

# Livestock farming systems in urban mountain: differentiated paths to remain in time

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**Abstract:** *In the northern French Alps, livestock farming systems have to cope with national and European agricultural change and, at the same time, residential pressure due to urbanisation. Both types of pressure as well as uncertainty may increase the rate of farm disappearance, whereas farm numbers already registered a drop of 83% in fifty years in Savoie. Nevertheless, agricultural systems feature assets in this region: they can provide local urban households with specified quality products while maintaining landscapes with tourism and recreation appeal. Therefore, in order to help decision-makers to support and advise mountain farmers, the issue is to identify driving forces and favourable factors that ensure persistence of livestock farming systems. This perspective leads to analyse processes of change in livestock farming systems that still remain, thanks to a retrospective approach reaching back to the 1950's. Fourteen livestock farming systems were sampled within three neighbouring communes located in the Chambéry area (Savoie). The objective is to characterize and model various trends of livestock farm change and shed light on the most important factors that prevent or favour change: workload, lack of income, restructuring of dairies, off-farm job opportunities for instance. The results show that, in this area, livestock farms achieved persistence thanks to the integration of other farming or off-farm activities in the farm-family system, during at least one phase of their path. And thus, they emphasize the difficulty of considering livestock production without the help of other sources of income and funding, and point out the importance of labour for the future of alpine farming systems.*

**Keywords:** *livestock farming systems, activities combination, mountain, process of change, long term*

## Introduction

In France, the reduction in the farming population during the post-war period was the sign of social and economic transition: increase in agricultural productivity made it possible for manpower to be used in the fast-expanding secondary and tertiary sectors (Duby and Wallon, 1997). In the Northern Alps, under strong urban and industrial influence, agriculture has been progressively abandoned: according to farming censuses, in 2000 only 17% of farms recorded in 1955 still exist in the department of Savoie. Today, mountain agriculture is certainly recognised and supported for its participation in preserving biodiversity, in fashioning remarkably attractive landscapes, and its products convey a positive environmental quality image. But in spite of national and European policies of support to mountain agriculture since the 1970s (for example the introduction of the Compensation for Naturally Less-favoured Areas), farms are still tending to disappear and the farmers' living conditions are difficult. On the one hand, the spread of house-building increases tensions and conflicts between inhabitants and farmers over land use (Torre and Lefranc, 2006; Nicourt and Girault, 2006). On the other hand, the daily routine work caused by livestock farming (the dominant activity in the mountains), in particular dairy farming, is less and less attractive (Seegers et al., 2006), all the more because farmers live in proximity with people not in farming and suffer from the discrepancies between their own way of life and that of a leisure society and the "35 hours work a week" legislation (Dufour et al., 2007). However, the North Alps have specific territorial resources (Roux et al., 2006) offering opportunities to farms: farmhouse processing and short distribution networks, accommodation on the farm, environmental services provision... (Peyrache-Gadeau and Fleury, 2005).

How have farms which are still in activity in these urbanised mountain areas managed to survive? Have they seized the opportunities offered by the proximity of towns and the high influx of tourists?

The area of study seems relevant in this respect; it is composed of three contiguous mountain communes on the plateau of La Leysse in the Regional Natural Park (PNR) of the Massif des Bauges, about ten kilometres from the agglomeration of Chambéry. It has evolved in a similar way to the whole

of the department: disappearance of three-quarters of the farms and a quarter of the Agricultural Area (AA) was abandoned between 1955 and 2000, a sign of serious decline. These communes nevertheless have potential assets for agriculture: several cheeses AOC including the Tome des Bauges (cow's milk) recognised in 2003, remarkable biodiversity recognized in a Natura 2000 zoning with contracts offered by the PNR to preserve this biodiversity, and local councillors mobilised via a land management plan – consisting of financial support to maintain land reverting to scrub.

The present paper focuses on an analysis of the changes in livestock systems over the long term (50 years) to direct reflections to the support for farms which are still in activity in these urbanised mountain areas. In the first part, it starts by going over the theoretical frameworks chosen for studying the changes in livestock systems, and then presents the methodology, whose main feature consists of an iterative approach to build up processes of change and propose a dynamic categorisation of these changes. The results then centre on the strategic patterns and principal paths chosen by the farmers; they shed light on the different dynamics that make it possible to maintain a livestock activity over the long term and the driving forces and constraints which affect and modify these dynamics.

