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Forms of work organisation in farms

Working conditions in large French dairy farm: differences and similarities between working groups

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Abstract: Dairy farms in France are growing and increasingly surpassing herds of 100 dairy cows. This trend of concentration is accompanied by an increase in labour productivity and a diversification in the composition of the workforce on these farms (individual farmers, worker-members, partners, employees). These major changes raise questions about the working conditions of livestock farmers on these dairy large farms, which are subject to various sources of tension due to a heavy workload and external risks and hazards, which can lead to a degraded working environment with high levels of stress and mental workload. However, the farmers are expecting decent working conditions and looking for a "life like any other". We consider the working conditions on these large dairy farms and formulate the hypothesis that there are specificities according to the different types of working groups. Surveys were carried out among 49 dairy farmers managing large dairy structures in France on their working conditions and their level of satisfaction with it. The working conditions were defined by work intensity (working time, hours, free time), work organisation (distribution of tasks and responsibilities, ease of replacement, communication within groups), physical and mental workload. The results show that working conditions differ according to the three types of working groups that we have defined, but that similarities also exist. The daily working hours and work rhythms are considered to be high or very high on most of the farms. The volume of work per worker is higher for farmers with few workforce available with also less free time. Large workforce farms with wage earners have higher work rhythms and mental workload than the two other types of working groups. Conversely, it is considered moderate to low by three-quarters of the type of large workforce collectives of associates. The results show that, overall, the dairy farmers are satisfied with their working conditions. This overall positive feeling may seem contradictory at first sight with some of the results showing high working hours and work rhythms. It must be qualified by the fact that it tends to be different between the types of working groups and that the working conditions within each type are very contrasted.

Keywords: *labor, dairy farm, workforce, working conditions*

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Introduction

Throughout Europe and the world, milk production tends to be concentrated on farms with increasing herd sizes. France is no exception to this trend. There has even been an acceleration of the phenomenon with a 56% drop in the number of dairy farms between 1996 and 2015, a phenomenon that has become more pronounced with the end of milk quotas in 2015. This decrease is accompanied by an enlargement of agricultural structures with a 40% increase in the size of dairy herds (Deyperot, 2017). This restructuring is leading to a rapid and continuous increase in the number and role of large farms (over 100 dairy cows) in the French dairy landscape. They represented about 3900 farms in 2012 and 7900 out of 58 800 dairy farms in 2017 (Madelrieux *et al.,* 2018).

This movement of concentration is accompanied by an increase in labour productivity (Depeyrot and Perrot, 2019) and a diversification of the forms of working groups, to cope with the increased work on these enlarged farms. The traditional model of family farming (individual or couple management), which is still the majority

one, is losing ground to a diversity of partnership forms (family partners or third parties to the family) and recourse to wage earners (Piet and Saint-Cyr 2018). In fact, the number of partnership forms has increased (+6% between 2010 and 2016, representing 36% of dairy farms). The number of wage earners is increasing: nearly one in three people working on a dairy farm is an employee (Depeyrot and Perrot 2019).
These major changes raise questions about the working conditions of farmers on these large farms (Kolstrup *et al.,* 2013; Madelrieux *et al.,* 2018). According to Kolstrup *et al.* (2013), dairy farmers are subject to various sources of stress related to high workloads and external hazards, which can lead to a degraded working environment with high levels of stress and mental workload. However, farmers expect proper working conditions and look for a "life like any other" (Servière *et al.,* 2019). If working conditions are a key element in the sustainability of these structures (Kolstrup *et al.,* 2013; Jacqueroud and Béguin, 2016), they can be different depending on the workforce composition of the working group (Hostiou *et al.*, 2014). However, since the end of milk quotas in 2015, few studies have examined working conditions on large dairy farms. The study presented in this article aims to understand and evaluate working conditions on large French dairy farms, according to different types of working groups, based on surveys of farmers. Indeed, we hypothesize that there are specificities in terms of working conditions specific to the different types of working groups. This study was carried out as part of the CasDar Orgue project, which aimed to study the conditions and methods of work organisation in these structures in order to understand the difficulties faced by dairy farmers and to identify possible levers to overcome them.

