

Sharing grass related innovations to enhance the resilience of European dairy farms.

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## **Abstract**

European dairy farmers face major challenges, putting pressure on their resilience. The hurdles they encounter are diverse and ever evolving, ranging from market volatility and environmental pressures to shifting consumer demands and regulatory complexities. This also leads to succession insecurity as the future for young dairy farmers is uncertain. A lot of knowledge is already available that could strengthen the resilience of dairy farmers; however, this knowledge does not often reach them. The R4D (Resilience for Dairy) project aims to disseminate the most promising solutions to dairy farmers to become more resilient. This paper describes how the most urgent needs and practical solutions were collected. In total, 100 ready-to-use best practices were selected. Among those, nine grass related innovations were ranked highly by farmers and other stakeholders: improving protein self-sufficiency thanks to a better grassland management, multispecies swards to enhance forage uptake and biodiversity, intercrops to reduce nitrate leaching, practices to capture carbon in soil, management of hedges and marginal areas to improve biodiversity, agroforestry, increasing grazing vs indoor feeding to meet customer desires, new grazing systems to increase market value, and virtual fencing.

**Keywords:** dairy production, resilience, innovation, grasslands, best practices

## **Introduction**

Resilience in the European dairy farming sector encapsulates a multifaceted approach that extends beyond mere economic viability. It encompasses mental fortitude, economic adaptability, technical efficiency, animal welfare, and the development of socially responsible production systems. In the final report of the EIP-AGRI Focus Group “Robust & Resilient dairy production systems” (2018) it is stated that to achieve more resilient and robust dairy farms, there is a pressing need for updated education for both farmers and advisors. The challenges faced by dairy farmers in Europe are diverse and ever-evolving, ranging from market volatility and environmental pressures to shifting societal demands (Delanoue *et al.*, 2015) and regulatory complexities. In navigating these challenges, the concept of resilience emerges as a guiding principle, reflecting the industry's capacity to withstand, adapt, and thrive in the face of adversity.

Three key areas in the dairy sector to face challenges are: economic & social resilience, technical efficiency and environment, animal welfare and society friendly production systems. Those issues are interconnected and depend on the livestock farming system, rearing management, people involved in the production process, feeding and material resources, and level of use of innovation (Fagon *et al.*, 2017). A lot of knowledge to be more resilient in those three key areas is already available but does not reach the farmers and advisors. Hence a platform that shares all that knowledge in an easy and accessible way is needed. This paper describes how the R4D (Resilience for Dairy) project, which aims to improve the European dairy sector's sustainability and resilience, widely disseminates innovations, facilitating knowledge exchange between farmers. The best practices related with grasslands or grass-based systems are put to the fore.

## Materials and methods

### *1- Collection of the farmers most urgent needs and solutions*

An inventory of needs for dairy farmers to be resilient was created through an online questionnaire distributed (online and on paper) across 15 EU countries (BE-Wallonia, BE-Flanders, DK, FI, FR, DE, HU, IE, IT, LT, LU, PL, SI, ES, NL, UK). Due to the survey being distributed online, the reach and response rate cannot be determined. In the survey, a list of 183 needs were proposed to stakeholders, asking them to assign a score from 0 (not applicable) to 5 (highly applicable) to each of them according to the potential to improve farm resilience. These needs were allocated to one of 10 predefined domains (1/animal nutrition, 2/animal management, 3/health, 4/welfare, 5/ecological and environmental footprint, 6/social issues, 7/financial needs, 8/budget management, 9/information sources, 10/labour conditions) to clearly identify the topics that farmers consider as pivotal. To create this inventory, two main steps were taken: a literature review and a consultation among partners.