## Representing the change in livestock farming

### Process of change and farmer strategies

Our approach is systemic and takes its inspiration from management sciences to formalise the processes of change (Vandangeon-Derumez, 1998) of livestock systems (Madelrieux *et al.*, 2002). Giving a dynamic representation of changes in livestock farms differs from methods of analysing farm trajectories (Perrot and Landais, 1993) that do not specify the elements of the system and the resources used by farmers to proceed from one stage to the next of the trajectory (Pettigrew, 1987).

How do changes of a technical, productive or organisational nature (mechanisation of work, reorientation of production, abandonment or taking over of land, diversification of activities) affect the operation of the livestock system and the family activities as a whole? To understand the motivations and reasons which guide changes operating in livestock systems, a dominant place has to be given to the actions implemented. This position consists of not confining the livestock activity to its economic dimension, where the farmer would appear to concentrate his or her efforts on increasing production, but to take into account the diversity of projects associated with the activity.

The farm's production targets – and the practices implemented to attain them - depend on the socio-economic role that this activity plays in the overall family project. To consider the family as a coherent system is to recognise that funds flow between the various areas of activity of the members of a given farm (Cialdella, 2005; Krebs, 2005). Thus, income supplied by other activities, agricultural or not, can facilitate decision-making on the livestock activity without compromising the cover of family needs.

Conversely, the introduction of a new activity requires work to be reorganised or the workforce to be distributed differently on the farm. In contexts where farming households combine several economic activities, changes in livestock farms can only be understood when placed in relation to all the activities of the work collective. So the changes in the livestock system are considered with regard to the other family economic activities: the family farm system (Osty, 1978) is the relevant level to understand the farmers' actions and choices, in particular those bearing on work organisation and technical and economic arbitrations.

Moreover, the change is continuous (Alter, 2005); the livestock system does not necessarily change by passing from one stable state to another. It is in constant movement with more or less rapid modifications, which come more or less into synergy at a given moment, but which follow a global logic of action. So our formalisation of changes represents an interpretation, a later reconstruction of strategies *actually carried out* – according to the meaning proposed by Minzberg (1987). It involves recognising consistency in the sequence of farmers' actions and making intelligible types of livestock farming, which are presented for example as "not having changed", whereas the practices are different now from fifty years ago. The study of livestock farming systems transformations on the long term refers to the flexibility of these organizations; on their capacity of adjustment and control of production under uncertainty and changing environment (Volberda, 1996; Ingalens and El Akremi, 2002; Dedieu *et al.*, 2008). This paper points out the different ways in which farmers use their resources (natural, human...) and find new ones, to remain in time. In this way, the matter rather deals with a characterization of sustainability as the functional integrity of the livestock systems (Thompson and Nardone, 1999).

## The survey over the long term

A preliminary series of interviews, carried out with almost all the livestock farmers and owners of animals in the area under study – i.e. 32 people – centred on the motivations of the livestock profession and on how this activity is operated today. We chose not to restrict the interviews to "professional" farms with a commercial production target, but also to approach people who have animals for pleasure or for their own consumption (Laurent et al., 1998), so as to include all the users of the agricultural area. A sample of 14 farms was selected for their present diversity, in particular the size and functioning of the farm, the type of products sold, the combination of activities of the household. A semi directed interview took place with livestock farmers and if possible with the person who had lived on the farm in the 1950s, if that was not the case of the present head of the farm. The interview concentrated on looking back over five recognised inputs: combination of household activities, labour, the herd and the land (size and technical management), the equipment (material and buildings), and investment financing sources. The triangulation technique – asking a farmer to talk about his or her neighbours in the sample - (Copans, 1999) was used to confirm what the farmers said. The evolution of land use and configuration was also tracked down on two series of aerial photographs, respectively 1948 and 2001 (source IGN, French national geographic institute).

