

Raw milk cheeses in France: challenges, collective action and projects

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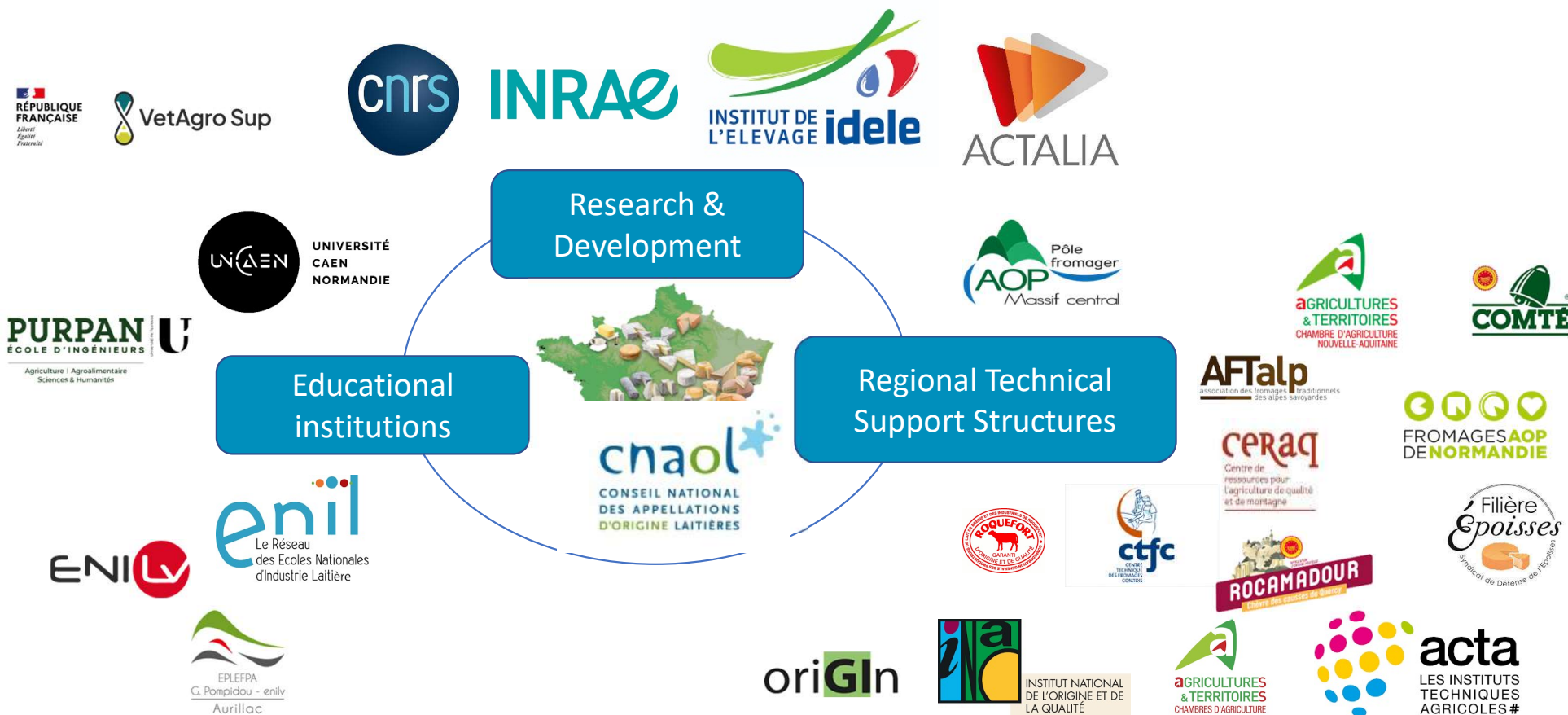
Réseau Fromages de Terroirs → *Terroir* Cheeses Network

Terroir Cheeses Network

Financial
support
from the
State
300 000€
for 5 years



Avec la contribution financière
du compte d'affectation spéciale
«développement agricole et rural»



