increasing the milk yield of the cows. The milk yield measured on the alp Nagiens rose from around 550 liter per cow and alp summer in the 1950ies to 1,000 liters during the alp summer of 2011 (data from alp accounting books). The cows became heavier, less agile and pickier regarding the quality of the fodder. As a result the use of good and easy accessible pastures got intensified while steeper and remote pastures became either young cattle pastures or have been abandoned.
- But also the traditional barns to produce cheese that characterized the *Maiensäss*-level have been abandoned until around the same time (Volland 1993), as the cheese production was labor intensive and not indispensable any more (availability of cheese and other products in the store). The highest *Maiensäss* pastures, which were abandoned, became part of the young cattle alp but a great part of the other pastures at that level turned into skiing slopes, construction grounds or wilderness.

On the institutional level of the alp association those severe economic, social, political and ecological changes starting in the 1960ies had less impact than expected. Having abandoned the rotational system in 1969 the functioning of the alp association was stabilized by the long terms of two alp masters from 1970 to 2000. Their great knowledge and ability to run the alp hid the fact that the farmers were increasingly marginalized within their community and lost bargaining power at various levels: at the level of the local government, as the last farmer left the commune council in 1990; within the community, due to the rapid increase of the non-farming population (310 inhabitants in 1960, 1,197 in 1985, and 1,541 in 2011, according to communal statistics); and in bilateral negotiations, due to increasingly powerful external actors such as tourism agencies. But also within the alp association the interests diverged more and more. Several social factors increased the structural decay of the traditional CPR regime: Personal differences hampered the communication and information flow between the users. Meetings were reduced to the minimum, the communal work became more and more individualized, and the management of the alp was led by one person. That person also had the necessary knowledge to do so, but did not share his knowledge with others. With the support of the commune council some farmers convinced the members of the alp association in 2000 to return to the rotational system in order to distribute power more evenly. The lack of the necessary traditional knowledge to run the alp and the short terms to gain experience led to the request to write down customary law. The commune council supported the idea and asked a cantonal agricultural advisor to assist the process of constituting the rules. Five members remained in the alp association, all of them dairy farmers at that time. Despite their small number and same type of production, divergent views and self-interests dominated the discussions and raised the transaction costs to the extent that only standard rules were agreed upon, without considering any local specificity. These new regulations could not prevent the failure of the rotational system. Under general approval, one of the old alp masters from the period of 1970 to 2000 took over the position for three more years until 2008. In 2008, major changes caused the institutional system to collapse: two of the younger farmers shifted from milk to meat production (suckler cow husbandry), which was interpreted as a severe break with tradition by the remaining dairy cow farmers, aggravating internal disputes. Furthermore, the community assembly of Laax decided to use one part of the cowshed of Alp Nagiens to open up a restaurant. The decision was supported by a general change of ideology within the community: The subsidies and the privilege to construct stables and residential houses in the agricultural zone were perceived as unjustified and unfair (mentioned by several members of the local government). "The farmers are spoiled," was the general discourse. With no leader and in a decision-making environment where there is nothing to win and not much to lose, none of the farmers were ready to assume the responsibilities of the alp master. In the end, the commune as the supervising organ had to take over the alp management. However, the lack of traditional knowledge remained a problem. The head of the department of tourism and agriculture was not a farmer and had no experience in alpine farming and in managing an alp. Furthermore, he could not count on the support of the farmers, as he was also made responsible for the predicament. The only way to strengthen his position was to ask the agricultural training and advisory centre of the Canton of Grisons for assistance. But suggestions made by the cantonal agricultural advisor were *per se* not accepted by the farmers. Later, the farmers justified their non-cooperative behaviour by pointing out that the suggestions were perceived as being in contradiction with customary law and were not well explained to them. Despite resistance by the farmers, changes were made *inter alia* in the accounting system leaving doubts about the fairness of the distribution of costs and benefits between the dairy cow and the suckler cow farmers. The shift from a common property to a public management system has left its marks during my field work in 2010 and 2011. While the economic function of the alps could be maintained thanks to experienced alp staff not relying entirely on local or professional knowledge the communal work was reduced to a

minimum putting at risks the maintenance of the remaining pastures, which have already been reduced due to earlier changes. However, the shift from common property to public management does not necessarily imply a change for the worse as will be discussed at the end.

In the next section the institutional developments on the different governance levels are compared, and the impact on the services provided by the CPR regime discussed.

