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Family Dairy Farms in the Northern French Alps: Persistence and Adaptation in a Changing World

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The maintenance of family farms in mountain areas constitutes a serious challenge in the context of globalization. European mountain agriculture faces significant natural constraints and cannot follow the same development path as agriculture in the plains. The study reported here sought to analyze recent changes in mountain family dairy farming in the Vercors (Alpine uplands with urban and tourism development) and characterize the diversity of family farm development trajectories. We developed an analytical framework that allowed us, based on individual data from the National Census of Agriculture for 1988, 2000, and 2010 and semistructured interviews in farms, to capture and analyze patterns of change on family dairy farms between 2000 and 2010 and to link changes in farming systems and farming family organizations. Our results show a drop in the number of dairy farms and changes to their organization. This article discusses the different strategies adopted by dairy families, which are based on different adaptive resources.

Keywords: *Mountain dairy farming; family farming systems; development trajectories; process of change; adaptive resources; Vercors; France.*

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Introduction: The future of mountain family dairy farms

Livestock farming, especially milk production, is a key activity in most mountain regions worldwide, providing regular and secure income (Bernet et al 2001) and employment for mountain communities (Malla 2007). In these regions as elsewhere, livestock farming is subject to global forces driving change, such as market globalization and climate change, and more local forces such as demographic change and pressure for land, as well as national and supranational public policies (Darnhofer et al 2012). The dairy sector in France has been particularly affected and has experienced several crises. The milk quota scheme introduced in the 1980s in Europe by the Common Agricultural Policy aimed at regulating dairy production (Huguies 2013). It will end in 2015, and mountain zones—constrained by difficult terrain and climate conditions—cannot hope to keep production costs low enough to stay competitive in the global agricultural marketplace (Dervillé et al 2012).

Although mountain zones are acknowledged and sustained for their major impact on land use, landscapes, rural life, and development (Fleury et al 2008), the maintenance of family farms in mountain areas constitutes a real challenge, including for the dairy sector. Some mountain farmers have found ways to turn their geographic niche into added value and profits (Huguies 2013) through the *appellation d'origine protégée* (AOP)—a legally protected brand name incorporating the product's region of origin, which adds prestige and value to the product. An example from the French Alps is Beaufort cheese. But other areas in the Alps where dairy production prevails, without an emblematic brand-protected cheese, are worried about the future of dairy production and the community of family dairy farms, when milk quotas are about to be discontinued.

In spite of the significant changes experienced in the past 60 years, French mountain farms have remained mainly family based (Martin et al 2014). A farm can be considered a family farm if (1) the principals are related by kinship or marriage, (2) business ownership is combined with managerial control, and (3) control is passed from one generation to another within the same family (Gasson et al 1988). Thus the family determines the decision-making process, the management of activities and means of production, and the transfer of assets. External forces interact with the dynamics specific to families (nuclear or extended) who live and work on dairy farms, leading them to either adapt or leave dairy farming (Evans 2009).

This article reports on a case study that explored the processes of transformation at work in family farms in the Vercors, a dairy farming area of the Alps, to better understand how farmers manage their long-term development in order to stay in business. It analyzes recent changes in mountain family dairy farming in the Vercors, characterizes family farming systems' diverse

TABLE 1 Strategies for coping with change on family farms.

Family farming system	Strategy	Options within the strategy
Livestock farming system	Degree of specialization	Specialized dairy farming Diversified farming
	Mode of production	Organic farming Conventional farming
	Farm size	Small (<30 livestock units) Midsize (30–45 livestock units) Large (>45 livestock units)
Farming family organization	Structure of the work group	Lone farmer Farming couple Family association Nonfamily association[a)]
	On-farm activities	Only farming Farming plus other on-farm nonagricultural activities (eg cheese making and direct-to-consumer sales, tourism)
	Off-farm employment	Off-farm employment of household members working on farm Off-farm employment of household members not working on farm

[a)]A nonfamily association includes at least one farm manager who does not have a family link with the other farm managers.

development trajectories, and investigates the resilience of family farming in mountain areas.

