Climate Change – what agriculture can do

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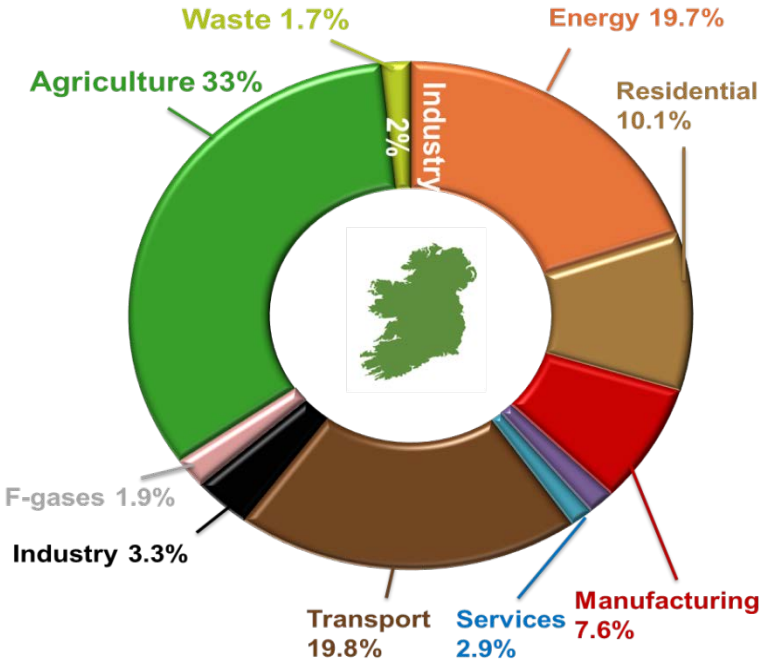
2018 – a very difficult year

- Several extreme weather events … indicative of *Climate Change* (CC)
- Challenging fodder situation but highly variable
- Substantial additional costs; reduced incomes; and stress
- What can agriculture do to combat CC?

