



Climate Change – what agriculture can do

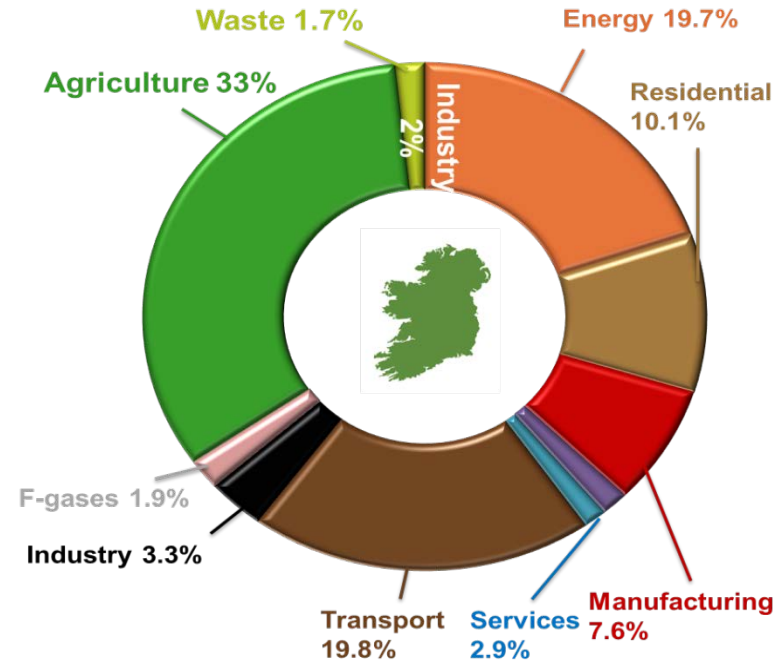
Professor Gerry Boyle, Director Teagasc
Presentation to Briefing for Oireachtas Members and MEPs
October 24th 2018

2018 – a very difficult year

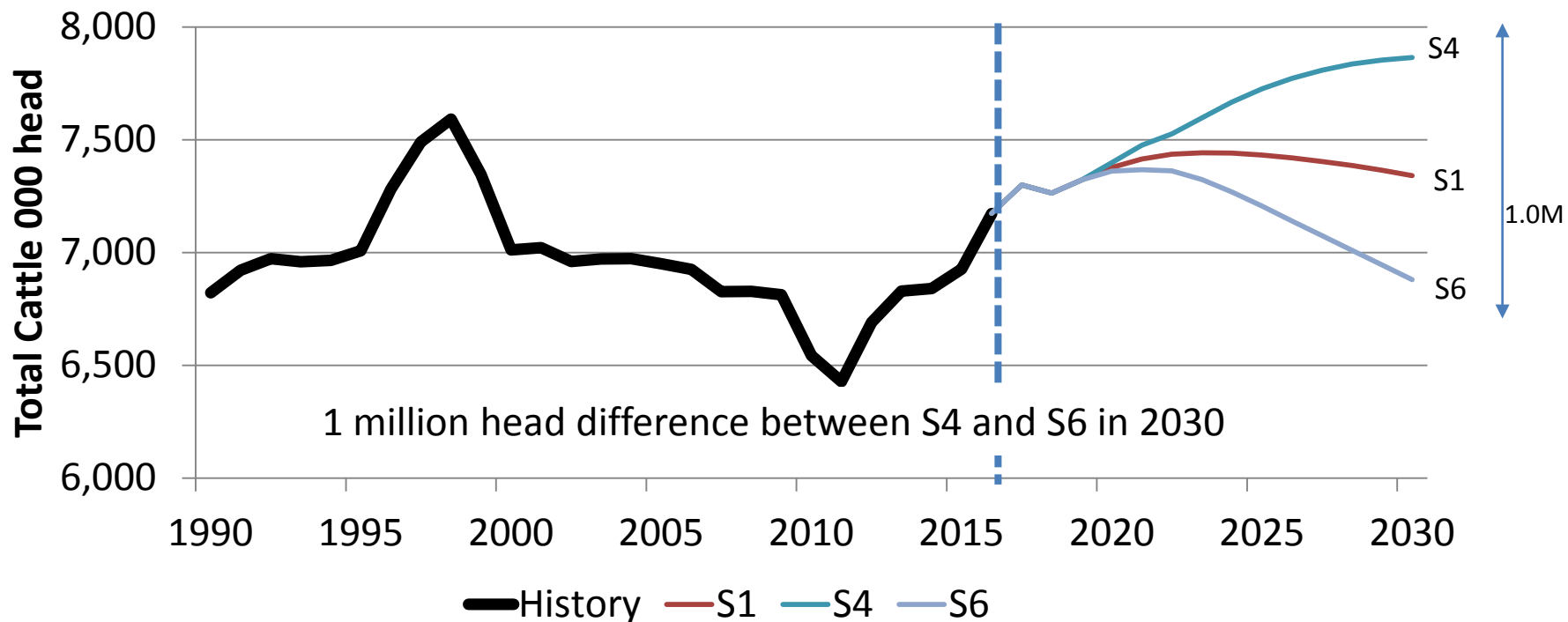
- Several extreme weather events ... indicative of *Climate Change (CC)*
- Challenging fodder situation but highly variable
- Substantial additional costs; reduced incomes; and stress
- What can agriculture do to combat CC?

