



a phenotypic independence from its predictors. The correlation between the averaged RFI over the lactation and RFI at each time point was always positive and above 0.5, and maximum in mid lactation (>0.9). In addition, the model performed reasonably well in the presence of missing data and recent tests showed that it was possible to mix data from different farms and obtain very similar results as if the model was run on each farm separately. This opens new perspectives for datasets that would be too small to be analyzed alone.

This approach allows a dynamic estimation of the traits, free from all time-related issues inherent to the traditional RFI methodology, and can easily be adapted and used in a genetic or genomic selection context. However, some questions remain with respect to the ability to split true individual variability from errors or the possibility to compare efficiency from animals coming from different farms. These first results will be published soon, and we still have plenty of further developments to explore.

## Farm adaptation to climate change impacts: a farmers' perception case study

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In Europe, the number of mountain farms is decreasing due to various socioeconomic drivers. Although mountain livestock farming systems are generally considered as extensive, they are actually very diverse, influenced by both internal factors (such as the level of use of natural resources or farmer's age) and external factors (like agricultural policy, environmental conditions or market dynamics). In addition, farmers need to adapt to crucial challenges that affect agriculture globally, like the increasing risk of droughts due to climate change and higher prices of inputs due to market dynamics. Understanding farmers' views on the relevance of actions and strategies to face these challenges is key to study mountain farming adaptive capacity and resilience.

The aim of this work was to analyze:

- I. Farmers' perception about the relevance of different farm practices to face a situation of climate and market change and,
- II. The influence of farms and farmers' characteristics on those perceptions.

To carry out this study, 54 beef farmers from the Spanish Pyrenees were surveyed in 2018 (GenTORE W1), gathering information about farm structure, management and economic performance. The questionnaire also measured farmers' perception on the importance of different actions to deal with I) **a 2-year-long drought** and II) **the rise of input prices during two consecutive years**. We specifically asked: *Would any of the following measures improve the continuation of your farm and how important would they be?* Farmers answered using a 5-point categorical scale from "Not important" to "Very important". Specifically, we considered 23 measures related to:

- ⇒ **Reproductive management**, like grouping calvings
- ⇒ **Health management**, such as eliminating the worst adapted animals
- ⇒ **Feeding management**, like extending the grazing season or looking for new grassland areas
- ⇒ **General management**, like introducing new breeds or modernizing machinery, and
- ⇒ **Commercialization**, like producing under a quality brand or diversifying activity in and out agriculture.

ANOVA was used to **identify which farm and farmer profile characteristics influenced their views in the relative importance to face these challenges**, like farmer age, size of agricultural area or whether they fatten on-farm or not.

Farmers generally thought that the best strategy to face to the short-term effects of both a prolonged drought and a rise of input prices would be to take measures to reduce production costs (i.e. eliminating the worst adapted animals, seeking for feed self-sufficiency) and





reduce investments (i.e. renewing machinery, introducing new breeds or changing the type of product). In the case of a scenario of rise of input prices, farmers would focus on measures related to feeding management such as extending the grazing season or seeking for new pastures.

**Farmers thought that the best strategy to face short-term effects of both, a prolonged drought and a rise of input prices would be to reduce production costs.**

Besides this general strategy, we found that age, on-farm fattening and farmland area influenced farmers' perception on adaptation practices. Farmers above 51 years were significantly more determined to look for new pastures than the younger ones in an increase of input prices scenario. This could be related to the fact that young farmers tend to reduce labor and increase technification. Farmers that did not fatten on farm would be more likely to look for new pastures, while they considered less relevant to invest in renewing machinery or facilities, both in an increase in input prices and a prolonged drought scenarios. Finally, owners of large farms (above 77 ha) were significantly more determined to change indoor diets than farmers with smaller farms.



To conclude:

1. Farmers considered that implementing actions aiming to **reduce costs** such as eliminating worst adapted animals, diversifying activity out of agriculture and seeking for new pastures and self-sufficiency, would be the most relevant strategies to adapt to both increase in input prices and drought scenarios.
2. These strategies apply to short-term perturbations scenarios. **Farmer strategies to adapt to mid or long-term perturbations might be different.**
3. **Farm and farmers' characteristics** such as farmer age, farm size and on-farm fattening, **modify farmers' strategies to face challenges** related to climate change.
4. Some of the most relevant actions that are usually pointed out when analyzing farming at a systemic level such as introducing more adapted breeds, diversifying farm activity, seeking for external advice or modernizing farm technologies, were considered by farmers as having low relevance.

## How do beef cows cope with short nutritional challenges during lactation?

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In the typically extensive suckler cattle production systems in mountain areas, diet quantity and quality can vary widely both in the long and the short term. The objective of this experiment was to **determine the mechanisms through which suckler cows respond to short but severe nutritional challenges** that may occur during lactation, and **analyse if their ability to cope with such challenges and maintain their performance depended on the stage of lactation.**

