EAAP Porto 2022

UNDERSTANDING THE GREENHOUSE GAS AND AMMONIA MITIGATION STRATEGIES IN FRENCH DAIRY FARMS

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The CCC Farming project

Production efficiency and climate protection

January 2020 — 40 months — June 2023

Develop cattle production systems that reduce GHG and ammonia emissions, while maintaining the socio-economic prospects of the farm business

Provide an **assessment of the environmental performance of a network of farms**

- Agri-environmental assessment tools
- Simple methods for measuring emissions
- Point of view of farmers on climate issues, interests / obstacles, in order to implement practices to mitigate gas emissions (GHG and NH3)

CAP'2ER performed on farm

Gaseous emissions measurements

Approach to “Climate Issues" Questionnaire

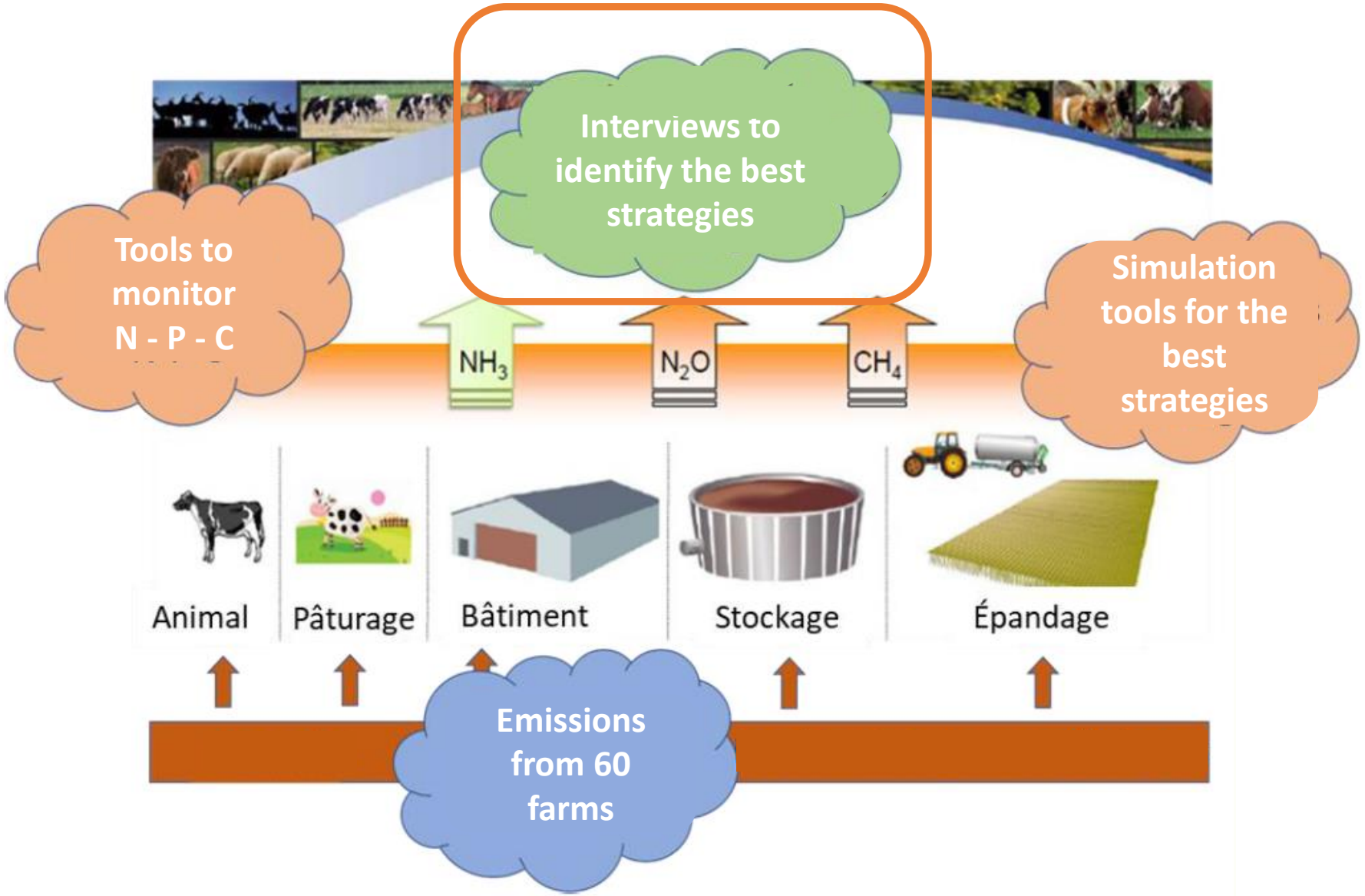
1 (2021)