Material and methods

Framework to analyse farmers' working conditions

Working conditions in livestock farming system, when addressed, are most often studied with a narrow view focusing on employment (Dogliotti *et al.*, 2014) or labour productivity (Glesson *et al.*, 2008), without taking into account different components. Other studies focus on work duration with the aim to quantify the number of working hours (Cournut *et al.*, 2018), or analyse a set of work dimensions the sustainability of livestock dairy farms. For example, Lebacq *et al.* (2012) have defined working conditions by working time, workload (including pain), and workforce. Dumont and Baret (2017) identified nine dimensions to study vegetable producers' working conditions from socioeconomic and agronomic literature. Thus, working conditions cover several dimensions that also embrace diverse facets. In this study we consider working conditions as: work intensity (working time, hours, free time), work organisation (distribution of tasks and responsibilities, ease of replacement, communication within workforce member), physical and mental workload.

Study areas and choice of farms surveyed

Farms were selected from the three dairy regions of the Orgue project. They are contrasted and subject to different economic dynamics: the specialised lowland dairy systems in the Great West (following administrative regions: Brittany, Pays de Loire, Normandy), the specialised mountain dairy systems in the Massif Central area (Puy-de-Dôme and Aveyron counties) and the mixed crop-livestock systems in the Great East (Lorraine, Alsace region).
Farms were recruited according to three types of workforce composition within working groups identified during partners' meetings of Orgue project: small workforce collectives with high labour productivity (T1), large workforce collectives based on wage earner (T2), large workforce collectives with several partners (T3). A large dairy farm was defined in agreement with the project partners as having above 60 dairy

cows (DC) if there is only one labour unit and above 100 DC in other cases, with modulation in mountain areas where herd sizes are on average 30% smaller than in lowland areas.

Surveys of working conditions and data analysis

Two successive semi-directive surveys were carried out by agricultural advisers, partners of the project, among 49 farmers in the three types of working groups. The aim of these surveys was to collect a detailed description of the farms surveyed and information on the various dimensions of working conditions (intensity, organisation, physical and mental load, communication) using quantitative and qualitative indicators.

The quantitative indicators focused on:

1) The overall annual working time in the dairy workshop (cows and heifers). It includes the daily tasks related to the herd (milking, feeding, monitoring and care of the animals, clean/change the litter and pasture management), either the so-called "routine work" (RW), the tasks related to the forage areas (sowing, treatments, harvesting, etc.) or the so-called "seasonal work" (SW) as well as the other tasks of equipment and building maintenance, management and administrative work. This working time is calculated on the basis of an estimation by livestock farmers of the average weekly working hours of each member of the working group, modulated by periods of the year considered to be homogeneous in terms of labour and work to be done. The sum of the individual times per period, after deduction of holiday time, allows to obtain an annual working time for each member of the working group. The distribution of individual annual times between workshops when there are others (beef cattle, cash crops, on-farm processing, etc.) is based on fixing a percentage of time dedicated to the dairy workshop for each worker (between 0 and 100%). This percentage is determined by the farmer(s) with the support of the interviewer. A table summarizing who does what in terms of tasks at farm level is used as a support to objectify the estimate.

2) The routine work of the dairy cattle workshop. It is calculated according to the Work Assessment Method (Cournut *et al.* 2018) which has been adapted to the conditions of the survey. This routine work is composed of several tasks (milking, feeding cows, feeding calves and heifers, herd care, clean/change the litter, grazing management). The calculation is based on the reconstitution of an average daily duration for a typical week for each worker. Up to four homogeneous periods over the year were considered. The daily hourly working time previously evaluated is divided between the different routine tasks. Calculations are carried out in situ during the survey using an Excel calculator to facilitate consistency checks (possibility of going back and forth between the daily working time calculated from the start and end times of work breaks deducted and the addition of the times declared for each of the routine tasks).

3) The number of weekends and holidays declared by the farmer(s).

4) The ease of replacing labour in the event of unforeseen circumstances, using a score from one (very difficult) to four (very easy).

5) The degree of versatility/specialization of the members of the working group. It is assessed for each worker on the basis of the number of tasks he or she performs out of the total number of tasks (in %) and for the working group as a whole (average of individual results). The tasks taken into account are milking, monitoring the herd, feeding dairy cows, heifers management, calves management, clean/change the litter, pastures and grass crops management, fodder crops (and cash crops when there are any) management, maintaining equipment and farm management (administration). Versatility qualifies someone who has a variety of skills and can perform multiple functions.

