



Re-Livestock

RESILIENT FARMING SYSTEMS

Re-Livestock - Facilitating innovations for resilient livestock farming systems

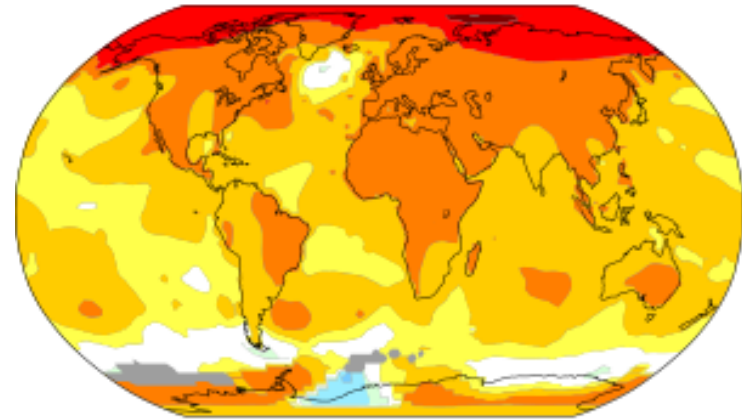


Birgit Gredler-Grandl
on behalf of EB members

ICAR meeting, Toledo 23rd-25th May 2023

- Global warming
- Long-term shifts in temperature and weather patterns
- Human activities

Temperature change in the last 50 years



2011–2021 average vs 1956–1976 baseline

-1.0 -0.5 -0.2 +0.2 +0.5 +1.0 +2.0 +4.0 °C



-1.8 -0.9 -0.4 +0.4 +0.9 +1.8 +3.6 +7.2 °F

This article is more than 4 months old

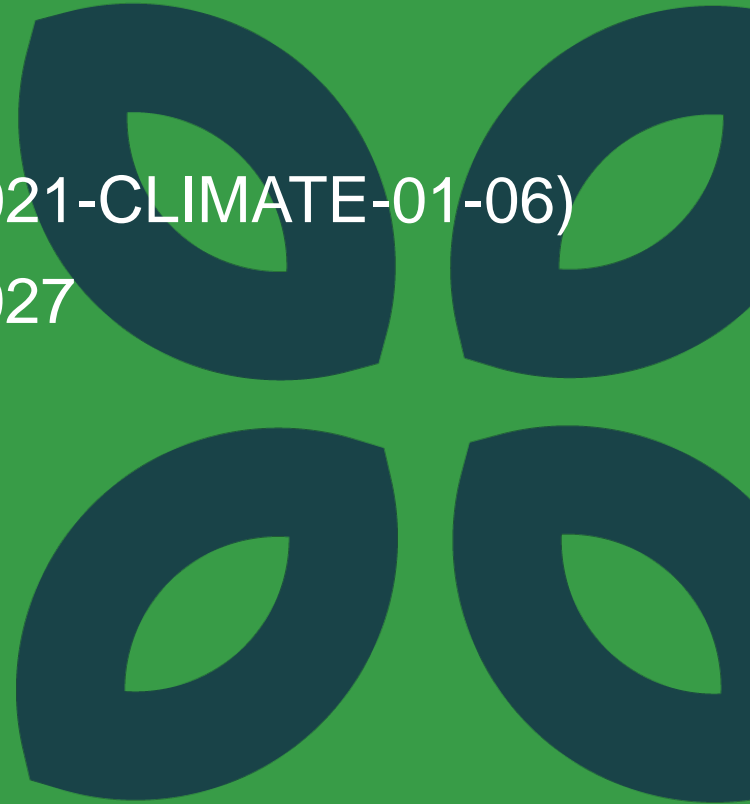
New Zealand farmers may pay for green first p

By 2025, fa
as cow bur
by Jacinda



Re-Livestock

- Horizon Europe (HORIZON-CL6-2021-CLIMATE-01-06)
- September 1, 2022 - August 31, 2027
- Budget: €9,5 Million