**A multi-thematic Technological Research Network focused on its target audience:
the cheese sectors that enhance their *terroir***

28/08/2026



Summary

- ❖ Context
- ❖ Challenges
- ❖ Collective and multidisciplinary organisation
- ❖ A 360-degree approach: scientific, technical, patrimonial and organisational
- ❖ A general mobilisation to preserve raw-milk cheeses

Context

Raw-milk: 15% of ripened cheese in France

- ✓ Very diverse microbial composition depending on practices, area of production....
- ✓ More taste diversity and complexity
- ✓ Positive impacts on health and immunity (research ongoing)
- ✓ Barrier function against pathogens



Raw milk
=
**An expression of the
link to *TERROIR***

Context

- ✓ 75% of raw milk cheeses in France are PDOs
- ✓ The remainder is mainly farmhouse production



354 Dairy plants	7 200 Farmhouse producers
189 745 T → -6% Since 2017	41 000 T approximately

Raw milk cheese consumption

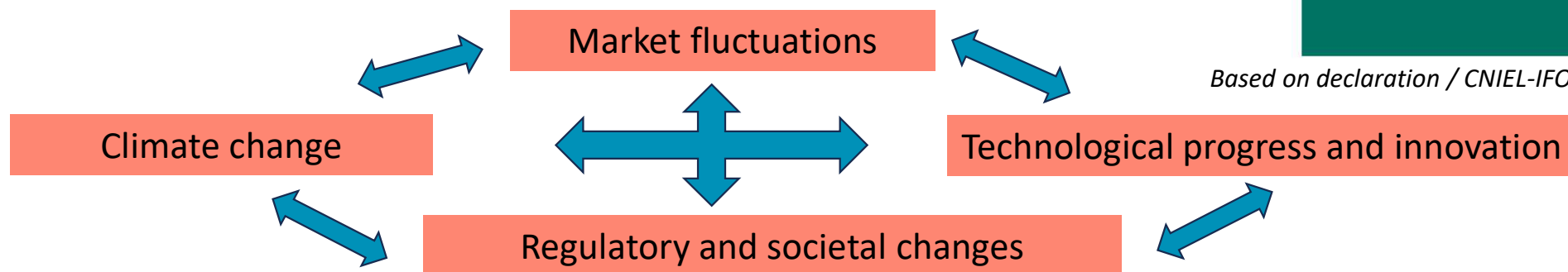


$\frac{3}{4}$ at least once a month



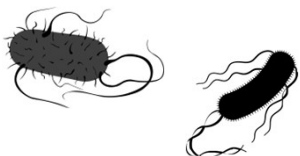
$\frac{1}{2}$ every week

A dynamic environment



Based on declaration / CNIEL-IFOP 2021

Challenges



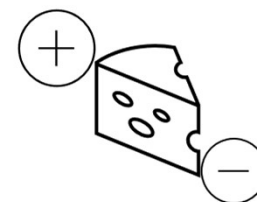
Pathogen risks (mainly
STEC, Listeria, Salmonella)



Health quality control
measures

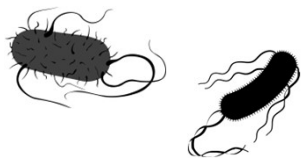


Drastic hygiene
practices



Decline in microbial
biodiversity

Challenges



Pathogen risks (mainly
STEC, Listeria, Salmonella)

- ✓ Level of knowledge that varies among pathogens
- ✓ Different sources, practices associated and impact on consumers
- ✓ Difficulties to understand the link between the practices and the risk associated

Challenges



Health quality control
measures

- ✓ A health issue that needs to be addressed
- ✓ Major and growing expectations from consumers and public health officials
- ✓ Risk-oriented management that can increase discouragement – Sword of Damocles