### *2- Evaluation of the collected solutions and creation of national workplans*

At the same time, already existing practical solutions to face challenges were collected during local meetings among farmers, researchers and advisers. An assessment scheme was developed based on 5-scale questions related to the following sub-categories: social resilience (less to more), economic resilience, technical efficiency, environment, animal welfare, societal perception items, readiness and acceptability (low to high). This scheme was applied to 185 practices, techniques and tools (named solutions) collected in the 15 countries. Sixty-two experts from universities and research institutes scored these solutions, completing a total of 3300 assessments. The solutions were also scored by farmers and stakeholder in local workshops and some on the field in all 15 countries on the same sub-categories, with focus on readiness and acceptability. The scoring took place with, in mind, farm types or systems where the solution is applicable and attractive. When answering the question about the impact of the solution, the average dairy farm in the region was taken as a reference. This collection of potential solutions also led to the creation of national workplans focusing on local most urgent challenges and the ranking of the most promising solutions from the global inventory. At the end, the 100 most promising solutions were selected for dissemination with factsheets, videos, webinars or on farm demos ([www.resilience4dairy.eu](http://www.resilience4dairy.eu)).

## Results

### *1- EU dairy farmers most urgent needs*

From the 535 surveys completed (average: 33 per country, IQR: 14-37), 379 answers came from farmers and 156 from advisors, vets, researchers, and others. Due to the survey being distributed online, the reach and response rate cannot be determined. Regardless of regional differences, the improvement of work-life balance and the necessity of a transparent and effective communication with civil society are in the top 10 issues that farmers must face to be resilient in the future, just on the same level of other more technical challenges, like animal health/welfare and energy self-sufficiency (table 1). Work-life balance is always in the top 3 position and often in 1st position regardless of cluster (farmers/non farmers, men/women, under 40/over 40 years of age etc.).

### *2- Farmers, advisers and researchers proposed solutions.*

Practical management issues related to dairy cow care, nutrition and feed production were emphasized as existing solutions, in relation to actions that can be controlled at farm level. The domain with the highest number of proposed solutions was “animal nutrition”. Table 2 lists the solutions for which farmers and advisers can share existing knowledge, but also the ones for which they want to receive more information.

Table 1. Results of the collection of most urgent needs by the online survey (535 answers).

Rank	Domain	Need
1	Quality of life	Work-life balance
2	Animal welfare	Improvement of welfare conditions of cows
3	Quality of life	Salary/returns
4	Communication	Effective communication and transparency to the public on agricultural practices
5	Prevention	Innovative testing/analysis for early detection of diseases
6	Animal welfare	Improvement of welfare conditions of calves
7	Quality of life	Flexibility
8	Environment	Energy efficiency and use of renewable energy sources
9	Prevention	Innovative detectors/devices for metabolic disease, pathologies
10	Animal welfare	Innovative and animal-friendly housing grazing behaviour, calving time detectors

Table 2: Domains with the highest number of proposed solutions (online survey and NDA meetings) and examples of ready-to-use knowledge and most promising solutions.

Domain	Ready-to-use knowledge (farmers can share knowledge)	Most promising solutions (farmers want more information and training)
Feeding	Protein self-sufficiency, Optimizing /reducing protein feeding, novel feeds	Improving protein self-sufficiency thanks to a better grassland management
Grass/ Forage	Forage quality, analyses, platemeter measuring, drones; Reduce silage storage losses	Multi-species swards to enhance forage uptake and biodiversity
Grazing	Improving grazing management New grazing systems	Virtual fencing. Increasing grazing vs indoor feeding to meet customer desires, new grazing systems to increase market value
Other	Slurry technologies, agroforestry	Intercrops to reduce nitrate leaching, Practices to capture carbon in soil, Management of hedges and marginal areas to improve biodiversity, Agroforestry on farms

## Conclusion

The improvement of work-life balance is the most urgent issue that farmers must face to be resilient in the future. Solutions related to grassland management and grazing are already well known by the farmers, advisers and researchers involved in the R4D project in the 15 participating EU countries. Although, some topics still need to be explained, demonstrated, and disseminated at farm level. These technical ready-to-use best practices will only be implemented if they are financially feasible and if they help European dairy farmers face the three main challenges identified: improving their work/life balance, improving animal welfare and facilitating communication towards the society.

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