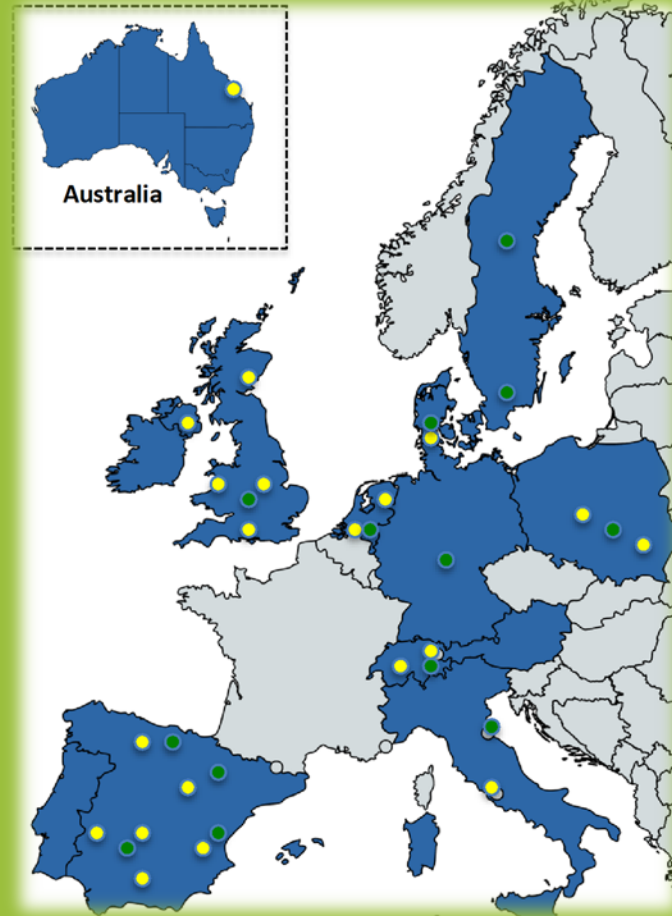


Overall objective

To evaluate and mobilize the adoption of innovative practices applied cross-scale (animal, herd, farm, sector and region) to reduce GHG emissions from livestock farming systems and increase their capacity to dealing with potential climate change impacts.

37 partners // 13 countries

AT	Austria
AU	Australia
CH	Switzerland
DE	Germany
DK	Denmark
ES	Spain
IE	Ireland
IT	Italy
NL	The Netherlands
PL	Poland
PT	Portugal
SE	Sweden
GB	United Kingdom