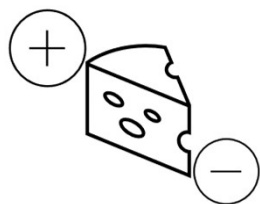
Challenges



Drastic hygiene practices

- ✓ A wide range of options and a diversity of situations
- ✓ Risk of over-simplification
- ✓ Challenging traditional practices
- ✓ Growing costs of production and discouragement of raw milk production

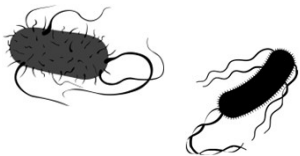
Challenges



Decline in microbial
biodiversity

- ✓ Impact on :
 - ✓ organoleptic diversity
 - ✓ health benefits
 - ✓ barrier function against pathogens
- ✓ What medium to long term perspectives for raw milk cheese differentiation ?
- ✓ What impact on long-term consumer recognition of *terroir* production ?

Challenges



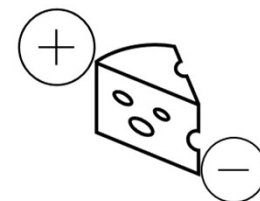
Pathogen risks (mainly
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Health quality control
measures



Drastic hygiene
practices



Decline in microbial
biodiversity

How can we find the right balance ?

→ How can we work toward it ?

Collective and multidisciplinary organisation

- ✓ Different collectives try to face this challenge but with diverse approaches :
 - ✓ Better understanding of the risk and how to address it (*STEC example*)
 - ✓ Scientific knowledge about raw milk : a microbial ecosystem approach
 - ✓ Technical support for raw milk cheese production
 - ✓ Improving Knowledge of and Recognition for raw milk through the social sciences
 - ✓ Communication with consumers
 - ✓ Public health : toward a risk-benefit approach ?

Better understanding of the risk and how to face it (*STEC example*)

STEC : AN INTEGRATED RESEARCH STRATEGY AT THE FRENCH DAIRY INTERBRANCH

Over more than 15 years, research has addressed STEC risk throughout the raw-milk cheese production chain through 4 complementary areas

FARM

Preventing contamination

Research confirmed that animals are **healthy, intermittent fecal shedders**, with **no evidence of mammary excretion**.

Good farming practices are essential, particularly **udder/teat preparation before milking** and limiting prolonged contact between young and adult animals.

For STEC investigations, milking-machine filters are particularly useful samples, ahead of environmental and udder swabs

PATHOGENICITY

Understanding high-risk strains

Dairy **O26 strains are predominantly stx1a**

Research has contributed to changes in the management of AEEC.

E. coli O157 and O26 can associate with fat globules in raw milk, although this affinity varies according to serotype and strain.

PROCESSING

Managing safety consumer

Quantitative Risk Assessment models have been developed to evaluate how effectively surveillance strategies protect consumers. Models are available for STEC and other major dairy pathogens such as *Listeria* and *Salmonella*.

These approaches also support the design of **sampling plans adapted to different situations**, from routine surveillance to reinforced surveillance and outbreak investigation.

ANALYSIS

Improving STEC detection

Research has optimized enrichment and detection methods.

Molecular markers, **EspK, EspV and CRISPR O26** reduce unconfirmed suspicions.

Detection kits have progressively improved, When there is a **discordance protocol** for an alternative method, it can improve the detection performance of the methods.

For milking-machine filters: **storage at 4°C for up to five days**, and the tested filter weights did not affect recovery.

Better understanding of the risk and how to face it (*STEC example*)

STEC : RESEARCH IN PROGRESS IN 2026 AT THE FRENCH DAIRY INTERBRANCH

Project in farms

Controlling contamination during the milk production phase is a major challenge for the raw-milk cheese sector

The use of milk fermented by *Streptococcus thermophilus* and *Lactobacillus delbrueckii* subsp. *bulgaricus* is tested to control STEC O26:H11 carriage in young dairy calves.

56 calves from 4 farms where STEC O26:H11 had previously been identified are included in this project.

