



Improved management to limit milk production losses resulting from the transition to once-a-day milking in dairy sheep

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ABSTRACT

There has been increasing interest in once-a-day milking (ODM) in recent years. Despite the loss in milk production due to the reduction in milking frequency, ODM has several advantages for farm management, particularly labour savings. It has already been demonstrated that adapting management can compensate for the reduction in milk production, especially on dairy cow farms based on extensive grazing systems. The objective of this study was therefore to investigate the impact of management adaptations associated with a switch to ODM in a diverse range of dairy ewe farms in the 'Rayon de Roquefort', France, at the farm level. For that purpose, a model was developed to evaluate the ability of three flock management adaptations to compensate for losses due to the transition to ODM: (i) increasing the flock size, (ii) increasing the milking period and (iii) increasing grazing in the ewes' diet. The model results show that depending on the farm, a transition to ODM on the first day of milking reduces the milk yield of the whole flock by 18–19% and causes an 8–16% decrease in household income. When the transition occurs around the turnout date, the impact on the performance of the flock is reduced, but so is the time spent on routine work. In the short term, it is possible to make adaptations to limit losses both in milk production and in household income by lengthening the milking period and/or by making better use of pasture. Conversely, increasing the number of milked ewes does not compensate for the loss of income. For each farm, a scenario was designed to provide a satisfactory trade-off between household income, milk delivery and routine workload. However, although the management adaptations are the same, their modalities of implementation depend on the farm concerned, which have different amounts of leeway. For the diverse range of farms tested, ODM represents a good compromise between flexible workload management and the performance of dairy sheep farms. ODM, during the whole or part of the milking period, is a useful farm management tool to manage both labour and grazing during strategic periods.

1. Introduction

Compared with intensive dairy systems around the world, in which cows are milked twice a day or even more, reducing the milking frequency is still rare (Stelwagen et al., 2013). However, this practice is appropriate for more extensive dairy production systems, particularly those based on grazing (Clark et al., 2006). In systems in which less emphasis is placed on milk yield per cow, once-a-day milking (ODM) is a viable and practical alternative management system (Remond and Pomies, 2005; Clark et al., 2006). As labour costs constitute an important component of farm operating expenses (Stockdale, 2006), the savings associated with ODM are high. Similar to farms in other countries around the world, on most French farms, sheep are kept in

small flocks and are looked after by the owner and his/her family, and ewes are generally milked twice a day (once in the morning and once in the evening), with a time interval as close as possible to 12 h. ODM is thus one way to reduce the workload of dairy farmers (Seegers et al., 2003).

Several studies have focused on the quantitative and qualitative effects of a reduction in milking frequencies in dairy sheep systems and the advantages and disadvantages of this reduction at the dairy farm level to optimize milking routines and consequently to improve the quality of farmers' lives (Castillo et al., 2009; O'Driscoll et al., 2010; Koutsouli et al., 2017). The results of these studies vary with the breeds tested and are in some cases contradictory, but all the studies reported that the most important consequence of once-a-day milking is a

