

ClieNFarms Practice Abstracts

Modelling cost-effectiveness of mitigation solution in the Dutch Dairy sector

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One of the objectives of the ClieNFarms project is to develop business models in supply chains for upscaling the transformation of farms towards climate neutral farms. To facilitate this, six dairy farms archetypes representing the Dutch dairy sector were identified. The farm typology is based on expert knowledge of key factors influencing farm structure, GHG emissions and reduction potential (Figure 19). The objective was to analyse per archetype the costs and GHG mitigation potential of various solutions, both as stand-alone measures and as farm-specific packages.

The FarmDyn model, a detailed bio-economic, mixed-integer programming model, was used to simulate farm decisions and assess the impact of measures on management, cost, and emissions. It mainly focuses on non-CO₂ emissions but includes on- and off-farm CO₂ sources such as diesel, fertilisers, and purchased feed.

As stand-alone measures, adding Bovaer (3-NOP) to rations and using anaerobic mono-digestion with nitrogen stripping delivered the highest emission reductions—between 10% and 18%, depending on the farm type. Most other measures showed modest effects.

In packages, Figure 20, the CLIEN1 farm type achieved the highest reduction at nearly 34%. CLIEN4 and CLIEN5 reached around 20%, mainly due to Bovaer. CLIENPeat achieved 14%. CLIEN2 had the lowest abatement cost at €10/ton CO₂-eq by using concentrates with a low CO₂ footprint. CLIEN1's cost was €30/ton due to mono-digestion investment. Extensive farms (CLIEN3–CLIENPeat) had higher costs: €60–85/ton.

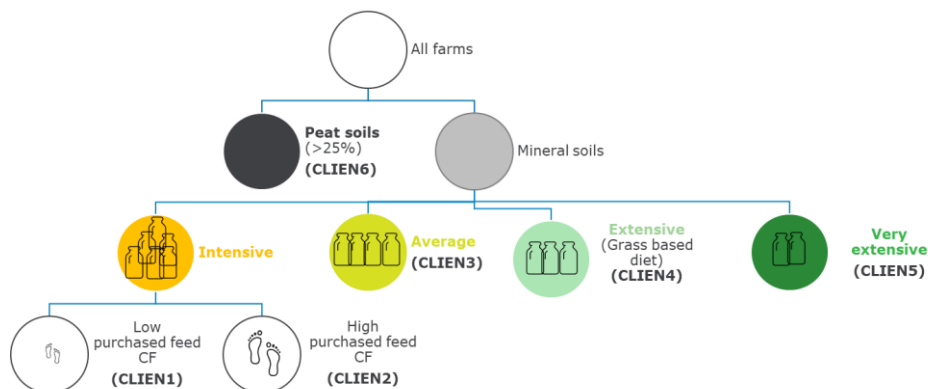


Figure 1: FrieslandCampina farm type analysis. Source: FrieslandCampina.

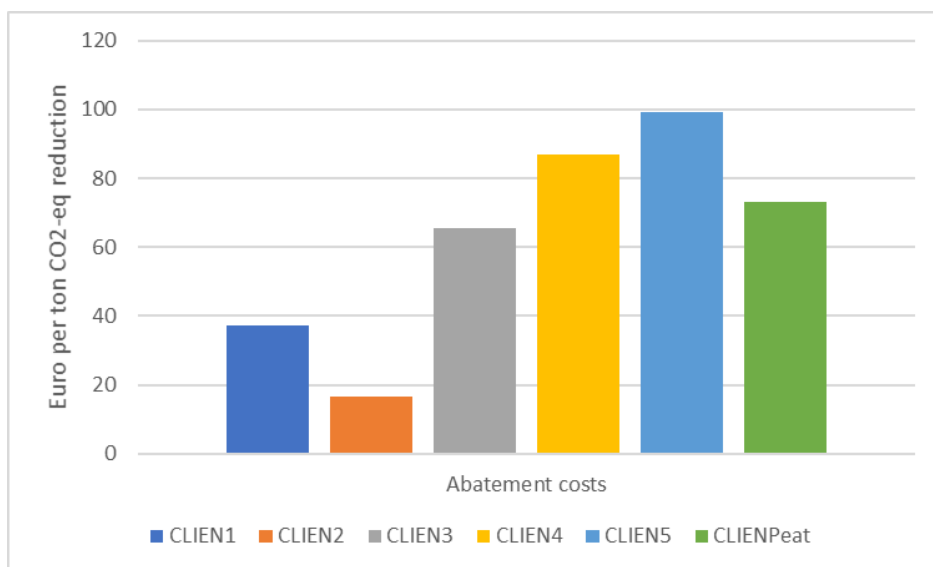


Figure 2: Marginal abatement costs in euro per ton CO₂-eq reduction compared to the base scenario per farm type for implementing a farm specific package of mitigation measures. Source: FarmDyn.



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