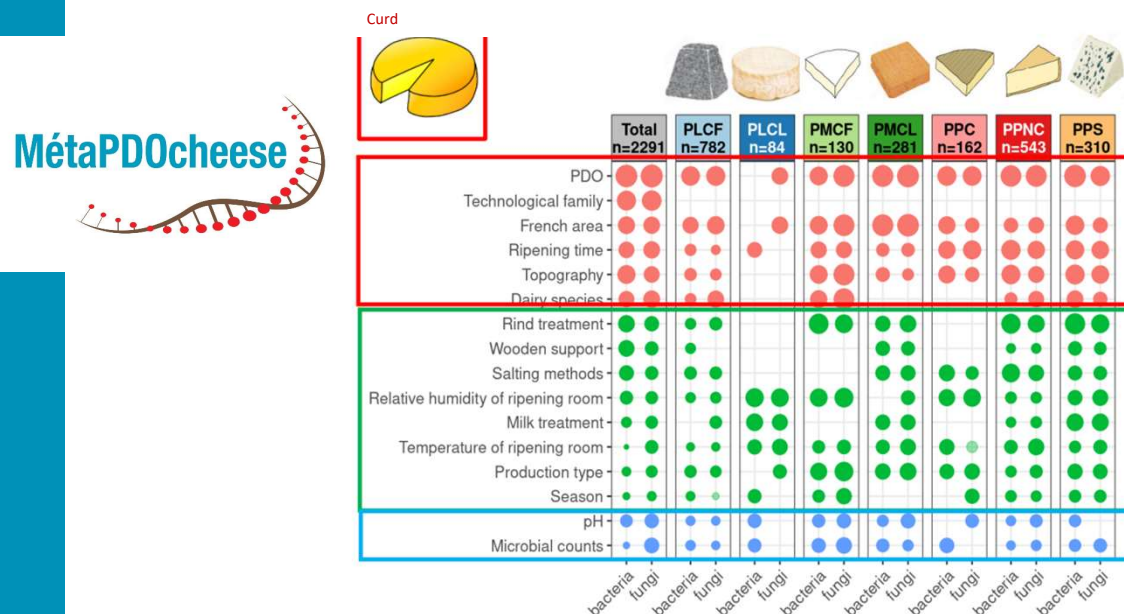
Project on counting STEC on milking machine filters

Various Quantitative Risk Assessment models (QRA) have been developed by the dairy industry with the aim of simulating the impact of operational measures for the consumer safety

The study aims to refine the STEC QRA models by providing **quantitative data** on STEC contamination levels in collected milk → Quantification of stx2-carrying STEC on milking machine filters by the most probable number technique

Scientific knowledge about raw milk : microbial ecosystem approach

- ✓ Scientific research on raw milk can not be limited to risk assessment
- ✓ Example : Development of omics-based methods as an opportunity to have a better understanding of raw milk microbial ecosystems

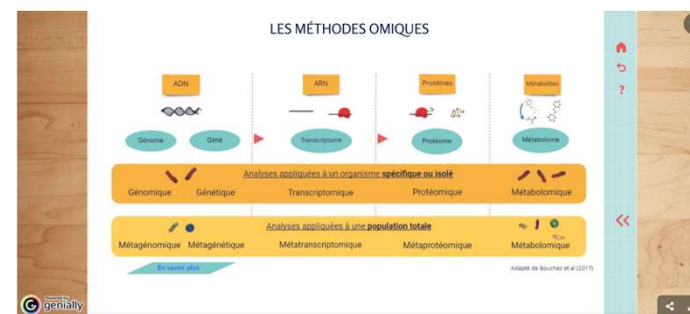


Parallel project to deepen the use of omics methods to address the specific challenges faced by the sectors

Example : How can omics methods help to understand the bitter taste with PDO blue cheeses ?



