

## Extended Abstract

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<b>Paper/Poster Title</b>	<b>Assessing Dairy Farmer's Willingness to Participate in a Cap-and-Trade Scheme</b>
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**Abstract prepared for presentation at the 98th Annual Conference of The Agricultural Economics Society will be held at The University of Edinburgh, UK, 18th - 20th March 2024.**

<b>Abstract</b>	<b>200 words max</b>
<p>The reduction of greenhouse gas (GHG) emissions from the agricultural sector is inevitable to achieve climate change targets, but there is no consensus on how to achieve this. This especially true in Ireland where agricultural GHG emissions make up over one third of all GHG emissions. One policy option is a cap-and-trade scheme where farmers can trade carbon credits to achieve GHG reduction targets. In this study, we conduct a survey with about 300 Irish dairy farmers that implements a dichotomous choice method to assess farmers' willingness to participate in a cap-and-trade scheme. Farmers make two decisions, first compared to the status-quo and second compared to a mandatory herd reduction scheme. As the price for carbon credits increases, farmers who expect to sell carbon credits are expected to have higher willingness to participate, whereas farmers who believe they are GHG emission credit buyers will have a lower willingness to participate. Willingness to participate in the cap-and-trade scheme is expected to be higher when the alternative is the herd reduction scheme. These findings can provide insight into the best policy to achieve required GHG emissions reductions while maintaining food production capacity.</p>	
<b>Keywords</b>	Climate change, Greenhouse gas emissions, Dairy, Cap-and-trade scheme
<b>JEL Code</b>	Q1 Agricultural and Natural Resource Economics
<b>Introduction</b>	<b>100 – 250 words</b>
<p>Greenhouse gas (GHG) emissions from agriculture mainly consist of methane from ruminant animal digestion and nitrous oxide from fertilizer use. Both have higher warming potentials than carbon dioxide—25 and 273 times higher for methane and nitrous oxide, respectively. The diffuse nature of emission sources makes quantification and reduction of these emissions costly. However, reduction of these emissions would be impactful. This is especially true in Ireland where over one third of all GHG emissions stem from agriculture and the agricultural sector is committed to a legally binding 25% GHG emission reduction to be achieved by 2030.</p> <p>Market-based approaches, like a cap-and-trade scheme, could provide flexibility for farmers while maintaining progress towards GHG reduction targets. While these approaches are well-studied in other industries like energy and manufacturing, their applicability to the agricultural</p>	

sector remains underexplored. The status quo in Ireland is currently no strict farm-level reduction mandate and achievement of the emission target remains reliant on the voluntary adoption of emission reduction practices. A herd reduction has been discussed as a potential solution if GHG emission reductions cannot be achieved.

In this study, we assess dairy farmers' willingness to participate in a cap-and-trade scheme compared to two alternative policies: one with no strict farm-level emission reduction mandate and another requiring herd size reduction. By comparing farmers' willingness to participate at various emission price points against these policies, the study aims to evaluate the feasibility of implementing a cap-and-trade scheme to achieve GHG emission reductions from the Irish agricultural sector.

### Methodology

100 – 250 words

We will conduct a survey of about 300 Irish dairy farmers early in 2024. A dairy sector stakeholder meeting, stakeholder interviews, and dairy farmer focus groups discussing cap-and-trade schemes informed the design of the survey. Two dichotomous choice questions framed as hypothetical referendums will be used to assess willingness to participate in a cap-and-trade scheme. The referendum questions ask farmers to vote for or against implementation of a cap-and-trade scheme as a way to achieve GHG emission targets. Hypothetically, if a majority of farmers voted for the cap-and-trade scheme it would be implemented within the year. The GHG emission credit price varies across participants, which will likely influence the willingness to pay or accept of participants.

