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Livestock farms with ruminants have large and diverse fluxes of greenhouse gases, but are also affected in diverse ways by climate change. This calls for assessments of possible options to mitigate GHG and to adapt to changing climate, primarily at the farm-scale. This study focuses on the effects of adaptation and mitigation options, and their synergies and trade-offs on GHG emissions and production on European dairy farms. Climate change will impact on livestock production systems in several ways depending on livestock type, system design and local conditions. These effects are direct through impacts on animal performance, for example heat stress, diseases and land accessibility, and indirect through effects on yield and quality of feed crops caused by changes in the thermal growing season, drought, heat stress and water logging. These impacts demand adaptations of farming systems to cope with the changed climate. Adaptation can be categorized in three main categories: feed production, feed supply (feeding) and livestock management. Several of these adaptation options have impact on greenhouse gas emissions and thus on the mitigation potential. There is therefore need to align measures for reducing greenhouse gas emissions with the likely adaptations to be adopted. Assessments of which adaptation and mitigation measures would likely be adopted for real and virtual farms mixed dairy farms has been determined. The virtual farms are created combining estimated data and information based on regional production systems and national statistics whereas the real-life data are collected on real farms. The climatic zones represented in the study are Maritime, Continental and Mediterranean. The second stage was to assess synergies and trade-offs between the adaptations and mitigation measures. This was based on general considerations combined with assessments by local experts.

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