The qualitative indicators relate to:
1) Livestock farmers' appreciation of the daily schedule, physical and mental workload according to three occurrences (low, moderate, high).
2) Farmers' satisfaction with several aspects of the work: working conditions during the "classic" week, during weekends and during the holidays of members of the working group, daily working hours, physical workload and the quality of daily exchanges between the members of the working group. The assessment is based on closed questions according to four occurrences (very dissatisfied, dissatisfied, satisfied, very satisfied) supplemented by free explanatory comments. Questions on workers' health also enabled the farmers' opinion to be gathered on the perceived (or not perceived) risks to physical and mental health, as well as the occurrence of occupational diseases within the working group over the last five years.
The surveys were entered into an online form creation and processing software (Lime Survey) which constituted the database. After homogenizing the data, statistical analyses were carried out on the quantitative data (means, standard deviation). Complementary thematic analyses on the different dimensions of working conditions were carried out and are compared with the level of satisfaction expressed by the breeders.

Results

Presentation of the sample

The characteristics of the 49 farms surveyed by type of working group are presented in table 1.

	T1 – Small Working group (16 exploitations)	**T2 – Great Working group with wage earners** (11 exploitations)	**T3 – Great Working group with associates** (22 exploitations)	**TOTAL** (49 exploitations)
Workforce and structure (average and standard deviation [...])				
ALU * total	2.3 [0,8]	5.0 [1,9]	5.0 [2,7]	4.1 [2,4]
ALU Farmers	1.5 [0,5]	1.4 [0,6]	3.8 [1,6]	2.5 [1,6]
ALU Wage Earners	0.4 [0,5]	3.4 [1,8]	0.7 [1,1]	1.2 [1,6]
ALU Voluntary	0.4 [0,5]	0.2 [0,4]	0.5 [0,5]	0.4 [0,5]
ALU Milk (% total ALU)	1.8 (78%) [0,7]	3.6 (72%) [1,8]	3.4 (72%) [1,6]	2.9 (71%) [1,6]
Milk production (L)	742 000 [261 000]	1 225 000 [613 000]	1 286 000 [437000]	1 086 000 [492 000]
Numbers of MC (Maxi)	92 (190) [37]	156 (264) [63]	153 (275) [44]	133 (275) [54]
AA (ha) (% MFA/AA)	134 (67%) [70]	191 (69%) [113]	270 (64%) [130]	208 (66%) [123]
Labour productivity (average and standard deviation [...])				
Milk/ALU Milk (L)	468 000 [260 000]	353 000 [156 000]	418 000 [169 000]	420 000 [204 000]
Nb. DC /ALU Milk	60 [38]	45 [15]	49 [16]	52 [26]
Milking equipment				
Nb. Epi-Rear Milking-Rotolactor-Milking Robot	6 – 1 – 3 - **6**	2 – 3 – 3 - 3	4 – **7** – 2 - **9**	12 - 11- 8 – 18
**1 ALU corresponds to a worker whose professional activity is 100% dedicated to farm work regardless of his weekly working hours. E.g.: 1 farm manager or employee working full time each represent 1 ALU. A half-time employee represents 0.5 ALU.*				

Table 1. Characteristics of farms according to the type of working group.

The T1 farms (16) are characterised by a small working group (< three annuel labour units (ALU)) and high labour productivity (60 DC/ALU dedicate to milk production). Half of the working groups are made up of a single head of farm and the other half of two heads (including two couples). Wage earners or apprentices account for more than 0.5 ALU on half of the farms. The presence of voluntary work is important on six farms. Milking robots and herringbone parlours are strongly present. Herd size ranges from 50 to 190 dairy cows (median to 78 dairy cows).
The T2 farms (11) are characterised by a large working group (5 ALU on average), where the weight of wage earners is the majority. There is little voluntary work. Seven farms are managed by a single farm manager and four by two partners. The number of people working on the farms varies from 3 to 12, with up to 7 wage earner LU for the largest groups. Labour productivity is lower than that of the other groups. Herd size ranges from 70 to 264 dairy cows (median at 156).
The T3 farms (22, *i.e.* 45% of the sample) include on average 5.1 ALU with 3 or 4 associates in 80% of cases. Four very large working groups with five to nine partners manage diversified farms (chickens, pigs, etc.) including a dairy workshop with more than 180 cows. Partners represent three-quarters of the workforce. Wage earners and apprentices are present on one farm out of two and significantly on three farms (from 2 to 3.7 ALU). There is little voluntary work. Labour productivity is close to average. Milking robot and rear milking are common. Herd size ranges from 80 to 275 dairy cows (median at 149).

