

North-South Exchange – Research in JACS ALPS

Report of the study on

**Institutions and mechanisms regulating Swiss alpine
pasture use and the marketing of pastoral products**

By

Gilbert Fokou

Karina Liechti

Almaz Abdiev

Janyl Kozhomuratova

**north
south**
NCCR
47nos

Joint Areas
of Case Studies:

East Africa
Horn of Africa
West Africa
South-East Asia
South Asia
Central Asia
Central America
and Caribbean
South America
Switzerland

TPP-PPS / JACS ALPS

December 2008

Acknowledgements

When we were preparing this research project in the Alps, our main worries were the difficulty of jumping into an unknown world with unfamiliar people. The question was how to make relevant scientific study without being perceived by informants themselves as a group of southern tourists? If it was easy for us members of the team to forget our own differences, it was more difficult for people from “socially hot countries” to carry research in a so-called “individualistic” and “cold country”. The expected socio-cultural, scientific, or even climatic shock was supposed to be violent. Finally, many things were different but many others similar to other parts of the world. Carrying research in the Swiss Alps is as exciting as it is on the shores of the Lake Chad in the heart of Africa or in the remote pastures of Jergetal on the Kyrgyz mountains. In the Alps, an interview does not start with a bowl of *kymys* like in a Central Asian yurt or a cup of tea as in a West African tent. But in their own way alpine people are able to express their sympathy and friendliness, their support and availability. The research experience in the Alps has been an exceptional learning experience for each member of our team. There are many institutions and individuals who made this learning experience possible and we would like here to express to them our sincere and deepest gratitude.

First of all, we are indebted to the NCCR North-South, co-funded by the Swiss National Science Foundation (SNF) and the Swiss Agency for Development and Cooperation (SDC), for promoting stimulating intercultural, interdisciplinary and transdisciplinary research to mitigate syndromes of global change. We particularly wish to acknowledge the coordination office of JACS Alps for financing this project. Special thanks to its regional coordinator, Dr. Astrid Wallner for her advices and support. Special thanks also to Prof. Bassirou Bonfoh, the coordinator of the Transversal Package Project on Pastoral Production Systems (TPP-PPS), who is the initiator of this research project. Within the NCCR family, many other people have contributed by providing advices, contacts, comments, encouragements and criticisms. Thus we are grateful to Prof. Jakob Zinsstag (STI, Basel, Switzerland); Dr. Daniel Maselli (CAMP Alatau, Bishkek, Kyrgyzstan), Mrs Mira Arynova (Regional coordinator JACS Central Asia, Bishkek, Kyrgyzstan), Dr. Claudia Zingerli (University of Zurich, TPP leader); and to Bernd Steimann (University of Zurich, PhD student) for his inputs and his active participation to the fieldtrip in Lötschental.

We are grateful to Martin Weber and Hugo Roggo from the Federal Office for Agriculture for their availability to clarify issues related to direct payments, to Walter Schläppi (agronomist), Martina Cantieni, and Franziska Grossenbacher (students of geography) for giving us thematic inputs about pasture use systems, and to Marlène Thibault for translations. We are deeply indebted to special people: the farmers we met in the Alps and who provided us with accommodation, information and transportation. Many thanks for their hospitality, friendship, openness and trust. It would be unfair not to mention a few of them: Richard Cantieni and his family in Patzen (Schamserberg, GR), Daniel Ritler in Blatten (Lötschental, VS), and Peter Ryter and family in Schönried (Saanenland, BE).

To everybody who contributed to the success of the research project, we say: “merci vieu mau”.

1. Introduction

With its 41 285 square kilometres, Switzerland represents only 1/5 of Kyrgyzstan in Central Asia and 1/30 of Mali in West Africa. Swiss citizens are subject to three legal jurisdictions: the commune, canton and federal levels. The Swiss Confederation consists of 26 cantons and more than 3,000 communes, or municipalities (Diem et al. 2008). The 1848 federal constitution defines a system of direct democracy. The instruments of Swiss direct democracy at the federal level, known as civil rights (Volksrechte, droits civiques), include the right to submit a constitutional initiative and a referendum, both of which may overturn parliamentary decisions (Diem et al. 2008).

Geographically, Switzerland comprises three basic topographical areas: the Swiss Alps, the Swiss plateau or Mittelland, and the Jura Mountains along the northwestern border with France. The Alps are a high mountain range running across the central-south of the country, comprising about 60 % of the country's total area (Diem et al. 2008). The Alpine landscape is characterized by strong natural gradients such as topography and climate creating different habitats and a high biodiversity (Maurer 2005). This biodiversity has been shaped by human land use.

In Switzerland, out of the 4.1 million hectares of land only 24.6 % is agriculture land. This land is devoted to agricultural production (grains, fodder, vegetables, fruits, and vineyards) and pasture. Part of the pastureland is used exclusively for mountain pasture (Diem et al. 2008). Thus about 13.7 % of the total area is alpine pastures extensively used during the summer months (Bravo 2005). Practiced throughout the country but especially prominent in the Mittelland and pre-Alps, cattle raising is Switzerland's primary agricultural pursuit, yielding products exported throughout Europe. The income from dairying and cattle raising amounts to more than two-thirds of all agricultural value. Products include milk, butter, cheese, yogurt, and milk for chocolate (Diem et al. 2008). With a total output of about 10 billion Swiss francs, Swiss agriculture contributes with 2.5 % to the GDP (Bravo 2005). The livestock production is the most important sector with a share of 50 % of the agriculture output, followed by the vegetable production with 14 %, fruits with 5 %, vine production and cereals with 4 % each one. Other crops and services contribute about 23 % to the agriculture output. Switzerland is a net importer of agriculture products with a self-sufficiency of about 60%. About 65 % of the imported agriculture products are imported from the neighbouring countries of the EU, 7 % from Eastern Europe, 7 % from the USA and the remaining 21 % from different countries all over the world. The only agriculture product, which Switzerland is exporting in a substantial quantity, is cheese mainly to the EU. Switzerland and the EU agreed in a bilateral agreement to increase mutually the market access for cheese step by step to achieve total market liberalization in 2007 (Diem et al. 2008).

When an outsider has a look at the mountainous Swiss alpine landscape, the first impression is one of admiration of the picturesque beauty of this nature (beautiful flowers, picture-postcard alpine pastures, green forests, mountains with impressive (often snow-capped) peaks). The Alps look like the ideal place for retreat, offering plenty of peace and quiet. This belief is easily verified when one simply counts the number of tourists visiting a ski resort during winter or hiking in the mountains during summer. For a city-dweller or a foreigner visiting the Alps, the wooden farmers' huts offer an idyllic cliché and the sound of the cowbells are not perceived as a nuisance at all.