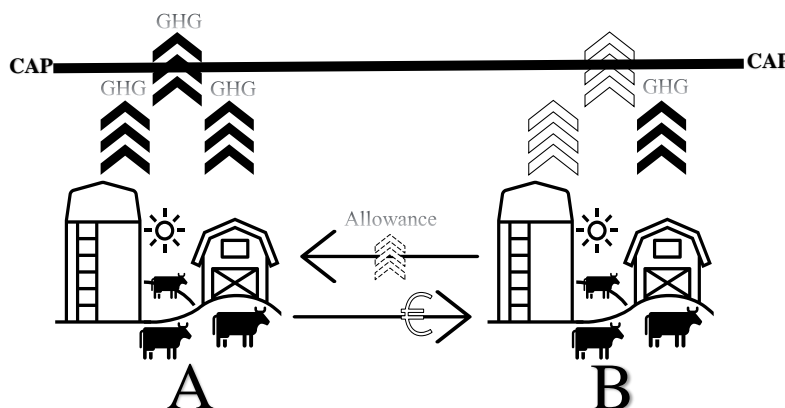


Figure 1: A graphical representation of the cap-and-trade scheme presented to farmers in the policy description.

Both referendum questions are a vote to implement a cap-and-trade scheme, but the alternative schemes if the referendum does not pass are different. The first alternative is a continuation of current voluntary GHG emissions reduction schemes without strict farm-level GHG emission

reduction enforcement. The second alternative is the implementation of a herd reduction scheme. Farmers are provided policy descriptions of both the cap-and-trade and herd reduction scheme, including figures like the one above. They are asked if they anticipate being a credit buyer or seller after the first referendum question so as to differentiate willingness to pay from willingness to accept estimates. Farmers are also asked background questions about their environmental attitudes and farm characteristics.

### Results

100 – 250 words

There are a number of expected results from this data. The first of which is willingness to participate will be higher when the alternative to the cap-and-trade scheme is the herd reduction as opposed to the alternative of no farm-level GHG emission reduction enforcement. Feedback from the farmer focus group indicated a preference for the status quo over the cap-and-trade scheme. However, focus group farmers also indicated an extreme aversion to any kind of herd reduction scheme. This expected result also stems from the alternative of the status quo (i.e. no strict farm-level GHG emission reduction enforcement) leaving some farmers the ability to free ride on the emission reduction efforts of others. Both schemes in the second referendum question require farmers to account for their GHG emission reduction activities. Requiring farmers to choose between the cap-and-trade and the herd reduction schemes limits free riding ability.

Secondly, farmers who anticipate being credit sellers within the cap-and-trade scheme are expected to have increased willingness to participate as GHG emission credit prices increase. Farmers who anticipate being credit buyers will have an increased willingness to participate as GHG emission credit prices decrease. However, focus group results show farmers, both anticipated buyers and sellers, are unsure what would be a reasonable price for GHG emission credits.

**Discussion and Conclusion**

*100 – 250 words*

We aim to assess willingness to participate in a cap-and-trade scheme for GHG emission reductions in agriculture through a survey of Irish dairy farmers. The cap-and-trade scheme is compared to two policy alternatives – continuation of current GHG emissions reduction schemes without strict farm-level GHG emission reduction enforcement or a herd size reduction scheme. We use a dichotomous choice mechanism, framed as a referendum question for the implementation of a cap-and-trade scheme. Farmers are expected to show a preference for the status quo over the cap-and-trade scheme and a preference for the cap-and-trade scheme over the herd reduction scheme. This would indicate a greater willingness to participate in market-driven approaches over measures directly impacting their operations.

These expected results suggest market-based mechanisms like a cap-and-trade scheme could help effectively reduce GHG emissions from agriculture while sustaining food production. There is, however, a large amount of uncertainty and concern from farmers as to how a cap-and-trade scheme would work. Questions over measurement of GHG emissions on farm and the possible barriers to new farmers entering the market were just two of the concerns voiced in focus groups. Policymakers could use these findings as support for the implementation of a cap-and-trade scheme as a way to achieve emission reductions without limiting farming production practices. However, successful implementation of this scheme would require clear and consistent communication from the government. Future research should explore the specific incentives impacting farmer’s willingness to participate and assess the long-term economic and environmental implications of different scheme implementations.