Analytical framework

Most scholars analyze farming system changes independently of the type of social organization running the farm (Ryschawy et al 2013), yet the availability of a family workforce is a major driver of change (Potter and Lobley 1996). Indeed, the literature suggests (Johnsen 2004; Darnhofer et al 2012) that the paths chosen by farmers to stay in business in this context of change are based on complex economic choices (eg to expand, invest, or form a partnership), production choices (eg to specialize or diversify), and strategies of integration in the food chain—for example, whether to deliver farm products to an industrial group, qualify for the local AOP, or sell directly to consumers—but also on family circumstances (eg whether the family has an off-farm source of income). Expanding on earlier studies, we consider family farming systems as the interdependence of a farm business and its associated household(s) (Gray 1998; Terrier 2013).

We developed an analytical framework that allowed us to link changes in the farming system (such as farm products and farm size) with changes in the farming family organization (such as structure of the work group, on-farm activities, and off-farm employment of household members). Table 1 presents the key categories analyzed in this study.

Methods and study area

Trajectories of change in family farming systems

Farming systems are embedded in a wider sociotechnical system that includes market structure, policies, consumer preferences, and ecosystem behavior (Darnhofer et al 2012). Thus, they are shaped by a wide array of interacting factors that, like the farming system, change over time. Farms do not exist in a stable environment but evolve in response to an ever-changing environment (Milestad et al 2012). The study of the dynamics of farming systems is a thriving field of research.

Recent research on development trajectories can be divided into different approaches. One approach aims to understand the strategies that farm managers mobilize to contend with shifts in circumstances. These strategies include changes to farm size and type (diversification into new agricultural commodities), farm and/or household expenditures, the use of paid and unpaid labor, and participation in off-farm work (Johnsen 2004). This approach makes it possible to highlight the strategies adopted by farmers in a particular territory but does not make it possible to understand the coherence of farmers' choices over the long term. For this purpose, Garcia-Martinez et al (2009) and Ryschawy et al (2013), comparing systems simultaneously or over time, revealed the dynamics of farm trajectories over a long period of time.

Another approach to studying change in farming systems analyzes the way the changes take place—that is, the processes of change rather than the global dynamics between different dates. Some researchers have investigated how different adaptation strategies are fitted into a succession of phases (Moulin et al 2008; Cialdella et al 2009) in order to assess the relationships between farm changes and farm manager strategies. Others investigate each facet of the change process—not just why the change is made and its strategic dimension but also how the system transitions from stage to stage (Terrier 2013). This allows a detailed examination of the circumstances

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surrounding change, a subject that has been understudied (Evans 2009).

To better grasp the changes in family farm systems over time, we combined the study of the strategies used, of the way these strategies are articulated within family farm trajectories between 2 dates, and of the processes of change underpinning these trajectories.

Data sources and their treatment

Our study drew on data from the national Census of Agriculture for 1988, 2000, and 2010, for which the French National Committee on Confidential Statistics granted us access to individual farm data. This enabled us to build a picture of the study area, integrating every farm with at least 1 dairy cow in 2010. These data were reworked in order to build synthetic variables connected to our analytical framework. In 2010, 71 farms with dairy cattle were censused in the study area; 3 were excluded from the sample for reasons described below.

We also carried out comprehensive interviews on 33 dairy farms selected to represent diverse situations in order to take account of the many different relationships families have with their farms. The sample included farms where only a farm manager, a couple, or an association between several farm managers ran the farm, and farms on which the households had a variety of on-farm and off-farm activities. The factor common to all was the management of a dairy farm on the Vercors. The interviews sought to elicit life stories in order to identify changes to the family's on-farm and off-farm activities, production systems, markets, and labor arrangements.

Each phase of investigation provided progressively finer-grained detail. First, we analyzed recent changes in mountain family dairy farming in the Vercors by identifying strategies for change. These were captured through an analysis of global trends and patterns of change revealed during the interviews and in the agricultural census data. The interviews enabled us to pinpoint which strategies were effectively mobilized and how, and to detail the changes between 2000 and 2010 in the family farm systems for each strategy. We used 2000 and 2010 agricultural census data to track dairy farms via the French equivalent of companies' house registration numbers. We were able to pair up 2000 and 2010 figures on 68 of the 71 farms.