Working conditions on the farms surveyed

Work Intensity

• Working time

The overall annual working time is close to 2700 hours per paid LU (including farmers and wage earners, excluding volunteers and trainees) with the lowest for T2 due to the high presence of wage earners whose weekly working time is limited by laws (table 2). The overall time per farmer's LU is close to 3000 hours per year with the highest amount of work for T1 farmers and the lowest for T3 farmers. The annual working time assigned to the dairy production of 7.5 hours per 1000 liters of milk presents on average few differences between the three types of working groups. The routine work (RW) per thousand liters is higher for T2 and lower for T1. It can be hypothesized that, faced with greater number of cows to be managed by ALU, T1 farmers are looking for a more efficient routine work. The milking robot, present in 38% of T1 farms, is one of the levers used to reduce RW. For all types of working groups, farms equipped with a milking robot have a significantly lower RW than those without robot (4.6 hours *vs* 5.6 hours per 1000 liters).

	T1 (16 exploitations)	**T2** (11 exploitations)	**T3** (22 exploitations)	**TOTAL** (49 exploitations)
Working time (average and standard deviation [...])				
Hours/year/ ALU remunerated	3041 [565]	2249 [347]	2664 [626]	2709 [619]
Hours/year/ALU farmers	3216 [519]	3029 [790]	2780 [619]	2984 [641]
Total hours / DC /year	61 [37]	54 [17]	60 [21]	59 [26]
Total hours /1000 L/year	7.5 [4,7]	7.3 [3.3]	7.5 [3.3]	7.5 [3.7]
Hours RW /1000 L/year	4.6 [2,0]	6.4 [3.1]	5.2 [2.2]	5.2 [2.4]

Tableau 2. Overall work time and routine work time (RW).

• Daily schedule and rhythm of work

The daily range of farmers' working days is high: more than 12 hours per day, including breaks during "normal" periods, *i.e.* 10.5 hours of effective work (table 3). The working hours are higher for T2 for both farm managers (12h30) and wage earners (10h). T2 farm managers frequently have to extend their working day to compensate for the shorter working day of their wage earners and/or act as a "buffer" in case of wage earners' absence (holidays, illness, etc.). In a third of the partnership, working hours vary between members for different reasons: health concerns of a member, age (member close to retirement), presence of "ancillary" activities to be managed (lodging, children), variable implications of members with herd and crops activities. These differences in the duration of the working hours do not seem to create tensions between partners if they are justified, accepted and assumed by all.
All types of working group taken together, the daily range of farmers 'working day of farms with milking robot is significantly lower than that of farms without a robot (11h10 *vs* 12h45) and 80% of farmers equipped with a milking robot say they are satisfied with this schedule.
Overall, the rhythm of work (defined as the sum of the periods of time spent performing a set of tasks within a defined time frame) is considered high/strong in two thirds of the evaluations. This intensity appears to be even higher for T2 farmers (89%) but less for farmers equipped with a milking robot (39%).

	T1 (16 exploitations)	**T2** (11 exploitations)	**T3** (22 exploitations)	**TOTAL** (49 exploitations)
Daily schedules (average)				
Farmers's daily schedule *(including break time)*	11h50 (1h33)	12h30 (1h34)	12h10 (1h45)	12h10 (1h40)
Wage earners's daily schedule *(including break time)*	9h50 (1h50)	10h (1h50)	9h35 (2h10)	9h45
Satisfaction / daily schedule (in number of farms and et percentage of farms per type)				
Satisfactory	10 (63%)	4 (36%)	14 (64%)	28 (61%)
Appreciation of work rhythm (nb. of farms and percentage of answers) *				
High/strong	9 (64%)	8 (89%)	12 (60%)	29 (66%)
**5 no answers*				

Table 3. Hourly amplitudes and farmers' satisfaction with working hours and appreciation of rhythm of work.

• Free time

On average, the farmers surveyed manage to take one weekend out of three and 10 days off per year (Table 4). The T1 groups logically have more difficulty taking time off (one weekend out of five) than the large groups in T2 and T3 (two weekends out of five). The length of holidays is also shorter for T1. However, there is a significant intra-type diversity: some T1 farmers manage to take up to 1 weekend out of 2 and T2 and T3 farmers up to 3 weekends out of 4. This ability to take time off is favoured by the size of the working group, the presence of wage earners (80% of the employers in the T1, T2 and T3 groups take more than 7 weekends a year compared to 66% of non-employers) but it also depends on the versatility of the members and the overall workload. The milking robot, if its management is shared, favours the taking of weekends thanks to its positive impact on the duration of milking. Conversely, a very (too) sophisticated technical management can be a brake on access to free time. Farmers who are dissatisfied with the frequency of their weekends are also dissatisfied with their holidays. Dissatisfaction with holidays relates both to the difficulties in taking them due to a lack of manpower to be replaced or

to difficulties in delegating work, but also to working conditions during the absence of a partner: "*During holidays (very short, less than a week), happy to see the other partner come back (because it's very hard to manage the herd alone) ".*