Multi-level institutional development

Before becoming part of the Helvetic Republic in the early 19th century, the communities of today's Canton of Grisons enjoyed high legal and economic autonomy. Rule constitution particularly regarding the CPRs has a long tradition. Even though federal state laws affecting the agricultural sector and alpine farming increased rapidly after 1950 the interference could be reduced to laws in line with local customs (Communal Law) or laws providing financial support (direct payments), which was important for the communes and for the alp associations to maintain their services despite increasing expenditures provoked by shifting relative prices. The economic and political pressure from the European markets and governments but also the ideological shifts within the global society to recognize ecological outputs such as biodiversity initiated the transformation of the direct payment system towards the compensation of ecological services. Aware of the importance of the local CPR institutions for the allocation of those ecological services the federal state continuously increased the direct payments for summering animals on the alps and fixed them on sustainability criteria. However, while the stocking capacities can be effectively controlled by the cantons, the sustainability of the resource use still depends on the quality of the communal work and the monitoring mechanisms of the local CPR regimes. The lack of a controlling system is an important issue to keep in mind when discussing the institutional developments in Laax.

Until the World Wars Laax and the Swiss communes in general relied exclusively on the economic benefits from the CPRs. The social and economic life of the whole community was closely related to their appropriation and provision. Industrialization and tourism brought new job opportunities to Laax and a growing non-farming population. The social function of the CPR system (communal grazing) became obsolete and was abandoned. The commune became the main infrastructure provider (investments in infrastructure) and the alp association allocated the natural resource by doing communal work and caring for an adapted pasture management. The increasing costs were compensated by increasing direct payments from the federal state and by the additional income sources of the commune (tourism, taxes). Hence the impact of the shifts in relative prices, which would have most probably meant the delusion of the CPR institution, were reduced by the interference of the federal state and other external actors (tourism agencies, tourists, non-farming residents). However, the institutional development in Laax shows that not only money determines the outcomes. The maintenance of the pastures became more difficult with the disappearance of the small livestock, the reduction of animals in general, and the high yield dairy cows. The loss of cultural landscape could have been prevented by doing more communal work but such investments were not reasonable in the light of the increasing work load on the intensified and individualized farms and the high costs per working hour. Also, the communal work has lost its social aspect due to the internal differences between the farmers. In other communes social capital was identified as a major factor to invest in the maintenance of the pastures (Tiefenbach et al. 2006). In Laax the economic function on the alpine prevailed but the ecological and social components of that function were reduced to a minimum.

Now, comparing the institutional development on the macro and the micro level disjunctures can be identified: While on the macro level the ecological functions of the CPR systems are increasingly valued, they are increasingly neglected by the CPR regime due to the reasons explained above.

According to Pierracini (2013) disjunctures between legal orders tend to endanger the robustness of a CPR system. As a next step I will discuss what factors indeed undermined the robustness of the CPR institution in Laax and finally caused the collapse.

Institutional robustness from a New Institutional point of view

External factors such as industrialization, tourism, demographic shifts, shifts in relative prices and the direct payment system have changed the conditions for managing the alps. The historical development shows that the direct payments are a precondition for the survival of CPR institutions and that other external variables highly influenced individual decision making (sale of land, retreat from farming and keeping small livestock, specialization and intensification of farming) and the institutional output (neglect of communal work, less small animals and animals in general to maintain all pastures) and may to a great extent explain the divergence of the local institutional development from national policies. However, the macro-level analysis does not explain why the local CPR regime was not able to react to those changes. As suggested by the New Institutionalists: bargaining power and ideology have to be considered in order to explain institutional change.

The institutional developments in Laax show that customary law may be an efficient and cost effective way to manage CPRs, but only if customary law is regularly discussed and adapted collectively, if information is shared and knowledge is transferred. If this is not the case, as in Laax, knowledge inequalities arise, leading to power inequalities. The knowledge monopoly of the long-term alp master gave him the power to continue the management of the alps as it has always been without establishing collective decision making platforms to discuss institutional adaptation. The lack of a tradition to revise rules also reflected in the rare and unsystematic creation of written regulations in the past might have fostered such a strategy. Even though reducing transaction costs as long as adaptation was evitable, this strategy led to high transaction costs, and to the brake down of the CPR regime, as soon as it became exposed to radical disturbances. With the brake down of the CPR institution and the alp management in the hands of the commune, another knowledge gap became relevant: the commune council did not have sufficient information to run the alps and the non-cooperation of the farmers hampered the integration of local knowledge. The information provided by the cantonal agricultural advisor could not make up for the knowledge gap but was able to provide the commune council with “new” information how to run the alps in a reasonable and faire way. The external intervention helped to legitimize and to empower the commune but the rules created were not perceived as faire and legitimized by the farmers. The institutional outcome reflects the lack of social embedding of the farmers in their community and the importance of the relation between the infrastructure provider and the user group. Those aspects have been pointed out as being key aspects for determining the robustness of CPR institutions (Anderies et al. 2004).