Next, for the 68 farms covered by the census data, we characterized the diversity of development trajectories by analyzing the way the strategies for change articulated within them. We developed a typology by rank ordering the information and selecting the most relevant strategies used in the farm systems (Landais 1998), based on information from interviewees on the 33 farms that participated in the survey. This information was thus used in an iterative process to build the variables and modalities of the family farming system according to changes observed in the sample, and to analyze the recent changes (Glaser and Strauss 1967). Information from interviewees also helped to build the typology of family farming system trajectories and to illustrate and elucidate the processes of change.

Study area

The study area covers the central Vercors plateau (around 5°E and 45°N), located in the Vercors Regional Natural Park, in a humid climate zone around 1000 m high (Figure 1). It is near the Grenoble urban cluster and thus exposed to urban and tourism development (demographic change and pressure for land). Farming is predominantly and traditionally dairy farming. Systems are based on grassland (natural and cultivated pastures), milk is delivered to the local cooperative, and all farms are family farms. Off-farm employment has a long history linked to mountain tourism.

Since 1998, the Vercors plateau has fallen within the boundaries of the AOP for Bleu du Vercors-Sassenage, a blue cheese. Vercors farms have attempted to take advantage of the AOP, but with less success than other emblematic models in France such as Beaufort, because the milk price paid to producers was no higher than the standard milk price at the time of the study. Indeed, the local cooperative faced economic difficulties, which did not allow it to provide a better milk price. Only half of the milk volume was processed as cheese, limited by cheese sales, and the other half was sold at a low price. The move to discontinue milk quotas at the European level, when the blue cheese market is already fiercely competitive at the national level, calls into question the future of dairy production in the region. This situation is exacerbated by recent droughts, which have limited dairy cattle's forage self-sufficiency and increased production costs.

Results

Changes in family farming

This section discusses general changes between 1988 and 2010 at the Vercors plateau scale and changes in the strategies chosen for analysis at the farm scale, based on the agricultural census data set as a whole ($n = 68$) and the sample chosen for interviews ($n = 33$). The census data revealed a sharp drop in the number of farms, similar to that seen in France as a whole, with almost 1 in 2 farms (47%) disappearing from the study area between 1988 and 2010. Dairy farms proved less resilient than other farms, as 63% either ceased operating altogether or ceased dairy operations over the same period. Dairy farms' proportion of agriculture as a whole is also shrinking (60% of farms had dairy cows in 1988 and only 41% in 2010).

Changes in farming family organization: During the period observed, family farms saw an increase in the number of worker units, although they remained predominantly family based (relying only 7% on wage labor in 2010). Family

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FIGURE 1 Grassland landscape on the Vercors Plateau. (Photo by Grégory Loucougaray)

associations increased from 3% to 11% between 1988 and 2010, and there were signs of nonfamily associations, including at least one farm manager who did not have a family link with the other farm managers (5% of nonfamily associations in 2010; data unavailable for the period before 2010). On-farm activities and off-farm employment of farm members also changed between 1988 and 2010, with almost 1 in 4 farms running a dairy processing activity and 47% having an off-farm source of income in 2010.

Based on the census data from 68 farms, we identified 4 work arrangements (numbers in parentheses represent the number of farms involved): (1) no change patterns (39/68), (2) change toward family and nonfamily associations (13/68), (3) change from a lone farm manager to a farming couple (either the farmer got married or the spouse did not work before on the farm) (6/68), and (4) change from farming couple to lone farm manager (10/68). Information shared during the interviews suggested that workforce reductions were due to family problems or to the spouse taking an off-farm job. New family associations emerged when additional family members (such as children or brothers) joined the business. New nonfamily associations often occurred when a lone farm manager, with no successor to take over the business, brought in a partner to share the workload and other responsibilities.

To ensure steadier and more secure income, farm managers often combined multiple strategies: off-farm employment (continued or started: 33/68), on-farm activities (continued or developed on-farm nonagricultural activities: 19/68). These trends were sharper among the 33 farmers interviewed for the study, as the interviews covered a longer period (from the date the farm owner started to 2012). Some trends dated back to before 2000, chiefly with the switch to cheese making and direct sales (Figure 2) driven by the move to AOP status in 1998. A number of farms also experienced an activity scale-back, refocusing on the on-farm activities (ceasing off-farm employment 22/68) and even just farming (6/68).

