

Livestock feed and fodder development in Uzbekistan

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Context

Livestock production represents 40% of agricultural output.

- ▶ 95% "Dehkan farms": traditional household plots: 62% of agricultural output, 96% of milk, 94% of meat – mainly communal lands.
- ▶ 4% "Private farms": since 1998 reform (42 heads of cattle).
- ▶ 1% "Corporate farms" (former large scale collective farms).

Key issues

Degradation of natural resources.

- ▶ Inadequate management practices, aggravated by climate change, reduce ground cover and palatable biomass, while increasing erosion.

Low animal productivity (1,600 kg milk/yr, Dehkan farms < 1,000 kg/yr).

- ▶ Feed shortages: since 1991 70% reduction of areas forage and feed crops, <0.05 ha per head of cattle.
- ▶ Dependency on grown and purchased expensive "high-quality" feeds.
- ▶ Administrative restrictions on feed crop production, land tenure issues.

Objective

To assess the environmental impacts and climate change mitigation potential of improved feed and fodder options in Uzbekistan.

Methodology

- ▶ Analysis of two scenarios: the current situation "Business as Usual" (BAU) and a scenario with feed and forage options.
- ▶ Ex-ante assessment of biophysical, environmental and climate impacts.
- ▶ Data and assumptions based on literature, feed databases and expert knowledge.
- ▶ Application of CLEANED (Comprehensive Livestock Environmental Assessment for Improved Nutrition) tool (Notenbaert et al., 2016).

Feed and fodder options – rationale

- ▶ Establish silvopastoral systems on private farms and communal lands used by Dehkan households, including drought resistant and salt-tolerant legume shrubs/ trees: (e.g., *Atriplex* spp.).
- ▶ Increase the use high-quality agro-industrial by-products such as cotton seed cake.
- ▶ Increase on-farm areas of forage legumes (alfalfa) and cereal forages (maize, sorghum), also as silage.

Table 1. Feed rations in BAU and intervention scenarios

	Private farms		Dehkan farms		Rationale of proposed feed/fodder options
	BAU	options	BAU	options	
Pastures and silvopastoral options					
Natural pastures	34%	15%	32%	15%	Reduce overgrazing, dependency low quality feed
Atriplex spp.	0%	10%	0%	15%	Forage tree/shrub: feed quality, soil fertility, carbon stocks
Forage legumes					
Lucerne	5%	15%	0%	10%	Forage legume: feed quality, soil fertility
Other forages					
Maize forage	7%	10%	0%	10%	Increase on-farm feed availability
Sorghum forage	6%	5%	8%	10%	Increase on-farm feed availability
Crop residues					
Cotton straw	12%	10%	5%	0%	Reduce low quality feeds
Rice straw	8%	5%	8%	0%	Reduce proportion low-quality feed
Sugarcane residues	0%	0%	6%	0%	Reduce dependency off-farm low quality feed
Wheat straw	16%	10%	23%	10%	Reduce proportion low-quality feed
Agro-industrial by-products					
Cotton seed cake	3%	10%	2%	15%	Locally/nationally produced agro-industrial by-products: increase feed quality, productivity
Rice bran	0%	0%	5%	5%	
Wheat bran	9%	10%	11%	10%	

These values represent the proportion of the feed in the diet. Green indicates an increase when compared with the BAU scenario, red a decrease.

References

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Acknowledgments

Thanks go to the Asian Development Bank and the CGIAR research program on Climate Change, Agriculture and Food Security – CCAFS for the financing of this study.



RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



Poster prepared for:
Tropentag 2023
September 20–22, 2023
Berlin (Germany)

Implications - Productivity

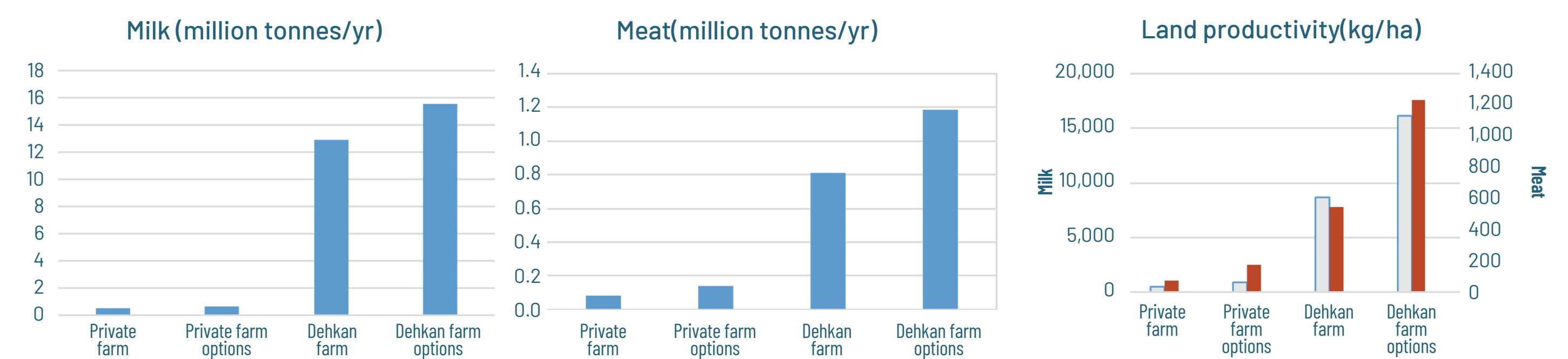


Figure 1. Implications of proposed feed/fodder interventions for productivity

- ▶ The proposed feed and forage options allow for a reduction in livestock (by 20%), whereas the milk and meat volumes increase (by 20 to 40%).
- ▶ Land productivity (kg/ha) doubles.

