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Designing a multicriteria index to assess on-farm working conditions to maintain farms in mountain areas

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Abstract. Grass-based dairy farming systems located in mountain areas and complying with Protected Designation of Origin specifications provide multiple services to these territories. However, the number of dairy farms has decreased since the 80s. Consequently, there is a need to assess the sustainability of these farms. As on-farm working conditions are a major issue of the sustainability of farms, this study aims to develop a tool to assess on-farm working condition (FWC) on a farm scale to detect possible leeway to improve sustainability of dairy farms and to maintain milk production in the mountains. To design a relevant and meaningful tool for the target users –the farmers– relying on a pertinent and exhaustive overview of working conditions of the PDO dairy systems, a participatory approach has been chosen. First, a focus-group, including farmers, advisors and researchers, defined criteria covering the different aspects of working conditions. Then, they selected or created appropriate indicators out of a list of possible existing indicators. Afterwards, the index was built by weighting indicators and criteria. This process results in an index made up of 5 criteria described by 40 indicators with original criteria compared to former index such as mental dimension of work. The index will be further tested on dairy farms. This index, designed by and for the farmers will be implemented on a large number of PDO dairy farms to obtain more insight on their FWC and to help advisors to support farmers to improve their FWC and their sustainability.

Keywords. Working conditions – Multicriteria assessment – Participatory approach – Grass-based dairy systems – PDO cheese systems – Mountain area.

Co-construction d'un index multicritère sur les conditions de travail de l'exploitation agricole pour améliorer l'évaluation de la durabilité : cas des systèmes laitiers de montagne adhérant à une AOP fromagère

Résumé. *Malgré les services rendus par les systèmes laitiers situés en montagne et adhérant à une AOP, ces derniers tendent à diminuer. Il y a donc un besoin d'évaluer leur durabilité, et plus particulièrement leur durabilité liée aux conditions de travail, considérée comme étant un point critique de ces systèmes. Dans le but de construire un index le plus exhaustif et le plus pertinent possible pour les futurs utilisateurs, que sont les éleveurs, une démarche participative a été choisie. Un focus-group a été ainsi constitué comprenant des éleveurs, des conseillers et des chercheurs afin de sélectionner et/ou créer des indicateurs pertinents. Les focus-group ont permis d'aboutir à un index comprenant 5 critères regroupant 40 indicateurs.*

Mots-clés. *Condition de travail – Évaluation multicritère – Approche participative – Système laitier herbager – Système AOP fromager – Montagne.*

I – Introduction

Since the 1950s, mountain areas have to cope with a continuous reduction or abandonment of agriculture (García-Martínez *et al*., 2009), even higher than the general decrease in the number of dairy farms in France. Grass-based dairy farms located in mountain areas complying with Pro-

tected Designation of Origin (PDO) specifications have not been spared from this drastic trend (Sturaro *et al*., 2013). On-farm working conditions (FWC) play a crucial role in dropping number of farms in pasture-based livestock farming systems (Bernuès *et al*., 2011).

Many tools to assess FWC on a farm scale exist. These tools are either specifically related to FWC or include some FWC aspects within a more global tool to assess sustainability, such as IDEA tool (Zahm *et al*., 2008). But these tools do not take into account special features of those systems such as geographical and pedoclimatic constraints due to mountain location and the special link between farming practices. But those constraints affect FWC, such as a long in-door period implying tasks dedicated to in-door feeding and manure scraping. Moreover, the IDEA tool assesses FWC with only 6 indicators such as social involvement, life quality, workload intensity, training programmes, isolation and visits on farm, hygiene and security conditions on the farm. Considering that on-farm working conditions deals with many disciplinary fields such as sociology, economics, ergonomics and medicine (Madelrieux and Dedieu, 2008),this IDEA index does not cover all the dimensions of FWC. So there is a need to build a relevant and complete tool to assess FWC. Thus, it has been decided to build, *de novo*, an index to assess FWC, by a participatory approach, in order to: (i) consider system specifications; (ii) tend to cover all the dimensions of working conditions; and (iii) being pertinent for helping farmers to improve their FWC. So this study will focus on working condition assessment in order to develop a tool built by the farmers and for them. Indeed, this tool will be directly used by the stakeholders of the PDO network in order to establish on-farm diagnosis and supply advice supports.

II – Material and methods

The aim of this study is to build a relevant and appropriate multicriteria index to assess on-farm working conditions for the target users, the farmers. By building an index, we mean to describe on-farm working conditions by its dimensions, to select or to create indicators, to scale, to rate and rank them.

The building process of multicriteria index relies on a strong bill of specifications referring to the project's aim. Selection of indicators relies on the strong premise that they have to be relevant and operational. In this way, firstly, to be selected, indicators have to be adapted to local context and PDO system specificities. But, they also need to be generic for all the different dairy systems within the geographical PDO area, and relevant to on-farm working condition assessment. Secondly, data collection of indicators has to be carried out easily and quickly to perform on-farm working condition assessment on a large panel of farms. Secondly, index building process relies on a participatory approach. Indeed, to design a relevant, meaningful and useful tool for the target users, the farmers, a participatory approach, is appropriate (Reed *et al*., 2006).