The Fifties is the reference time because the national agricultural development structure was set up shortly after this period, in particular via the laws of "agricultural orientation" of 1960 and 1962 (Duby and Wallon, 1977). According to what local people said, the mixed farming-livestock systems of this mountain sector had not yet started their modernisation process and functioned on a model based on a significant family workforce, little equipment and small structures. This period is also selected as a point of reference for the study of the impact of changes in livestock farming on the evolution of the landscape, in particular in connection with the abandonment of arable lands (Mottet et al., 2005). Moreover, taking the history of the farms into account over a long period of time sheds light on the proportion of changes to the livestock farm due to external factors (effects of agricultural and rural policies) and internal factors (Moulin et al., 2007). The operation of the farm is considered as an inter-generational continuity, not fixed in relation to the farmer's installation date. Within the sample, with two exceptions, the farms and the herd were transmitted from father to son or between members of the same family.

## Representation of the change from the actual case to the « typical path »

The changes in farms are analysed at two levels: the farm, which corresponds to a case by case analysis, then the « prototype », resulting from a constructed and situated typology (Girard, 2006). This last level is free from the individual study case and highlights in the farm changes what is due to the evolution of the context (local context, industries...) or to the particular characteristics of the farm (means available and household projects).

### Analysis at farm level

A monograph, a collection of data organised according to the analysis headings, was written for each farm in the sample. It was used as a basis for two types of diagrammatical representation of the changes: i) diagrams of strategic options (figure 1) which take as a starting point the theory of the options in its heuristic dimension (Durand et al., 2006) and ii) organisational representations (choremes) of the farm territory (Brunet, 1987). It is a representation of the land used, its location and its use at a given moment of the process of change. This first phase of processing and scheduling the data provides good knowledge of practical cases to gain in relevance when choosing general analysis criteria.

### Processes of change to the strategic patterns of the farmers

The processes of change result from a constructed, iterative analytical approach between the analysis and the data. The objective is to produce a contextualised representation of transformations in livestock systems according to farmers' projects. In the whole process, periods can be identified which we define as strategic patterns. From this analysis, coherence emerges in the sequence of options selected and actions carried out (Moulin et al., 2007). The global process of each farm is divided into « phases » corresponding to the different strategic patterns adopted (ex ante or ex post) by the farmers at a given time. These patterns shift over time, over a more or less long period depending on the case: the overall process of change is then composed of a sequence of strategic patterns that differ according to the evolution of the projects, the family's resources and the evolution of the context.

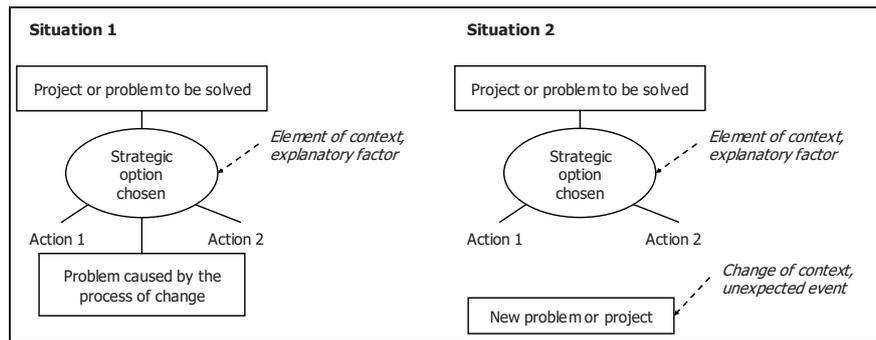


Figure 1. Diagram of strategic options (from Madelrieux et al., 2002)

After this preliminary processing, each process is divided into several phases (between 3 and 6 according to farm), representing a total of 57 phases for the 14 farms in the sample.

A second stage consists of identifying among the five inputs the elements to which the changes relate. Thus, for each phase, 21 criteria were selected as being the most significant of the modifications operated, on which the farmers resemble each other or differ from each other during the phases: the workforce of the basic group or the household (1) and the whole of the work collective (2), the skills (3), the combination of farming (4) and non-farming activities (5), the herd: species (6), size (7), breeds if a cattle herd (8), the farm buildings (9) and equipment (10), reconfigurations of area used (AA): extensions (11) and their location (12), reduction in areas (13) and ways of transferring land (14), regrouping and exchange of land (15), land development (land cleared of scrub, fences) (16), objectives of land purchases (17), investment financing sources (18), the internal (19) and external (20) driving forces for change, the duration of the phase (21).

Each criterion is presented with several modalities (figure 2), to which a score is allocated to make a hierarchical clustering (CAH) by the Statlab software. The results obtained by the CAH are analysed one more time against the matrix obtained by the score attribution. This stage helps in formulating the contents of phases in terms of strategic pattern.