Changes in farming systems: Average farm size increased notably during the period studied, from 27 hectares (ha) in 1988 to 48 ha in 2010. Dairy herds doubled over the same period, from 15 dairy cows per farm in 1988 to 32 in 2010, and the proportion of farms with more than 25 dairy cows rose from 50% in 2000 to 65% in 2010. In dairy farming, production remained largely specialized, although diversification made inroads; the proportion of mixed-species livestock farming systems increased from 8% in 1988 to 14% in 2010. Organic farming also gained ground, with almost 1 in 4 farms registered as organic in 2010.

However, these averages hide different types of dynamics at the family farm scale. Of the farms in the agricultural census data set, 44% continued at the same size. A further 38% increased in size, by building new farm housing, securing access to new land, or switching to organic farming (where herd numbers can be increased to offset the lower productivity of dairy cows). The remaining 18% dropped in size, in some cases to avoid entering a higher tax bracket or pending retirement with no successor lined up.

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FIGURE 2 Direct sale of cheese products on a farm on the Vercors Plateau. (Photo by Sophie Madelrieux)

Farmers also sought to increase returns by diversifying production (11/68) or switching to organic farming (19/68), which yields higher milk prices. Diversification into field crops (outside the Vercors Plateau) or beef production was prompted by quota freezes and the milk price crisis. Other farmers refocused on a specialized milk product (3/68) or exited from organic farming (5/68).

Thus, the strategies mobilized varied. The next section explores the ways in which this broad picture is expressed at the family farm level.

Diversity of family farm development trajectories

Based on the strategies discussed above, analysis of the 68 cases from the agricultural census over the 2000–2010 period revealed 46 different family farm trajectories. Only 10 farms experienced no changes in strategy (3 of these were managed by a single farm manager and 7 by a couple). We divided the cases into 3 groups: farms that had experienced no change in activities, a development in activities, and a scale-back in activities. These are discussed in more detail below.

Type 1: Continuity in activities: In Type 1 cases, the farm continued with the same on-farm activities (whether these involved farming alone or other activities as well) and the same farm products (either specializing in milk or diversified, and either organic or not). The main strategies concerned livestock management—cost reduction or intensification. Four subtypes emerged based on work group.

1. *A family-based work group (lone farm manager, couple, or family association) is continued* (24 cases in the census data and 7 cases among survey participants). Among survey participants, this type corresponds to lone farmers or couples who started out at a small size, were unable to expand the farm, and turned to off-farm employment or cheese making and direct-to-consumer sales to make a living. For example, one couple took on the family farm in 1972 with 12 dairy cows on 20 ha. Limited by their enclosed geographic position, they have stayed small and worked off-farm (in a ski resort during winter and at other odd jobs). Today they have 20 dairy cows on 33 ha and meet their 105,000-L quota. As they are unable to increase output, they try instead to minimize their overhead. As they are not feed self-sufficient, they stopped using fertilizer and switched to compost from the wastewater treatment plant to supplement their own organic manure. This type corresponds also to family associations; they rely on specialized dairy farming, banking on complementary revenue, or on growing in size.
2. *There is continuity in activities despite an increase in family work group size* (7 cases in the census data and 2 cases among survey participants). In these cases, the work group expands but stays family based. Strategies for change focus on increasing size and intensifying

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production. A typical case is a dairy farm where a son joined his father's business. With the increase in the work group, the dairy-specialized farm aimed at self-sufficiency in feed and finances, with little mechanization and a relatively small herd; it looked for ways to increase output through the intensification of tillable land and improvements in feed and diet, with a substantial herd and labor-saving mechanization.

3. *Activities are continued despite a decrease in family work group size from couple to lone farmer* (4 cases in the census data and none among survey participants).
4. *The work group either continues as or evolves to become a nonfamily association* (3 cases in the census data and none among survey participants).

Type 2: Development in activities: Type 2 farms have either continued with their on-farm activities—in which case (unlike Type 1) they take up organic farming and/or diversify into new agricultural commodities—or turned to on-farm nonagricultural activities; their farm products may or may not have changed. Again, subtypes emerge based on work group.