4 (2021 et 2022)*

2 (early 2021 and end 2022)

To study and provide information on the **effect of a combination of practices that reduce gaseous emissions** at the agricultural system level

The CCC Farming project



Italie

Pays Bas

Lettonie

Allemagne

Pologne

Lituanie

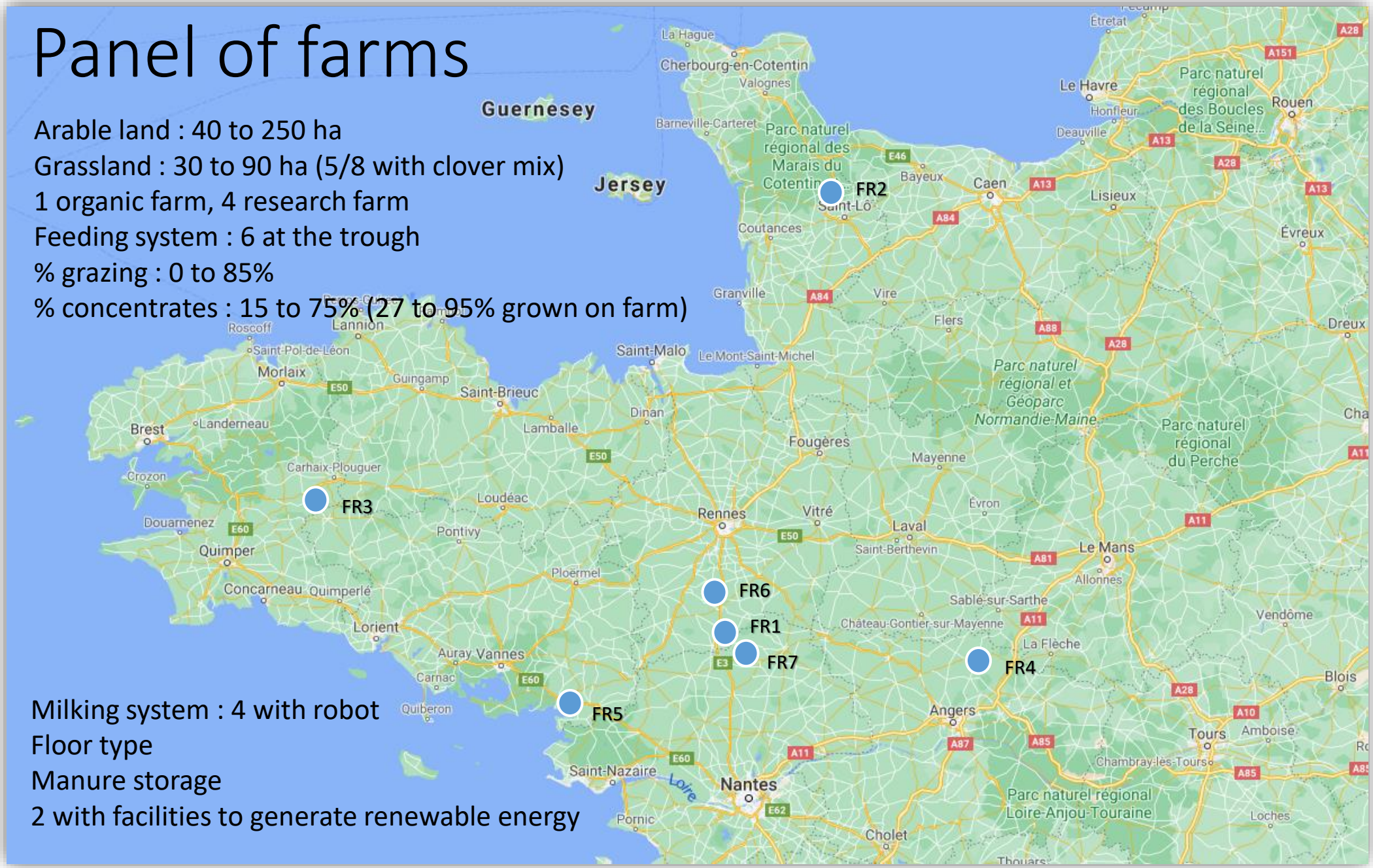
Royaume-Uni

France

Panel of farms

Arable land : 40 to 250 ha
Grassland : 30 to 90 ha (5/8 with clover mix)
1 organic farm, 4 research farm
Feeding system : 6 at the trough
% grazing : 0 to 85%
% concentrates : 15 to 75% (27 to 95% grown on farm)

Milking system : 4 with robot
Floor type
Manure storage
2 with facilities to generate renewable energy



Panel farms and farmers

Main farm characteristics

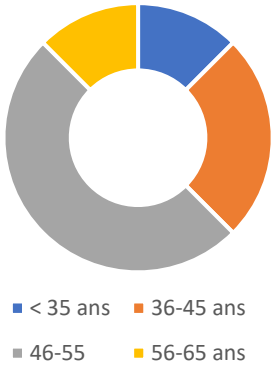
2,5 to 11 employees

4/8 from 50 à 90 k€ / year

4/8 have 30% of their income from diversification or non-farm activities

5/8 have obligations to implement sustainable practices: organic, HEV…

Main farmer characteristics



6/8 > 20 years of expérience

6/8 > educated at tertiary level

Farmers'networking and information sources

All use agricultural contractors

7/8 > 20 meeting farmers * / year

7/8 engaged in **multiple research projects** concerning **environment or sustainability**

For 3/8, half of the **events monitored** concern the **environment or sustainability**

5/8 involved in one or more unions, cooperatives or associations

