





# Economic assessment of greenhouse gas mitigation on livestock farms

LiveM 2016 Conference, 15-16 June 2016, Potsdam

Vera Eory<sup>1</sup>, Philippe Faverdin<sup>2</sup>, Laurence Shalloo<sup>3</sup>, Donal O'Brien<sup>3</sup>, Nick Hutchings<sup>4</sup>, Marcia Stienezen<sup>5</sup>

<sup>1</sup>SRUC, <sup>2</sup>INRA, <sup>3</sup>TEAGASC, <sup>4</sup>Aarhus University, <sup>5</sup>Wageningen UR

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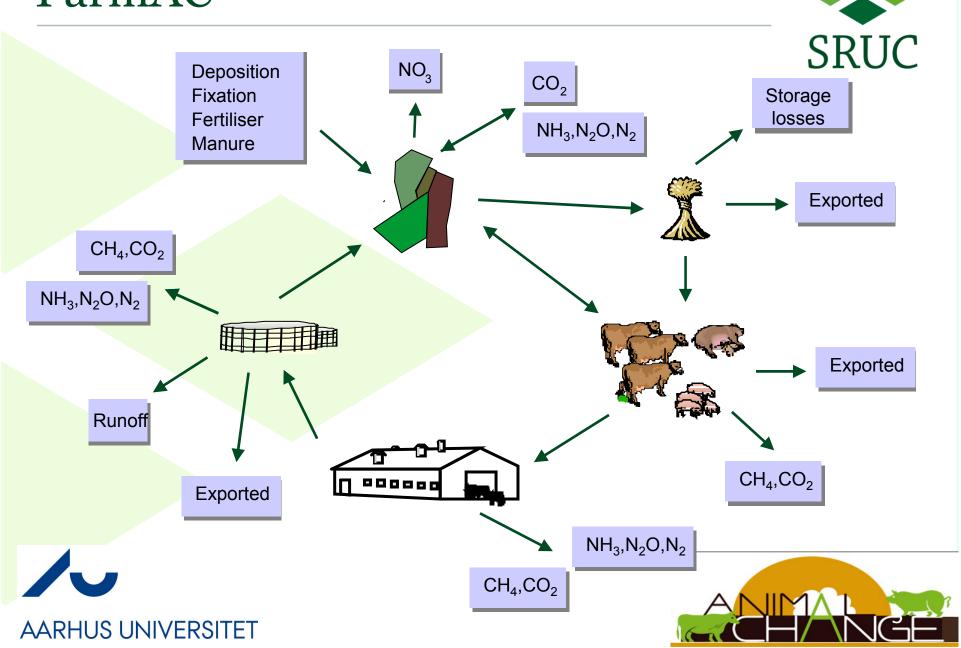
#### Farm level assessment



- GHG, N: biophysical model (FarmAC)
- Finances: partial budgeting
- Farms:
  - Maritime grass-based dairy
  - Maritime grass-based beef
- Mitigation measures:
  - Reduced N fertilisation, grass-clover mix, improved pasture quality, longer grazing, nitrification inhibitors, improved genetics of dairy, earlier finishing of beef



#### FarmAC



## Farms' description summary



|                                      | Maritime<br>dairy | Maritime<br>beef |
|--------------------------------------|-------------------|------------------|
| Farm size [ha]                       | 35.2              | 47.2             |
| Grazed pasture [ha]                  | 21.8              | 24.5             |
| Grass silage [ha]                    | 13.4              | 22.7             |
| Number of cows [head]                | 66                | 35               |
| Urea used [kg N/yr/farm]             | 2,532             | 0                |
| CAN used [kg N/yr/farm]              | 2,686             | 3,211            |
| Concentrate imported [kg DM/y/farm]  | 49,126            | 27,978           |
| Grass silage imported [kg DM/y/farm] | 1,851             | -7,087           |



