

Agroecological farming practices and French cattle farmers' working conditions

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Abstract: Concerns for the future of the French livestock sector are growing, amongst others due to the decline of people willing or able to become livestock farmers. Contributing to the decline in attractiveness of the profession are for example agricultural crises and difficult working conditions. In France, the transition to agroecological farming systems is seen as a solution to these problems. In addition, agroecology in its search for social sustainability should offer better working conditions to farmers, and thus contribute to a sustainable future for the livestock farming sector. The objectives of this study were; i) to understand whether expected changes in working conditions are taken into consideration when cattle farmers decide to adopt or not agroecological practices (AEP) and ii) to study AEP' impact on farmers' working conditions by testing and discussing the use of a multidimensional framework to study working conditions. The designed framework addresses 7 dimensions known to impact farmers' working conditions, namely 'time spent at work', 'health', 'work organization', availability of 'equipment' and 'skills', 'intrinsic benefits of work' and 'work related displeasure'. Twenty-two semi-structured interviews were conducted with certified organic and non-organic beef and dairy cattle farmers in the department Puy-de-Dôme (France) who had adopted AEP. Working conditions were taken into consideration by the majority of the farmers when deciding to adopt or not AEP, but were most often not the sole motivation. All farmers, experienced an impact of the adoption of AEP on their working conditions. Across farms, all dimensions were impacted, but not all on each farm. Moreover, depending on the individual situation, a certain dimension was improved in one farm but could deteriorate in another (e.g. the dimension 'time spent at work'). On a farm certain dimensions were improved (such as the 'intrinsic benefits of work' or 'health') whereas others were deteriorated (e.g. 'workload' or 'work organization'). This was another example showing the importance of a multidimensional framework to analyze interactions between dimensions affecting working conditions. Finally, we also recommend certain improvements of this version of the framework.

Keywords: agroecology; work; cattle farming; labor conditions

Acknowledgements: We would like to thank all the farmers that kindly offered us their time to share their experiences. This work is part of the LIFT ('Low-Input Farming and Territories – Integrating knowledge for improving ecosystem-based farming') project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 770747.

Introduction

Livestock farmers' working conditions today are difficult, despite improvements made due to the mechanization of their work (Dedieu *et al.*, 2019; Malanski *et al.*, 2019). Other aspects, such as an increased administrative workload, pressure from society or difficulties in maintaining the balance between professional and personal life are known to negatively influence farmers' health, welfare and/or quality of life at work today. Consequently, the difficult working conditions are leading to higher suicide rates amongst farmers compared to other professions (Hagen *et al.*, 2019; Midler *et al.*, 2019). The stakes are high for creating sustainable working conditions, as the livestock farming sector faces a loss of interest of people in becoming farmer (Servièrre *et al.*, 2019b). More generally, improving the environmental, economic and social sustainability of livestock farming systems is one of the challenges the sector is facing.

Putting in place the principles of agroecology (AE) is seen as a way to design sustainable farming and food systems (Gliessman, 2007). In France, the government has adopted in 2014 a law that aimed at promoting the economic, environmental and social performances of French agriculture by promoting the adoption of agroecological practices (AEP) and farming systems. At farm level, AE can be defined as a

set of agricultural practices privileging the biological interactions of the ecosystem with the objective to manage them in the most optimal way (Journal Officiel, 2015). Considering farmers working conditions, AE promises to be an opportunity to obtain an honourable and fulfilling employment (Gliessman, 2007). Moreover, a reduction of time spent at work can be a motivation to adopt certain agroecological farming systems (Lusson and Coquil, 2016). In contrast, in certain cases the time-consuming nature of AEP can lead to situations where farmers give up these practices (Aubron *et al.*, 2016; Delecourt *et al.*, 2019). Relatively few studies focus specifically on livestock farmers' working conditions in agroecological farming systems (Duval *et al.*, *in progress*). When "work" is part of sustainability analyses, most often, indicators of labour productivity are used providing thus, a very narrow view of farmers' working conditions. Indeed, working conditions are determined by multiple factors and farmers are obliged to make trade-offs between different dimensions contributing to their working conditions (Dumont and Baret, 2017). In addition, contrasting results can exist within dimensions contributing to working conditions. For example, Cournut *et al.* (2018) showed that the time spent at work can be highly variable across organic livestock farms.

The objectives of this study were; i) to understand whether expected changes in working conditions are taken into consideration when cattle farmers decide to adopt or not AEP and ii) to study AEP' impact on farmers' working conditions by testing and discussing the use of a multidimensional framework to study farmers' working conditions.