** Network : **advisors** and researchers, milk controller, vets, **accountants**, **administrators**, peers, commercials, cooperatives*

** Events : Technical days and open farms, farmers' groups, unions meetings*

Level of knowledge of the link between agricultural practices and GHG & carbon emissions

Perception between agriculture and environment

Awareness of their responsibility on the environment BUT overestimated by the society (8/8)

Ready to make improvements BUT with conditions:
- Income maintenance
- A collective commitment

Belief that sustainable agricultural practices can create business opportunities (6/8)

Farmers' understanding of GHG and NH_3

All have **heard of GHGs, carbon footprints and NH_3**, and all believe that agriculture contributes:

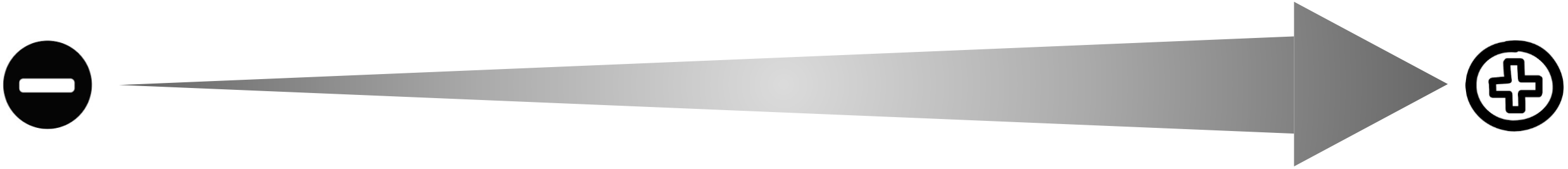
- Significantly (4/8) or slightly (4/8) to GHG emissions
- A little bit (2/8) or a lot (6/8) to NH3 emissions

6/8 producers have already assessed the carbon footprint on their farm (via CAP2ER (5/8))

Importance of farm management for the long-term financial viability of the farm

Not important

Very important



Technology and automation

5/8 to try new technologies,
2/8 ready to do so (2/8)

"We can't find any more employees in breeding"

Farm management (contracts, HR)
Machinery / fuel
Meadow and pasture management

Animal management: feeding, breeding, health, housing
Fertilization / Spreading
Irrigation / Drain
Field crop management