# Financial data summary



| Urea price [EUR(2011)/t N]                    | 878   |
|---|-------|
| CAN price [EUR(2011)/t N]                     | 1,185 |
| Concentrate price [EUR(2011)/t fresh matter]  | 284   |
| Grass silage price [EUR(2011)/t fresh matter] | 30    |
| Reseeding cost [EUR(2011)/ha]                 | 250   |
| Clover seed price [EUR(2011)/kg]              | 8     |
| DCD price [EUR(2011)/kg]                      | 7     |
| Milk price [EUR/kg]                           | 0.345 |
| Average heifer/steer price [EUR/kg LW]        | 1.9   |



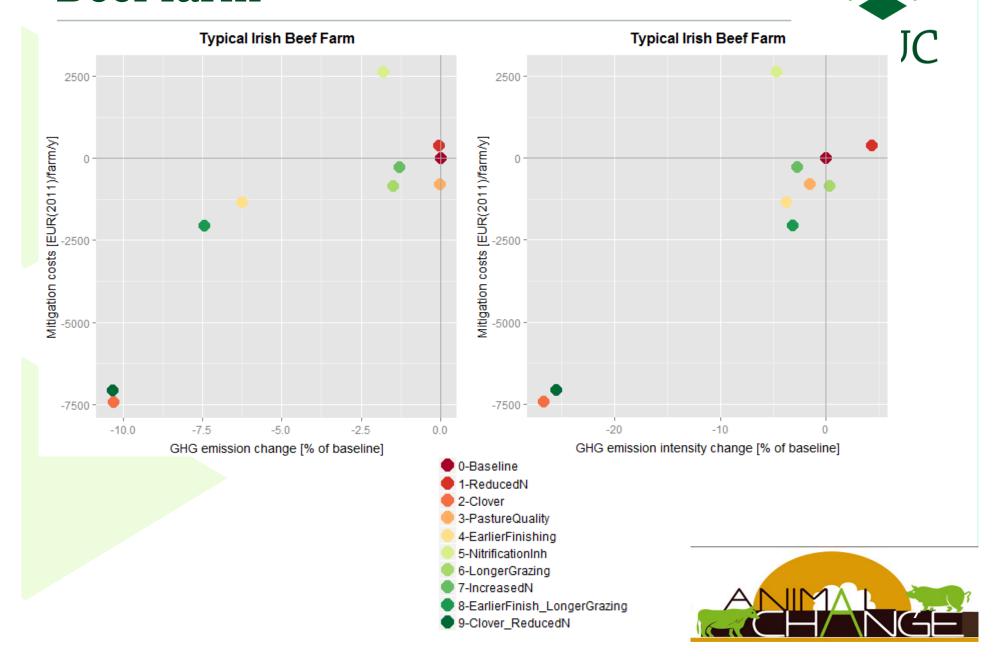
## Mitigation option assumptions



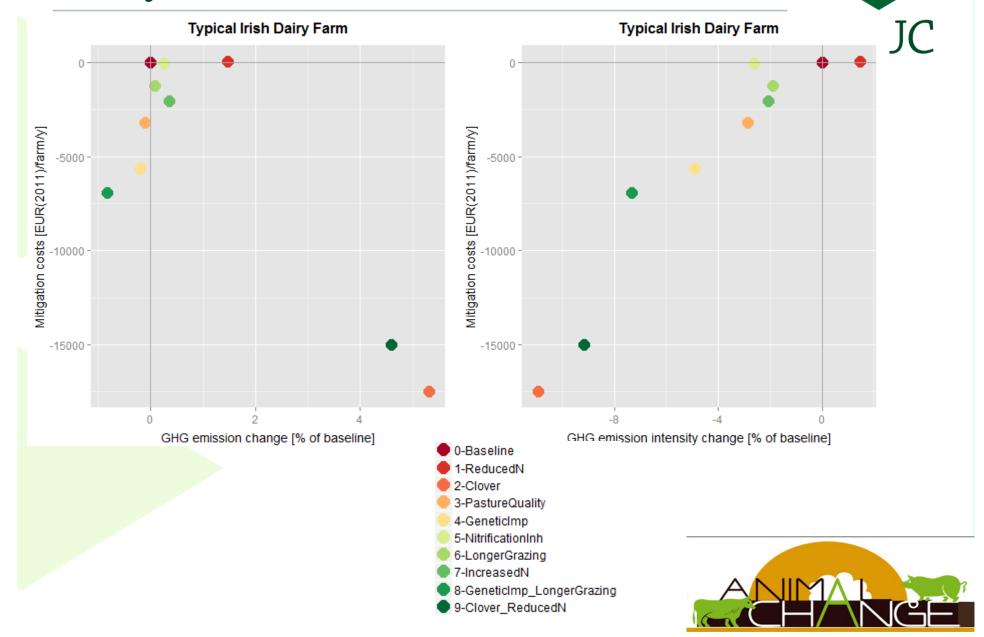
- Reduced N fertilisation
  - -5% synthetic N, -4-6% grass yield, +3-4% forage utilisation
  - No technical cost
- Grass clover mixture (7-10% clover)
  - -16% synthetic N, same grass yield, +4% milk yield/growth rate
  - Seeding cost €8/ha/y, no change in reseeding frequency
- Improving pasture quality trough better management
  - Increased digestibility (assuming rotational grazing), +2% milk yield /growth rate
  - Reseeding frequency increased
- Improved genetics (dairy farm only)
  - +5% milk yield/growth rate
  - No technical cost (assumption: artificial insemination in the baseline)
