CCDR\_KYR: Direct emissions from the livestock sector

Livestock emissions contribute significantly to Kyrgyzstan's national greenhouse gas emissions, accounting for around 90% of agricultural emissions and total domestic methane emissions[[1]](#footnote-1)[[2]](#footnote-2). Addressing emissions from this sector is a key priority in Kyrgyzstan's Nationally Determined Contribution, which outline strategies such as replacing low-producing livestock, implementing advanced manure management practices, and rehabilitating degraded pastures. These measures aim to mitigate the significant rise in emissions from the livestock sector, which have increased by 70% from 1995 to 2023.

Using the IPCC Tier 2 calculation methodology and data on herd parameters, feed practices, and manure management from a previous NDC study[[3]](#footnote-3) as the primary source, this analysis explores the effects of adaptation measures and evaluates the potential of mitigation strategies on direct emissions from the livestock sector, including emissions from enteric fermentation and manure management. The analysis focuses on direct emissions from cattle and sheep, which together account for approximately 85-90% of total livestock emissions.

In the reference year 2022, livestock emissions were estimated at 3.9 mil tCO₂-equivalent. With **current growth** in the livestock population and minimal advancements in herd management, feed efficiency, and manure handling, these emissions are projected to increase by 66% from 2022 to 2050, while protein production is expected to grow by 68%, reaching 103.3 tons per year.

With the implementation of **reforms** from government initiatives, such as the IFAD-funded *RRPCP* project, which focuses on improving health management, breeding practices, and feed optimization—particularly to address overgrazing—productivity is expected to rise, resulting in a 27% increase in protein production by 2050. These measures enhance efficiency, reducing emissions intensity (EI) by 15%. However, with higher overall production, total emissions are still projected to rise by 8% in 2050 compared to current growth.

With **climate-resilient measures**, the resulting productivity gains, slight fertility improvements, and better feed digestibility bolster resilience to climate shocks, leading to a 17% reduction in EI compared to the current growth scenario in 2050. However, similar to the reformed scenario, the increase in protein production by 34% still leads to a rise in total emissions by 11%.

To **mitigate emissions**, the government can invest in improved manure management (biodigesters, composting) and feed additives in more intensive systems, to lower emissions per animal and further reduce EI. However, significant reductions in emissions require the containment of herd growth caused by the productivity improvements. Maintaining protein production at current growth levels while increasing efficiency could decrease emissions by -20% in 2050. The addition of dietary shifts - such as replacing 20% of ruminant beef with broiler meat – could bring the emission reductions down further to 32%, although total protein production declines due to fewer cattle and lower milk output. Combined, these measures result in a total emission reduction of 2.1 mil tCO2-eq compared to current growth. The mitigation of these emissions provides the opportunity to attract climate finance to facilitate the transition to more sustainable practices, if suitable measurement report and verification (MRV) systems are adopted and there is demand for resulting carbon credits.

Despite these reductions, emissions remain higher than in the reference year of 2022. To achieve a net reduction in emissions, further dietary shifts, possibly away from animal-source foods, are needed along with grazing land management measures to sequester soil carbon. However, as livestock in the Kyrgyz Republic play a crucial role in livelihoods, herd reduction is challenging. A stepwise approach—one that integrates productivity gains, sustainable land use, and a gradual reduction of inefficient livestock, combined with dietary diversification—will be essential for achieving long-term sustainability.

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**Figure 1**.: Estimated direct livestock emissions and protein production per capita per day in Kyrgyz republic under various adaptation and mitigation scenarios (2000-2050) (source: WB, and FAOSTAT).

**Table 1:** Estimated livestock emissions, emissions intensity, and protein production under various adoption and mitigation scenarios for Kyrgyz republic.

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| --- | --- | --- | --- | --- | --- |
|  | Year | GHG (mil tCO2) | EI | Protein (ton) | Protein (g/cap/d) |
| Reference year | 2022 | 3.9 | 64.1 | 61.5 | 24.2 |
| Current growth | 2050 | 6.5 | 63.2 | 103.3 | 29.4 |
| % difference compared to BAU | | | | | |
| Reformed growth | 2050 | 8% | -15% | 27% | 27% |
| Resilient growth | 2050 | 11% | -17% | 34% | 34% |
| Mitigation | 2050 | -32% | -23% | -12% | -12% |

1. *FAOSTAT*. (2021). https://www.fao.org/faostat/en/ [↑](#footnote-ref-1)
2. *Kyrgyzstan climate change data | Emissions and policies*. (2021). https://www.climatewatchdata.org/countries/KGZ?end\_year=2021&start\_year=1990 [↑](#footnote-ref-2)
3. Abdurasulova, G., Wassie, S., Özkan, S., Dzhumabaeva, S., Mundy, O., Mottet, A., ... & Ibraimova, A. (2021). Analysis of Livestock and Pasture Subsectors for the NDC Revision in Kyrgyzstan. *IFAD: Bishkek, Kyrgyzstan*. [↑](#footnote-ref-3)