	T1 (16 exploitations)	**T2** (11 exploitations)	**T3** (22 exploitations)	**TOTAL** (49 exploitations)
Free time (average and standard deviation [...])				
Nb. WE free /year	10 [9]	19 [14]	20 [13]	16 [13]
Nb. days of WE free /years	18 [17]	33 [25]	29 [18]	26 [20]
Nb. days of holidays /year	7 [6]	11 [7]	12 [7]	10 [7]
Total free days /year	24 [17]	42 [23]	37 [22]	34 [23]

Table 4. Free time according to the 3 working groups.

Working organisation

• Distribution of tasks and responsibilities

The different types of working groups present a great diversity of organisational style based on different degrees of workers'versatility or specialisation. The greatest versatility is observed in T1 (60% of shared tasks) compared to T2 and T3 (45% of shared tasks) and is undoubtedly linked to the smaller size of the working group. Milking is the most task shared. It is carried out by 80% of the members of the T1 and T2 working groups and 65% for T3 (50% with robotised milking, 74% for the "non-robotised"). Involving as many people as possible in non-robotized milking is an important factor of equity between workers because of its weight in the work (45% of routine work) and its significant physical workload.
The least sharing of the milking is often linked to the presence of the milking robot. The slightest sharing of milking robot can have consequences on the collective's ability to manage unexpected absences and access to free time" *Stéphanie is the only one who knows how to use the robot well. The other two partners would not be able to manage in case of absence, they manage but it is risky and they don't know how to do everything, they are versatile except for the robot".* Other routine tasks are less shared than milking, with little difference between the three types of working groups.
The three main motivations expressed for the distribution of tasks (by taste, by skills or by the search for versatility and equality between workers) differ according to the types of working groups. Skills are put forward as the main motivation by T2 demonstrating the importance of the issue of skills and their acquisition by wage earners. T1 and T3 combine several different motivations with an attraction for certain tasks for T1, particularly among couples and family associations. The search for versatility and equality in the distribution of tasks and its implementation (everyone carries out all tasks with regular rotations) can be observed in several farms belonging to all three types, with positive consequences on working conditions, in particular on the ability to take time off and to manage unforeseen replacements. Overall, responsibilities are very little shared between farm managers and wage earners. Wage earners are delegated few responsibilities, except for a few T2 farms that employ employees in charge of activities (milk, cheese processing).
The lack of sharing responsibilities and decisions with wage earners seems to be a hindrance to good working conditions for T2 farmers (increased mental load). Situations vary greatly between partners, with, for example, responsibilities concentrated on a single leader, pairs of responsible persons for each task, or responsibilities distributed by workshop (herd, surface area, equipment, etc.). The mental load

is reduced when responsibilities are shared and the ability to take time off or to deal with "hard knocks" is enhanced by the presence of pairs of persons in charge. The organisation linked to the distribution of tasks and responsibilities is little discussed within the three types of working groups. Very often, it appears to be stabilized over time, or even fixed. However it is the subject of exchanges at key moments in the farm's trajectory: changes in the workers, starting up a milking robot, enlargement. Periodic reorganisation of work seems to be more frequent in T2 due to the presence of wage earners (turnover, motivation lever). Beyond the few global trends related to the types of working groups, we observe above all important differences in the choices (or sometimes "no choice") of sharing tasks and responsibilities, resulting from a plurality of factors: trajectory/history, work habits, motivations, people's status, links between stakeholders (family or not, hierarchical) and presence of technologies requiring the acquisition of specific skills (*e.g.* milking robots).

• Replacement facilities

Nearly 70% of farmers say they have thought about solutions to unexpected worker absences and this is even more important for T3 farms (77%) (Table 5). This is explained by the fact that many farmers have already been confronted with these situations (accident, illness, breach of contract by an wage earners or apprentice), which has led them to organize themselves differently.