- Earlier finishing (beef farm only)
  - -8% synthetic N,
  - No technical cost
- Nitrification inhibitors
  - -9% synthetic N, 10kg/ha/y DCD, +2% milk yield/growth rate
  - DCD cost €17/ha/y
- Longer grazing (+5 days)
  - -0.5% synthetic N, +1% milk yield/growth rate
  - No technical cost



### Beef farm

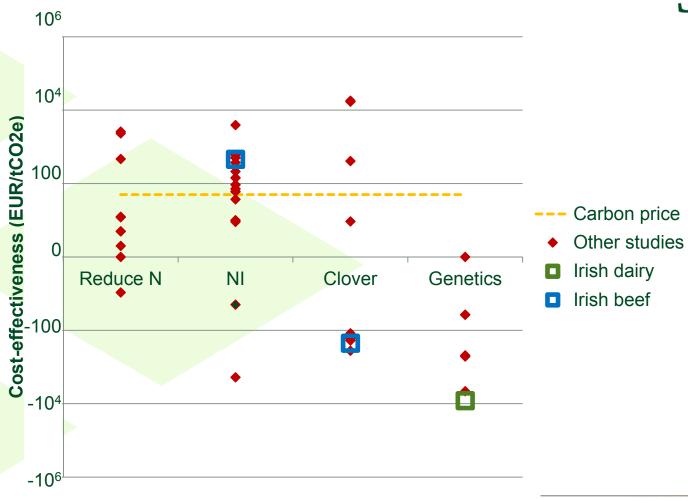


# Dairy farm



## Comparison with other studies





Graus et al. 2004, Weiske et al. 2007, Amann et al. 2008, ICF 2008, Moran et al. 2008, Bates et al. 2009, Hasegawa et al. 2010, Hoglund-Isaksson et al. 2010a, Schulte et al. 2012, ICF 2013



#### Conclusions



- Emission intensity or absolute reduction?
  - Currently mixed policy messages
- Mitigation by individual options are low
  - Need for "packages"
- Most of the selected measures have negative costs (technical costs only!), though many implies improved management practice
  - Barriers (time/effort of implementation, perceived risk of reduced yield, lack of information/trust)
  - Framing the message: focus on efficiency and profitability
- Both implementation and effects are different on different farms
  - Information/advice should be farm-specific as much as possible









### Thank you!

vera.eory@sruc.ac.uk

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