Another glance deep inside a Swiss farm gives another astonishing picture. Contrary to what one might believe before, even though barns are getting bigger and bigger, the number of farmers is decreasing and the number of cattle per farmer is not so high. This is illustrated by **Table I** on the evolution of the annual variation of the number of farms in mountainous areas between 1990 and 2006. Is the number compensated by the size and the production of each animal? In fact, it would be hardly believable under the tropics that a cow could produce 30 litres of milk and even more per day. Even the most productive Sahelian farmer who breeds only some Zebu or *Ndama*¹ would be amazed to see the impressive size and the weight of a Swiss cow. But quickly the first question that emerges from these first surprises is: how do Swiss farmers manage to cope with the difficult environmental and climatic conditions (mountains with steep slopes, high risks of landslides and avalanches, hard winter), as well as with economic, social, and political changes? What are their assets and what are their difficulties?

Table 1: Evolution of the annual variation of the number of farms in mountainous areas between 1990 and 2006

Farming in mountainous areas	Annual variation in %	
	1990-2000	2000-2006
Full time farming	-3.3	-0.6
Part-time farming	-2.2	-4.5

Source : OFAG 2007

In Switzerland, the landscape and climate are not particularly favourable to agriculture. Farms are usually family enterprises, mostly small in size, especially in the alpine areas. They produce cereals such as wheat and barley, root crops such as sugar beets and potatoes, and fruits such as apples and grapes. However, in the Alps, livestock keeping is predominant. Livestock include cattle, pigs, sheep, goats, horses, and poultry. Dairy products, such as cow's milk and world-renowned Swiss cheeses, make up a significant portion

1 Variety of cows raised in West Africa

of the agricultural revenue. All this production is concentrated in the hand of some 4% of the Swiss population (Bravo 2005).

The above mentioned figures on Swiss agriculture show that even though climatic and environmental conditions are often difficult, farmers are still motivated to produce food and public goods. However, the preservation of the agricultural sector is largely due to governmental intervention and support. Producers, particularly those in alpine and other difficult zones, are especially actively supported. Approximately 80 % of gross farm income can be attributed to government intervention (Diem et al. 2008). With this state support, the Swiss farming system is regarded as one of the most sophisticated of the world and the first impression one has is that it could inspire many countries. Swiss farmers might even be regarded as being in an El Dorado or paradise. But a deep scrutiny of this system reveals that it is more complex (in understanding and implementation) and possibly more questionable than one could imagine. Figures in **Table 1** show that today, part-time farming is decreasing more quickly than full-time farming. This could be interpreted as the result of implementation of state policies; economic specialisation; or the strengthening the agricultural identity for a certain category of farmers. But these are still assumptions from people out of the Swiss farming system. In sums, a characterization of the Swiss agriculture could be possible only by trying to get a clear understanding of various state policies and implementations levels; the exposure of Swiss farming system to global change (climatic change, change in market regulations and prices); the identity of farmers; the perception of Swiss citizens on this category of population to whom a large amount of money from their taxes is paid. Only this clear understanding of the multifaceted dimensions and dynamics of the Swiss agriculture could contribute to drawing lessons that Switzerland could teach or learn from other people in the world.

This is the exercise we tried to do in a research project conducted in the Swiss Alps by an international research team from three continents (Africa, Asia, and Europe), aiming at understanding institutions and mechanisms regulating Swiss alpine pasture use. This report presents the remarks and interim results of an interdisciplinary team involving four researchers working on pasture management.

2. History of the project

Since it's launching in 2001, the NCCR North-South was convinced by the idea that north-south partnerships are of major importance in generating high valued scientific findings useful in mitigating syndromes of global change (Hurni et al. 2004). However, most of the research fields were in southern countries of Africa, Asia, southern and Central America, Swiss institutions giving their support to their southern partners to generate knowledge and build up their capacity in their respective countries. Nevertheless, recently the NCCR has decided to make a new experience by inviting southern partners to carry out research in the north (Switzerland). The aim was to make it possible for

researchers from different cultural backgrounds to generate scientific results in Switzerland.

For the Transversal Package project on pastoral production system (TPP-Bonfoh), this opportunity was a platform to compare results from the two JACS where it was already involved (West Africa and Central Asia) with the alpine experience. A project was then designed on pastoralism with the first aim of “Building up capacities of semi-arid pastoralists through the Swiss Alps farmer’s organizational experiences”. The idea was to learn from organizational experience of Swiss farmers useful for development projects in the south. But finally, based on the metaphor of a movie presenting farmers from two different geographical and cultural areas (movie entitled «Encounters on the Milky Way», by Juerg Neuenschwander making a comparison between savannahs and alpine meadows, between West Africa and Switzerland), the study was considered as a new “Encounter on the Milky Way” and this time with scientists from the south investigating on the same topic in the Alps and sharing their experiences with farmers and other scientists. It is on the basis of enhancing this mutual learning process that a team of four scientists from Mali (West Africa), Kyrgyzstan (Central Asia) and Switzerland (Europe) was designated to conduct a field research in the Alps.

This team was constituted of:

- Gilbert Fokou, PhD, anthropologist, postdoctoral researcher based at Institute of Sahel in Mali, West Africa and working on institutional mechanisms for access of pastoral people to natural resources and basic social services in the Sahel;
- Karina Liechti, PhD, geographer, postdoctoral researcher based at the Centre for Development and Environment (CDE), Bern, Switzerland working on sustainable regional development issues, both in Switzerland and Kyrgyzstan;
- Almaz Abdiev, land planning engineer based at Land Management Institute “Kyrgyzgiprozem”, and consultant at the CAMP Alattoo project on “sustainable pasture management in Jergetal watershed”;
- Janyl Kozhomuratova, economist, project coordinator of the Kyrgyz development NGO ‘CAMP Alattoo’ (self-funded member of the team) working on developing of sustainable pasture management approach in watershed level.

All the members of the team had an interest or are currently working on pastoral issues. The idea was to come together with different cultural and scientific backgrounds and reflect on the Swiss alpine agriculture in a mutual learning process.

3. Approach of the study

Switzerland is recognized as a country characterized by a long and deeply rooted tradition of direct democracy which could be determinant in planning and managing natural resources. However, in Switzerland, like in all other European countries, the political regulation of common pool resources has been affected by two major changes since the last century: the diffusion of the modern conception of property rights and the emergence of a great number of public policies since the 1950s (Welfare State) (Thomi et al. ND). Swiss alpine farmers are deeply affected by environmental, economic, political and social change. For instance, they are increasingly vulnerable due to climatic vagaries, institutional constraints and international market regulations. As this is true for farmers all over the world, one could recognize that all of them face these challenges, but of course preoccupations vary from one region to another one. In order to compare these various ongoing trends, it becomes interesting for researchers from other regions to carry out research in the Alps.

The project was built on the following research questions:

1. Which institutions and corresponding mechanisms regulate the use and management of Swiss alpine pastures?
2. How do Swiss alpine farmers organise the marketing of livestock and related products?
3. Which are supporting or hindering factors affecting Swiss alpine farmers in their access and use of resources and basic social services?