37 Partners



#	Role	Short Name	Legal Name	Country
1	COO	CSIC	Agencia Estatal Consejo Superior de Investigaciones Cientificas	ES
2	BEN	WR	Stichting Wageningen Research	NL
3	BEN	UNIBO	Alma Mater Studiorum - Universita di Bologna	IT
4	BEN	UPV	Universitat Politecnica De Valencia	ES
5	BEN	WU	Wageningen University	NL
6	BEN	SLU	Sveriges Lantbruksuniversitet	SE
7	BEN	AU	Aarhus Universitet	DK
8	BEN	IAMZ-CIHEAM	Mediterranean Agronomic Institute of Zaragoza (ES). International Centre for Advanced Mediterranean Agronomic Studies	ES
9	BEN	UCD	University College Dublin, National University of Ireland, Dublin	IE
10	BEN	UNIPI	Universita di Pisa	IT
11	BEN	CONSULAI	Consulai, Consultoria Agroindustrial Lda	PT
12	BEN	MVARC	MVARC	PT
13	BEN	PIK	Potsdam-institut fur Klimafolgenforschung Ev	DE
14	BEN	AERES	Stichting Aeres Groep	NL
15	BEN	CRV BV	CRV BV	NL
16	BEN	ICOEL	Innovationscenter for Økologisk Landbrug P/S	DK
17	BEN	UEX	Universidad de Extremadura	ES
18	BEN	PULS	Uniwersytet Przyrodniczy W Poznaniu	PL
19	BEN	PCH	Pig Champ Pro Europa SL	ES
20	BEN	BOKU	Universitaet Fuer Bodenkultur Wien	AT
21	BEN	ANAS	Associazione Nazionale Allevatori It Suini	IT
22	BEN	PIC	Pig Improvement Company España, SA	ES
23	BEN	PROVACUNO	Organización Interprofesional Agroalimentaria De Carne De Vacuno- Provacuno	ES
24	BEN	AEANI	Asociación Española de Criadores de Ganado Vacuno Selecto de Raza Avilena Negra Ibérica	ES
25	BEN	IRIAF	Instituto Regional de Investigación Y Desarrollo Agroalimentario Y Forestal De Castilla-la Mancha	ES
26	AP	FIBL	Forschungsinstitut Fur Biologischen Landbau Stiftung	CH
27	AP	Agroscope	Eidgenoessisches Departement Fuer Wirtschaft, Bildung Und Forschung	CH
28	AP	AGRIFIRM	Agrifirm Group BV	NL
29	AP	Barenbrug	Barenbrug Holland BV	NL
30	AP	UQ	The University of Queensland	AU
31	AP	ABS	Agribusiness Service B.V.	NL
32	AP	DSM	DSM Nutritional Products Ltd	CH
33	AP	UREAD	The University of Reading	UK
34	AP	SRUC	SRUC	UK
35	AP	QUB	The Queen's University of Belfast	UK
36	AP	ORC	Progressive Farming Trust Ltd Lbg	UK
37	AP	PFLA	Pasture-fed Livestock Associationic	UK

Re-understanding
and mobilising adoption
multi-actor approach

Re-map a roadmap
for transition

Re-feeding livestock
for resilience

**Re-
Concept**

Re-design of circular
systems

Re-breeding livestock
for resilience

Re-assessment of livestock
farm systems

Re-managing farm
level for livestock
resilience

Re-Feeding livestock for resilience



To identify and evaluate
low carbon footprint feed materials



To evaluate **grasslands** in
low carbon livestock production



To increase the contribution of
feed supplements
to low carbon livestock production



To make **forage crops and livestock**
more resilient to climate change and volatility

Re-Breeding livestock for resilience



Demonstrate the **potential of animal breeding** in climate change **mitigation** and **adaptation**



To improve **accuracy** and **predictive ability** of **EBV** for **mitigation** and **adaptation** traits



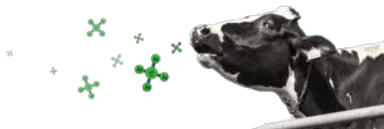
To design **breeding strategies** that **reduce** GHG emission by **10% in 10 years** and **contribute** to adaptation to climate change

Role of animal breeding in climate change mitigation

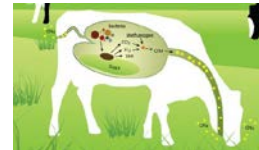
- Evaluate the reduction of CH₄ and CO₂ through selective breeding
- Define traits and combine phenotypes for CH₄ and CO₂ of four countries (more countries under discussion)
- Estimation of EBV for CH₄ and CO₂ traits and evaluate accuracy of EBV

Across country
analysis



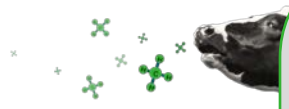
Phenotypes for CH₄ & CO₂
Host genomic data



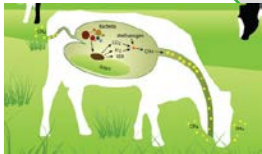
Rumen microbiome
Rumen metagenomic data



Task 3.1 Data



Powerful data set
~ 20,000 cattle phenotyped for CH₄
~ 2,000 cattle with rumen metagenome data



- **The Netherlands:**
 - 7,000 Holstein cows (100 herds: 15,000 cows)
 - Sniffer
 - Microbiome information 1,000 cows in 2023