Material and methods

Study area and selection of interviewees

The animal production systems of the Massif Central are considered to be meeting the national objectives of the AE transition in France (Colas *et al.*, 2019). We considered it therefore a relevant area to study the impact of AEP on farmers' working conditions. For logistical reasons, we targeted farmers working in the Puy-de-Dôme (one of the administrative divisions of the Massif Central). The aim was to conduct interviews with both beef and cattle farmers, as they represent the main animal production types in the Puy-de-Dôme. We selected persons who had adopted or were considering adopting AEP enabling us to interview them on their motivation and possible impact on their working conditions. Therefore, local farmer groups known to be working on AE were contacted as well as a local organic farming association to identify farmers matching the above mentioned selection criteria.

A framework to study cattle farmers' working conditions

A multidimensional framework was used to question farmers on their working conditions, inspired by the framework designed by Dumont and Baret (2017). Five dimensions were retained, namely time at work, health, skills, intrinsic benefits of work and work-related discomfort (Table 1). Two dimensions were added as they can be of importance for work conditions in general, namely farm equipment and work organization (Cournut *et al.*, 2018).

Data collection and analysis

Face-to-face interviews were conducted with farmers (all were decision-makers on the farm). The interviews were conducted between May and July 2019 and lasted on average around 1.5 hours. In total 22 interviews were conducted (12 dairy farmers, 8 beef cattle farmers and 2 farmers with both a dairy and beef cattle herd). Eleven out of the 22 farms were certified organic. All farms, were integrated crop-livestock farms, except 4 farms that had a completely grass-based system.

Dimensions contributing to working conditions	Definition used
Time spent at work	The time spent doing all work-related tasks (including administrative work, marketing and sales activities), experienced workload. The balance between personal and professional life, including the possibilities to take days off and holidays.
Health	Presence of health problems (mental or physical) due to the work on the farm.
Skills	Possession of experience and skills to be able to conceive and execute tasks needed to be able to perform their work. Including, the access to new knowledge and training.
Intrinsic benefits	Pleasure derived from daily work, personal interest found in the work and perceived advantages found in work and working conditions.
Work-related displeasure	Unpleasant tasks in daily work, loss of interest in work, other negative aspects of the work.
Availability of equipment	Expressed need and accessibility of specialized equipment, if needed.
Work organization	Being able to organize and plan all work-related tasks in order to optimize the work schedule.

Table 1. A multidimensional framework to study cattle farmers' working conditions.

Different subjects were addressed in the following order during the interview. First farmers were asked to present their farm system and its development over the years. This was followed by a discussion using a closed questionnaire to identify the different components of the farm system (e.g. labor units, herd size, utilized agricultural areas) and the AEP implemented on the farm. Finally, using a semi-structured interview technique, farmers expressed themselves about their motivations to adopt AEP and consequences of their adoption on their working conditions.

Data concerning farmer' and farm' characteristics were organized in a spreadsheet (Microsoft Excel Version 2016, Microsoft Corporation, Redmond, USA) for descriptive analyses. The semi-structured interviews were recorded using a dictaphone, after asking the interviewees' written authorization. The interviews were transcribed (Transana, professional version 3.21) and relevant statements were coded with headings (Mindjet Mindmanager, 2019). The codes were compared across interviews to identify overarching themes, which were further organized in categories. Within these categories, similarities across interviews and contradictory experiences were sought to try to understand the diversity of the situations encountered. A mind-map was created with the different dimensions and new ones that emerged from the interviews, being illustrated by the most relevant verbatims.

Results

Farm characteristics and workforce composition

The average Total Utilised Agricultural Area was 120 hectares, ranging from a minimum of 50 and a maximum of 360 hectares. The workforce composition ranged from 1 to 4 full-time labor units, with on average 2 full-time labor units on the farms. The part of direct sale of farm products to consumers showed important differences across farms, varying from none to a 100%.

Farmers' perception on possibilities to improve working conditions

Within each subject of possible improvements to be made individuals' answers varied (Table 2). Reducing mental workload seemed to be the most important possible improvement to be made. The

other possibilities of improvement received a median score of 3 (neither agree, nor disagree) except for the reduction of the feeling of isolation which received a median score of 4 and seemed thus less important across persons interviewed. The interviewed farmers' worked on average 65,5 hours per week on their farm (min. 35; max. 85 hours) and took on average 0.9 weeks of holidays. Time spent working seemed not correlated to the individuals' appreciation of the necessity to improve their working conditions, since both persons with long as shorter working weeks agreed as well as disagreed with the necessity to improve their working conditions (data not shown).