	T1 (16 exploitations)	**T2** (11 exploitations)	**T3** (22 exploitations)	**TOTAL** (49 exploitations)
Anticipation of unscheduled absences (in number of farms and percentage of farms per type)				
Oui	10 (63%)	7 (64%)	17 (77%)	34 (69%)
Ease of replacement (number of farms)				
Easy to very easy	6	6	13	25
Difficult to very difficult	9	3	8	20
No answer	1	2	1	4

Table 5. Anticipation of absences and ease of replacement of farms.

In nearly one out of every two farms, the ease of replacement is considered difficult or very difficult. This proportion is logically higher for T1 and lower for T3 and T2. Several obstacles are mentioned, including, for example, the complexity of tasks related to manage and monitor the herd, the use of the milking robot and equipment or the management of the farm: "*Marie-Hélène's absence is difficult to replace because she has a very good technical mastery of monitoring milking robots and calves".* It is also difficult to find temporary labour, to access replacement service and skilled animal husbandry workers or to mobilize family members who are less and less available: "*To drive a tractor is no problem, but to follow a herd with a robot or simply to handle animals is not easy to find*". The time span and the heavy workload are also mentioned: "*To replace me you would need 2 or 3 people! It would be too expensive".* "*The distribution of tasks is difficult to reorganize. The workload is heavy and hiring someone is difficult to organize, you need someone who is versatile, straddling crops and animals".* Conversely several assets, sometimes combined together, are put forward to make it easier to replace oneself: a large collective, the versatility of workers, an organisation that facilitates the integration of new people, tools to facilitate the transfer of information, the simplicity of the system and equipment, the possibility to access to temporary labour, an insurance contract such as cowherd replacement insurance in the case of illness.

• Communication within working groups

The quality of daily exchanges and communication between the members of the working group is judged satisfactory by the farmers interviewed in almost all situations (86%). The tasks to be carried out are very often discussed during daily items (coffee break, milking, meals, etc.). Tools are used such as whiteboards/instruction boards (40% of the working group). The use of digital tools (software, smartphone application) encourages the sharing of information between all the members, generates time savings (limitation of meetings and unproductive time because everyone knows what they have to do), and reduces the mental load. Some T2 and T3 farms transmit information among workers via SMS or WhatsApp groups. T3 farms use a health book to notify and monitor the care acts to be done (cows to be treated or already under antibiotic treatment, etc.). The dissatisfactions expressed concern communication between partners and employees in one case (T1), between employees in two cases (T2 and T3) and between partners in three cases only (T3). The farmers mention tensions between people, a failing organisation (loss of efficiency because several people are on the same task, tension on the equipment or on activities due to a lack of prioritization), recurring technical errors not corrected, etc. due to communication deficits between members of the working group. A few farmers complain about a lack of systematic daily exchange time "*I would have liked to set up a daily meeting of a quarter of an hour, I have seen this in other farms and it works well but I have not succeeded. There is a generation gap that may explain"; "Improvements can be made with the employee on the instructions and the distribution of tasks".*

Physical and mental workload perceived

The physical load is perceived as "moderate to low" by two-thirds of farmers. This is even the case for nearly 80% of the farmers in T2 group. The presence of adapted equipment, which is frequent in these large herds, largely explains this feeling: "*I have designed everything so that I don't have to use force, I use the entire telescopic handler. Only the mulching of the calves is done by hand".* In the case of T1, the workload is a significant risk factor, even though the situations can be very different: some farmers do work alone on a daily basis, while others benefit sometimes from the frequent help of a retired parent. To better manage risks, T1 farmers cited facilities or equipment that aim to reduce manual labour and, as a result, reduce physical workload. The physical workload appears to be more moderate for farmers with a robot: only 6% esteem that they have a high level of physical workload compared to 44% for other farmers not equipped with a robot.
Mental workload is reported to be high/heavy by more farmers than physical strain (38%). This difference is more important for T2 farmers (56%) and to a lesser extent for T1 farmers (46%). This can be explained by a lesser sharing of responsibilities within the group and by the complexity of the job, especially for T2 farmers who have several employees to manage. The situation is much more favourable for T3 farmers (25%) who benefit from a sharing of responsibilities and decisions: "*The collective relies on 4 people, there is always one person to take over the others".*

