



The effect of future climate scenario on carbon footprint of milk production in Ireland

Pooja Sharma (1), James Humphreys (2), and Nicholas Holden (1)

(1) UCD School of Biosystems and Food Engineering, University College Dublin, Belfield, Dublin 4, Ireland., (2) Moorepark Dairy Production Research Centre, Teagasc, Fermoy, Co. Cork, Ireland

The predicted increase in population growth will lead to increased demand for food. The challenge is to meet this increased demand in the context of climate change mitigation policies. Irish policy is encouraging expansion of the dairy sector at least until 2025. This will put pressure on the environment as the livestock industry is a significant contributor to national greenhouse gas emissions. In Ireland dairy production is grass based, where grass is the main feed. System modelling combined with life cycle assessment has been used to assess the environmental impacts of this production system.

The objective of this study was to estimate the effect of future climate scenarios on carbon footprint of simulated dairy farms in Ireland (on both well and poorly drained soils). A dairy simulation model (Dairy_sim) was used to simulate an optimised farm system, which was then used to generate the inventory for life cycle assessment to estimate carbon footprint. Dairy_sim captures the effect of weather and soil drainage on the management of grass based milk production. Baseline climate and future scenario with low and high emissions were compared for five agroclimatic regions in Ireland.

The results suggest that management practices vary by soil type and agroclimatic region in Ireland, but that for all locations there would be a change in the carbon footprint of milk produced in Ireland in the future.

This research is leading towards an understanding of the effect of future climate change on milk production in Ireland and to establish a theoretical underpinning for low carbon management of dairy farms in future.

Keywords: Climate change, System simulation, Life cycle assessment, Dairy