1. *The work group remains in a family-based configuration* (5 cases in the census data and 12 among survey participants). Among survey participants, farmers in this group were looking for ways to protect themselves from changes in the dairy sector, especially because they are not necessarily economically sound. They were lone farm managers or couples. Some joined an initiative led by the dairy cooperative to switch to organic farming as a strategy to get better value out of their milk production and profit from the security of a 5-year guaranteed price floor. Others opted for diversification of the farm products or on-farm nonagricultural activities, hoping to take advantage of urban and tourism development, or combined these options. In all cases, the degree of reliance on off-farm revenue streams either continued or increased on more than half of these farms.
2. *The family work group increases in size* (4 cases in the census data and 4 among survey participants). Among survey participants, this occurred when a family member joined the farm business and brought about a change in activities that went further than size alone. The farm managers switched to organic farming or diversified the farm products to include meat production or processing and direct-to-consumer sale of all or part of their output. For 1 in 2 farms, this entailed ending off-farm employment because of the increased workload.
3. *Change in activities occurs despite a decrease in size of the family work group* (6 cases in the census data and none among survey participants).
4. *Change in activities occurs despite a decrease in size of the nonfamily association* (4 cases in the census data and 8 among survey participants). Among interviewees whose farms had a nonfamily work group, those who practiced farming only and had a specialized farm product made the switch to organic farming. Others got better value out of their production using processing of all or part of their output; some also adopted organic farming. Farms that needed to increase income but had limited opportunities for expansion were under more pressure to find ways to better monetize their products. The spouses generally worked off-farm, and farmers quit any off-farm job they had (or it generates tension between associates). For continued nonfamily associations, the switch from a simplified taxation allowance scheme to full tax liability forces development of activities. When family farms added nonfamily associates, often because of the heavy workload and diminishing help from parents, they had to increase revenues. For example, a livestock farmer whose assets and quotas were frozen saw cheese making as an option because of proposed new AOP-based subsidies, and looked to recruit a cheese maker as a business partner.

Type 3: Scale-back of activities: Farms in this category (11 cases in the census data and none among survey participants) either continued with the same on-farm activities but downsized the farm products, by specializing in milk or withdrawing from organic farming, or refocused the on-farm activities on farming only and continued or limited the farm products. They experienced the continuous operation of a family-based work group (7 cases in the census data and none among survey participants), or changes within a family-based work group (4 cases in the census data and none among survey participants).

Discussion

Added insights brought by the analytical framework and multiscale approach

Given the challenges family farms have to face to adapt and survive a widening range of site-specific and global pressures of unprecedented speed, magnitude, and uncertainty, the study of changes on family farms is fast gaining priority on the research agenda (Darnhofer et al 2012). The complexity of these changes prompts us to stress the utility of thinking in terms of trajectories or processes instead of types of farmers. Typologies of farms and farmers, which are quite often based on practices, mask both the diversity of circumstances through which farmers come to change (Evans 2009) and the ways they change. This approach allows us to better understand the interpenetration of individual, family, local, and global histories, as well as the diversity of development paths.

Most papers on development trajectories rely on survey data from relatively large farm samples, and few

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have relied on in-depth farmer interviews to assess farmer strategies (Cialdella et al 2009). We attempted to combine these 2 approaches as they appeared complementary. This made it possible to view the in-depth interviews in a broader and statistically representative context.

The physical constraints within which farmers must operate in upland regions and the emphasis on diversification as a way of maintaining farm households have already been highlighted (Glass 2013). But analyzing family farming systems as an interaction between the farm and the family also offers an original contribution by showing the broad set of strategies that family farms can mobilize and combine to survive.

A drawback of this approach is that it overlooks technical management issues (except for choices regarding organic farming), which also help shape family farm choices, especially in the search for feed self-sufficiency and increased dairy productivity. We plan to address this issue as we move forward with our research. Another important research question is whether the processes at work on the farms of our interviewees are replicated in the agricultural census data; this could be investigated through further work with the census data and further farm surveys.

Adaptive resources of family farms in a mountain area

We found a broad diversity of family farm trajectories. Given the context—a small study area where development perspectives are more limited than elsewhere—we had expected to find fewer and more stable trajectories. However, no single prevailing pattern of development emerged from Vercors plateau dairy farms during 2000–2010.

