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What evolutions for wage earners' work in farms after hiring? A case study in dairy farms in Auvergne, France

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Abstract: *Enlargement of farms in association with the decrease in the family workforce are inducing the development of permanent wage earners. In dairy farms, permanent wage earners have been recruited to carry out milking in particular. Studies show that human resource management practices can help farmers to retain wage earners in farms, but the authors do not take into account changes in wage earners' work over time. Our hypothesis is that dynamic aspects in work content are crucial for wage earners, because they give them some perspective and good reasons to stay. In this paper, we analyze the evolution of permanent wage earners' work in dairy farms according to a human resource management approach. Individual interviews were carried out with farmers and permanent wage earners who work in specialized or diversified dairy farms. Five pathways of evolution of wage earners' work were identified as well five variables and categories were identified to describe the pathways of evolution according to the assignment of tasks and versatility/specialization.*

Keywords*: Pathways of evolution, work, wage earner, dairy farm*

Introduction

Structural changes in livestock are impacting work conditions; farms become larger and more modern, inducing an increase in labor productivity (Dedieu and Servière, 2012). In the same time, even if the family workforce remains important, wage earners are becoming more common in family farms (Dufour and Giraud, 2012; Nettle, 2012; Chmieliński and Karwat-Woźniak, 2015; Pluvinage, 2015; Nowak and Kijek, 2016). In France, permanent wage earners are responsible for 17% of work in farms (AWU), they represent 16% of active agricultural population working in almost 67 000 farms (Agreste, 2015). Permanent wage earners are taking an increasing place in dairy farms to carry out milking, which requires a large, highly skilled and regular workforce (Porter, 1993; Stup et al., 2006).

However, farmers have some difficulties in managing wage earners in many aspects, such as difficulties in hiring, in delegating tasks and avoiding staff turnover. Agricultural advisors and researchers try to better understand these difficulties, to give advice and to develop tools, such as ensuring the successful integration of a wage earner in farm activities (Depoudent et al., 2011), or helping the farmer to prepare his replacement by a wage earner in some tasks (Frappat, 2006), or defining farmer practices to make a more attractive workplace (Nettle 2012). Certainly, these studies enabled some progress to be made, but frequently they are focused on the farmer, and not, or too little, on the wage earner and his work.

In management science, authors show that human resource management (HRM) practices contribute to retaining wage earners in farms and to improving farm profitability by improving the wage earners' work conditions (Porter, 1993; Stup et al., 2006; Nettle, 2012; Ullah and Zheng, 2014). One of HRM practices is the work organization of wage earners in farms by assignment of tasks according to the wage earners' profile and skills (Hutt and Hutt 1993; Porter, 1993). Assignment of tasks is an important action to decide and to organize the work at farm level and define the tasks that the wage earner has to carry out and his responsibilities (Hutt and Hutt, 1993; Vafaï and Anvar, 1998). Most tasks carried out by wage earners in dairy farms in France are milking in the first place, and then the feeding of animals and maintenance of farm equipment (Beguin, 2008). The profile and skills of the wage earner are strongly linked to the tasks he carries out (Everaere, 2008; Attia et al., 2012). Wage earners have different profiles in swine farms. For example, specialized wage earners carry out important technical tasks such as artificial insemination, some veterinary care and technical control of

animal production; versatile wage earners carry out routine tasks such as cleaning buildings and feed distribution (Depoudent et al., 2014).

Even if those studies describe the work of wage earners, they do not take into account the dynamic aspects of work, such as changes in the division of work, changes in the rhythm of work and how interactions at farm level make changes in work organization over time. As farms change, we assume that the work of permanent wage earners in dairy farms may change over time as well. Therefore, understanding the evolution of wage earners' work in the farm may contribute to defining strategies to avoid staff turnover and to face changes in dairy farms. Our aim is to produce knowledge about how permanent wage earners' work organization evolves in dairy farms after their recruitment, to identify different types of evolution and to identify the relevant variables to analyze these evolutions.