The use and management of alpine pastures, the marketing systems and channels, and basic infrastructure were identified as the main foci of the research. However, the focus on basic infrastructure was of minor interest since the first field trip revealed that contrary to our previous conceptions as southern researchers, the need of basic social services was not as urgent as it is in the Naryn Oblast in Kyrgyzstan or Timbuktu region in north Mali for instance.

Thus the objectives of the study were to:

- Analyze existing structures and institutions to understand exogenous and endogenous factors of organization and determinants influencing the sustainability of livelihoods of local people in the Swiss Alps;
- Explore mechanisms and strategies of Swiss alpine pastoralists to organise and secure access and competitiveness of their products on the market;
- Analyze how Swiss alpine pastoralists are directly or indirectly affected by the global change in organising access to resources, management and commercialisation of pastoral products.

The expected outputs of the projects were twofold: direct and indirect. The expected direct outputs of this project were:

- A description of selected institutions and mechanisms collected through field work in sample regions of the Swiss Alps;
- An assessment of the appropriateness of these institutions and mechanisms in consideration of global change;
- A joint – if possible peer-reviewed – scientific article comparing institutions and mechanisms regulating the use of pastoral resources in the contexts of JACS West Africa, JACS Alps and JACS Central Asia.

The indirect benefits expected from this project were:

- Collecting information and genuine experience of the South / East partners involved in carrying out field research in Switzerland and stimulating them to search new and appropriate institutions and mechanisms in their respective home countries;
- Contributing to ongoing studies within the NCCR North-South – in particular within the TPP ‘Extensive Production Systems’ – as well as to the individual studies or projects of the involved researchers;
- Creating research partnerships and a platform for mutual learning between actors from various regions.

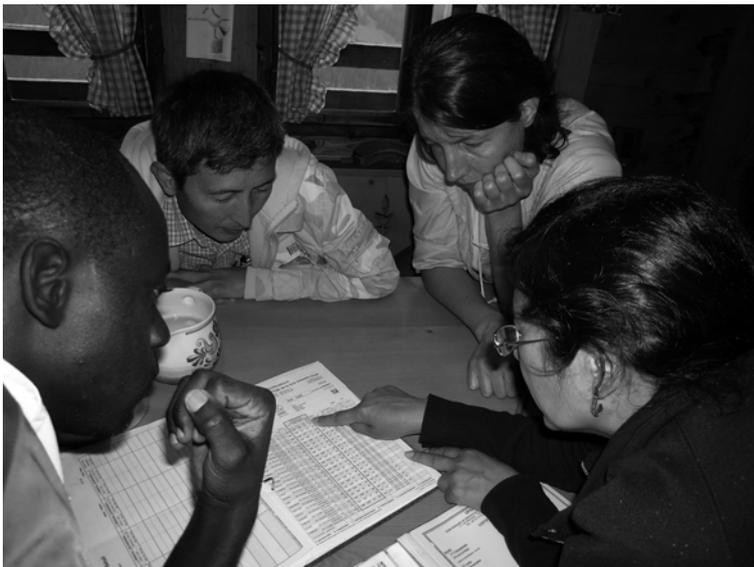


Photo 1: The research team (photo: Gerhard Ryter 2008)

4. Methodology

During the fieldwork phase, qualitative data were collected with social sciences research methods such as semi-structured and informal interviews and participant observation. Interview guides were discussed after each interview in accordance with current information. This was important for defining the subsequent steps. When it was possible, the researchers spent few days with farmers, also participating in some household activities (hay gathering, conducting livestock to alpine pastures, etc.). This method was important in gathering a lot of information just by observing. Most of interviews were done in German or Swiss-German and were spontaneously translated in English. Each member of the team was asked to take notes that have been compiled and discussed at the end of each day. These discussions were always in reference to the West African or Central Asian contexts.

4.1. Delimitation of the research focus and identification of actors

In Switzerland, the most productive farming activities are concentrated in the lowlands where large parcels of land are available for crops production or hay making. Mechanised production systems are mostly concentrated in these areas. However, large scale production systems were not the main focus of this project, whose aim was to investigate more on production systems that are easily comparable to those of the sandy African Sahel or mountainous Central Asia.

It appears from the Swiss agricultural report of 2007 (OFAG 2007) that between 2000 and 2006, the number of farms below 25 ha is decreasing while those above 25 ha have increased. The decrease affects mostly mountainous areas where the annual variation of the number of farms during this period (2000-2006) is (-2.1). Therefore, the study focussed precisely on livestock farmers in the alpine regions where this dynamics is clearly observed, and where farms are usually family enterprises and mostly small in size. Animals and often farmers are seasonally mobile and it was interesting to learn and try to understand the highland-lowland interactions, the regulations and mechanisms for use and management of pastures or pastoral production according to seasons.

During three weeks, selected villages in three Swiss cantons were visited. The selection of the three sites was not based on a particular sampling method, but rather oriented by criteria such as the pastoral orientation (region with a pastoral interest), the diversity of systems (organizational type of pasture use, type of animal), the availability of organized groups, the presence of local contacts to organize meetings with farmers and local authorities. This last criterion was important in introducing researchers to local communities. During three weeks, we visited the following regions:

1. Schamserberg in the canton of Graubünden: discussion with farmers of Patzen and Donat, both villages belonging to the commune of Donat. The area has a pastoral vocation and is reputed for its special breed of cow used in the lowlands for milk production.
2. Lötschental in the canton of Valais: discussion with farmers of Blatten where sheep breeding is predominant. In this region, where people make a living using a number of small parcels of land due to the topography; risks of avalanches and cultural reasons, livestock keeping is often just a hobby for part-time farmers. People in the area generate income from salaried jobs in public and private services and also from the tourist industry.
3. Simmental in the canton of Bern: discussion with farmers and an agronomist and pasture specialist at Bühlberg in the commune of Lenk.
4. Saanenland in the canton of Bern: discussion with farmers at Schönried. In this area it was interesting to compare two property regimes in the alpine pastures: private and communal ownerships. The particularity here is that community ownership is organized in a form of privately-run cooperation in which few farmers have the possibility to purchase cow rights from other members.

In any of these locations, the aim was to discuss at the horizontal level with farmers, leaders of the alpine cooperation's, as well as communal authorities. The surprise for a foreigner in the identification and characterization of these actors was that many of them played several roles at the same time (farmer, member or head of the cooperation and member of the commune board). In other areas (e.g. in Mali), a farmer is rather seen as a special category, far from decision making arenas. In the Swiss case, it was possible to get the whole picture of pasture use and management in a specific region from one informant. However, it was also necessary to have a vertical view by discussing with farmers organizations at the higher levels as well as with implementation agencies at the federal and cantonal levels. Even though this objective was not fully achieved due to time constraints, discussions were organized with representatives of the Federal Office of Agriculture in charge of direct payments.