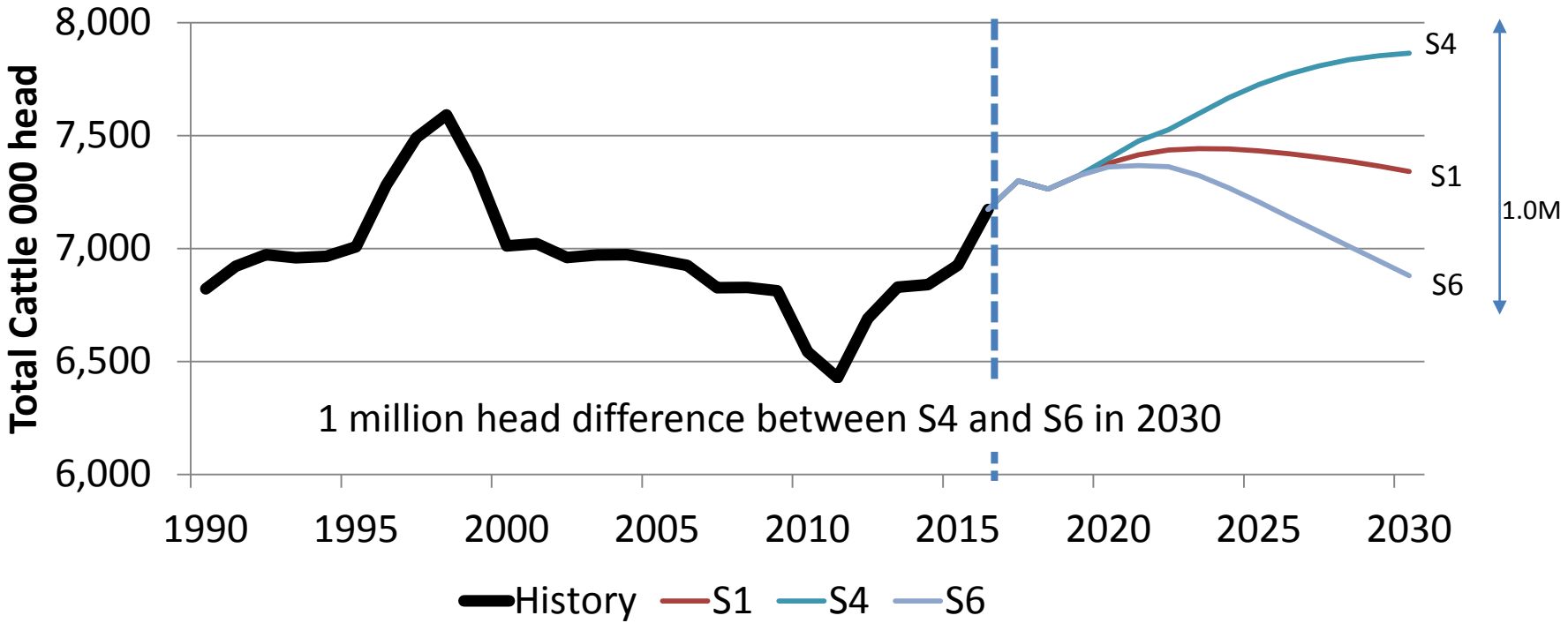
Background

- Irish agriculture comprises
  - 33% of Irish GHG emissions
  - 45% of Irish *non-Emissions Trading Scheme* (ETS) GHG
- GHG targets
  - 20% emissions reduction by 2020
  - 30% non-ETS reduction by 2030

    (EU 2030 Effort Sharing) with up to 10% flexible mechanisms allowable due to LULUCF credits and transfers from ETS