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

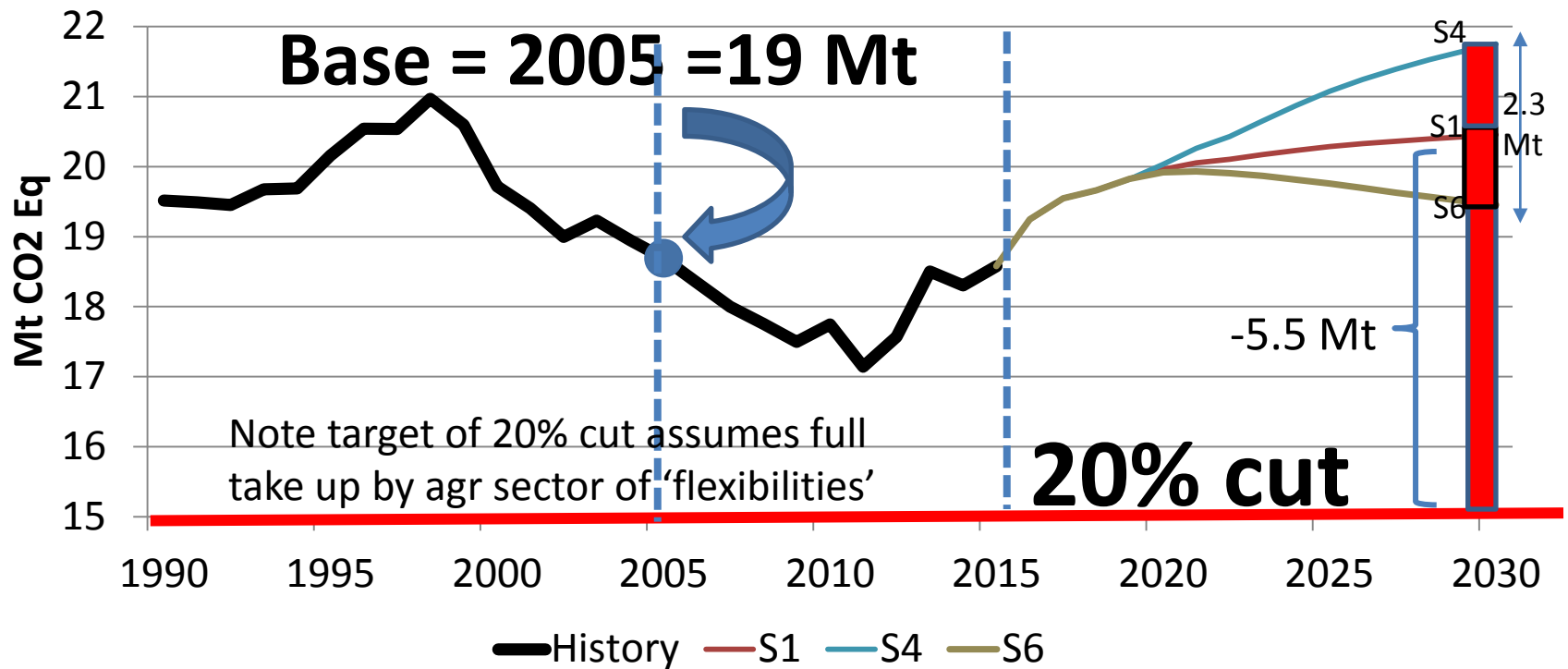


Total Cattle Population: Scenarios



Source: FAPRI-Ireland Model

GHG emissions with NO mitigation actions



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

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 (CH₄)	0.43 Mt	
4. Extended grazing (CH ₄)	0.07 Mt	
5. Nitrogen-use efficiency (N₂O)	0.10 Mt	
6. Improved animal health (CH₄)	0.10 Mt	
7. Sexed Semen (CH ₄)	0.02 Mt	
8. Inclusion of Clover in pasture (N ₂ O)	0.07 Mt	
9. Change Fertiliser Type* (N₂O)	0.52 Mt	
10. Reduced crude protein in pigs* (N ₂ O)	0.05 Mt	
11. Draining wet mineral soils (N₂O)	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* (N₂O)	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