Photo 2: Discussion with sheep breeder (photo: Karina Liechti 2008)

4.2. Knowledge production processes

In such a heterogeneous team, it became interesting to explore the knowledge production processes and the respective meta-levels of inter-cultural, interdisciplinary exchange in development-oriented research. Thus, the project benefited from the contribution of Claudia Zingerli through the TPP-Knowledge, Power, and Politics. The idea was that apart from the topic, the approach chosen by the project could be interesting from a knowledge production point of view. Claudia contributed to the project with some methodological inputs on our joint research activities, helping us in bringing out challenges and potentials of North-South research collaborations. She provided us with a list of guiding questions on the way involved researchers produce knowledge together, their aims and objectives and interests, and the way they experience the joint research effort. Interactions with Claudia were important to question ourselves on the type of results and knowledge we were intending to produce and for which purpose. By conducting three series of interviews with each researcher at different stages of the research project, Claudia was also able to generate information for her own TPP research questions.

5. Interim results of the study

In our investigations on the Swiss agricultural system, it became obvious that information and knowledge generated made sense for us when compared to the situation we knew from Central Asia or West Africa. In our characterization of the Swiss alpine farming, we therefore tried implicitly or explicitly to trace similarities and differences with other regions. It nevertheless also became

obvious, that it is difficult and useless to create dichotomies between good and bad systems or to categorize different systems into north/south oppositions. For instance, Switzerland and Kyrgyzstan, which have the same geographical characteristics (mountainous pasturelands), share the same vertical system of pasture use with specific regulations according to seasons (near village pastures, pre-alps or intermediary graze lands, alpine or remote pasture). On the other hand, Swiss farmers share with their West African and central Asian counterparts the fact that livestock husbandry does not only play an economic function but it has a social value. If in Africa the most famous farmer is the one with the biggest and the nice herd, the most beautiful cow or sheep during public exhibitions is a source of prestige to its owner in Switzerland.

5.1. Motivation of farmers

In an assessment of the full impact of the agricultural sector on environmental problem, it appears that the livestock sector emerges as one of the top two or three most significant contributors to the most serious environmental problems, at very scale from local to global (Steinfeld et al 2006). This sector is the largest anthropogenic user of land; responsible for 18 percent of greenhouse gas emissions measured in CO₂; key player in increasing water use, accounting for over 8 percent of global human water use; livestock account for about 20 percent of the total terrestrial animal biomass, and 30 percent of the land they use now was once habitat for wildlife (Steinfeld et al 2006). However, animal husbandry, being the unique livelihood strategy as well as way of life of millions of people over the world, is still economically, socially and politically of major importance. Thus, this sector could have a bright future only if there was a balance between socio-economic profitability and environmental sustainability. The question is how farmers could produce food and public goods without degrading the environment? How could they use the earth which in an ecological perspective is finally a common property, without being locked in the “tragedy of the commons” scenario (Hardin 1968)?

The Swiss experience inspires a potential solution: **the notion of motivation**. The motivation is the incentive, the drive, the inspiration or the state of being stirred to action. Motivation appears as a key determinant for agricultural production in an environment increasingly threatened by socio-economic and ecological change. It is based on clear incentives of various actors for a sustainable management of natural resources. This motivation exists in the Swiss agricultural policy where farmers are encouraged to produce high quality products but this should be done in an environmentally friendly way. In other parts of the world, farmers could have the same motivation where livestock keeping is the unique livelihood option, meaning that they could manage pastoral reserves in such a way to guarantee resources for future. However, degradation of near village pastures in Kyrgyzstan and dry season grazing reserves in the Sahel are again few examples to illustrate that the management choices in those areas do not contribute to balance economic profitability with environmental sustainability in those regions. This could be explained by the fact that it is difficult in a context of resource scarcity to bear the costs of

environmental degradation individually. There is a need to provide farmers with incentives to use pasture land in an environmentally friendly way. In developing countries where farmers have difficulties to sustain their livelihoods, one could postulate provocatively that if such incentives could not be afforded, there is little chance to avert degrading use of pastures.

In Switzerland, this is made possible through the direct payment system. This system could be summarised as the system of “financial advantages for farmers against the production of environmental services”. The Swiss direct payment system is better understood when one considers the multifunctional orientation of the agriculture (see **Box 1**).

Box 1: Multifunctionality of Swiss Agriculture

In Switzerland, the process of agricultural policy reform started in 1993 when the administrated prices of the politically sensitive dairy sector were first slightly reduced. The reform culminated in 1998, when the Parliament approved a new package of agricultural policy measures. According to the package, administrated prices will continue to decline and direct payments to farms will be gradually linked to their use of environmental production methods such as organic agriculture (Diem et al. 2008).

According to the constitution, agriculture in a sustainable manner must contribute substantially to: 1) the provision of the population with food; 2) the conservation of natural resources; 3) the upkeep of rural landscape as well as; 4) the decentralized settlement of the territory (see FOAG 2004).

Swiss agriculture is supported by a two-stage payment system. In contrast to former times, these payments are less and less based on production but rather on achievements and ecological services rendered by the farmers. General direct payments are intended to ensure area-wide utilization and maintenance of agricultural land. Additionally, farmers’ extra efforts due to aggravating topography are rewarded. To obtain general direct payments, farmers must comply with certain minimal ecological requirements concerning e.g., livestock husbandry or soil protection, and every farm has to manage 7% of its land as ecological compensation area (Maurer 2005).

The Government therefore had the task to define a policy which ensures that agriculture can fulfil these multifunctional tasks in producing food and public goods.

5.2. Rules and institutions

The fundamental difference between Swiss farming system and other regions is the regulation system and the support given to farmers by the state (**see Box 2**). To put it in a comparative perspective one can oppose the “dictatorship of rules”, as perceived by some farmers in Switzerland, to the “weakness of institutions” in southern countries where regulations are poorly enforced. West African and Central Asian countries have been affected by the influence of external regimes, and farmers are now complaining about the inadequacy of institutional and legal arrangements in place. The Kyrgyz pastoral laws are currently hotly debated but still face difficulties in reaching consensus (several versions exist). Local arrangements for pasture use are not well enforced. They lack internal rules such as time schedule of different pastures uses, pastures rotation, pasture’s capacities, etc. Even though rural inhabitants use certain rules based on tradition to regulate transhumance to spring or summer pastures, there are not comprehensive plans for the use and protection of pastures at the municipality level (aiyl okmotu). In West Africa, many countries have adopted pastoral codes in the 1990s and the beginning of 2000s, but these regulations are still considered as bureaucratic decisions and poorly implemented. Swiss farmers are in a different situation and some of them consider the rules as one of the major problems for economic performance and self-determination.

Box 2: Swiss regulation system of mountain pasture use

“I think very soon, to be able to breathe fresh air, one will need to ask for permission. There are too many rules for farmers nowadays”. This statement from a farmer of the Saanenland Alps in the Bernese Oberland illustrates the difficulties of some Swiss farmers to comply with the requirements of the federal government. These rules comprise the rational use of alpine pastures, the compliance with ecological requirements, the stocking rate in the alpine pastures and duration of grazing period, etc. The system could be summarized as: direct payment from the government against strict fulfillment of the rules to produce environmental services.