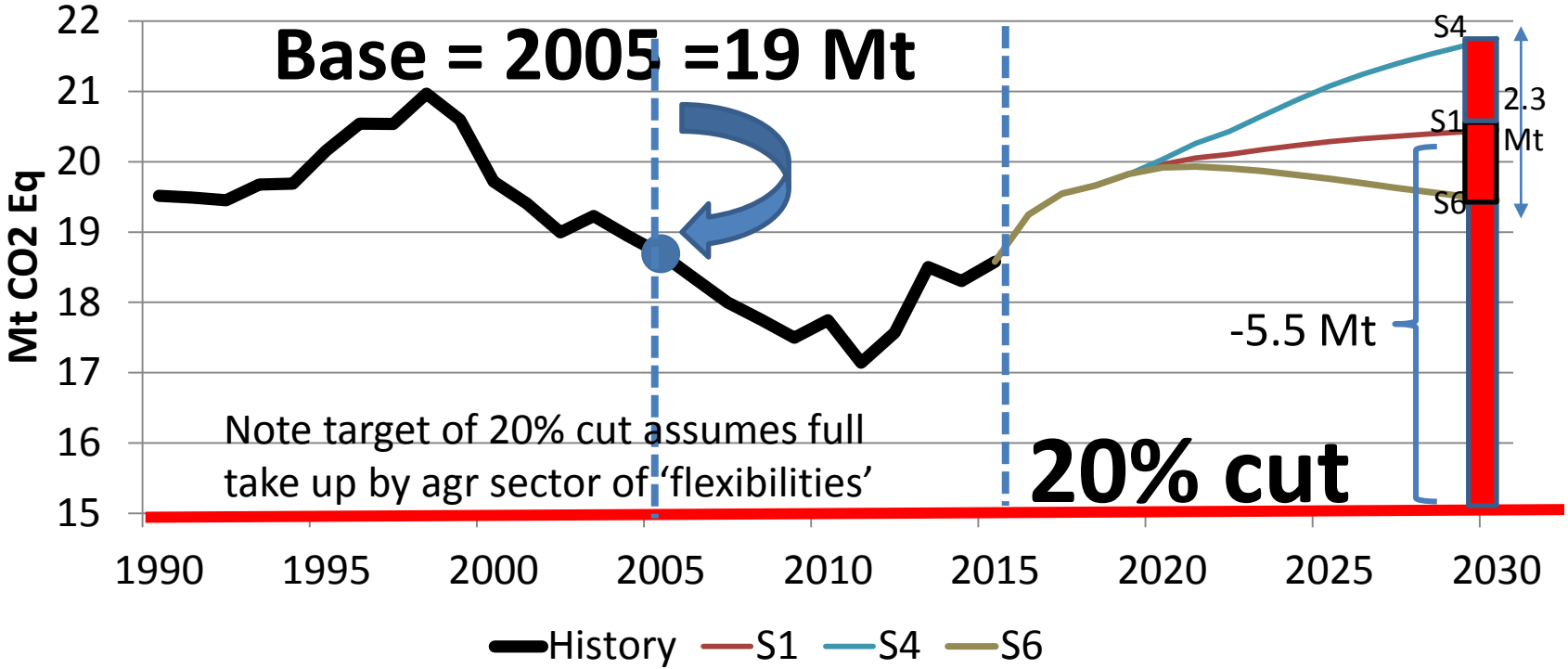


Total Cattle Population: Scenarios



Source: FAPRI-Ireland Model

GHG emissions with NO mitigation actions



Source: FAPRI-Ireland Model

Three Mitigation Pathways to 2030

1. Reduce **Agricultural Methane** and **Nitrous Oxide**
   - lower emissions from animals, animal waste and fertiliser
2. Sequester **Carbon** (LULUCF)
   - Via land use change and forestry
3. Energy efficiency & **biofuels** and **bioenergy** production
   - to reduce overall energy usage on farms
   - to displace fossil fuel emissions

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1. Agricultural Abatement

Measure	Mean ann. saving 2021-30	Saving 2030
1. Improved Beef Maternal Traits (CH_4)	0.03 Mt	
2. Beef Genetics: live-weight gain (CH_4)	0.06 Mt	
3. Dairy EBI (CH_4)	**0.43 Mt**	
4. Extended grazing (CH_4)	0.07 Mt	
5. Nitrogen-use efficiency (N_2O)	**0.10 Mt**	
6. Improved animal health (CH_4)	**0.10 Mt**	
7. Sexed Semen (CH_4)	0.02 Mt	
8. Inclusion of Clover in pasture (N_2O)	0.07 Mt	
9. Change Fertiliser Type* (N_2O)	**0.52 Mt**	
10. Reduced crude protein in pigs* (N_2O)	0.05 Mt	
11. Draining wet mineral soils (N_2O)	**0.20 Mt**	
12. Slurry amendments* (CH_4)	0.03 Mt	
13. Adding Fatty Acids to dairy diets (CH_4)	0.03 Mt	
14. Low-emission slurry spreading* (N_2O)	**0.12 Mt**	
Total	**1.85**	**3.07**

* Double dividend as it also reduces ammonia emissions

2. Land-Use Sequestration

Measure	Mean ann. saving 2021-2030	Saving 2030
15. Grassland Mgt.	0.26 Mt	
16. Water table mgt. of org. soils	0.44 Mt	
17. Forestry	**2.10 Mt**	
18. Tillage Mgt – Cover crops	0.10 Mt	
19. Tillage Mgt – Straw incorp.	0.06 Mt	
Total	2.96	**3.89**

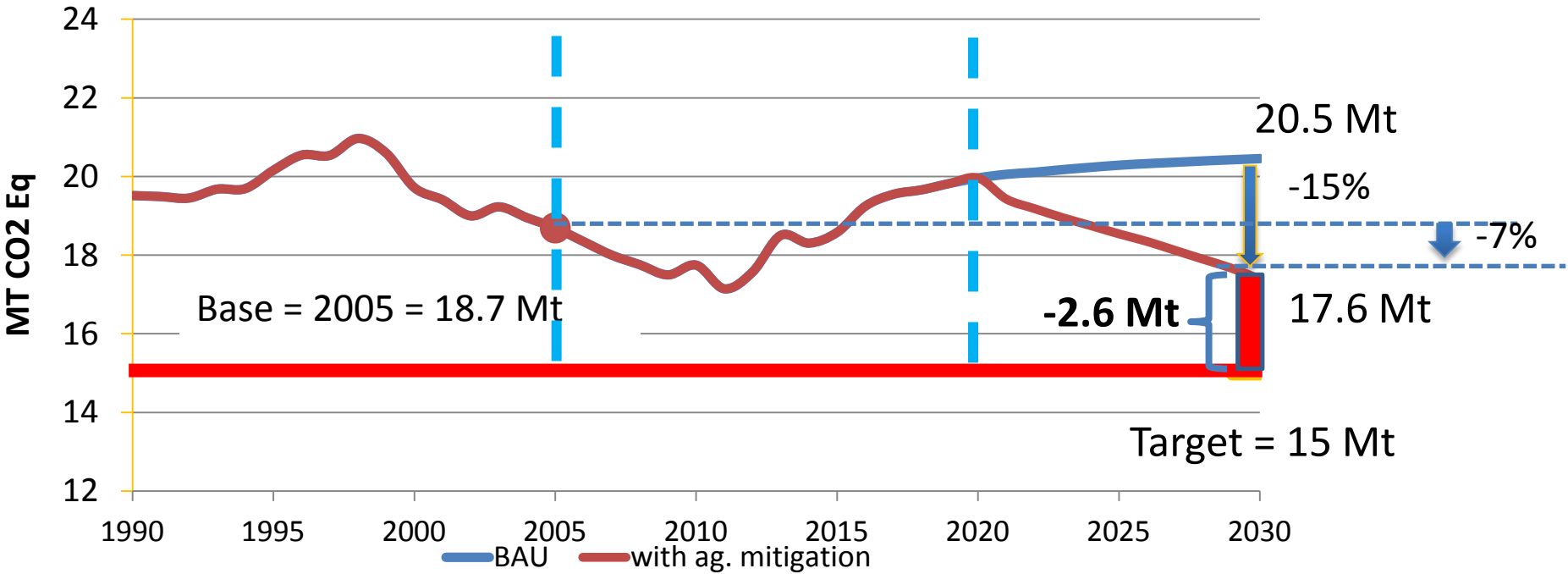
3. Energy Efficiency, Bioenergy and Biofuels