	Answers to the question: "If it were possible, how would you improve the working conditions on the farm?" (scale; 1= strongly agree, 2 = somewhat agree, 3 neither agree nor disagree, 4 somewhat disagree, 5= strongly disagree)					
	<i>Reduce the workload in general</i>	<i>Reduce the intensity of work at certain times of the year</i>	<i>Reduce the level of physical work</i>	<i>Reduce mental workload</i>	<i>Reduce feeling of isolation due to on farm work</i>	<i>Total median score of all the answers</i>
Min.	1	1	1	1	1	2
Max.	5	4	4	4	5	4
Median	3	3	3	2	4	3

Table 2. Cattle farmers' perception of elements related to how their working conditions can be improved.

Farmers' motivations to adopt agroecological practices

Improving working conditions was rarely the sole motivation to adopt AEP (Table 3). Only two farmers expressed that their main motivation to change their farming practices was improving their health by stopping the use of chemical products and for one this was also related to the health of the consumers eating their farm products. For ten farmers, motivations were a combination of factors; besides economic reasoning, farmers drivers for change were related to what is important to them e.g. the protection of the environment, producing quality products, preserving human health, providing a positive image of their profession, a wish to improve their autonomy (financial, decision-making, etc.). In terms of improving working conditions, the most cited dimension that drove change were wishes to improve health, but in many cases several working dimensions were mentioned (improve work organization, reduce time spent, improve their pleasure at work). For nine farmers working conditions were not a motivation.

The consequences of adopting agroecological practices on working conditions

Relatively little change in sources of work-related displeasure or the use of equipment

Compared to other dimensions relatively fewer changes were experienced by farmers on the dimensions: 'work-related displeasure' and 'use of equipment' (Table 3). When work related displeasure was addressed, it was not related to AEP specifically, but related to cattle farming in general. Farmers talked for example about, the hard nature of the work or the need for a daily presence due to having animals. The use of equipment could be modified due to the adoption of AEP. Many farmers referred to adopting mechanical weeding, which required specific equipment. Having less equipment was also reported, for example, when abandoning corn silage production over a grass-based system. In addition, certain farmer tried to have a more efficient use of equipment.

Contrasting experiences in terms of time spent at work

Farmers experienced in different ways the impact of AEP on 'time spent at work' and reported situations of an increase, decrease or no overall change (Table 3). Various explanations were found for the contrasting situations. Certain farmers experienced a reduction due to abandoning certain practices on the herd or crops. Regarding the herd, it could be related to stopping systematic treatment of animals with veterinary drugs and focusing on preventing disease. F10: "... the time you spent doing, catching a cow that is ill, that has something, you lose more time doing curative [treatments Ed.] than working on prevention." Also at crop level, examples related to abandoning certain treatments are identified, such as stopping chemical weeding F14: "well eh we plough, we sow and finished. In springtime, if it is dirty we weed mechanically and it is finished, we wait for the harvest. With the corn it was the same, you have to sow but there are 1 or 2 treatments with weed killers, there is a treatment with fertilizers, there is..." Changes in forage crop choices were in several farms, directing forage systems towards more grass-based systems. Depending on the situation, it affected the time spent on interventions between sowing and harvesting as seen above, but also the time spent harvesting. In some cases, it led to a gain of time by simplifying the distribution of feed during winter, as it was no longer necessary to mix different types of feed.

Other farmers expressed that they spent more time because mechanical weeding takes more time than chemical weeding or new pasturing practices required more monitoring time. Although not specific to AE, but part of the farm system, direct sales activities were reported very time consuming by F4. Others expressed no notable changes in working time because abandoned practices are replaced by new ones or by time spent piloting the system.

From a simplification to complexification of work organization

Work organization was impacted in different ways across farms (Table 3). For some the situation improved, for others it seemed more complex or different and some experienced no change. Different explanations were given for improved situations. First, simplification of the system by adopting practices that require fewer interventions could simplify work organization. E.g., F15: "meslin simplifies things. In autumn when we go out of the field, we lock the gate and we only enter again in August." Second, the loss of certain problems or constraints also contributed to the improvement of work organization, e.g., improvement of herd or soil health contributed to having less non-anticipated problems. Third, at farm level, an improved financial valorisation of farm products also allowed certain farmers to have less cows per worker or offered the possibility to divide farm work in a different way amongst farm workers.