Animal husbandry in the Alps has to follow certain conditions according to seasons. Whereas animals are kept in barns in the village in the winter, they can be moved during summer and autumn to intermediate altitudes (also called “Maiensäss”, about 1500 m asl), and at the alp level (about 2000 m asl). The use of alpine pastures is submitted to the fulfillment of governmental requirements concerning the “Normalstoss” or the livestock unit (grazing space provided for one cow for 100 days). Farmers have to respect the carrying capacity clearly defined and well known by everybody. The failure to follow agricultural regulations on forests, the protection of water, environment, landscape and animals is sanctioned by the reduction of the direct payment. Thus, according to the rules (art.16, al.1 let. a)¹, in case of false indications on the number of animals put on the alpine pastures, the surfaces used, the duration of their stay on summer pastures, the direct payments are reduced from 20 to 50 % according to the seriousness of error (OFAG 2005).

For example, farmers of Patzen in the Graubünden have established a regime to move their livestock to the Anna Rosa Alp in mid-June and members of the cooperative do not have the

¹ Decision of 29th March 2000 on summer contribution (from French: Ordonance sur les contributions d’estivage (OCest) du 29 mars 2000).

right to exceed the 280 “cow rights” available in that particular Alp. Alpine pastures are common resources for local community. But there is no open access to these pastures for everybody in the commune, because all pastures have certain amount of “cow rights”, which belong to farmers. According to his cow rights, a farmer is allowed to use the cooperative pastures during summer for fixed grazing days. Farmer can sell or buy the cow rights from other farmers, and these rights are registered in cadastral office. The cow right system is also highly dynamic to fit with the transformations of farming system. Nowadays, cows are becoming fatter and need more fodder. Therefore, in some areas, one cow right is no longer equal to one cow.

However, at first sight it is difficult to understand why about 7.3% of public spending of the country is used for agricultural purposes without substantial economic results. The results of a quantitative analysis of agriculture’s economic and social impacts in Swiss regions show that agriculture’s contribution to the overall economy, both in terms of gross value added and employment is generally very low (Buchli et al. 2006), contributing with 2.5 % to the GDP (Bravo 2005). But this agricultural sector contributes to far more than the production of food, e.g. to the preservation of biodiversity or to the attractiveness of the landscape for touristic purposes, tourism being one of the most important sectors of the Swiss economy with many direct and indirect impacts. Eco-tourism, preservation of traditional cultural landscapes for tourists are made possible thanks to farmers (see **Box 3**). Whereas it is possible to quantify the impact of farming on tourism, the social impacts in terms of policy strategy to keep a certain category of people in the rural areas (decentralized settlement of the territory) are difficult to measure. This is for example the case in the Lötschental in the Valais canton.

Box 3: History of the Lötschental

Blatten is one of the alpine villages of the Lötschental region. It is a commune constituted of hundred of houses built in on the side of the mountain. A glance on the landscape reveals all the man-made transformations to limit the risks of avalanches. The village shows two faces: the old Blatten with its old and partly abandoned wooden huts and barns, giving it the image of an abandoned village. Beside this old picture, there is the new Blatten with its modern fashion buildings, open to young people who can move each morning to work in town but still living in their village. As in various Swiss alpine villages visited, there are generational clashes, environmental problems, etc.

However Blatten or the Lötschental in general is definitely a place different from others. There is no need to visit its multiple-stars' hotels to realise that the area is a famous touristic destination. Besides providing nice ski resorts in winter, the region, which is part of a World Natural Heritage Site, is a paradise for hikers. Those of them who are more interested by the alpine geography could easily recognise the Bietschhorn. Some few plots (never more than five meters square) of potatoes appear as survivals of previous times when people in this valley were subsistent livestock and crop producers before shifting to tourism or salaried jobs in industries. Despite the economic reorientation in the production towards goods and services, the Lötschental still has a special landscape interesting for scientists and tourists.

Reading the cultural landscape of the Lötschental requires a reference to the history of the area and the cultural heritage of people of Valais. The area is characterised by an old history of more than six centuries marked by various interactions between different human groups and between people and their environment to be able to shape the landscape as it is nowadays. The landscape is influenced by strategies of people over times to achieve their livelihood goals by organising access and management of pastoral resources in the near village pastures, pre-alp and alpine pastures. However, the peculiarity of the Lötschental is its special form of heritability system influenced by the Romanic tradition. According to the Romanic culture, heritage is partitioned in parcels among all children of a family. This concerns wealth, land, livestock or houses. In this area, one cow could easily belong to two or more people, a stable of less than ten meters square to four or five owners. With this type of heritage partitioning, landscape is structured in a particular way. Since there is a strong emotional link of the Lötschental people to pieces of land often inherited from famous ancestors, it is difficult for one farmer to consolidate his hundreds of plots scattered in the valley. A farmer from the region recognized that he is owner of some 800 plots he uses to feed his animals. Being owner of a large herd, this farmer needed large parcels of land for pastures and fodder during spring, autumn and winter. However it was difficult under the Romanic heritability system, to merge the plots. Some young farmers have initiated some efforts to convince older farmers of exchanging land plots in order to allow full-time breeders to make a living. But the renegotiation of traditional rules is still very slow in the area.

Thus, the cultural tradition of the Lötschental has deeply affected the man-made landscape diversity which is important for the touristic industry.

However, in the Swiss context farmers would not like to be considered only as “gardeners of the Alps” as some people perceive them. And even though it will be honest to recognise that the system itself is not sustainable with the state intervention and all the money injected in alpine agriculture, it is interesting to see in the federal state strategy the need to pay farmers to produce at the

same time goods and environmental services. Affected by policies or not, statistics (**Table 2**) show that small farms are decreasing while bigger one are increasing exponentially (farms from 0 to 3 ha have decreased between 2000 and 2006 for 3.6 % while at the same time the number of farms of more than 50 ha have increase for 5.9% (OFAG 2007). These figures could be interpreted as the decrease of hobby farming and the increase of professional farming in which farmers are not paid “just to relax” as people could think, but are encouraged to be good economic entrepreneurs. With the abolishment of the system of all guaranteed or minimal prices and intervention systems linked to minimal prices, alpine farmers are becoming more imaginative and more economically oriented (leasing more land, fulfilling the requirement of the state, etc.). There are basically several types of payments, which are all linked to the fulfilment of strict cross compliance conditions such as regular crop rotation, observance of a nutrients balance, the setting aside of some portions of the land as ecological compensation areas and periodical soil analysis (Maurer 2005). Specifically in the Alps people care about the intensive or extensive use of the meadows; definition of grazing periods for summer pastures; the stocking rate: each co-owner of an alp has a certain number of cow rights and the total number should not exceed the carrying capacity of the area (see **Box 4**). Beside the carrying capacity in summer, one additional limiting factor for farmers to keep certain amount of cattle is the volume of winter fodder, which they can produce from hay lands.