Measure		Mean ann. saving 2021-30	Saving 2030
20.	Energy efficiency on farm	0.03 Mt	
21.	**Wood Biomass* for energy**	**0.76 Mt**	
22.	SRC & Miscanthus for Heat	0.11 Mt	
23.	SRC for Electricity	0.10 Mt	
24.	Anaerobic Digestion**	0.22 Mt	
25.	Biomethane	0.15 Mt	
Total		**1.37**	**2.03**

*thinnings and sawmill residues

**slurry and grass for CHP

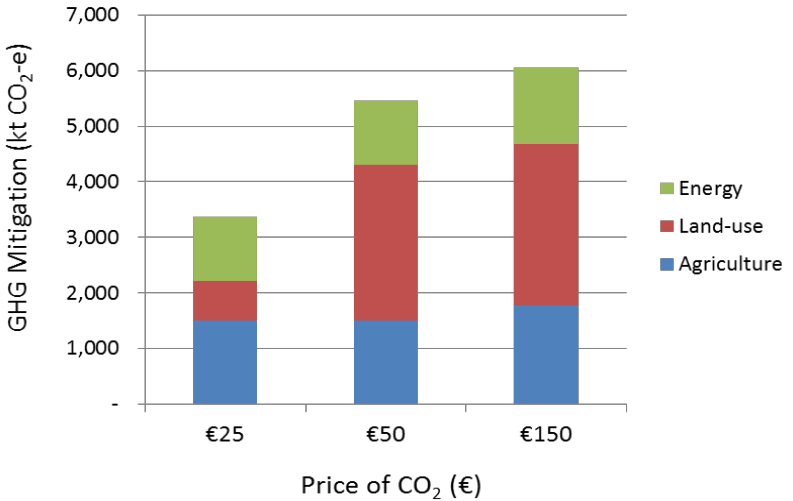
Impacts on 2030 GHG targets
S1 Scenario with mitigation



Associated Costs

GHG mitigation

- Most (>85%) mitigation < €50/t CO_2e
  - Agricultural Mitigation generally cheaper
  - Land Use and Energy more expensive
- Farm level agricultural efficiencies
  - e.g better breeding
  - can *potentially* save €136m p.a.
- Technical measures
  - cost €157m p.a. for Ag, Forestry and Land Use
- Bioenergy costs
  - calculated at €58m p.a.
  - but higher uncertainty about feasibility



Conclusions

- **WARNING:** Across the world there is a poor take up of GHG mitigation actions by the ag sector
- Without mitigation, Ag GHG emissions are likely to increase
  - Mainly due to increased dairy production
  - Which would lead to a larger cattle population
- Significant mitigation potential exists
  - But these solutions exist on paper only
  - Significant advisory input required plus
  - Policy measures to encourage uptake of mitigation measures

Thank you