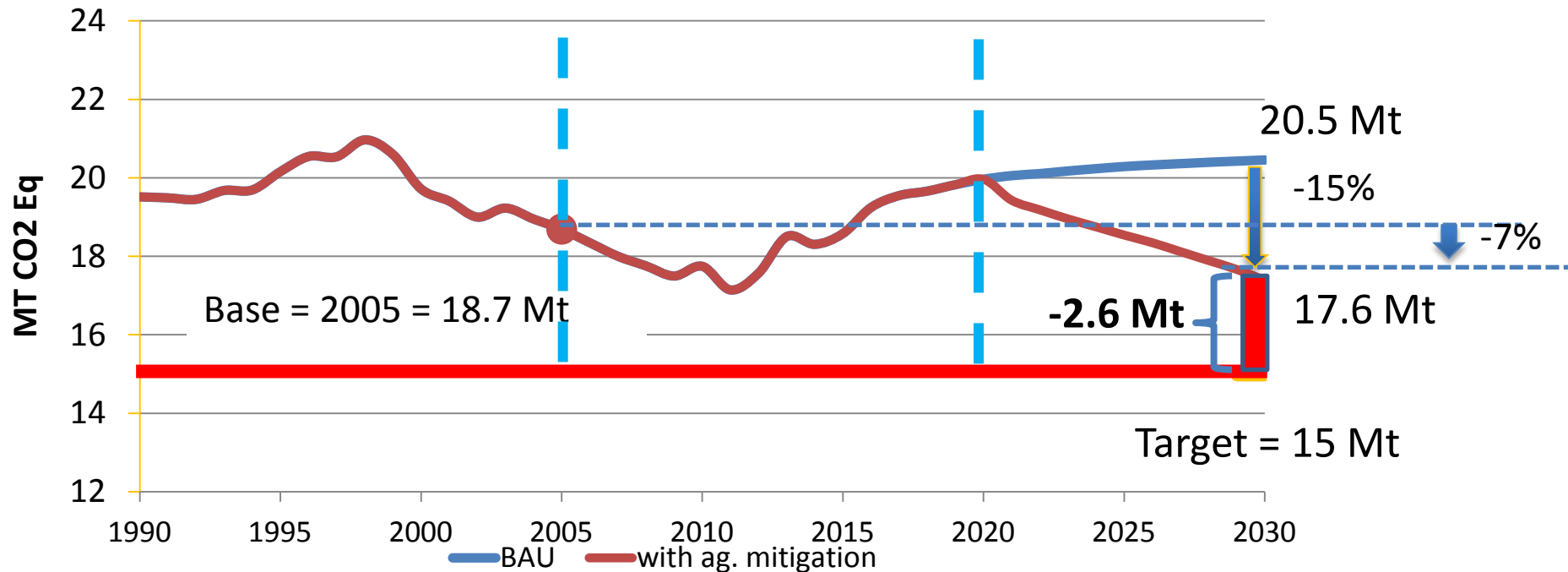
Measure	Mean ann. saving 2021-30	Saving 2030
20. Energy efficiency on farm	0.03 Mt	
21. Wood Biomass* for energy	0.76 Mt	
22. SRC & Miscanthus for Heat	0.11 Mt	
23. SRC for Electricity	0.10 Mt	
24. Anaerobic Digestion**	0.22 Mt	
25. Biomethane	0.15 Mt	
Total	1.37	2.03

*thinnings and sawmill residues

**slurry and grass for CHP

Impacts on 2030 GHG targets

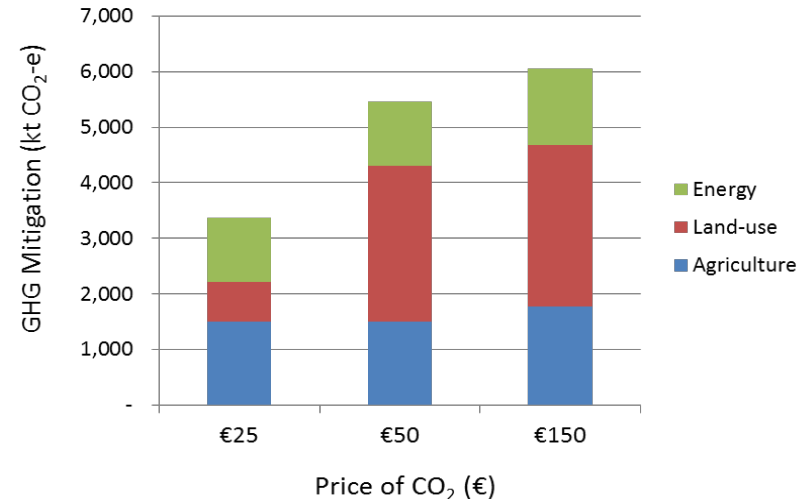
S1 Scenario with mitigation



Associated Costs

GHG mitigation

- Most (>85%) mitigation < €50/t CO₂e
 - 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