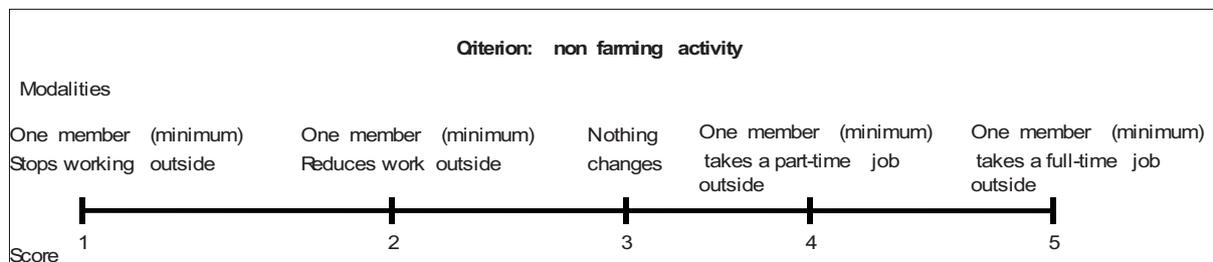


Figure 2. Construction of criterion 5 "non-farming activity of members of the basic group"

### From strategic patterns to paths

The qualification of the strategic patterns provides information about the different ways of modifying the livestock activity, but it is timeless, although a criterion of phase duration is included so as to distinguish rapid patterns from those that are more stable (some spread over about twenty years!). In an ultimate formalisation stage, we again relied on the data to establish typical paths, defined as the sequence in time of different strategic patterns chosen by farms. To do this, we began by locating the strategic patterns in the chronology of the overall processes of change of each farm in the sample. The standard paths are then established by grouping together actual cases which are the most similar.

## Results

Contrary to what is usually described by local stake-holders and in the literature (Blanchard, 1938), in the Fifties there was a differentiation of the mixed farming-livestock systems (combining small cattle herds (2 to 5 cows) with between 2 and ten head of goats or sheep). Some small farmers had

sufficient production means to profit from this: sale of apples, cider, honey or potatoes and production of milk and even draught oxen when the land and buildings permitted. Others tended towards self-sufficient agriculture and they already often had recourse to non-farming activities. Of the 14 farms, 12 were already farming in the 1950s; in 2000 these farms show a great diversity of production systems. Two of them have a flock of sheep of less than 10 head on less than 3 ha, mainly for home consumption. These two farms also live from a non-farming activity, or retirement or unemployment benefits. Seven farmers produce milk, one of them making cheese for sale on the markets; another introduced a meat production unit and does the cutting-up himself. For these farmers, the size of the herds varies from 8 to 45 dairy cows on land varying from 15 to 103 ha. Three farmers rear cattle to sell fat calves, with herds ranging between 3 and 33 cows. These three farmers have a variety of activities or have retired from a non-farming activity. How this differentiation does operate?

### The strategic patterns

Figure 3 illustrates, for a selection of representative criteria, the contents of four of the eleven strategic patterns obtained. « Autonomous and progressive modernisation » corresponds to a pattern in which the farmer and his or her family make the choice of limited development of the livestock farm, increasing the size of the herd, renovating buildings and acquiring farming equipment, by keeping hardy cattle breeds. The increase in the herd means looking for nearby grazing land to rent – movements are limited by the lack of manpower on the farm –. Financing is autonomous; there is no recourse to loans. In the case where livestock is not combined with another commercial farming activity, one or more members of the family take a job outside, not connected with farming, even if it means reducing farming activities other than livestock (vines, cereals) because they do not have enough manpower and it is not entirely compensated for by equipment.

In the strategic pattern « Radical modernisation and securing the land » the farmer will keep his work force on the farm and invest more in production means: equipment, livestock buildings and land, and abandons the local cattle breed (Tarine) for breeds judged to be more productive such as Abondance or Montbéliarde. The objective: to expand, even if it means borrowing to do so, with in some cases a contribution from an external income, or from another commercial farming activity such as wine. The term 'securing' is preferred here to 'growth', because most of the time for the farmers it is a question of acquiring land that is already in use or near land used but rented, to « lock up the sector », i.e. to take a legitimate hold over neighbouring land to be able to rent it – or acquire it – more easily later.