Farmers' level of satisfaction with their working conditions

Only a quarter of all farmers express dissatisfaction with their working conditions. T3 Farmers express a better feeling than those in T1 and T2 (Figure 1). The T1 type shows a lower level of satisfaction due to a high working time and little free time. The T2 type has a good capacity to free up time (due to a large working group), but with a work rhythm considered high (farmers supplement their working hours with wage earners) and the highest mental load perceived (management of wage earners, often limited

sharing of responsibilities). The T3 type obtains the highest level of satisfaction thanks to the sharing of responsibilities and the size of the group, which makes it easier to take time off. However, for all types, the number of farmers dissatisfied with their working conditions during weekends and holidays is twice as high as those dissatisfied with working conditions during the conventional week (30% *vs.* 15% on average for all farms). The overall level of satisfaction of farmers and the number of days off per year are correlated (Figure 2), showing that freeing up time makes it easier to live his work. It can also be hypothesized that farmers who manage to free themselves more easily have implemented a work organisation that promotes good working conditions on a daily basis. The average length of the working day during the 'usual' period for farmers who are satisfied with their working conditions is in fact almost 1h30 less than that of dissatisfied farmers (11h42 *vs.* 13h06).

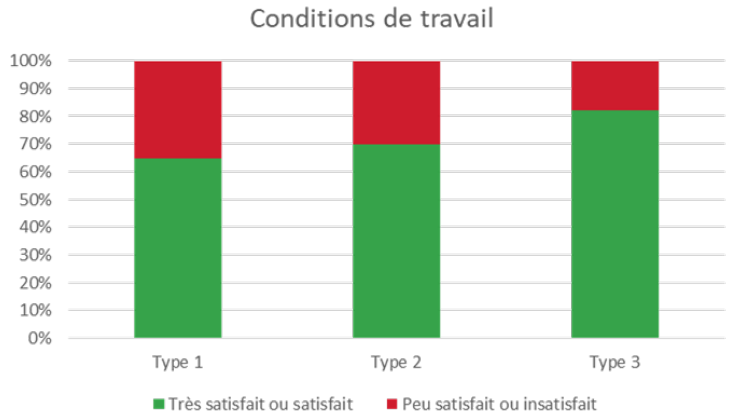

Figure 1: Farmers' level of satisfaction with their working conditions.

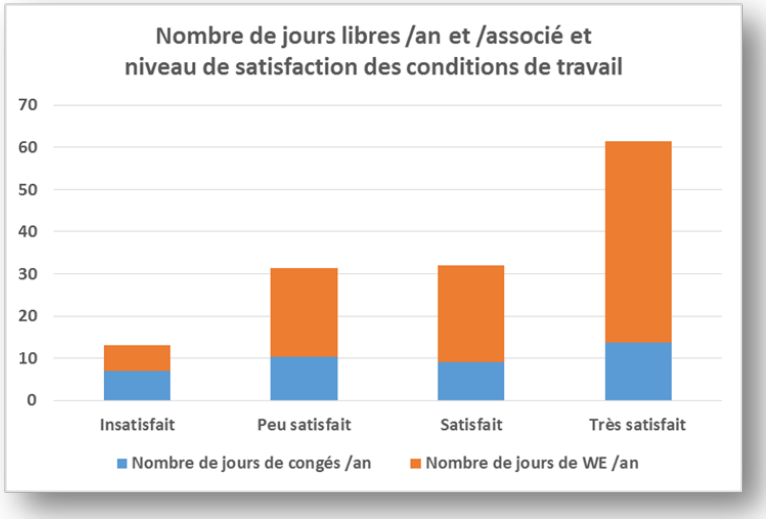

Figure 2. Link between satisfaction with working conditions and free time

Discussion and conclusion

Interests and limits of the approach

The study carried out in the Orgue project on the basis of two series of surveys of some fifty farms makes it possible to characterize and draw up a broad and quantified portrait of working conditions on large French dairy farms, a basis for comparison to other studies. It also makes it possible i) to confirm the hypothesis of specific working conditions for each of the three types of working group, and ii/ to produce useful results for farmers and their advisors by allowing them to be more attentive to the more specific issues and risks for each of the three types (*e.g.* mental burden for T2 farmers, workload and lack of free time for T1 farmers, lack of communication for T3 farmers). However, the analytical framework and its translation into indicators does not always allow to fully grasp working conditions and what is at stake in the working groups, especially because not all members partners and/or wage earners were surveyed. In fact, the way in which working conditions are viewed is individual, intimate and subjective, depending on the values and representations of each farmer (Kling-Eveillard *et al.* 2012). Some dimensions of working conditions deserve to be addressed, such as the representation of the profession (Dockès *et al.*, 2018) to better understand and support the transformations of these large dairy farms. We can also deplore the under-representation of the T2 group in the sample but which is currently emerging in France (Depeyrot and Perrot, 2019), in Europe and in the world as the US (Evink and Endres, 2017) and whose farms, which are still infrequent, have been difficult to recruit in our project. Furthermore, it is also likely that employees' working hours have been underestimated, particularly for the T2 group due to the results obtained. Indeed, a declarative method was used to collect information on working hours, and it was not possible to record wage earners' working hours in order not to increase the duration of the surveys. On the other hand, the average trends presented mask a high intra-type diversity (which we have tried to specify at times in the results). Working conditions are in fact very much linked to the individual or individuals in a working group (Dockès *et al.*, 2018). This diversity accounts for different choices in terms of equipment, workforce, delegation, etc. with more or less rapid expansion trajectories for which the impacts on work have been or not anticipated by the farmers.