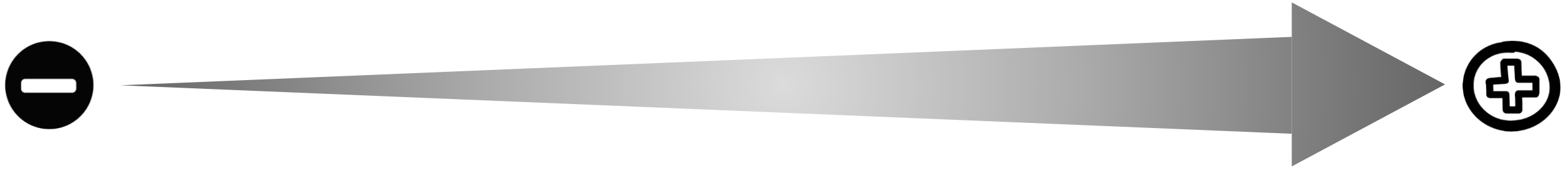
Breeder well-being: workload, health, agribashing

Peer-to-peer exchanges

Importance farm management on GHG and Carbon emissions

Not important

Very important



Animal health

Irrigation / Drain

Farm management (contracts, HR)

Different environmental management standards for different stakeholders

Personal conviction

Territorial Climate Air and Energy Plan

Societal expectations

"Be careful not to affect negatively the milk production"

Animal management: feeding, breeding, housing

Fertilization / Spreading

Field crop management

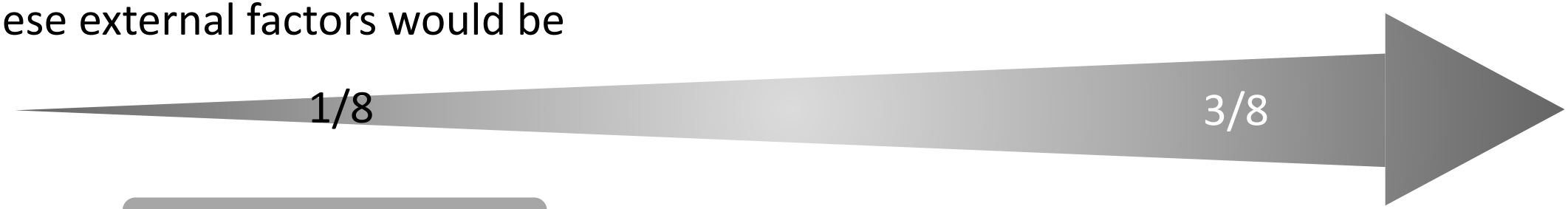
Meadow and pasture management

Machinery / fuel

Technology and automation

Changes on the farm

These external factors would be



CAP Evolutions

Social Evolutions
- « Green » Production
- Data increase

Climate change

Economical context
- Market
- Requests from the dairy company
- Transmission of the farm

Future changes considered to adapt to new external factors

Creation of renewable energy

Diversification
- Sale crops
- Miscanthus

Increase of food autonomy
(proteins / grasslands)

3/8

Changes to ↘ GHG emissions or ↗ carbon sequestration

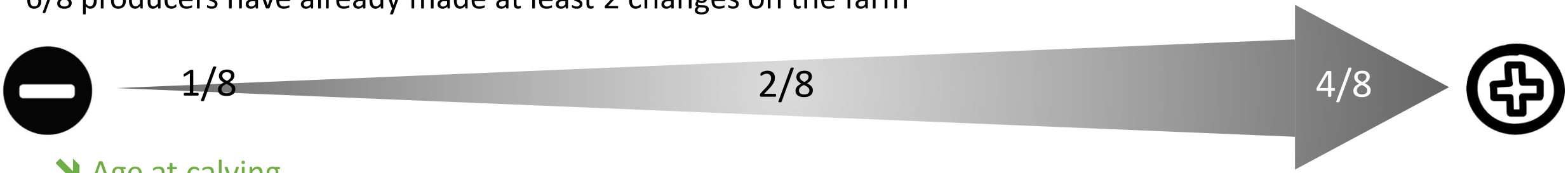
Levers to motivate changes in practices

- **First levers:** those linked to **public policies** (increased regulatory pressure, education on sustainable practices) or **to markets** (dairies)
- **Second levers:**
  - Economic: increased **subsidies**
  - Social: increased **local community pressure**