The development trends observed in the Vercors mirror general patterns found across France. Firstly, dairy farms are losing ground, decreasing between 1988 and 2010 by 63% in the Vercors and 69% in metropolitan France (Madelrieux et al 2014). This may be due to the milk quota limiting the development of dairy farms, or the policy to favor departure from the dairy sector, but also due to the workload compared with the generated income. This is reinforced by a decline in the amount of work contributed by family members, which is not fully compensated by increased mechanization (Madelrieux and Dedieu 2008). One farmer said:

> *I believe that the improvement of family life and health have a cost [wage labor], because going to work every day is not possible, after a while, you crack up.*

Another difficulty is the handing on of farms that are bigger and a financial weight to the next generation.

We observed, both in Vercors and in France in general, that members of households work increasingly less on the farm and work groups are open to nonfamily members, and the activities of households are no longer only farming (Hervieu and Purseigle 2013). In the study area, with the development of off-farm employment, farming has tended to become one of several income sources for farming families. Either milk production is no longer sufficient to make a living and household members have to find off-farm work or diversify on-farm activities, or farming is not attractive to household members, or it is a choice to secure diverse sources of income. One farmer interviewed for this study said:

> *I think that financially, it would have scared me if she [his wife] had settled with me, except with cheese making. But just in dairy farming and as a couple, it is true I was scared … Also, she sees her parents on their farm, and it is not always easy, so she would rather work off-farm.*

As Ryschawy et al (2013) stated, it seems that farming systems attempt to protect themselves from change by diversifying and maximizing self-sufficiency. Only 3 farms in our 33-farm survey sample, and 13 farms in the 68-farm census data set, made a living exclusively as dairy farms without any added-value milk products or other revenue streams.

In the Vercors, there are thus tangible patterns of change in farm activities. There are also cases of continuity, including farmers who were unable to expand or preferred to continue pursuing only dairy farming, banking on complementary revenue or on growing in size and intensification. But there are also cases in which the weight of the older generation prevails; as one farmer said,

> *It is true they changed almost nothing on the farm since the son settled. Everything was done before. The parents always managed everything and still do.*

There is also a pattern of scaling back activities in an attempt to avoid entering the fully tax-liable tax bracket or pending retirement with no successor lined up.

Adaptability needs to be balanced with efficiency and livability. Indeed, maintaining quality of life and job satisfaction is a core consideration to ensure renewal of the farming population (Milestad et al 2012). Nonfamily associations appear to be a preferred way of maintaining dairy production in mountain areas, whereas elsewhere in France there is more reliance on wage labor (Madelrieux et al 2014). In the Vercors, integration of nonfamily members in farm associations is driven by the workload and the need to free up time for family or a wider social life and to share the burden of responsibility, which for many has become too heavy for a lone farm manager—even if the move to more collective management brings a new set of tensions. As a former employee, now in a nonfamily association, said:

> *It is all the same 2 worlds which are in confrontation. I continue to think on a wage basis; we work the hours, and if we can have time*

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off, we take it. But my partner lives on the family farm and it is all quite mixed. He works, but if he needs 2 hours during the week, he takes them, but then he makes up the time during the weekend. So it is hard, because these are 2 different ways of doing things.

Conclusion

This article explored the transformations under way in family dairy farms in a mountain region to better understand how farmers make decisions about their long-term development in order to stay in business. The case study was performed in the Vercors region of the French Alps. We found a reduction in the number of dairy farms but at the same time a heterogenization of family dairy farming systems. The traditional couple farming together, on a farm that produces only milk, and supplementing their income with off-farm employment in the tourism industry has become scarce. To envision the future for family dairy farming in the Vercors region, we have to consider other on-farm and nonfarm activities and the shifting composition of farm work groups. To maintain dairy production in mountain areas, we should think about the links between dairy farming and other economic activities at the regional scale, and about the effect on farmers of the shrinking of the family workforce—on the one hand to avoid isolation for farmers working alone, on the other hand to help the opening of dairy farms to nonfamily workers (in nonfamily association or as employees), which is not easy when farmers are used to functioning as a family unit.

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