Table 2: General evolution of number of farms per categories between 1990 and 2006

Parameters	Annual variation	
	1990-2000	2000-2006
Categories		
0-3 ha	-8.3	-3.6
3-10 ha	-3.7	-3.9
10-20 ha	-2.3	-2.5
20-25 ha	0.8	-0.3
25-30 ha	2.8	1.0
30-50 ha	5.0	2.6
>50 ha	5.8	5.9

Source: OFAG 2007



Photo 3: Blatten from above (photo: Karina Liechti 2008)

Box 4: Codified rights showing interpenetration of tradition and modernity: The ‘famous’ wooden sticks of the Lötschental

The Swiss farming system has an old and well codified way of regulating access and use of alpine pastures. The stocking rate is clearly defined according to the extension of the grazing area and the quality of the fodder. The number of cattle and the time to spend in summer pastures is calculated accordingly. The Swiss case shows here an interesting overlapping of tradition and modernity. The stocking rate is nowadays defined by the cantonal service for agriculture, but data are often based on traditional decisions of local cooperatives or secular systems of regulation

Contrary to the situation in many parts of the world (e.g. West Africa), where local farmers until today rely on oral tradition to codify institutions of access and use of natural resources, in the Swiss context, rules, discussions, decisions, legal acts, major events, etc., have been recorded in the commune archives since several centuries. Thus, the fluctuations of the livestock and farmers strategies in terms of modification of the grazing right are well-known by every member of the community. It is then surprising that in some parts of the country, such as in Lötschental in the Valais, farmers still rely on pieces of wood to regulate access to alpine pastures.

Beside the registration of major decisions and events in the communal register, farmers of Blatten in the Lötschental and members of the same alpine cooperation use pieces of wood as ‘pass’ or grazing certificate. This ‘wooden pass’ is a parallelepiped piece of wood ranging from 10 to 20 centimetres of length on which the number of cows or sheep the owner is allowed to put on the alpine pastures is carved. This piece is divided into two parts. One is kept by the owner and the other by the cooperative representative in charge of transhumance issues. When times come to put livestock in the Alps, both parts are matched to reconstitute the number of animals one can put on the pastures.

The lesson Lötschental people can teach the world through this ‘wooden pass’ could be that animal husbandry - even though it has been profoundly modernised and is nowadays directed by state regulations and the direct payment system - is one of the oldest livelihood strategies and thus deeply marked by ancestral traditions. It is only by keeping well established traditional ways of regulation alive or by including them adequately that new forms of

regulations have the potential to be successful.



Photo 4: The wooden sticks of Lötschental (Photo: Karina Liechti 2008)

Even though some farmers are complaining about the rules, it is obvious that they approve the system of direct payments that constitute an incentive to fulfil the requirements of the federal government for the preservation of environment and biodiversity. The motivation appears here as a strong tool for the implementation state policy (system of monitoring and sanctioning at various levels: state and canton). Nevertheless, one should not focus on financial motivation alone: socio-cultural aspects and thus the emotional links farmers have with their homeland and the activity of their ancestors are key motivators as well (see **Box 5**).

Box 5: The cultural importance of farming

For most of the Swiss farmers, who represent 4% of the population, agriculture is a profession, contrary to many of their counterparts in other areas of the world where farming is the only option they have to achieve their livelihood goals. Swiss farmers are economic entrepreneurs investing time and money to make a living from their land. A Swiss farmer could thus at first sight be labelled as a purely economic oriented actor trying to maximise profit.

However, the multifunctional character of the Swiss agricultural policy and the examples from few regions visited (Schamserberg in Graubünden, Simmental and Saanenland in Bernese Oberland) show that the production of goods is not the ultimate aim of farming, especially in the alpine areas. Apart from alpine cheese, the production is often just for local consumption (households, restaurants and supermarkets of a limited region). In these mountainous regions, emphasis is thus also put on the production of environmental services (e.g. the maintenance of a well kept cultural landscape). This frequently overshadows important cultural aspects of Swiss farming.

As in other regions of the world such as West Africa, farming is a way of life for many Swiss

farmers. They keep this activity despite all costs and difficulties (for instance due to an ever changing world market and national and international policy reforms). Farming is a way to keep ancestral traditions. Many farmers have inherited land or cow rights from their ancestors and are sometime strongly and emotionally attached to this legacy. This contributes in keeping them on lands which would have been abandoned otherwise. However, the survival of alpine agriculture could not be interpreted only as a way of maintaining ancestral traditions at a time when young people are increasingly losing their pastoral culture (some moving to town or abroad). It could also be perceived as a passion for many people who have affection toward this type of work, allowing independence and self-reliant decisions, and who see their future nowhere than in agriculture. For these people, farming is a way of keeping some of their traditions and their material culture (e.g. the 'wooden sticks' in the Lötschental). Moreover, farming is also a way of acquiring a social prestige through exhibitions, which are not just a local folklore, but important events for social differentiation. The bell-trophies hung in alpine farmers' houses do not only have a decorative purpose but contribute to reinforce the social status of the winner, who is often the most respected man of the region, more than state officials or elected representatives.

5.3. Participation, trust and governance

Even in case of financial motivation, the organization of farmers in cooperatives, their involvement in decision making, and the trust between various actors – including governmental bodies - are of tremendous importance. What would be the importance of good rules if they are not crafted / established in a participative way and lack clearly defined bodies with well defined responsibilities to implement and enforce them?

Box 6: Pasture use systems in Schamsenberg

With its 26 cantons and more than 3000 communes, the Swiss confederation appears as an administratively well structured country. At various levels, there are institutions and organisations for the management of pastoral resources, which are either private or communal property. However, there is the superposition of a traditional structure, the alpine cooperation bringing together various members with the right to use an alp for summer grazing.

In Schamsenberg, according to the topography, land occupation is organized into near village pastures, pre-alps or “Maiensäss” and alpine pastures. In many parts of Switzerland, terraced slopes characterize the sites of villages that serve as bases for “Alpine nomadism,” the seasonal moving of livestock to or from the mountains (Diem et al. 2008). In Schamsenberg, the land is exclusively used as pastureland. Some parcels are fertilized, mostly with liquid manure or dung, while others are not fertilized. Easily accessible parcels, where fertilizer application is increased, are used more intensively, meadows are cut more often, and pastures are grazed with more and larger cattle. In these areas, access to land is organized into private property close to the village and intermediate communal lands, which are currently leased by members of the commune. The leased parcels are discussed and redistributed every 6th year. Each member has to use the land with respect to environment. Beside this communal land belonging to each municipality, there is the common property land where the ownership of the land belongs to an alpine cooperation, constituted of members from several communes with exclusive rights to put a certain number of cattle on a specific alpine pasture.

In Schamsenberg as well as in many parts of Switzerland, the cooperative system is rooted in old traditions which can be traced back to the Middle Age when the area was dominated by landlords. Local populations had to acquire the exclusive right to use the land either through wars or paying compensation to the landlords (clearing the woods and cultivating the land in the severe environmental conditions). Cooperatives have resisted to change and - despite all transformations experienced by the Swiss confederation since its constitution up to the establishment a Swiss modern state - they continue to regulate the management of alpine pastures.