Name of phase	Workforce	Farming activity	Non-farming activity	Herd	Breed/species	Equipt	Building	Land	Place	Purchase/rent.	Financing
Autonomous Modernising	⇓	↓	↑	↑	=	↑	Renovated	↑	near	Rent	Self
Modernising radically	=	=	=	↑↑	Dairy Cows	↑↑	↑↑	↑↑	near	purchase	Loan (+ salaries)
Developing collectively	↑	=	↓	↑	=	↑↑	=	↑↑	near + far	Rent (purchase)	Loan (self)
Developing with an alternative herd	↑	↑	↓	↑↑	Goats Horses	=	↑↑	=	(near)	(rent)	Loan (+ salaries)

Symbols '↑' increase ('↑↑' big increase); '↓' decrease; '=' nothing changes

Figure 3. examples of phases of change on a selection of criteria

### Sequence of strategic patterns: the paths

Four paths presented here (figure 4) correspond to the most frequent types of evolution, but some existing variants provide just as many lessons to be learned as to what motivates or holds back the maintenance of a livestock activity in rural households.

Path 1 corresponds to a sequence of strategic patterns adopted to « continue to exist as a livestock farmer ». This path goes through a first phase when the livestock farm takes a downward turn before gradually reducing this activity. This configuration also corresponds to the evolution of a large

proportion of farms which have since disappeared. A structure that was too small in the 1950s (less than 5 ha, 1 to 2 cows) only procures enough products for the farmer and his or her family to survive. Several members then leave the farm to seek full-time employment outside (downward movement phase on the cattle herd), as the income generated does not allow for the acquisition of new production means, and not even enough equipment to produce milk under current hygiene regulations. Progressively, the family stops selling milk to turn the farm towards the production of calves for their own consumption, or they change species – a change in reaction to the restructuring of dairies, we will come back to this -. The cows are replaced by a small flock of sheep, about a dozen head, to « keep the plots of land under control ». This path is accompanied by a reduction in the AA: rented land and the best land under ownership are given up to « big concerns », the farmers who are expanding. Maintaining a farming activity is evidence in this case of an attachment to certain practices of working the land, of « producing one's own food » or else keeping the status of farmer, and therefore social security (Blanchemanche et al., 2000). A variant to this path corresponds to a return of a young family member to the farm, with a move towards « autonomous and progressive modernisation »: depending on financial means, they buy a little farming equipment and they increase the size of the herd a little...

Path 2 corresponds to a development of an « autonomous and controlled » cattle farm; the livestock forms part of the commercial activities of the family to which they allocate manpower (at least 1 MWU man worker unit) and they invest. The main feature of this path is to avoid any debt, essentially with banks, but also with neighbours (not much mutual assistance, no joint investments...). All through the path, this means repeated arbitration about the allocation of the workforce among the different activities. A period of construction of the farm basis in the 1950s aims at acquiring land, which can involve finding a salary outside the farm... and working twice as hard because financial means do not allow them to buy equipment, except small second-hand equipment. From a technical viewpoint, the livestock farm « follows the movement » ; they increase the size of the dairy herd (from 3-4 head to about a dozen) at the same time securing the land capital (between 10 and 30 ha). Then savings (or part of the savings) are injected into the farm to buy equipment and build or renovate buildings. The aim of this phase of « autonomous modernisation » is to continue developing the farm, limiting financial costs. However, persistent manpower problems finally lead to modifications in the farm strategic pattern, choosing to produce meat rather than milk, or if the land area used allows it (extent and configuration), making arrangements such as putting up fences, that will free the farmer from the daily task of watching over the animals. In recent years (around the year 2000), the chosen direction is usually a reduction in the livestock activity. One alternative shows that some strategies are directed towards processing farm produce (milk, meat) and giving up jobs outside the farm to increase income whilst having an activity that complements livestock but at the heart of the farm this time.