Material and methods

We adopted an inductive method to analyze the evolution of wage earners' work. We conducted a literature review and an exploratory study with 14 wage earners working in 8 dairy farms in the Center of France (Auvergne).

Data collection and data analysis

Our methodology was implemented in three steps. The first step concerned data collection and individual analyses carried out as follows: 1) individual interviews with eight farmers about farm trajectory, division of tasks over time, composition of teamwork, wage earner recruitment; 2) integral transcription of interviews; 3) interview codification with software Nvivo 10 to build a data base; 4) construction of farm pathway to have a chronological point of view of farm changes; 5) writing a monograph for each farm to identify variables that describe the evolution of task assignment.

The second step was based on a second interview with wage earners : 1) to complete data of the first interview about division of tasks and about changes between interviews, if any (farm, teamwork and division of tasks); 2) to identify changes in tasks carried out over time, reasons for these changes and their consequences on the work (routine, tasks carried out and rhythm of work); 3) integral transcription; 4) to identify complementary variables that describe assignment of tasks and versatility/specialization.

The third step concerned transversal analysis based on data collected during the two previous steps. We first identified some profiles based on a classification of tasks carried out by wage earners according to the three levels of system management defined by Brossier (2003): operational, tactical and strategic. The operational level concerns technical tasks to maintain the functioning of a dairy farm, like milking, feeding distribution and maintenance of farm equipment; the tactical level concerns technical tasks to adjust and plan the functioning at operational level, like veterinary care and identification of cows in heat; the strategic level concerns tasks that define and guide the characteristics of the dairy system over time, like selection of the characteristics of a breeding bull for reproduction. Then, we assigned each profile to categories defined by Everaere (2008): i) task specialist: the wage earner carries out one task; ii) job specialist: the wage earner carries out several tasks in one job; for example, the wage earner who only works with animal husbandry carrying out milking and feeding; iii) versatile worker: the wage earner carries out several tasks in different jobs, for example the wage earner who works with animal husbandry and vegetable production. Finally, we combined the previous steps to describe the diversity of the evolution of wage earners' work. The first list of variables and categories was constructed comparing the two most different monographs. This first list was progressively modified by comparison between other monographs. Variables and categories were identified and regrouped until the point where they describe noteworthy characteristics of pathway of evolution of wage earners' work. In a fourth step, we used a graphic representation (Bertin, 1977) to identify the different pathways of evolution of wage earners' work. We described different pathways obtained by using trigger events (Mendez, 2010) that promote changes in the pathways.

Description of wage earners and dairy systems

The sample of 14 wage earners is composed of 9 men and 5 women, from 22 to 50 years old. They were recruited between 1998 and 2014. The majority are full-time workers (n=7) working 40 h/week; 3

wage earners are full-time workers working in employer group (they work 15h/week in the sampled farms); 4 wage earners are part-time workers working 25 h/week.

The wage earners work in 8 dairy farms that are larger than the average in Auvergne, center of France, with 150 ha on average as against 62 ha in Auvergne (Agreste, 2012). The average number of dairy cows in our farm sample is twice that of the regional average (83 dairy cows as against 36 dairy cows in Auvergne) (Agreste, 2012), except for one (n°8), with 12 dairy cows, but with a large herd of 250 dairy goats (Table 1).

Table 1. Size of the eight farms of the sample in Auvergne.

Farm	Production	Farm size (ha)	Number of dairy cows	Number of wage earners
1	Milk	80	50	1
2	Milk	115	80	1
3	Milk	140	90	1
4	Milk and cereal	260	130	1
5	Milk	102	80	1
6	Milk and cheese	115	60	2
7	Milk and cheese	110	160	3
8	Milk, cheese (cow and goat) and cereal	292	12	4

Results

Assignment of tasks to wage earners

We identified an important difference in tasks carried out by wage earners at recruitment and the tasks carried out since their recruitment. The tasks carried out by wage earners at recruitment are milking (Milkg), cheese production (CheeP), feed distribution (FeeD), manure spreading (ManSp), grassland maintenance (GrassM), silage (Sil), haymaking (Haym), harvesting (Harv) and maintenance of farm equipment (EquipM). All these tasks are linked to the operational level of the dairy system.