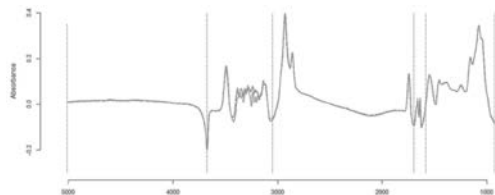
Novel phenotypes and genetics of adaptation to climate change Re-Livestock RESILIENT FARMING SYSTEMS

- Define innovative phenotypes
- Collection of climate data across various European regions
- Estimate genetic parameters
- Determine the –omics behind **heat tolerance**
- cattle and pigs: Local versus mainstream breeds



INSERT PICTURES of PIG & CATTLE BREEDS!!!

MIR as selection criteria for thermotolerance



Ramon et al., 2023

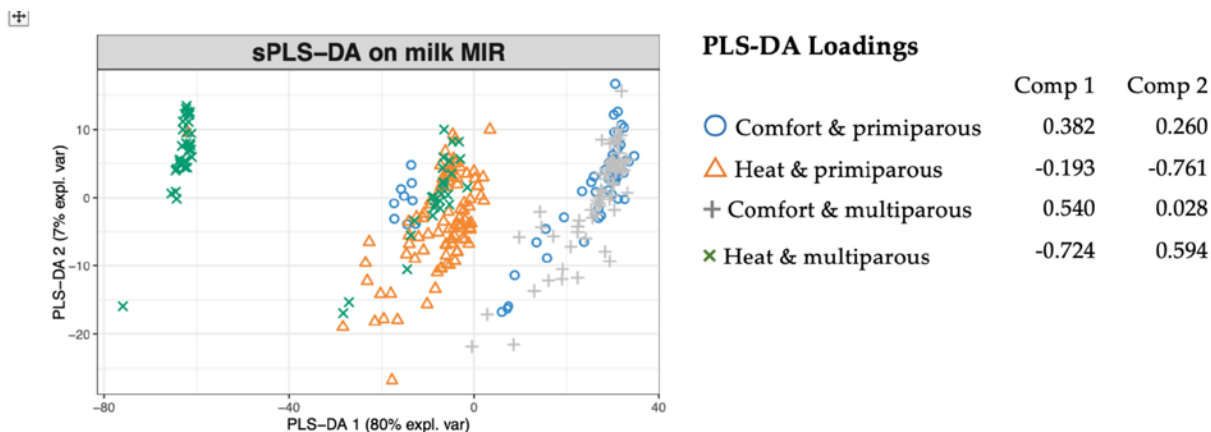


Figure 4. First two components of the PLS-DA analysis from mid-infrared spectra of sheep milk in relation to the physiological status (primiparous vs. multiparous) or the presence or absence of environmental stressors (comfort vs. heat stress).

Genetic evaluation tools and breeding strategies

Genomic prediction

- Include biological/functional information
- GWAS, selection signatures, biomarkers

Breeding strategies

- lower the environmental impact of livestock production systems without adverse effects
- increase the adaptation of livestock to climate change
- Selection indices for different future climate scenarios