Working conditions in the three types of working groups

The results show that large dairy farms are not a homogenous population but that working conditions differ according to the type of working group, even if similarities exist between the three types.

Overall working time is higher for farmers working in small working groups (T1) than in large working groups with employees (T2) or in associations (T3), which is confirmed by other studies (Cournut and Chauvat, 2012). Furthermore, farmers working in these small working groups face difficulties to take time off (few weekends and holidays) and their daily working hours are high in the absence of milking robot. Thus the large number of cows to be milked raises questions about the ability of milkers to maintain their health over the long term in the absence of milking robots.

The large farms with wage earners (T2) are marked by higher amplitudes and rhythm of work, higher than in the other two types. Farm managers often have to supplement the work of wage earners whose working hours are not flexible. This situation can be explained by the fact that these farms with wage earners are still marked by family management, where the farmer retains an important role in carrying out tasks compared to large dairy farms, for example in the USA, where the farmer is above all a manager (Evink and Endres, 2017).

Having free time is a particularly strong expectation among dairy farmers (Hostiou *et al.*, 2014). With one free weekend out of three and ten days off per year, farmers with large herds, particularly those working in large

working groups (T2, T3) are "privileged" compared to French dairy farmers as a whole, 43% of whom do not have access to more than two consecutive days off (Institut de l'Elevage, 2020).
Versatility to carry out the tasks seems quite common in all three types of working groups. However, the motivations for distributing tasks among workers differ. For T2, the question of skills, especially of employees, is central, which has already been highlighted by Malanski *et al.* (2019). For large dairy farms with wage earners, increasing wage earners' empowerment seems to be an important lever to reduce the mental pressure of the farm manager and facilitate replacements within the working group (Durst *et al.*, 2018). This model based on a large number of employees is recent in France and the recruitment and management of a pool of wage earners still does not always seem easy for farmers. Managerial capacities and access to salaried labour appear to be essential keys to success (Evink and Endres, 2017).
Mental workload is reported to be high to heavy by a large number of farmers, especially T1 and in particular T2. For T2, the intensity of work is not disconnected, as we have seen, from the workload linked to employment: physical, because it is necessary to be able to carry out the wage earner's work when he is not on the farm, and mental in relation to the organisation of work and wage earners turnover. This mental burden linked to management and employee turnover is also a cause of milk stoppage, as shown by the survey conducted on milk production stoppages on large farms (Madelrieux, 2020).
On the other hand, mental workload is judged to be moderate to low among 75% of T3 farmers, the majority group in the study.
The quality of day-to-day exchanges is judged to be satisfactory overall, regardless the type of group. However, few situations with tensions and/or imbalances between partners more or less well experienced are evoked for T3 farms linked to generational conflicts or differences in the involvement of partners in the running of the business.

Conclusion

The results of the ORGUE project surveys show that, overall, the dairy farmers surveyed are satisfied with their working conditions. This overall very positive feeling may seem *a priori* contradictory with some of the results showing high working hours, long working hours and mental workloads perceived. It must also be qualified by the fact that it tends to be quite different between the types of working groups and that a significant proportion of farmers face much less favourable working conditions. On the other hand, for each of the three types of working groups, there are producers who have chosen strategies and organisations that promote quality of life at work that can inspire other farmers. Surveys confirm the ongoing transformation of the dairy farmer's profession in France, which is increasingly part of an entrepreneurial logic requiring the acquisition of new skills, particularly managerial skills. This observation also raises questions about the attractiveness of large dairy farms to young people who are more sensitive than their elders to the work-life balance. Finally, the transferability of these farms is also questioned in view of the increase in capital levels per labour unit for T1 and T2 groups and the challenge of renewing partners for T3.

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