Changes already made

Impact on global emissions (GES)
Impact on Methane (CH4)
Impact on Carbone (CO2)
Impact on Ammoniac (NH3)

6/8 producers have already made at least 2 changes on the farm



↘ Age at calving
Methanization
Optimization of energy consumption

Liquid manure spreading and/or burying method
No-till practices
↗ meadows and maintenance of hedgerows

Animal feed (rapeseed instead of soya)

GHG mitigation measures or ↗ carbon sequestration

Changes considered in the next 5 years (7/8)

8/8 willing to make changes

No-till practices or ↘ tillage
↗ Share of hedgerows

Liquid manure spreading and/or burying

Animal feed (feed efficiency)
Methanization

Optimization of energy consumption

Impact on global emissions (GES)
Impact on Methane (CH4)
Impact on Carbone (CO2)
Impact on Ammoniac (NH3)

"I am still in this logic of change, but I don't know which ones yet"

"We reached the limit of what we could do on soil management and feeding, with a lot of difficulties with green feeding"

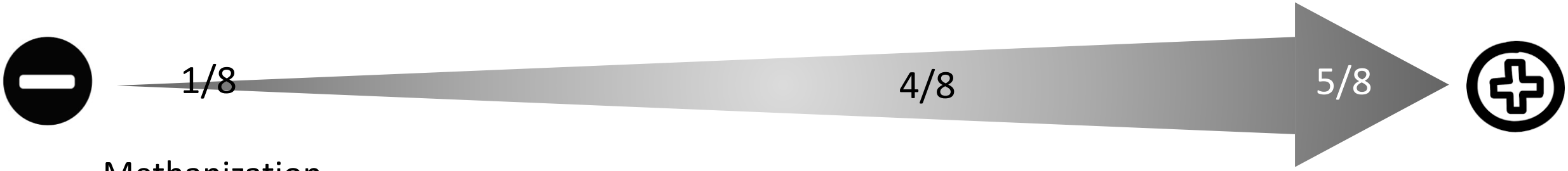
Changes considered but abandoned (3/8)

To expensive, finally not adaptable on the farm, too much extra work, lack of knowledge

Changes to ↘ NH3 emissions

Changes already made

7/8 producers have already made at least 2 changes on the farm



Methanization

Building ventilation

Manure and slurry management

Liquid manure spreading and/or burying mode

Changes considered in the next 5 years (5/8)

Manure and slurry management

Building layout (stalls)

Among those who do not plan to change in 5 years:

- One has just launched his new project > changes are already done
- One is waiting for the results of ongoing experiments

Conclusion

French panel stands out for its :

- **Sensitivity to environmental issues**
- **Curiosity to seek information on this topic**
- **Openness to innovative practices** that improve the environmental footprint of systems

Field / Manure spreading

Use of covercrops

Reduced tillage and restored pastures

Manure application techniques: slurry applied close to ground or buried

Storage

Covering manure storage

Composting manure

Covering liquid manure tanks with passive methane production

Anaerobic digester

Feed and crop production

- High digestable diet
- More hours on pasture
- Self-produced protein feed

Buildings

- Increasing the scrapping frequency
- Solid/liquid manure separation
- Innovative floors and bedding

Others

- Burning methane
- Solar panels

Conclusion

Very good knowledge about practices and their impact on environmental issues

⇨ Explained by :

- The farmers profiles : **experimented and well educated** (from experimental farm or true business owner)
- Diversified **french consulting panorama**
- Impetus generated by european and national **environnemental policies and regulations**

Even on this king of panel **some practices not yet well known ⇨ to improve**

➔ GES Mitigation trend when farmers are aware of the link practices / environment

BUT

- Those who have the best knowledge are not the most virtuous : **a lot system dependant**
- For a similar situation (e.g. animals in a building), gas emissions can **vary a lot depending on the facilities and practices** (e.g. regular scraping)

Knowledge is necessary but not sufficient

Limits between virtuous practices and technical & financial reality

Thank you for your attention

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