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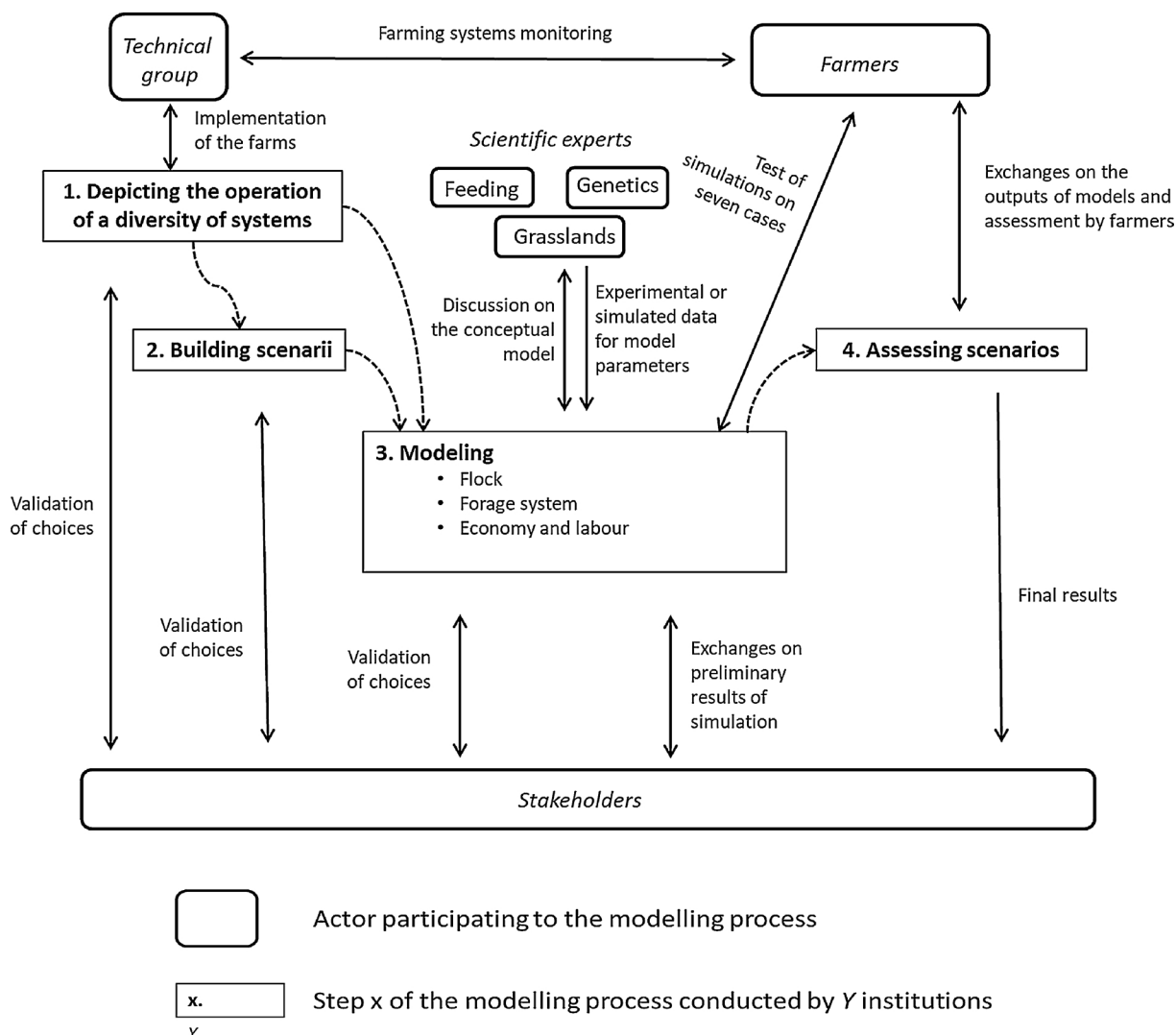


Fig. 1. Schematic representation of the involvement of the actors in the participatory approach used to evaluate the impact of the transition to once-a-day milking on dairy sheep farms in the Rayon de Roquefort.

significant decrease in milk yield. This decrease ranges from 15% (Negrao et al., 2001) to 48% (Knight et al., 1993) and varies with the period when milking starts and with the length of the period (Negrao et al., 2001; Nudda et al., 2002). In addition to reducing the milk yield, the reduction in milking frequency can also affect the main constituents of the ewes' milk. For example, milk produced by ODM ewes has higher protein and lower lactose contents (Nudda et al., 2002; Prieto et al., 2013). Compared with other sheep breeds, the Lacaune ewe appears to be well adapted to once-a-day milking (Hassoun et al., 2016), as this high-yielding breed is able to store more cisternal milk than the medium-yielding Manchega ewes, suggesting a better adaptation of the "large-cisterned" Lacaune ewes to less frequent emptying (Castillo et al., 2009). These results differ from those obtained in dairy goats (Mocquot, 1978; Komara et al., 2010; Torres et al., 2013), for which higher losses, ranging from 26 to 36%, have been reported. These results suggest that high-yielding goats and certain breeds of sheep cannot adapt to ODM.

Several management adaptations have been proposed to compensate for milk production losses due to the reduction in milking frequency. For example, the use of land that is not traditionally suitable for dairy systems due to hilly terrain or long walking distances can help farmers to maintain or increase the size of their herds without capital expenditure when the farm infrastructure (i.e., the number or size of

milking parlours and breeds with a higher capacity of walking) may not support this increase (Bewsell et al., 2008). Likewise, for systems that are not limited by feed, it is possible to increase the stocking rate to compensate for the reduction in the yield of individual ewes associated with ODM (Armstrong and Ho, 2009).

Ranked in decreasing order, Italy, Greece, Romania, Spain and France are the five main ewe milk-producing countries in Europe. In the Mediterranean dairy area, the production of sheep and goat milk is continually increasing (Anonyme, 2016). Similar to other products with protected designation of origin, ewe milk cheese must be traditionally and entirely manufactured (prepared, processed and produced) within the specified region, thereby acquiring unique properties. The number of protected designation of origin cheeses made from ewe milk or from mixed ewe and goat milk is 17 in Spain (including Manchego), 4 in Italy (including Pecorino), 3 in France (including Roquefort) and 3 in Greece (including Feta). With the exception of Roquefort, the label specifications do not include the obligation to milk twice a day. If ODM turns out to be advantageous for breeders, the practice should spread. However, in the Roquefort area, the specifications of the cheese's protected designation of origin will also have to be changed, which is a long process whose outcome is uncertain and which would affect other components of the specifications. An ex ante evaluation of the potential advantages of introducing ODM on dairy ewe farms is needed before beginning the

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