In contrast, certain farmers considered having more constraints in work planning as new working methods could impose stricter time-windows for intervening that were not always compatible with weather conditions.

A general feeling of improved health

Some farmers have experienced no change in their health. Most of the farmers expressed to have improved their health since adopting more AEP by the fact that they stopped using toxic chemical products such as fungicides and pesticides. One farmer also referred to the fact that a better valorisation of his farm products due to organic certification, allows him to have the financial means to acquire better performing equipment and improving his physical health. The farmers stated different reasons for mental

Farmer ID	Was the adoption of agroecological practices motivated by improvement of working conditions?			Impact of the adoption on the different working conditions (+ = improvement, -=degradation, 0=no impact)							
	No	Yes	And if yes, which work dimensions	Time spent at work	Health	Skills	Intrinsic benefits	Work-related displeasure	Availability of equipment	Work organization	Impact anticipated?
1	x			+	+	+	+	+	-	+	No
2	x	x	Organization of work, health	+	+	+	+	+	0	+	Not on all dimensions
4	x			-	0	+	+	0	0	Different	Not on all dimensions
5		x	Health	+	+	+	+	0	+	+	No
7	x			0	+	+	+	-	+	-	Yes
8		x	Health, time spent	+	+	+	+	+	+	+ / -	*
10	x	x	Health, intrinsic benefits	+	+	+	+	0	0	0	No
11	x	x	Health, time spent	+	+	+	+	0	+	+	Not on all dimensions
12			No changes: the farm system has always been agroecological	+	0	+	+	+	0	Different	Yes
13	x			-	0	+	+	0	0	Different	No
14	x			+	+	+	+	0	+	Different	Yes
15	x	x	Health	-	0	+	+	0	+	-	Not on all dimensions
17	x			-	0	+	+	+	0		No
18	x			0	0	+	+	+	0	Different	No
19	x	x	Health, intrinsic benefits	-	+	+	+	+	+	0	Not on all dimensions
20	x			0	+	+	+	0	0	0	No
22	x			0	0	+	0	0	+	-	No
23	x	x	Health	0	+	+	+	0	0	+	No
24	x	x	Intrinsic benefits	0	+	+	+	0	0	0	No
25	x	x	Health, intrinsic benefits	0	+	+	+	0	0	0	No
26	x	x	Health	-	+	+	+	0	0	0	No
27	x	x	Time spent, intrinsic benefits	+	+	+	+	0	+	0	Not on all dimensions

* = not discussed during the interview

Table 3. The role of working conditions in the adoption of agroecological practices and their impact on cattle farmers' working conditions.

health improvement, including stopping the use of chemical products by contributing to an improved state of mind of farmers. This could be related to feeling less stressed as toxic products did not have to be handled anymore, but also by being in harmony with personal values in terms of protecting the environment or producing safe food. F7: “when I work with homeopathy or herbal medicine [...] and when we have good fodder than, we feel well, mentally better...”. Reaching personal objectives such as regaining autonomy in the decision-making on the farm also contributed for some farmers explicitly to mental health F10: “Today, we produce the feed that we give to our cows, so we ask ourselves what we are going to sow for the cows. That is, that I find that really good. The other day I read in the press “we found again our farmers’ common sense”, I love that phrase (laughs)! And, to my opinion it goes with health!”. Farmers felt that their farm system is now more secure contributing to a better mental health, for example by improving animal feed quality or quantity and/or had less herd health problems.

In contrast, some farmers having the feeling that they do not fully master certain elements of their farm system expressed a certain stress F27: “yes there are more observations to be made, more stress, more anxiety. Yes, since it is new and we do not have yet the experience, we do not know the result so that is sometimes very complicated.”

Enriching experiences in terms of skills acquisition and experimenting

All farmers reported to have increased their skills in relation to the adoption of AEP, related to the acquisition of skills obtained in areas/topics that they previously were unfamiliar with, e.g. osteopathy for animals or new crop varieties. In some cases, farmers referred to skills that are more general, such as being able to test new things, learn from these experiences and continuously adapt their system F8: “*You have to have the means to question yourself. It is like you at school, later, it is about listening to your professor and then adapt it eh to a specific case. It is not easy. You have to search for information and then select (...) yes that is part of “skills”, but these are skills and adaptability.*”

Piloting the farm system

Even though beforehand farmers’ ability to pilot the farm system was not specifically identified as a specific item, it was raised spontaneously by farmers and identified across different interviews. The topic emerged in relation to different dimensions related to working conditions such as work time, work organization, situations of stress. Or, in contrast, it was seen as contributing to the acquisition of skills, intrinsic benefits of work or a simplification of work organization.