Over time, more tasks are carried out by some wage earners: declaration of birth calves (SBCal), support to calving (SCalv), support to artificial insemination (SAI), declaration of insemination (StIn), simple veterinary care (SVetC), identification of cows on heat (ICowH) and selection of breeding bull (SBull). All these new tasks are linked with the tactical level of the dairy system, except selection of breeding bull which is linked to the strategy level of the dairy system (Figure *1*).

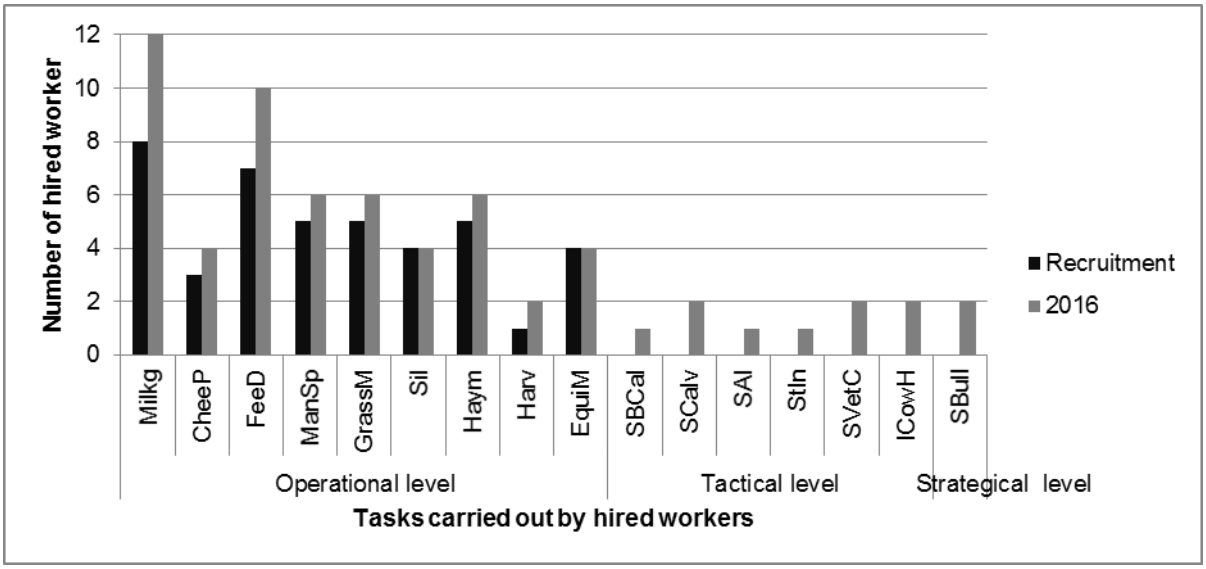

Figure 1. Differences between tasks and number of tasks carried out by hired workers at recruitment and currently.

We observe both quantitative and qualitative changes in the tasks carried out by wage earners since

recruitment. The quantitative change is about the “number of tasks carried out”, indicating the evolution of the quantity of tasks assigned to a wage earner since his recruitment. The results show that 11 wage earners carried out more tasks over time and only 3 wage earners carried out the same number of tasks since their recruitment. Therefore, assignment of more and more tasks to the wage earner is a common decision for farmers, especially for milking and feed distribution at operational level.