Irlinger F., Mariadassou M., Dugat-Bony E. et al. (2024). A comprehensive, large-scale analysis of 'terroir' cheese and milk microbiota reveals profiles strongly shaped by both geographical and human factors. ISME Communications, DOI : <https://doi.org/10.1093/ismeco/ycae095>



Technical support for raw milk cheese production

- ✓ Objective to build a bridge between scientific research and the technical needs
- ✓ Organisation of symposiums and training sessions on microbial ecosystem approaches in raw milk cheese production

Scientific symposiums on Raw milk cheeses (2020 and 2023) 500 Participants (dairy GI, scientists, teachers, students, administration, media)



FLUMI 3-days training sessions

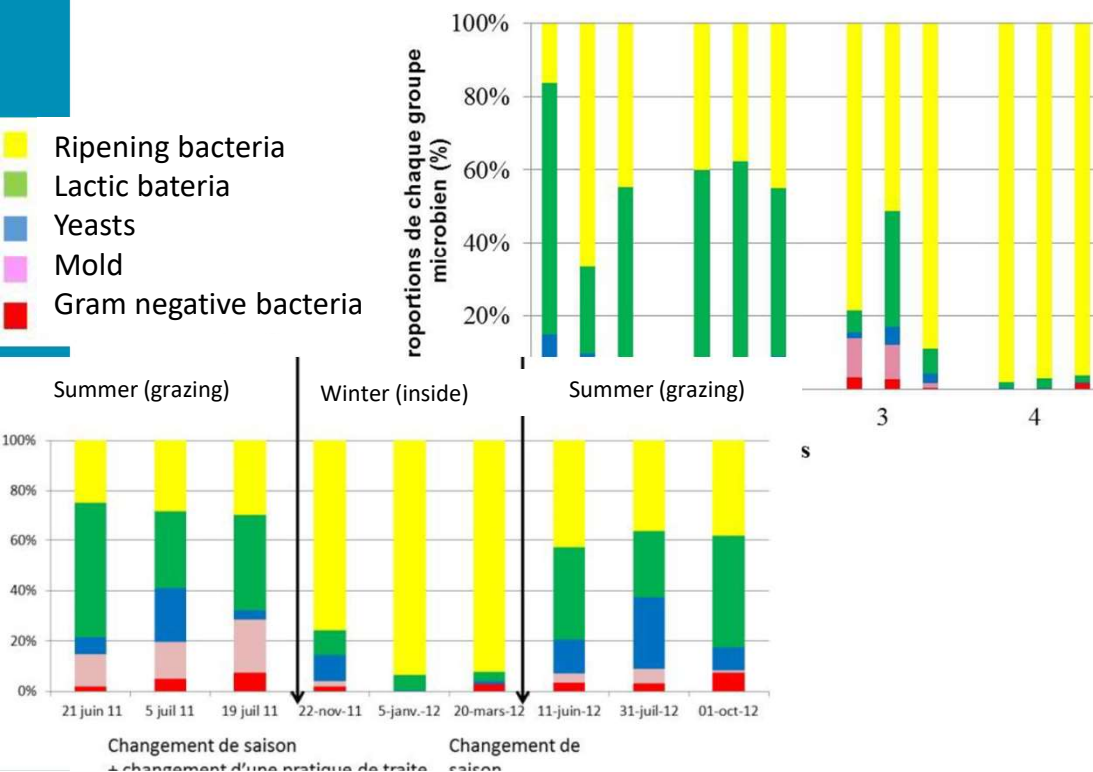


WORKING
GROUP ON
MICROBIAL
ECOSYSTEMS



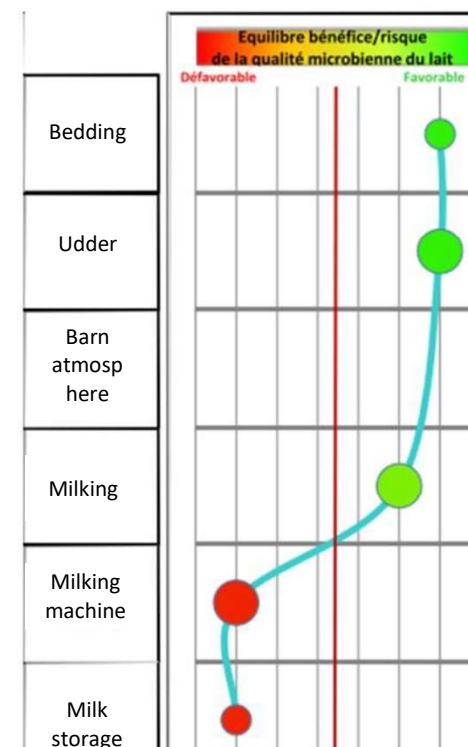
Technical support for raw milk cheese production

- ✓ Floracq : a support tool for raw milk production based on microbial ecosystem approach since 2013 – **updated based on scientific developments**



Equilibre bénéfices/risques

- « 0 » **Défavorable:** combinaison de pratiques défavorable aux groupes microbiens d'intérêts ou présentant un risque supérieur aux bénéfices
- « 5 » **Favorable:** combinaison de pratiques favorable aux groupes microbiens d'intérêts et ne présentant pas de risque



Improving Knowledge and Recognition on Raw Milk through Social Sciences

- ✓ Research projects with anthropologists to have a better understanding about how we take into account raw milk production and micro-biodiversity in our societies
- ✓ Project about the relationship between farmers and micro-biodiversity

➔ Collective project of recognition of Raw Milk Cheeses and Associated Know-How through Patrimonialisation

Ongoing process with the French equivalent of UNESCO



Communication and link to the consumer

- ✓ Mobilisation to inform the consumer about the specificities of raw milk cheeses, its risks and benefits
- ✓ National coordination of raw milk producers about packaging labelling guidelines

LES RECOMMANDATIONS D'ÉTIQUETAGE DES FROMAGES AU LAIT CRU

Les recommandations suivantes concernent les fromages au lait cru commercialisés en pré-emballé et en libre-service, à l'exception de ceux à pâte pressée cuite.