Implications - Environment/Climate

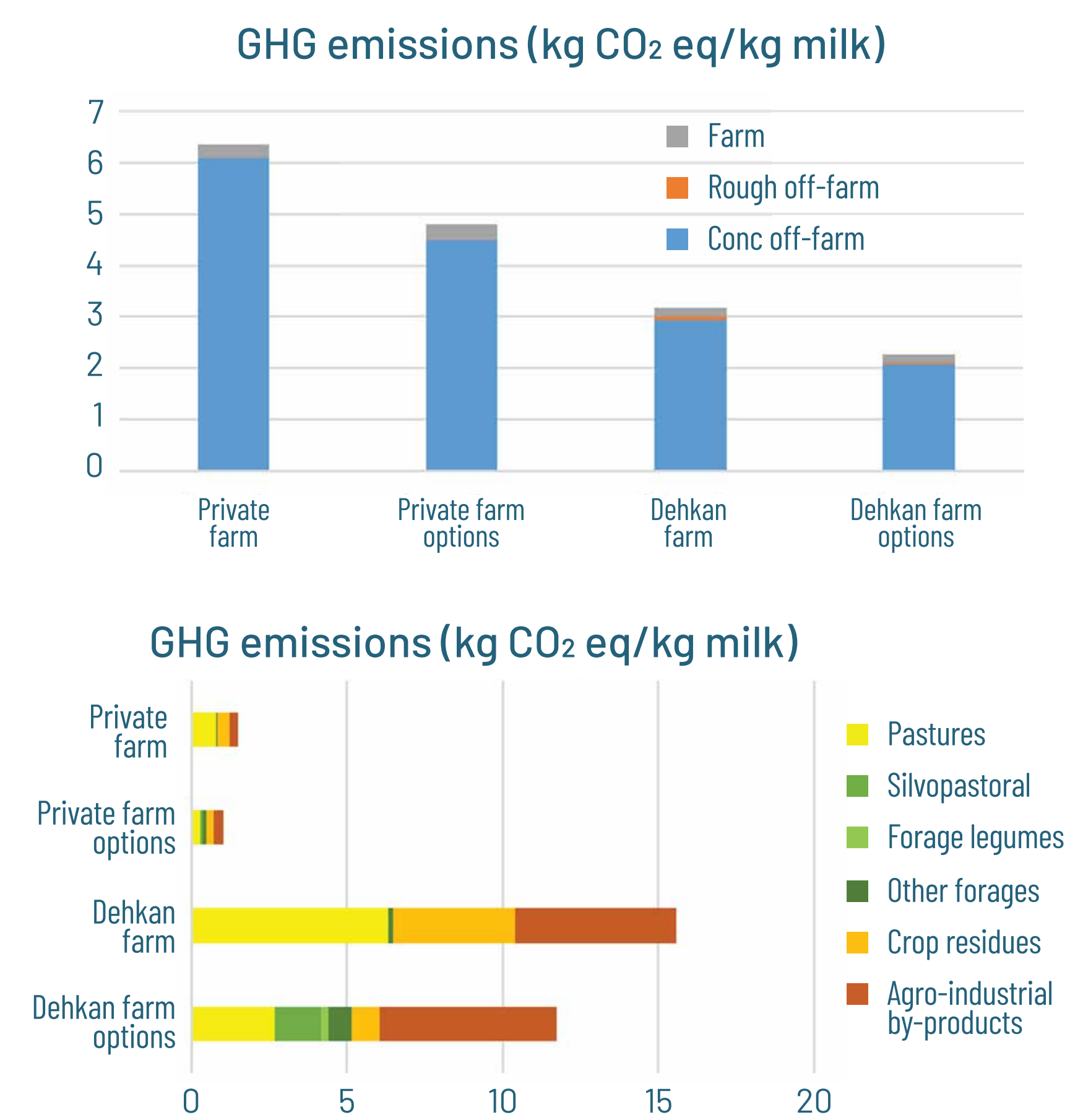


Figure 2. Implications of proposed feed/fodder interventions for environment and climate parameters

- ▶ Land requirement decreases by over 10%, of Dehkan farms by a third.
- ▶ GHG emissions reduce by almost 15% (lower enteric fermentation).
- ▶ GHG emission intensity decreases by 30%.
- ▶ Silvopastoral options increase annual C sequestration up to between 2.5 tCO₂e per ha at Private farms, compensating 75% of GHG emissions, and up to 4 tCO₂e /ha for Dehkan farms (off-farm – communal lands).

Recommendations

- ▶ Investigate possibilities to liberalize land market (ownership, land rights) with focus on Dehkan farms (representing over 90% of livestock production).
- ▶ To further reduce GHG emissions and land and water requirements: increase the proportion of monogastric livestock, like poultry and fish, as animal source foods. Develop options for integration of food and cash crops with forages (rotation, intercropping), and more adequate use of agro-industrial by-products.
- ▶ On-farm forage production and improved pasture and rangeland management.
- ▶ Improved seed systems – including ensuring availability of seedlings of (leguminous) forage trees for silvopastoral systems.