Re-managing farm level for livestock resilience



Develop
**husbandry &
housing
techniques** for
mitigation and
adaptation



Enhance
**nutrient
recycling and
C
sequestration**



Novel
**agroforestry
combinations
and grassland
management**



Improve
**decision
making** based
on **PLF**

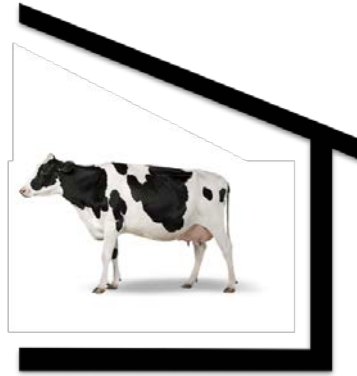


Re-managing farm level for livestock resilience



Develop
**husbandry &
housing
techniques** for
mitigation and
adaptation

Husbandry practices for cattle in indoor systems



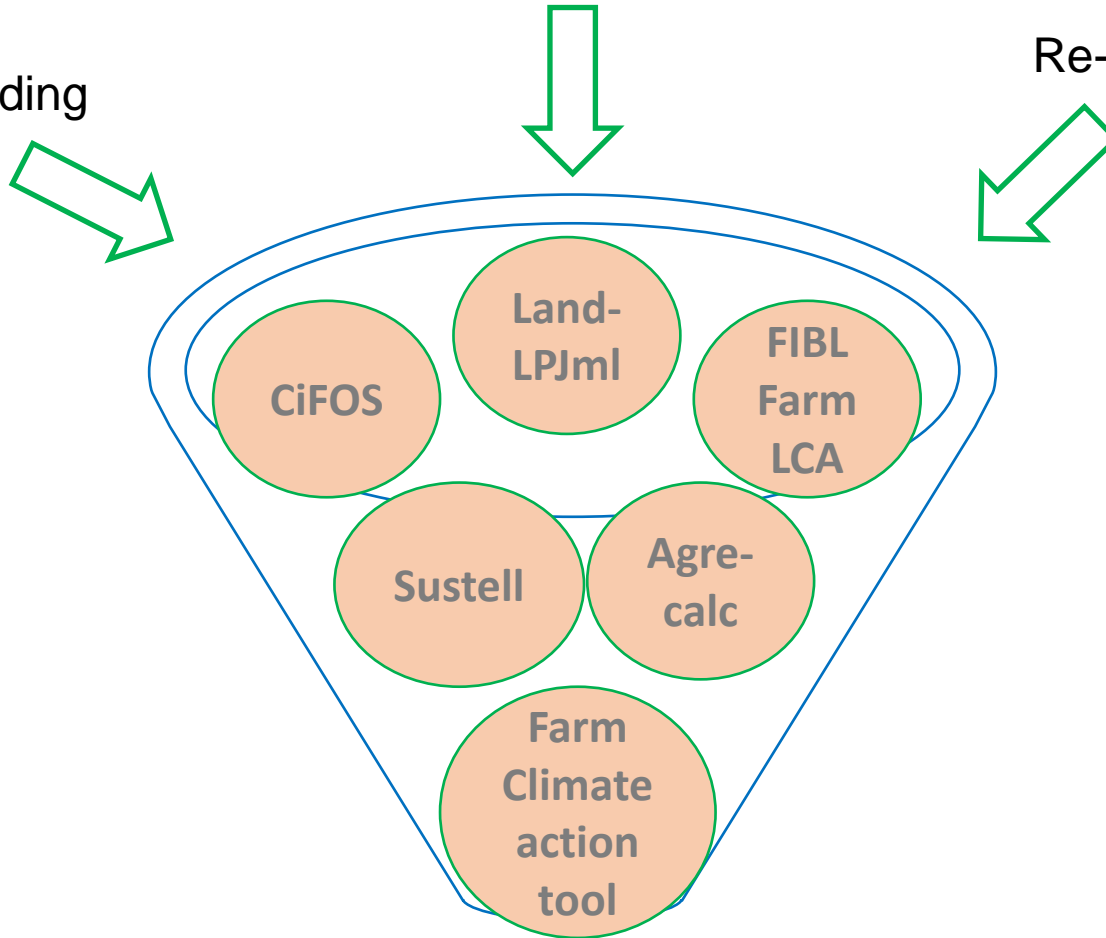
- Shadow, roof insulation, self-controlled showers.
- Calves (social management, colostrum), feedlot (size groups , densities...)
- PLF devices as non-invasive indicators

Re-Model – Re-Toolbox

Re-Breeding

Re-Feeding

Re-Managing



Thank You!

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www.re-livestock.eu



Re-Livestock
RESILIENT FARMING SYSTEMS



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