- Afficher la mention 'Lait cru' de manière visible en face avant des produits
- Inscrire une des mentions écrites suivantes, en face arrière ou latérale des produits :

Mention courte :

Ce fromage est au lait cru. Il est déconseillé aux populations fragiles, dont les jeunes enfants, de le consommer. Consultez www.fromagesaulaitcru.fr

Mention longue :

Ce fromage au lait cru contient une microflore laitière diversifiée qui confère des arômes typiques au fromage. Il est déconseillé aux populations fragiles, dont les jeunes enfants et particulièrement ceux de moins de cinq ans, les femmes enceintes et les personnes immuno-déficientes, de le consommer. Consultez www.fromagesaulaitcru.fr

- Par ailleurs, les opérateurs qui souhaiteraient apposer un visuel à proximité de la mention écrite peuvent apposer le logo commun suivant, qui renvoie vers notre site internet d'information :



Public health : toward a risk-benefit approach ?

- ✓ The risks associated with raw-milk cheeses are well known and documented. On the other hand, there are less references regarding its benefits
 - ✓ Work on a bibliographic review that can show the benefits associated with microbial diversity
- ➔ *Contribution to a risk-benefit approach with raw milk cheese instead of a risk-management one*



pour la santé
de la consommation
de fromages

Intérêts de la biodiversité microbienne

General mobilisation

- ✓ Tension remains high in the raw milk cheese production / Risk-management policies and growing production costs affect the sustainability of the sector

➔ *It was necessary to take political action*

- ✓ The French PDO organisations together with the cow, goat and ewe dairy boards organised a meeting in January 2026 to inform the Minister of Agriculture about the situation

National Plan to Preserve Raw-milk Cheese production



Key points

- ✓ Multidisciplinary approaches are challenging but necessary to support major developments
- ✓ It is important to engage producers and products organisations at every stage
- ✓ Raw milk cheese production may face an antagonist socio-economic context → however its basic principles can meet growing consumer expectations (food authenticity, attention to production conditions, current trend of fermented foods...)