A discounted cash flow analysis of producing silage as a feedstock for Anaerobic Digestion in Ireland

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Introduction

- Anaerobic Digestion (AD) has crucial role in the circular bioeconomy and reduce Green House Gas (GHG) emissions.
- Agriculture target to reduce emissions by **20% to 33%** by **2030**.
- Grassland accounts for over 90% of the utilizable agricultural area (UAA).
  - Pasture based systems.
  - Requirement to preserve silage for the winter housing period.
- Silage is a suitable feedstock for AD
  - No land use change
  - Pre-existing knowledge and experience in the farming community

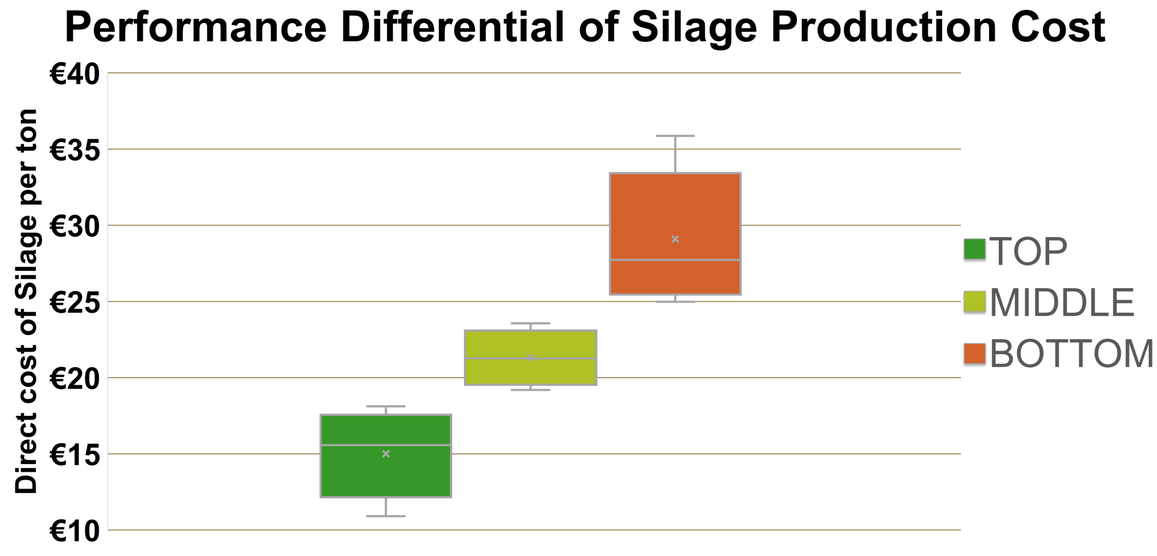
Method

- Data from the **Teagasc, National Farm Survey**.
  - Unbalanced farm-level data for 2018-2020
- The issues of scale are abstracted by evaluating on a per hectare basis
  - Minimum farm production quantity of 56 tons
  - Contractors used for works carried out.
- The discounted cash flow analysis used to evaluate new enterprise
  - 5 year time horizon
  - Discount rate 5%
  - Inflation 2.3%

Research Aims

- Asses existing silage production at farm level in Ireland in terms of direct cost of silage production and current yields
- Use a discounted cash flow model of silage production to compare economic returns from silage to existing farming systems

Average of 2018-2020	Ireland
Number Farms	63,200
UAA Size (ha)	43.2
Average yield of a silage harvest (t/Ha)	20.6
Average yield of silage per ha adjusted to entire year (t/Ha)	45.6
Fertiliser cost per ton of silage (€/t)	€6.30
Direct cost per ton of fresh silage (€/t)	€21.90