The qualitative change concerned the upgrade in the level of tasks carried out. Thus, the “nature of tasks carried out”, indicates the evolution of the type of tasks carried out by wage earners since their recruitment. Three categories were identified: 1) increasing tasks of execution and responsibility – this concerns tasks at operational level and tactical level or concerns all levels of the dairy system; 2) increasing tasks of execution – this concerns tasks at operational level; 3) stable – there is no change in the nature of tasks carried out. Five wage earners are in the first category; two of them carry out tasks at all levels of the dairy system and three wage earners carry out tasks at operational and tactical levels. The other wage earners are distributed between the second category (n=6) and the third category (n=3) (Figure 2).

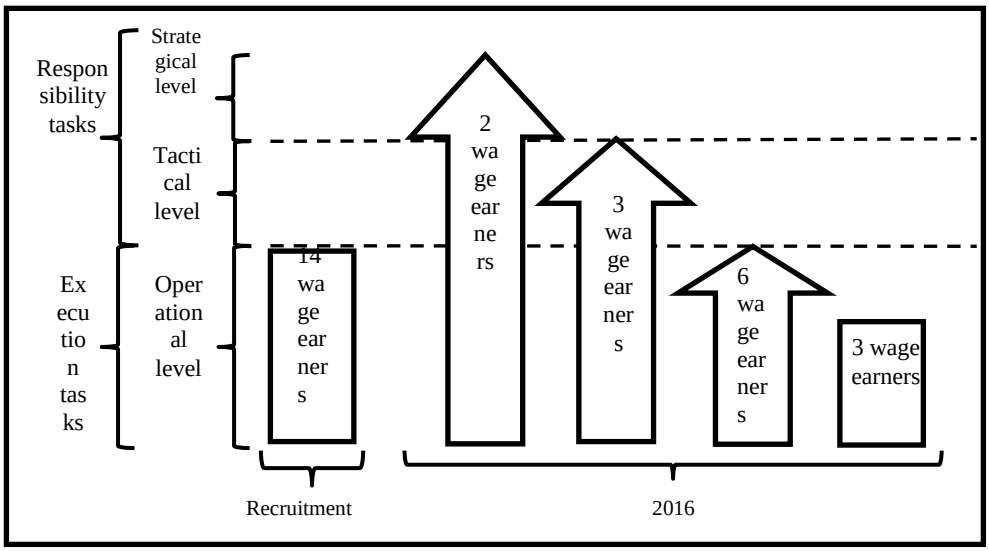

Figure 2. Differences between the nature of tasks carried out by wage earners at recruitment and currently.

Three categories were identified concerning “frequency of tasks’ execution”: 1) increasing daily tasks – with more tasks carried out every day, like milking or identification of cows on heat; 2) increasing regular tasks – with more tasks carried out systematically according to regular periods except daily tasks, like milking every week-end or haymaking every summer; 3) increasing occasional tasks with more rarely tasks carried out by the wage earner, the case of wage earners who usually do not do the milking, but sometimes they can do. Almost half of the wage earners have carried out more daily tasks (n=6), the other wage earners have carried out more regular tasks (n=4) or occasional tasks (n=4).

Wage earner profile: between specialization and versatility

Versatility/specialization is the second dimension to analyze the evolution of wage earners’ work. We have identified two variables linked to this dimension. The first variable, “variation between tasks carried out”, shows the evolution of the level of work assignment since recruitment. Two categories were identified: 1) between jobs – the tasks carried out by wage earners belong to two jobs or more, like the wage earner who works with animal husbandry and vegetable production; he can carry out milking and harvesting; 2) intra job – the tasks carried out by a wage earner belong to one job, like the wage earner who works with animal husbandry; he can carry out milking and feeding. The distribution of wage earners between these two categories is almost equal; the first category has 8 wage earners and the second category has 6 wage earners.