The example of Schamsenberg shows a distinction between community-run cooperation and a privately-run cooperation. The latter form of cooperation gathers a couple of farmers, who own and use a limited territory with a strict number of cattle to be put on the Alps. The decisions are taken commonly within this small group. All the members can put cows on the Alps and they have the obligation to spend some days working on the pastures consolidating fences, cutting shrubs and maintaining the pasture. In the community-run cooperatives, even people who are not putting cows on the Alps can be members (for further information, see Cantieni 2008).

One of the first preconditions for the success of an agricultural policy is to recognize the farmer himself as an important actor of the whole system and his opinion as something that counts. For many communities in the world, animal husbandry is a way of life, an ancestral inheritance. For others, it is only the last option they have to generate income for their livelihoods (e.g. in Central Asia). And in many areas, farming is reserved to voiceless and illiterate people in remote areas (e.g. West Africa). The scenario is however completely different in some countries such as Switzerland, where farming is a choice, a professional orientation based on personal wish. This is facilitated by agricultural training, which is nowadays compulsory for each individual planning to run a farm. The Swiss farmer also has certain esteem in the society. And he draws this esteem from the role played in the past to supply the country with food in critical periods (e.g. World War II). This example shows the importance of the local context in analyzing the dynamics of a production system. The strong support farmers have today in the Swiss parliament to influence important decisions on agricultural policy is attributed to the existence of powerful producer lobbies, but one could imagine that the esteem farmers have is equally important. In a different context where this esteem is lacking, even a good subsidiary and lobbying system might not produce the same promising results.

The key element for the success of the agricultural policy is community participation and also what Ostrom (1990:90) designated in her design principles as the “minimal recognition of rights to organize”. The participation of farmers at different levels of decision making is important in building trust between farmers themselves and between farmers and policy makers and implementation agencies. The mistrust between farmers in some areas outside Switzerland is due to overlapping rules or productions systems on the same land, and difficulties to share the costs of collective management of natural resources. Similarly farmers mistrust state authorities when the government fails to provide them with basic social services. The important fact in Switzerland as far as organizational issues are concerned is the relative freedom for farmers to devise their own institutions. These institutions, which were put in place by farmers several centuries ago and are continuously adapted by alpine farmer cooperatives until today, are not challenged by external governmental authorities. These economic-cultural organizations are responsible of alpine pasture management and contribute to provide to users a long-term tenure rights to the resource (see **Box 6**).

Even if the direct payment goes directly to farmers, this type of cooperative organization contributes to regulate the use of pasture by defining the number of livestock right on a particular land. This can work efficiently, when trust exists at different levels. And the trust is built on a good governance system. In Central Asia or West Africa state officials in charge of implementing rules are often corrupted and try to instrumentalise the rules to serve their personal interests. In the Swiss case, state officials have good salary and the governance

system is also good. In such a context, mechanism of monitoring and controlling of state decisions are more efficient.

Thus to conclude this aspect, it is clear that participation of farmer in decision making processes brings trust and this trust is strengthened by a good governance system. Participation of farmers in decision making processes is possible thanks to a well developed educational system: each farmer in Switzerland nowadays has to pass two to three years of study including theoretical and practical training. In Kyrgyzstan, by contrast, there is no obligation to have special agricultural education for farmers. After the collapse of the Soviet Union, each villager became a farmer, as he got a piece of land and a certain number of cattle. Among these new farmers are teachers, bankers or bookkeepers, who do not know how to manage a farm.

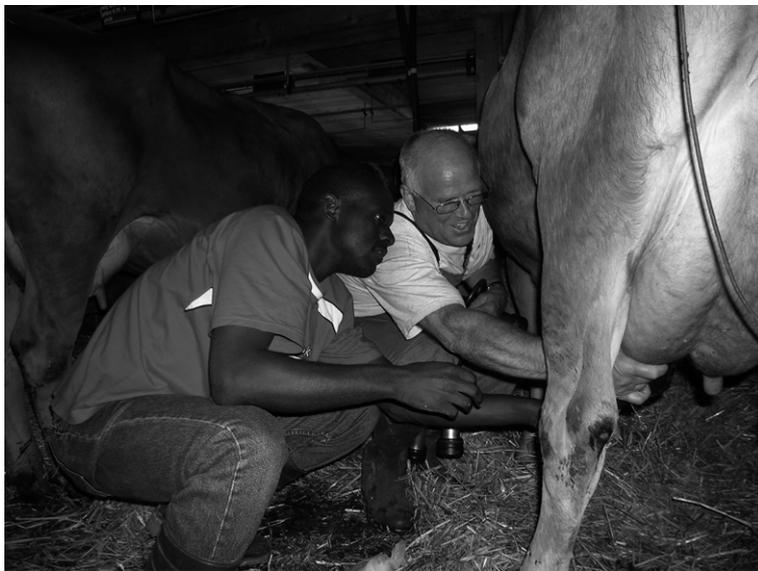


Photo 5: Cow milking (photo: Karina Liechti 2008)

5.4. Continuity in change

The Swiss experience shows that tradition and modernity are well combined for the sustainable management of natural resources: In this context, there is an integration of high technology and traditional animal husbandry; economic profitability and social prestige in public exhibitions; state implementation agencies and local organisations; the federal subsidiary system and customary regulations. In this context, modernisation based of traditional cultural norms. State regulations are still often based on rules, norms and valued existing since centuries. For example, the carrying capacity is often calculated according to the local figures existing since centuries. The cooperations with the responsibility to manage pastoral resources in the Alps are rooted in the history of the area. This contrasts with institutional dynamics in many other areas where rules of the past are no longer in place. In Central Asia as well as in Africa, these are mostly external influences such as colonialism or the Soviet system, which have contributed to the transformation of traditional rules and norms.

5.5. Marketing of pastoral products in the Alps: local versus global

Emmental, Fondue, Raclette, Gruyère are few of the most famous original Swiss cheeses, well-known all over the world. With milk chocolate, Swiss cheese is the most exported specialty foodstuffs. Some of the Swiss cheeses are included in the register of protected designations of origin. The Swiss cheese is generally seen as an original product made in the specific mountain area and produced using traditional methods. Figures from 2002 show that Switzerland exported some 44'955 t of semi-hard/hard cheese representing 80 % of the incomes from exports of dairy products (FOAG 2004).

In the Alps, where farms are mostly small scale family enterprises, this contribution of the Swiss agriculture to the global market overshadows a domestic market where farmers have to initiate strategies to generate incomes from their production. Several pastoral products are sold. But in a country where dairy farming is said to be a particularly important branch of agriculture, generating one-third of earnings (FOAG 2004), many farmers in the alpine regions are not allowed to sell milk. The quota policy will be abolished in 2009 but before the implementation of this decision, alpine farmers rely basically on pastoral products such as: fresh meat (from cows, sheep, and pigs), sausages, and dried meat. In some areas special breeds are raised to be sold to farmers in lowlands. Even though cooperative products processing exist (e.g. cooperatively-run butchery), meat and its derived products are frequently processed at the local level (village or commune) in these areas. Farmers (owners of animals) are thereby involved in the whole product process from farm to the shops or even directly to the consumers. Each farmer who desires to sell meat bears the costs of slaughtering and distributing products in a network of clients made of shops, restaurants and hotels. In this case of direct-marketing system, the quality of products is important for the reputation of the individual farmer. The most imaginative producers use innovative marketing tools such as the creation of web-sites for advertising their products.