The multicriteria index has been built based on a four-step process: (1) defining criteria covering the different dimensions of working conditions and then, selecting, or creating if necessary, appropriate indicators from a list of possible existing indicators from literature review; (2) establishing a scale for each defined indicators; (3) setting up a score corresponding to indicators' scales; and (4) ranking and weighting indicators within and between working condition criteria. The two first steps, which require comprehensiveness and creativity, have been conducted with an extended focus-group. It was made by three categories of stakeholders: (i) production sector with farmers and representatives of the institution defensing and promoting the PDO; (ii) advisors; and (iii) researchers. This composition has been decided to diversify points of views on on-farm working conditions. Advisors and researchers have been selected by their expertise and their interest. As step 3 and step 4 depend on the desired directions for PDO systems, they have been carried out with a restricted focus-group of farmers and PDO representative.

III – Results and discussion

The building process has resulted in an index assessing on-farm working conditions with 5 criteria described by 40 indicators (Table 1). The criteria are: (i) Work duration and work organization; (ii) Life quality; (iii) Physical dimensions; (iv) Mental dimensions; and (v) Isolation and relationships with others. The building process by focus-group leads to a large number of indicators. They cover diversified aspects of on-farm working condition dimensions comparing to existing tools assessing on-farm working conditions. Indeed, few general indexes at farm-scale integrate few social indicators related to working conditions (van Calker *et al*., 2007) and are mainly on one particular aspect of social sustainability, such as (van Calker *et al.*, 2007) centered on worker physical health, (Reig-Martínez *et al.*, 2011) on workforce description. Working conditions are not only physical health conditions or workload but also quality of life, relationships between the farmer and his close environment: family, professional, territory, etc.

Table 1. description of index to assess on-farm working conditions

Criteria number	Name of criteria (dimensions of working condition)	Weight indicators	Number of indicators	Type of indicators		
				quantitative	qualitative	mixed
1	Work duration and work organization	28	6	5	1	–
2	Quality life	25	11	3	7	1
3	Physical dimension of work	18	9	–	1	8
4	Mental dimension of work	16	3	–	3	–
5	Isolation and relationships with others	14	11	–	11	–

Our index is made by diversified indicators with mainly qualitative ones, but also quantitative and mixed ones (Table 1). For instance, to assess life quality, there are quantitative indicators such as number of week-end per year without any farm activity, qualitative indicators like “presence or not of regular time slot for farm activities” and mixed indicators with “presence of a working organization change between weekdays and weekends” coupled with a quantification of the extend of working organization changes (the whole week-end, only Sunday or Sunday evening). Other general tools exclusively rely on quantitative and qualitative indicators without mixing them. For instance, van Calker *et al.* (2007) have chosen to restrict working condition to physical and psychological health linked to farm characteristic variables and to exclude psychosocial and personal dimensions due to their non-measurable dimension. On the contrary, Ripoll-Bosch *et al*. (2012) and Zahm *et al.* (2008) assess qualitative and subjective indicators based on farmer’s perceptions.

Thereby, index designing process relying on participative approach mixing different actors enables to generate certain creativity. Indeed, the focus group members worked on a list of possible existing indicators. Some indicators have been selected in their original format; some have been simplified due to the constraint of collecting data easily on the farm. For instance, the well-established Quaework method developed by Hostiou and Dedieu (2012) to assess workload requires time to collect and to process data (1.5 day per farm). As a consequence, the focus-group decided to simplify the method by subdividing it into easier indicators. Thus, in order to estimate workload, it has been decided to use two steps: (i) a quantification of daily routine work on a typical day basis during winter-time and pasture-time; and (ii) a quantification of overloaded working days on total time needed to achieve a list of predefined tasks.

Furthermore, some indicators have been created. Unlike Ripoll-Bosch *et al.* (2012) or Zahm *et al.* (2008), the focus group members did not only want to base the assessment on farmer’s perceptions concerning their stress or satisfactory level. So they designed an indicator which objectively estimates farmer’s perceptions. To assess factor stress, the farmer declares three main fac-

tors from a predefined list of factors which can lead to stress. Each factor on this list has been previously judged by the focus-group members as a significant factor or as a less important factor with a different score.

In spite of certain creativity due to the participative approach, some features of work assessment on a farm scale have not been included in the index such as indicators related to labour productivity or labour input. These indicators are currently used to assess work or labour from an economic perspectie. These aspects of FWC have not been judged as relevant by the focus-group members. At this step of index building process and with this ranking method, compensation is possible between criteria or indicators. There is no threshold of exclusion.

IV – Conclusions

The participative approach based on focus-group meetings enabled to design a rich and diversified multicriteria index to assess on-farm working conditions with 40 indicators covering different dimensions. However, this index still needs to be tested on farm to verify that: (i) indicators are relevant and operational; (ii) data are easy to collect and process. Performing the index on a large number of PDO dairy farms will enable to get more insight on FWC and help advisors to support farmers to improve it.

This index to assess FWC is a part of an extended index to assess sustainability of dairy farms. This extended index is made up of 5 other dimensions or objectives: (i) respecting and highlighting natural resources and local heritage; (ii) improving and securing the farmer's incomes, (iii) being able to pass on the farm, (iv) guaranteeing the quality of milk product, (v) contributing and promoting the link between the farm and the territory and PDO food-chain. In the future, it would be interesting to investigate how this index could fit to other dairy systems.

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