The assignment of tasks determines the wage earners’ profile. We have identified three different profiles at recruitment. The first profile is a “task specialist”, in our sample 4 wage earners only carried out milking, thus they are milking specialists. The second profile is a “job specialist”, the majority of

wage earners of our sample have this profile at recruitment, 2 of them are animal husbandry technician, 3 wage earners are cheesemakers and 2 wage earners are agricultural equipment operators. The third profile is a “versatile worker”. Three wage earners in our sample have this profile; they carried out tasks that belong to an animal husbandry technician and an agricultural equipment operator.

Over time, the wage earner’s profile has changed. The “task specialist” profile has disappeared, however the number of animal husbandry technicians increased to “job specialist” profile. The “versatility” profile has the most important increase over time (*Figure 3*).

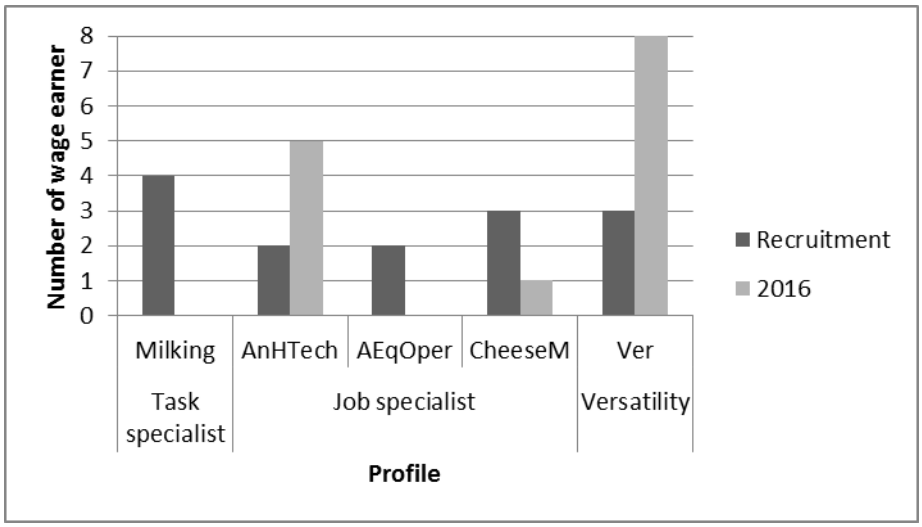

Figure 3. Changes in wage earners' profile between recruitment and currently.

Changes in wage earners’ profile have been constructed over time as described for the second variable, “evolution of job”. This variable qualifies the change in wage earner job profile after recruitment. Three categories were identified: suddenly, progressive and stable. For the first category, “suddenly”, the wage earner starts to carry out tasks that he does not expect to do because these tasks are incompatible with his job profile at recruitment. This is the case of six wage earners. Two of them were recruited to carry out tasks as agricultural machine operator, but over time they started to do milking and feed distribution, which are tasks of an animal husbandry technician. Two wage earners were recruited as cheesemakers; over time, one wage earner started to sell cheese in the local market; this is a task linked to commercialization. The other wage earner started to milk, a task of an animal husbandry technician. One wage earner was recruited as a versatile worker to carry out tasks as agricultural equipment operator and animal husbandry technician. Over time he started to carry out tasks as a cheesemaker. Thus, his versatility was improved because he carries out tasks in three jobs. One wage earner was recruited to milking, but throughout time he started do carry out tasks in two different jobs, agricultural equipment operator and animal husbandry technician. For the second category, “progressive”, tasks that the wage earner started to carry out after his recruitment belong to the same job. This is the case of 5 wage earners; three of them carried out milking at recruitment and over time carried out simple veterinary care and identified cows on heat, tasks carried out by an animal husbandry technician. The others were recruited as versatile workers to carry out tasks as agricultural equipment operator and animal husbandry technician. Over time the number of tasks carried out in both jobs increased the versatility of these wage earners. For the third category, stable, there is no change in tasks assigned and no change of job profile (Table 2).

Table 3. Summary of identified variables per dimension, categories and number of wage earners per category.