The interviews provided insight into how the nature and the collection of information used to pilot an AE system can change when adopting AEP. Many farmers reported on the importance of doing more and more frequent observations. E.g., F20: “We have to follow more closely our meadows and cereals, we have to pay more attention. Before we did not ask ourselves that many questions, we just looked at colleagues, when they sowed, we sowed around the same time.” A farmer reported also the importance of recording everything in relation to experiments he conducted. In addition, examples of a changed decision-making processes arose showing that not only the nature of the information used changes but also the interpretation and temporal nature of decision-making. First, different examples were identified in which time-windows to intervene on land or animals are shorter than before. E.g. F1: “well, you have to do it a certain day, and you have to observe a lot more, you have to go more regularly in the fields.(...) you have to do some mechanical things [refers to mechanical weeding Ed.] and it has to be at a very specific moment in time, you cannot say I will do it tomorrow...” Another

example showed contrasting experiences, referring to the feeling of a simplified organization: F5: “pfff, well eh the right time to do things..., when you had to weed or spread fertilizer, well eh, if it was too early or too late eh...now it is the weather that rules and if it's a bit late it doesn't matter.” Secondly, the temporal nature of the decision-making process changes. Certain farmers gave examples on how adopting AEP requires long-term thinking and new objectives. F19 :“(...) but they [the parasites Ed.] are useful. Controlled parasitism stimulates the immune system. If the cows are in contact with the parasites, their immune system is awake it is functioning. If it is never stimulated we render our animals more fragile”. Decision-making processes required taking into account multiple parameters and an individual analysis of each situation instead of applying always the same solution. Or as expressed by F7: “We always noticed that it was necessary to pay attention to a lot of things, that it was not that simple. It is not mathematical.” For some this change can be a source of stress, as presented earlier. For others experimenting, learning and changing contributed positively to their working conditions, being a source of pleasure in their work.

The more rewarding nature of work

All farmers, except 2 with whom the topic was not addressed, identified intrinsic benefits of the adoption of AEP. These benefits are of different nature, but are all related to rewards farmers find in their work. Stopping certain tasks considered as unpleasant or acquiring pleasant task contributes to this, but rewards farmers find in their work go beyond that. As F19 expressed “well, our way of thinking is in line with our way of working” and can thus be related to individual values that farmers carry. Adopting AEP required new skills and knowledge. The rewarding nature of work was therefore also related to farmers' personalities and their relation to learning, experimenting and progressing. F15: “well I find that what I like the most every day is that we have a profession in which we have to question ourselves, you have to find alternatives and that is interesting, it is a technician's job. A number of farmers found it very gratifying to succeed in producing and obtaining satisfying results without using chemical inputs, not only from a financial point of view. In addition, in some cases, this also contributes to becoming more autonomous in the decision-making on their farm which in itself was seen as a source of pleasure, as expressed by F25: “What is nice is to take back control of your job. Facing all these salespeople, whom I find annoying. It is nice to be able to say; I do not need you”. Other sources of pleasure were; improved financial or animal health situation, being able to spend more time with their animals, a more interesting nature of their relationships with consumers, being proud of the quality of products produced and/or contributing to a positive image of livestock production.

Multiple interactions between dimensions contributing to farmers' working conditions

Different dimensions contributing to farmers working conditions were affected by the adoption of AEP (Figure 1). The dimensions affected and how they contributed to working conditions were farmer and farm specific. It seemed dependant of a combination of factors: the farmers' individual characteristics (e.g. objectives, values, personality), the existing farm system and the time since the adoption of AEP. All farmers discussing the impact of AEP on their working conditions, except two, have stated that the impact on there working conditions were not at all or not fully anticipated (Table 3).