Despite various marketing strategies, information from the visited areas during this study shows that the geographical scope of some of these alpine products is somehow very limited (village, commune, or neighbouring town). Even though their activities are highly subsidised by the government, many farmers have agreed being satisfied with this small scale marketing. The reason is that their products are highly competitive. They are produced in animal-friendly conditions using natural fodder (some of farmers produce bio products and follow the requirements of organic farming). In the small scale context of the Alps, the farmer is involved in the marketing process from the beginning to the end. Since the production is not large and products are of good quality, they are more competitive. In this context, the producer is well-known, and the traceability of the product easy, this contributes in reinforcing the trust of consumers. This is different in other regions (e.g. Mali or Côte d'Ivoire in West Africa) where many intermediaries are involved in the chain between

producers and consumers of livestock products and the traceability is made more difficult. In such a context, nobody bears the responsibility on the quality of products sold. In the small scale production system of the Swiss Alps, this responsibility is borne by the farmer himself and this affects the production precautions. The marketing of livestock products at the local level is often supported by the touristic industry. Products from farms are taken by restaurants and hotels visited by tourists, ready to pay for high price goods produced in an extensive way.

This example of marketing of livestock products in the Swiss Alps characterised by an overlapping of the global and local markets shows that even small scale farmers are able to produce high quality and competitive products. This is possible through a network of commercial relationships contributing in developing strategies for customer loyalty. These strategies are similar to those going on in African villages where commercial activities are based on networks of social relationships.

6. Conclusions and outlook

The significance of such a research project involving researchers from various cultural and scientific backgrounds was twofold: 1) it was an occasion for mutual learning between actors. Researchers and farmers had the occasion to learn more about and from each other, about their similarities and differences in views; 2) It was an occasion to question the dynamics of pastoral systems in different parts of the world using the Swiss case as a mirror, which could help in understanding all the practices in their various characteristics. The research project in the Alps showed the potential for a comparison of pastures use systems between West Africa, Central Asia and Switzerland. For instance, the development of a management system for the vertical use of Kyrgyz pastures could become more efficient through a clear understanding of the process of the creation of Swiss alpine cooperative and the way rules have been designed and implemented. At the same time, the ongoing process of decentralisation in West Africa could be inspired by the administrative structure of the Alps. Swiss farmers, on the other hand, could learn from their Central Asian or West African counterparts, how to continue to make a living in hard ecological and economic conditions, and without state interventions.

It appears that one of the most important tools for the strength of Swiss agriculture is the federal state interventions through direct payments. This is a strong motivation to contribute to the multifunctional use of alpine agriculture. However, despite the ecological, socio-cultural and economic importance of alpine agriculture, supporting this sector with direct payments will, however, not result in stabilizing these regions in the long term. Structural change in agriculture might increase these regions' vulnerability (Buchli et al. 2006).

The motivation of the direct payment would not be very successful without a governance system built on trust and the involvement of various actors in the

process of institutional design and implementation. This institutional design is not just a state or cantonal officials' affair. It also involves traditional organizations such as alpine cooperatives which are rooted in very old traditions. This continuity of the past in the present is likely to contribute to a sustainable management of resources

During the three weeks spent in the Alps, first data have been collected to allow some comparisons in the three areas. In order to produce outputs such as a comparison between pasture use systems and institutions in West Africa, Central Asia and Swiss Alps, more research would be necessary. The expected results should focus on principles such as the definition of boundaries, collective-choice arrangements, monitoring and sanctioning systems, and the capability of local people to organize themselves and craft their own rules.

We therefore hope that this type of North-South exchange can go beyond this short time span project and that by supporting more involvement of southern researchers in the North, this new way of reflexion and knowledge generation will be maintained.

7. Bibliography

1. Bravo H. 2005. Challenges of Swiss Agriculture. Swiss Farmers Union
2. Buchli S, Giuliani G, Kopainsky B. 2006. Agriculture and rural development: A quantitative analysis of agriculture's economic and social impacts in Swiss regions. 96th EAAE Seminar "Causes and Impacts of Agricultural Structures" January 10-11, 2006, Taenikon, Switzerland
3. Cantieni M. 2008. Zwischen Tradition und Wandel: Alpbewirtschaftungssysteme am Schamserberg. Bachelor thesis, Institute of Geography, University of Bern.
4. Diem A, Egli E, Maissen T, Wachter D. 2008. Switzerland. In: *Encyclopædia Britannica*. Retrieved August 08, 2008, from Encyclopædia Britannica Online: <http://www.britannica.com/EBchecked/topic/577225/Switzerland>
5. FOAG [Federal Office for Agriculture]. 2004. Swiss Agricultural policy. Objectives, tools prospects. Swiss Federal Office for Agriculture: Berne
6. Hardin G. 1968. The Tragedy of the Commons. *Science* 162: 1243–48.
7. Hurni H, Wiesmann U, Schertenleib R, editors. 2004. Research for Mitigating Syndromes of Global Change. A Transdisciplinary Appraisal of Selected Regions of the World to Prepare Development-Oriented Research Partnerships. Perspectives of the Swiss National Centre of Competence in Research (NCCR) North-South, University of Berne, Vol. 1. Berne: Geographica Bernensia, 468 pp.
8. Maurer K. 2005. Natural and anthropogenic determinants of biodiversity of grasslands in the Swiss Alps [PhD dissertation]. Basel: University of Basel.
9. OFAG [Office Fédéral de l'Agriculture]. 2007. Rapport agricole 2007. OFAG: Berne
10. Ostrom, Elinor. 1990. *Governing the commons. The evolution of institutions for collective action*. Cambridge: Cambridge University Press.
11. Steinfeld H, Gerber P, Wassenaar T, Castel V, Rosales M, Han (de) C. 2006. Livestock's long shadow. Environmental issues and options. FAO.
12. Stevenson GG. 1990. Common property rights: From Swiss grazing to global environmental change. Paper presented at the first annual meeting of the International association for the Study of Common property, Duke University. Durham, USA.
13. Swissinfo. 2007. Swiss slowly pack their bags and leave the Alps. <http://www.swissinfo.org/eng/swissinfo.html?siteSelect=43&sid=8204376>
14. Thomi L, Gerber J-D, Nahrath S, Reynard E. The contribution of CPR institutions implementing Swiss environmental and nature protection policies. <http://iascpeurope.eco.unibs.it/papers/Thomi-Gerber-Nahrath-Reynard.pdf>.