Dimensions	Variables	Categories	Number of wage earner/ category
Assignment of tasks	Number of tasks carried out	1-Increasing number of tasks	11
		2-Stable	3
	Nature of tasks carried out	1-Increasing execution tasks and responsibility tasks	5
		2-Increasing execution tasks	6
		3-Stable	3
	Frequency of tasks' execution	1-Increasing daily tasks	6
		2-Increasing regular tasks	4
		3-Increasing occasionally tasks	4
Versatility/ specialization	Variation between task carry out	1-Between jobs	8
		2-Intra job	6
	Evolution of job	1- Suddenly	6
		2- Progressive	5
		3-Stable	3

Synthesis: 5 pathways of evolution of wage earners' work

Five pathways of evolution of wage earners' work were identified (Table 3). The three variables that most distinguish the pathways are: number of tasks carried out, variation of task assignment and nature of tasks carried out.

Table 4. Illustration of 5 pathways of evolution of wage earners' work according to the combination of 14 wage earners (lines) and 5 variables (column), each category describes changes in wage earners' work since recruitment (one color represents one category per variable).

Type of pathway	Wage earner	Number of tasks carried out	Variation of task assignment	Evolution of job	Nature of tasks carried out	Frequency of task execution
The wage earner becoming a farmer	4	1	1	1	1	2
	8	1	1	1	1	2
The executor that can do occasional replacement	14	1	1	1	2	3
	9	1	1	1	2	3
	1	1	1	1	2	3
	2	1	1	1	2	3
The versatile worker to regular replacement	3	1	1	2	2	2
	5	1	1	2	2	2
Becoming a high-skill technician	6	1	2	2	1	1
	7	1	2	2	1	1
	10	1	2	2	1	1
Staying an executor	11	2	2	3	3	1
	12	2	2	3	3	1
	13	2	2	3	3	1

The wage earner becoming a farmer: two wage earners are concerned by this pathway that characterizes an increase in versatility with tasks carried out on the three levels of dairy system (operational, tactical, strategic). Most tasks carried out are execution tasks on an operational level and responsibility tasks on a technical level such as milking, feed distribution, spreading manure, hay making, simple veterinary care and identification of cows in heat. The objective is to maintain the operational level running and to adjust or regulate how the operational level runs. However, the wage earner started to carry out some responsibility tasks on a strategic level, such as choosing the breeding bull. One wage earner was recruited as a versatile worker and became a farmer. The other wage earner was recruited to milking, but he evolved to versatile worker and is a potential candidate to become a farmer in the farm where he currently works. This pathway represents the increasing accountability of the wage earner in the whole dairy farm.

The executor that can do occasional replacement: four wage earners were identified in this pathway that characterizes a transition from job specialist on the operational level to a versatile worker for occasional replacement. All the tasks carried out are execution tasks to maintain the operational level running. In daily work, the wage earner carried out several tasks on one kind of job, however he may carry out execution tasks of other workers in the case of an unexpected event or sickness. This is the case of four wage earners. Two of them were recruited to carry out tasks as agricultural equipment operator, like manure spreading, silage, haymaking, harvesting and maintaining farm equipment. Over time they can replace the farmer on milking. The other two wage earners were recruited as cheesemakers. One of them started to milk the cows with one of the two farmers and the other one started to sell cheese in the local market.

The versatile worker for regular replacement: two wage earners were identified in this pathway that represents the increase of versatility on the operational level to regular replacement. All the tasks carried out are execution tasks on the operational level to maintain the operational level running. In daily work, the wage earner carried out several tasks on different jobs, however he regularly carried out execution tasks of other workers. This pathway represents the increasing flexibility of wage earners' work that in its turn gives flexibility to the rhythm of teamwork. This is the case of two wage earners recruited as versatile workers to carry out tasks like feed distribution, spreading manure and harvesting. Over time they started to carry out milking with the farmer or another wage earner, especially on weekends, but during the week milking is a task carried out by the farmer or another wage earner.