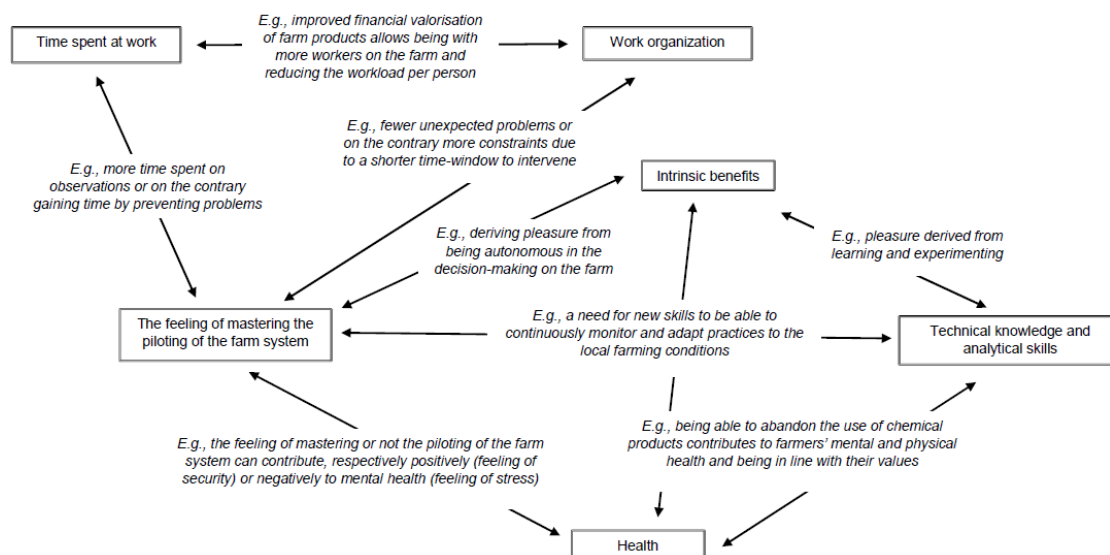


Figure 1. Interactions between dimensions contributing to working conditions specifically related to changes when adoption agroecological practices, as expressed by cattle farmers across interviews.

Discussion

Although working conditions were not always at the center of the decision-making whether to adopt or not AEP, all of the interviewed farmers' working conditions were in some way impacted. Interestingly, the dimensions that were improved in most cases, such as 'intrinsic benefits' or 'health' were also often cited as motivating factors in the adoption of AEP. Other dimensions were not always improved, such as 'time spent' as seen in other studies (e.g. Bendahan et al., 2018; Cournut et al., 2018b; Lusson and Coquil, 2016). Factors explaining contrasting findings between farms need further research, e.g. farmers' own attitude or objectives in terms of working conditions and the time since the start of adopting new practices, also the type and combination of adopted AEP, and general farm characteristics affecting working conditions. This calls thus for systemic approaches combining agronomic and social sciences (Coquil et al., 2018).

The tested framework to study livestock farmers' working conditions allowed a comprehensive understanding, from farmers' point of view, on how working conditions are constituted. Compared to other approaches, the tested framework does not allow to quantify changes in working conditions or typologies for comparison between farm systems as can be proposed by certain approaches of farm work (Cournut et al., 2018a; Hostiou and Dedieu, 2012). Nor does it allow a detailed understanding of farmers' activity (Guérin et al., 2006). However, it allows to show that farmers make trade-offs between different dimensions (Dumont and Baret, 2017). Moreover, the framework permits showing relations and interconnectedness between dimensions. Understanding these interrelationships might be useful when looking for solutions to improve working conditions in order to activate or develop the right levers for change. The fact that most often changes in working conditions were not anticipated and of singular nature calls for a tailor-made accompaniment of changes in work during AE transitions of farms as proposed by Coquil et al. (2018).

Possible areas for improvement of the framework itself were identified. First, the different nature of intrinsic benefits of work suggests that it is a too broad subject. However, it triggered discussions

addressing dimensions that were a priori not taken into account relating to for example job insecurity or political dimensions of work when farmers' talked about their valorization of their farm products (Dumont and Baret, 2017). Others dimensions are also of importance such as their ties to their territory or patrimony (Servière et al., 2019a). In addition, some dimensions seemed less important than anticipated, such as 'equipment', which seemed to be more a lever for change rather than affecting working conditions. In contrast, other dimensions were possibly underexposed. Mental workload for example was considered as an important point with room for improvement by farmers, but was not often evoked spontaneously during interviews when discussing health. It would be interesting to consult farmers on their understanding of mental workload, its causes and how they connect it to health.

Conclusion

Working conditions can be part of farmers' decision-making to adopt AEP. All cattle farmers' working conditions were impacted by the adoption of AEP, however they were rarely fully anticipated. The impact of AEP were dependent of the individual situation and trade-off seemed to be made by farmers between dimensions contributing to working conditions. The multifactorial nature of the framework used to study working conditions provided a comprehensive understanding of how working conditions are constituted from a farmers' point of view. In addition, it illustrates interactions between dimensions of work and their interconnectedness.

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