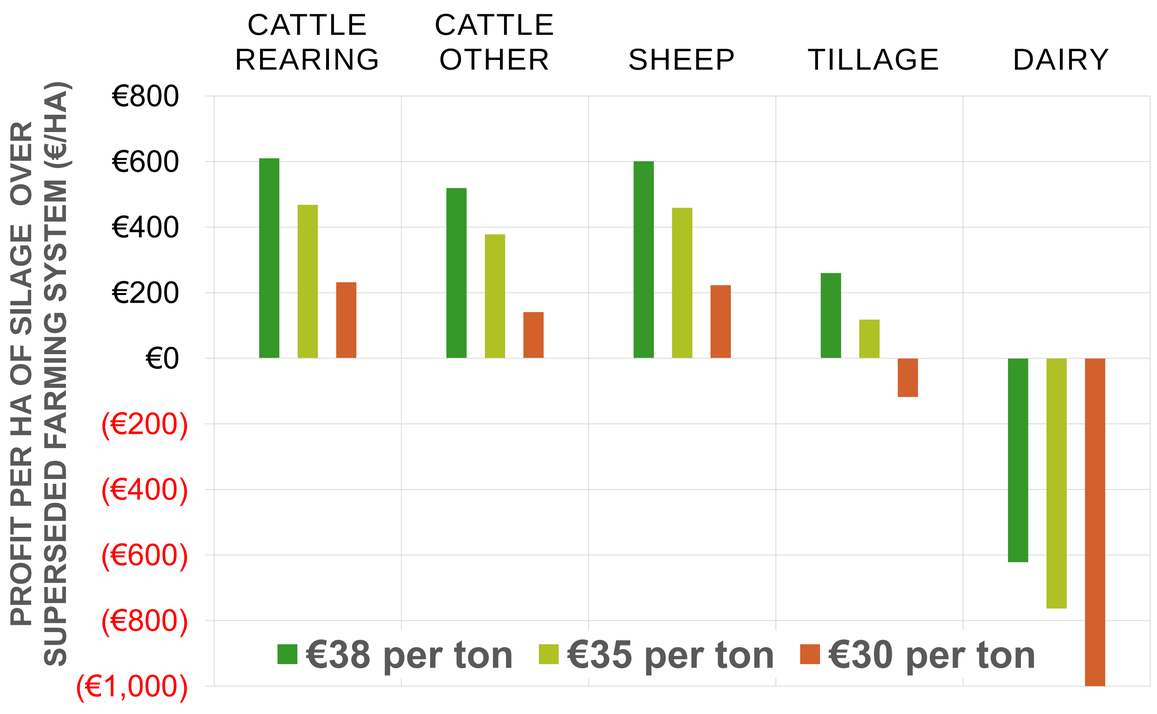
Results

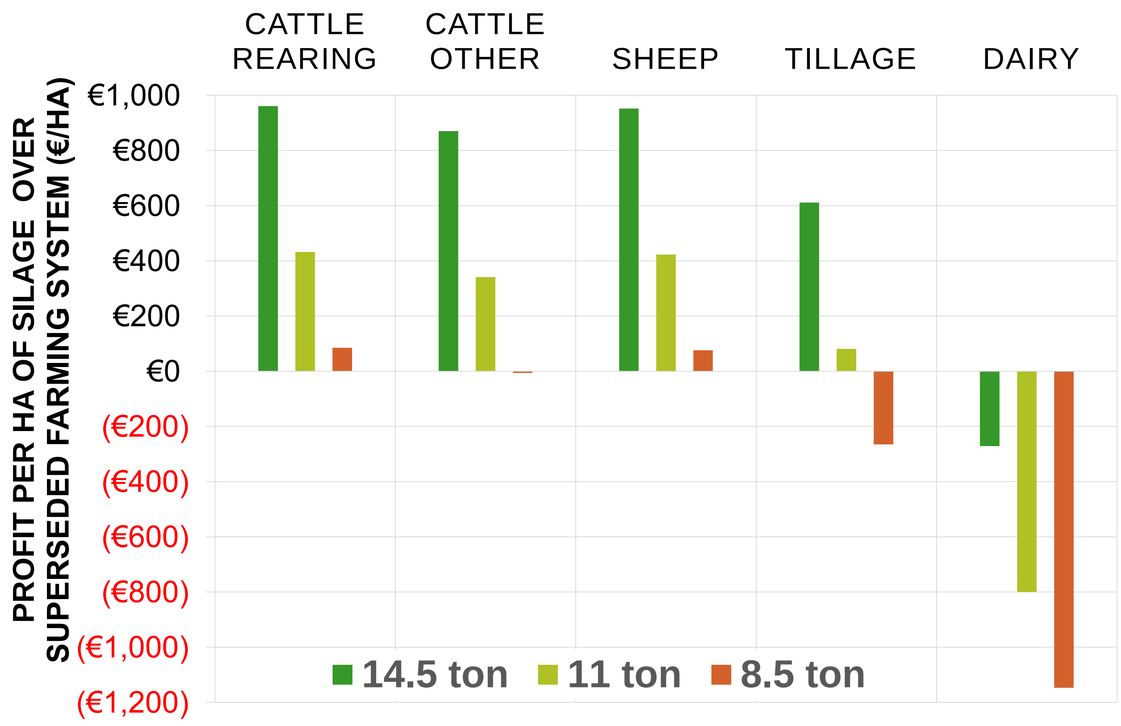
Making silage is a common practice throughout Ireland with variation in direct cost of production. There is variation in the number of harvests of silage farms typically make with fields also grazed. The farms with the lowest cost of production had lower expenditure on fertiliser per ton of silage produced and high yields per hectare.

The discounted cash flow analysis shows that for the average farm, growing silage for AD in Ireland can provide a positive Net Present Value (NPV) depending on the nature of superseded farm system. In the case of a superseded Dairy system the NPV is negative for all situations analysed.

In the case of the average Cattle Rearing, Cattle Other and Sheep systems, a positive NPV demonstrates that growing silage for AD facilities could substantially improve economic viability of these farms.

Sensitivity analysis highlights that sales price and technical efficiency will be a key driver of profitability. There are also practical limitations in certain regions, soils and terrains which will impact on the suitability of the alternative enterprise in specific regions.





Conclusion

The economic case for growing silage for AD was evaluated using a discounted cash flow analysis showing positive NPV for the majority of farming systems. The main exception is dairy farming which has a definite negative net present value to convert to this alternative enterprise.

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