Path 3 retraces the known dynamics of modernisation adopted by dairy farmers today, which consists of « taking the path of Modernity », in reference to the model preached by the agricultural advisory services system. We present it here with a variant, to illustrate the diversity of ways of changing the livestock farming, including for farmers presently grouped in the professional category. Originally owning a commercial mixed crop-livestock farm, livestock farmers chose in the 1950s to establish the land base of the farm and at the same time equip themselves with farming machinery (cf. « radical modernisation and securing the land » pattern). This path is expressed by a series of simultaneous investments as well as considerable mobilisation of the family workforce on the farm. The variant consists of starting the path by a preliminary phase constructing the land base, limiting investments in equipment. Then in the 1970s the path is marked by a « collective development » phase, which is expressed by making a certain number of resources mutually available: farming equipment, via a CUMA (Cooperative for the use of farming equipment); work and land, bringing in the hay harvest together on the land of neighbouring villages (several dozen ha rented for the occasion); creating (fencing off) collective fields for heifers. Two farmers even planned to found a GAEC (a joint farming arrangement under French law) during this time. This pattern is decisive for these farms; the expansion of the livestock activity is rapid and profound; by the increase in productivity, continued investments are made possible – creation of buildings, purchase of land – to increase the herd (to reach 20 to 30 dairy cows) and its productivity with artificial insemination... However, this phase is quite short (between 5 and 10 years); the following phases express a return to individual strategies, but which keep an objective of growth (modernisation and securing the land; in the early 2000s, the structures reached 50 to 100 ha). Since the early 2000s, one variant consists of pursuing a strategy of modernisation and of securing the land, whilst the other is committed to a strategy of diversification of production or processing of products, because of stronger economic constraints.

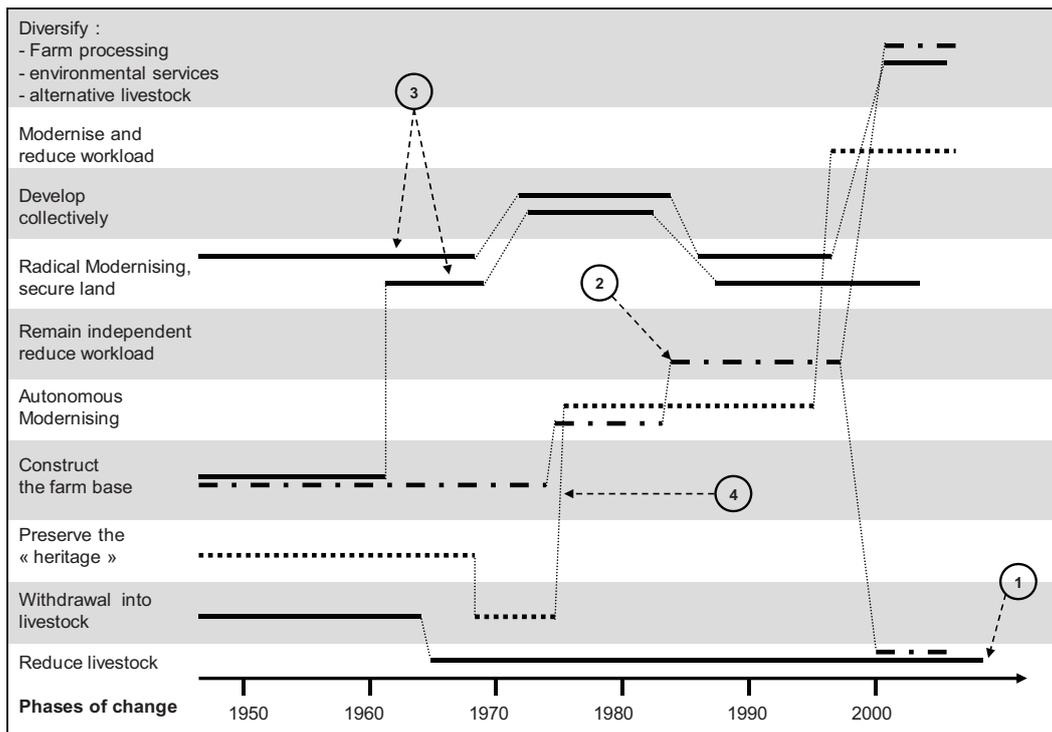


Figure 4: Typical livestock farming paths (1-2-3-4 correspond to the different types of paths)

Path 4 resembles Path 1 in its first part then continues along dynamics similar to Path 2: the farm is at subsistence level in the Fifties, but the base is sufficient (more than 5ha, communal land included) so that the livestock farmer and his or her family can continue their activity, in particular thanks to the contribution of external income. But this evolution leads sooner or later to the adoption of a strategy falling back on cattle farming (herd of ten animals) with the progressive abandonment of other farming activities (grain crops, vines). However, an opportunity to enlarge the land holding by renting land – when neighbours give up farming – as well as sufficient capacities for rational investments in materials and equipment - makes it possible to adopt an autonomous modernisation strategy. Then adding value to products or diversification of products become possible thanks to the arrival of a young workforce on the farm (children interested in farming).

