

The System adaptation for OneHealth under Climate change for Vulnerable groups and Ecosystems (SOLVE) project is a transdisciplinary initiative under the Belmont Forum and the FABLE Consortium.

SOLVE co-develops local adaptation roadmaps with societal partners to build resilient, healthy, equitable, and prosperous food and land systems. Using a suite of models, SOLVE integrates future climate extreme risks into long-term planning and promotes a OneHealth approach to better understand and address the complex interactions between people and nature.

THE CHALLENGE

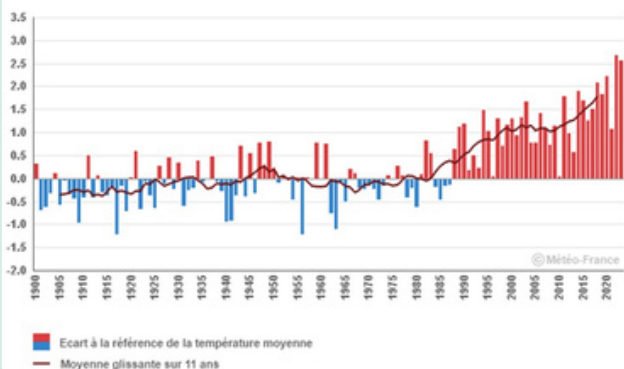
In France, temperature rises have accelerated since 2010, and precipitation has become more extreme and unpredictable.

Grasslands and rangelands, which provide numerous ecosystem services and are the basis of feed for ruminant herds, are particularly sensitive to drought and are the first national agricultural disaster fund expenditure related to climate damage. To adapt, farmers tend to purchase feed, reduce herd size, convert grasslands to croplands, or abandon them.

The main challenges vary across actors:

- **For farmers:** planning effective adaptation trajectories to secure both animal production and long-term farm financial viability.
- **For communities:** preserving biodiversity, water resources, rural landscapes, jobs, prosperity, and food security.
- **For the agro-food industry:** maintaining the production of high-quality products (PDO, PGI, LR), while sustaining export capacity for standard products.

Evolution of mean annual temperature in France between 1900 and 2020: difference from the 1961-1990 reference (in °C)



FOCUS AREAS

Three case studies will cover distinct climates where livestock is the main agricultural activity.



The Massif Central is a mid-mountain region with low population density, dominated by permanent grassland supporting traditional suckler farming systems. It mainly produces beef and lamb for domestic consumption, while most male calves are exported to Italy for beef production.

The Aveyron is a mid-mountain region with a Mediterranean climate, marked by high limestone plateaus, valleys, and gorges. Its large areas of rangeland and permanent grassland support small ruminant farming, mainly dairy sheep, producing the famous PDO Roquefort cheese. Dairy cattle, beef cattle, and mixed sheep-cattle farming are also well-suited to this harsh environment.

Brittany, with its oceanic climate (mild, regular rainfall) and low relief, is a highly productive livestock region. The population and animal production density are high. Covering 6% of France's agricultural land, it produces 56% of pigs, 37% of eggs, 23% of milk, and 32% of broilers. The agri-food industry has a major presence, employing one in four industrial workers.

STAKEHOLDERS & PROCESS

Stakeholders in the co-creation process:

This case study is led by the Institut national de recherche pour l'agriculture, l'alimentation et l'environnement (INRAE), in conjunction with VAACHERIN, a major French project on livestock farming and climate change.

INRAE collaborates with the French Livestock Institute (Idele) engineers, advisory services, cooperatives, and agribusiness within the framework of Joint Research Units. This long-standing dynamic approach ensures that the concerns of local farmers and stakeholders are integrated into both research and development activities.

Methods developed and used:

- Define climatic and socio-economic scenarios for 2050.
- Calculate agro-climatic indicators by region.
- Develop an engagement strategy with stakeholders, identifying strengths, weaknesses, opportunities, and threats faced by their region due to socio-economic and climate change.
- Analyze the livestock industry's exposure and vulnerability in each region.
- Discuss adaptation and mitigation strategies (practices and systems) with farmers and stakeholders.
- Co-construct adapted production systems and assess their productive, economic, and environmental performance using expert appraisal or farm-scale models (ORFEE).
- Model their potential impacts at the regional scale with the FABLE Calculator.



IMPACT

This case study will generate valuable insights for multiple actors:

- **Farmers** will gain a better understanding of the vulnerability of their production systems to climatic and socio-economic changes, and collectively discuss adaptation options.
- **The livestock industry** will be able to assess the advantages and trade-offs of different adaptation options for the sector.
- **Policymakers** will benefit from robust indicators and evidence-based information to support effective decision-making and policy design.
- **Research & development institutes** will further develop indicators and models to assess climate and socio-economic impacts and design more resilient farming systems.

This case study will benefit from and contribute to the global open modelling infrastructure of the FABLE Consortium.

The France case study is led by INRAE. To get involved, please contact:

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Your region and agriculture facing a 2050 climate horizon?