Becoming a high-skill technician: three wage earners were identified in this pathway that represents the evolution of a task specialist at operational level to job specialist at operational and tactical levels for the accomplishment of daily tasks at both levels. The tasks carried out are execution tasks on the operational level to keep the operational level running, and responsibility tasks at tactical level to adjust or regulate how the operational level runs. This pathway represents the increase in technical accountability of the wage earner. The three wage earners identified in this pathway were recruited to carry out milking. Over time, they carried out other tasks such as feed distribution, identification of cows in heat and simple veterinary care. Thus, they became animal husbandry technicians.

Staying an executor: three wage earners were identified in this pathway that represents the evolution of the stable pathway of a job specialist with several execution tasks at the operational level of a dairy system. The accountability of the wage earner is to carry out important daily tasks to keep the operational level running, such as milking or feed distribution. Their profile does not evolve because the number of tasks that they carry out is stable over time. The three wage earners identified in this pathway are full-time workers at the same farm. One of them is a cheesemaker and the others are animal husbandry technicians.

For all the pathways, the time of permanence in the farm after recruitment is not an explicative factor of stability or changes in pathways. We observed a wage earner in the "staying an executor" pathway who has worked for 5 years in the same farm; he has a stable pathway, he still carries out the same tasks as a cheesemaker. But a wage earner in the pathway "the wage earner becoming a farmer" who has worked for 1 year in the farm has significant changes in his pathway; he has started to carry out milking and currently he is a versatile worker who has carried out important tasks such as selection of breeding bull with the farmer.

Seven elements were identified as trigger events that explain wage earners' pathways (*Figure 4*). All the factors are linked with changes in different aspects of a dairy system. About structural changes, we identified two trigger events such as increase in herd size (Herd+) and increase in land (Land+). These events acted to change the pathways of six wage earners. Technical changes in a dairy farm also

contribute to changing the pathways; we identified two trigger events such as technical management (Tech Manag) and changes of equipment (Equip), each trigger event acted to change the pathway of one wage earner. Finally, changes in teamwork have promoted changes in pathways; we identified three trigger events: departure of worker (Team-), arrival of worker (Team+) and workers with health problems (Health); they changed the pathway of twelve wage earners. Sometimes trigger events can combine to promote changes. Trigger events acted in all wage earners' pathways, except in the case of the three wage earners on the executor pathway where no change was identified in the dairy farm.