Another aspect is the ideological gap between the non-farming population mainly interested in the ecological services (the public good) and the farming population primarily concerned with the economic output. The ideological gap is nourished by the rare interaction between the two population groups and the marginalization of the farmers within the community leading to a loss of common values and ideologies, a trend that has been observed also in other communes of the Canton of Grisons (Glasenapp and Thornton 2011, p.778). An ideological gap also evolved among the farmers: the shift of two farmers from dairy to suckler

cow husbandry meant a brake with tradition splitting the user group in two opposing parties, and depriving the CPR regime of the potential to act collectively. The social disjunction and the ideological gaps increase the transaction costs for establishing a robust CPR institution.

However, from the perspective of public environmental policies, the high valuation of the indirect product of the alpine pastures by the commune hides potentials: If the commune is interested in maintaining the ecological services it will get involved and will invest in the alp management. This means also that it has a long term interest in maintaining the alpine pastures. In communes where the number of farmers is small, the communal work neglected, and the alpine pastures provide no additional value (for tourism, national parks etc.), the commune has little incentives to interfere, will let the pastures decrease and might eventually abandon the alps in the case no farmer is remaining. Such developments can be observed in remote communes of the Canton of Tessin in the southern part of Switzerland.

Concluding remarks and policy implications

Institutional outcomes on all institutional levels reflect discourses and political lobbying. As the trend towards ecological services of CPRs has shown, the institutional change might start on an international level, move later on to the national, and at the end to the local level. To understand why changes on the local institutional level occur, it is important to analyze the institutional developments on all governmental levels. Disjunctures within the legal orders turned out to be an indicator for unsustainable institutional development in Laax, affirming Margherita Pieraccini (2013) hypothesis. However, it does not explain how and why those disjunctures were created over time. The historical developments revealed that the increasing interference of the state, the split between the owner and the user group, the divergence of ideologies, and the shifts in bargaining power due to the increasing heterogeneity of the actors involved in the alp management are key factors for explaining institutional outcomes. Furthermore, the New Institutionalism approach enabled to look more closely at local decision making processes influenced by power relations and ideology, which proved to be vital aspects in explaining why institutions change, why they resist to change, or why they perish.

Also approaches advocating for investigating the linkage between resource users and public infrastructure providers (Anderies et al. 2004) and the underlying social relationships and social network structures including leadership, information flow and trust (York and Schoon 2011) as important variables for institutional robustness are supported by the results of this research.

It is foreseeable that Swiss communes owning alps will sooner or later have to find new institutional solutions to react to the decreasing number of farmers, their difficulties to do enough communal work to maintain the alpine pastures and to find enough livestock to use the alpine pastures in an ecological and economical way. The outcome of institutional transformation will depend on the power distribution within the communities and on the influence of other interest groups such as tourism agencies. Depending on the distribution of bargaining power there will be more or less ties to the old community based management system. The commune council should be aware that the local knowledge of the farmers is important to find sustainable solutions, solutions that are legitimized and perceived as fair by all actors involved. It may facilitate a new institutional equilibrium by providing platforms for knowledge exchange, for getting to know others actor's opinion and for participating in discussions on an equal level. According to adaptive management approaches those aspects are preconditions for building trust, respect and to find common concerns and interests (Short 2008). In the same direction goes the constitutionality approach developed by Chabwela and

Haller (2010) that calls for the re-establishment of a sense of ownership by empowering local farmers and facilitating participatory decision-making processes including all actors involved.

The results are derived from a case study and hence have no general validity. Further research on communal alps is needed in order to give the results more weight and to make a well-founded statement about if the weakening of institutional arrangements is related to the property rights system of the communal alps or to other factors. Regarding other factors, in-depth historical research on the evolution of regulations could test the hypothesis that a long tradition of regular discussion and revision of regulations is positively related to the robustness of the CPR institutions.

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