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## Improvement of Land Use Management to Reduce Livestock Greenhouse Gas Emissions in the Peruvian Andes

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### Abstract

Enteric fermentation is considered one of the main sources of greenhouse gas (GHG) emissions in the agricultural sector. This study was undertaken to assess the emissions of GHG released from dairy cows in the Peruvian Andes from 2015 to 2030 and analyse *ex ante* the potential mitigation of GHG emissions from reducing the number of animals after increasing milk productivity by improving rangelands lands or introducing rye-grass-clover pastures in the highlands. Calculations were done considering a hypothetical land intervention equal to 100,000 ha for each scenario. Emission factors and regression equations were derived from the methodology TIER-1 from the Guidelines of the Intergovernmental Panel on Climate Change (IPCC) – 1996. Results showed a GHG emission from dairy cows in the Peruvian Andes equal to 30.8 millions tons of CO<sub>2</sub>-eq per period of evaluation. The accumulated CO<sub>2</sub>-eq abatement in the “improving rangelands lands scenario” and in the “introducing rye-grass-clover pastures” scenario, compared with the reference scenario, were 3 and 15.5 million tons, respectively. The corresponding total incremental costs of both scenarios were 44 and 468 million dollars. It is concluded that there is great potential for CO<sub>2</sub> abatement in the Peruvian highlands with those interventions. Although the implementation of sustainable measures such as investing in improving rangelands and pastures or adjusting the stocking rate of the farms to the stocking rate capacity of the lands will result in CO<sub>2</sub> abatement, higher levels of abatement will demand more land intervened and increased incremental costs. It is suggested further research and significant data collection in the Peruvian Andes to apply more precise methodologies such as TIER 2 or TIER 3.

**Keywords:** Climate change, dairy, GHG, land management, mitigation