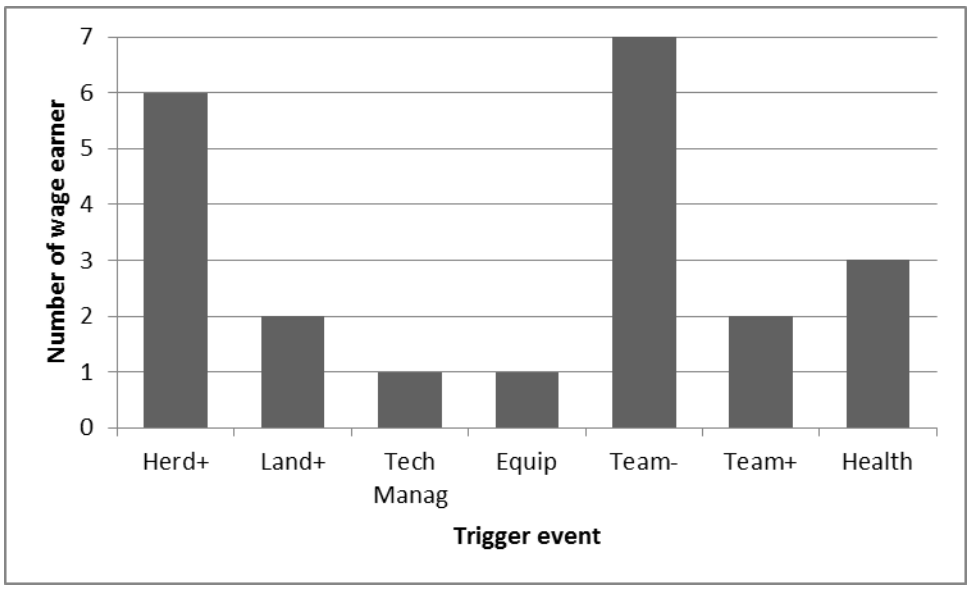

Figure 4. Types of trigger event identified.

Discussion and conclusion

Five pathways of evolution of permanent wage earners' work in dairy farms were identified by taking into account the human resource management approach in work organization; five noteworthy variables were identified to describe the pathways of evolution according to assignment of tasks and versatility/specialization. The specificities of our approach are the analysis of work organization in dairy farms by evolutional and individual perspective, highlighting changes in quantitative and qualitative characteristics of wage earners' work, as well the consequences of changes at dairy farm level in work at individual level. Most approaches and methodologies developed to analyze work organization in livestock systems highlight technical practices over a year to describe work organization at farm level (Dedieu et al., 1998; Madelrieux et al., 2009).

We have observed growing versatility of wage earners, which confirms that versatility of permanent wage earners in dairy farms is a profile wanted by farmers as shown by Dupré (2010). Three pathways represent the versatile wage earners. Two of them are "the executor that can do occasional replacement" and "the versatile worker to regular replacement". In both cases the versatility of a wage earner gives flexibility in teamwork organization to keep running the operational level of a dairy farm, which confirms that versatility is one strategy to improve flexibility in work organization (Mundler and Laurent, 2003). But the tasks to carry out replacement of farmers have to be simple and repetitive to facilitate the replacement, thus stimulating versatility only for replacement reasons has a negative effect on the development of high skills and competencies of wage earners (Everaere, 2008). The third pathway with increase in versatility is "the wage earner becoming a farmer". In this case, versatility is a way to train a wage earner and develop several technical and managerial skills in the entire dairy farm management. Our result accorded with the results of Madelrieux et al., (2009) about permanent wage earners with this profile who attempt to have their own farm in the future, and farmers test the permanent wage earner to become an associate farmer.

In the other way, we have observed two pathways of wage earner specialization. For "becoming a high-skill technician" pathway, specialization has been reinforced by a growth of technical responsibilities to monitor herd health and reproduction. However, Brasier et al. (2006) identified that

for some farmers there is no difference between the milker and animal husbandry technician profiles, while monitoring herd health and reproduction are complementary tasks of milkers. In the case of "staying an executor" pathway, the specialization has been retained by the stability of execution tasks such as milking and cheese-making.

Results show that to carry out several execution tasks to keep the operational level of the dairy farm running is the principal characteristic of three pathways: staying an executor, the executor that can do occasional replacement and versatile worker to regular replacement. Working for a long time in the same job with repetitive tasks and absence of responsibilities increases the dissatisfaction of wage earners with their work (Peltier et al., 2009). Dissatisfaction about work is one factor that stimulates staff turnover (Kossivi et al., 2016; Zhang, 2016).

We have identified different reasons for the evolution of wage earners' work linked to changes in dairy farms, such as structural changes (enlargement of herd and land), technical changes (technical management and equipment) and teamwork changes (arrival or departure of workers and health problems of workers). The perspectives are to identify how these changes in dairy farms induce the "direction" of evolution of wage earners' work between the pathways identified.

We can conclude that assignment of tasks and versatility/specialization are pertinent dimensions to better describe and understand the evolution of the work of permanent wage earners in changing dairy farms because they qualify the consequences of changes in wage earners' work and identify their role in teamwork. The perspective is to discuss those profiles with farmers and advisory services to validate them and to assess their usefulness for a reflexive process.

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