## Non linear paths: origins of present diversity

### Continued existence of farming on the Plateau de la Leyse

In the context of the urbanised northern Alps, it appears that all the paths, including those of professional farms, are based on recourse to non-agricultural activities or on diversification of productions, in one or more phases. The farms are then differentiated by the role given to livestock, and the resources used for this. The wine production is still integrated in three farms in the sample, including two professional dairy farms and a dairy farmer who has a salaried job. Five other farmers stopped this activity between the 1950s and 2000, for work and manpower problems or because this activity was handed over to another member of the family. Jobs in the local communities, most of the time in the public services or industries in the Chambéry valley, offer opportunities for the families for six farms out of twelve, throughout the career of at least one member of the family (for a period of between 20 and 40 years). The cattle trade and the craft industry, as well as occasional factory work have been used as a lever to develop livestock farming in all the other farms in the sample.

### Differentiation of the farming systems

The original farming structure and their functioning are part of the reason for the current diversity: farms at subsistence level generally finding themselves in paths "continuing to survive as a livestock farmer" whereas today's professional farms had sufficient structures and resources for commercial farming as early as the 1950s. However the paths show that these trends are not linear and that there is no absolute determinism in the overall process of change in livestock systems. Path 3 and its variant already illustrate the existence of several ways of becoming professional: different rates of

change, variable strategic patterns. A third variant consists of a trend towards a much more independent dynamic, after a period of high investments in time and money in the farm. In this path, if nobody takes over the farm, it leads to a strategy of reducing the livestock activity, then closing down the farm.

Conversely, the farms that take path of change 4 show that it is possible to start an independent livestock activity again, on condition that a project is made of it, that there is an opportunity to acquire land and a possibility of financing equipment. This redeployment of livestock farming does not seem very likely in the farms taking a type 1 path, which tend to reduce their agricultural activities as of the 1950s and do not have sufficient resources to inject into the farm.

## Discussion

### On the methodology

#### The viewpoint on the past, a question of interpretation

The representation of the changes in livestock farming proposed here receives its information from present discussions on past events. A bias is therefore introduced in the way the people interviewed perceive their history; we have tried to limit this by triangulation and markers on aerial photographs. What is more, those interviewed are not necessarily the "decision makers" of the technical and organisational choices of the activity, a role held by the parents at the time. If the past events of change persist in the memory of the people surveyed, they are difficult to connect to an explicit project. But for lack of time, we could not carry out the same cross-checking work using local historical documents which would have made it possible to reduce the bias introduced by discussions on past events, calling upon the memory (Candau, 1996).

In addition, the representation is the result of our own interpretation, which will be validated with the farmers to have an estimate of the gap between our view and their own vision. In the same way, establishing dialogue with third parties (local stake-holders, other scientists) will further clarify the tacit stages of construction of the model, to make a generic analysis framework from a locally situated categorisation.

#### A representation that creates links with other approaches

In the context of French agriculture, the results confirm works showing that livestock farming is not just an economic activity, but that those involved in it are motivated by passion for the work and animals (Fiorelli et al., 2007), to maintain a heritage or to mark one's territory. The results then check the main trends of evolution of the livestock farms: increase in business dimensions for the professionals (path 3), maintenance of "heritage" livestock farming for those with several activities (paths 1 and 2). These logics must be compared to the work undertaken on livestock systems flexibility in Burgundy (Lémery et al., 2005) on the way farmers react or anticipate when confronted by the growing uncertainties of the livestock farming context. The authors describe a logic "of making do" which consists of trying out new things without finding themselves in an irreversible situation; this behaviour can be that of the farmers of path 2. In another logic, «taking action on», the farmer anticipates the change, even if it means taking risks to achieve the goals of change s/he has fixed for himself. This logic can be carried by farmers of path 3.

