CCDR\_KYR\_Draft: 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 this sector is a key priority in Kyrgyzstan's Nationally Determined Contributions, 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 has increased by 70% from 1995 to 2023.

Using the IPCC Tier 2 calculation methodology and adjusted data on herd parameters, feed practices, and manure management from a previous study conducted for the NDC[[3]](#footnote-3), this analysis examines 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 direct livestock emissions.

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

With the implementation of **reforms** driven by 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, due to the higher overall production, total emissions are still projected to rise by 8% in 2050 compared to current growth.

With **climate-resilient measures**, resulting in productivity gains, slight fertility improvements, and better feed digestibility through greater resilience to climate shocks, EI is expected to decrease by 17% 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, further reducing EI. However, significant reductions in emissions require control in herd growth. Maintaining protein production at current growth levels while increasing efficiency could decrease emissions by -20% in 2050. In addition to this, dietary shifts - such as replacing 20% of ruminant beef with broiler meat – could result in an -32% decrease in direct emissions, 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. This reduction could potentially generate climate finance, facilitating the transition to more sustainable practices.

Despite these reductions, emissions remain higher than in the 2022 reference year. To achieve a net reduction in emissions, further dietary shifts, possibly away from animal-source foods, is needed. 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)