In other countries, Bowler et al. (1996), identified "paths of development" that match our representation : the phase "Redeployment of farm resources (including human capital) into new agricultural products or services" corresponds to our "diversify with an alternative livestock farming", the phase "Redeployment of human capital into an off-farm occupation" approaches our phases "withdrawal into livestock" and "reduce the livestock" and "Maintenance of traditional farm production and services with either reduced inputs and/or reduced income" with the phases "autonomous modernising" and "remain independent, reduce workload". As well, Pierce (1994) and Johnsen (2004) work on farm adjustments employed during the last crisis periods, and find again withdrawal, pluri-activity, diversification... However, there are differences in the content of the phases and in the fact that these authors give static descriptions of strategies of survival or adaptive strategies. The sequence of the phases and the mechanisms of passages from one to the other are not considered according to evolutions of the family and its environment.

## Dynamics and events which mark changes

### The dynamics of collective development

The development called "collective" is around the 1970s for all the farms using this strategic pattern in their path. Four farmers, out of the 14 in the sample, tried to work together for a time and went as far as to organise and redistribute their land areas themselves. This initiative only affected the farms which, in the Seventies were in a phase of radical modernisation and securing of land, and construction of the farm base, farms which can be said to have been more advanced in the "professionalization" process. In other areas, like the Monts du Lyonnais (Houssel, 2006) similar collective initiatives, based on mutual aid and solidarity, were encouraged by Catholic Agricultural Youth (JAC).

It will be noted that, on the plateau of La Leysse, the mutual use of resources certainly allowed these farms to belong among current professional farms but it also contributed to widening the gap with the other farmers on the plateau. The poor take-up of the movement in these communes is undoubtedly explained by the fact that in the majority of farms, livestock did not represent the main source of income. In the Chambéry area, employment in industry has absorbed most of the labour: it conveyed an image of progress more than agriculture did.

### The restructuring of the dairies

This was started in the 1960s and is still going on, and has left its mark on livestock farms: the reorganisation of the dairies, which does not have the same effect on the changes in livestock systems. They had an impact that differed according to the farmers' investment capacities to satisfy health standards and milk quality in particular. And in a more or less direct way, the location of the farm base in relation to the collection round also played a role in maintaining dairy production on the farm. Indeed, the replacement of village cheese dairies to the profit of bigger cooperatives increasingly reduced the small producers' capacity for negotiation. The collection circuits were gradually modified; forcing small producers to transport their milk themselves part of the way. Increased workload and obligation to invest in refrigeration equipment were just some of the many factors which discouraged a considerable number of farmers who were following an autonomous path. An alternative is then to direct the herd towards the production of meat or stop completely. On the other hand, autonomous livestock farmers who had their farm base on the route taken by the collection trucks (at crossroads, near professionals...) are able to retain dairy production even though they are small producers.

### The emergence of short distribution networks

In recent times (around 2000), a trend is seen, moving towards the value enhancement of products and their direct sale. These patterns are the fact of farms on «autonomous» or «modernised» paths (2 and 3). They seek to improve their income by taking advantage of the proximity of urban centres such as Aix les Bains and Chambéry. It seems that these farms are more affected by problems of income and work than before. But it is also possible that awareness of these problems is amplified by different socio-professional categories living in close proximity (farmers, those with several activities and non farmers) in the same areas.

## Conclusion

Understanding changes in livestock farming in the form of a sequence of strategic patterns over the long term, taking account of all the economic activities of rural families, produces results that are original in several respects. It confirms the major agricultural evolutions noted elsewhere in France, while clarifying how families use their resources and skills to remain in time. In the area of study, livestock farming is an activity which is transformed in association with others: they sometimes come into synergy and allow a development of livestock or can on the contrary mark the progressive decline of this dominant agricultural activity in the mountain. At present this balance is called into question by ever heavy workloads, for a workforce that is increasingly reduced on farms. In addition, we showed that the cohabitation of very varied forms of livestock farming on a small territory results from a shared history of rural families. Some, while also profiting from a collective initiative, were professionalised and enlarged partly because others did not use their farmland any more. Land reorganisation analysis at the territory scale therefore constitutes a way of prolonging this work. The present results come from an interpretation of changes on a small sample. They give the possibility of opening dialogue with

other scientists in an objective of reflexivity on the formalisation approach and with local stake-holders on the kinds of agriculture they wish to have on their territory.

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