

Context

Livestock production

- Livestock production represents 40% of agricultural output
- 95% “Dehkan farms”: traditional household plots: 62% of agricultural output, 96% of milk, 94% of meat – strong dependency on communal lands
- 4% “Private farms”: since 1998 reform (42 heads of cattle)
- 1% “Corporate farms” (former large scale collective farms)

Key issues

- Low animal productivity (1,600 kg milk/yr), lower in 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, monopolist dictates prices and quality
- 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
- Private and Dehkan farms
- 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)

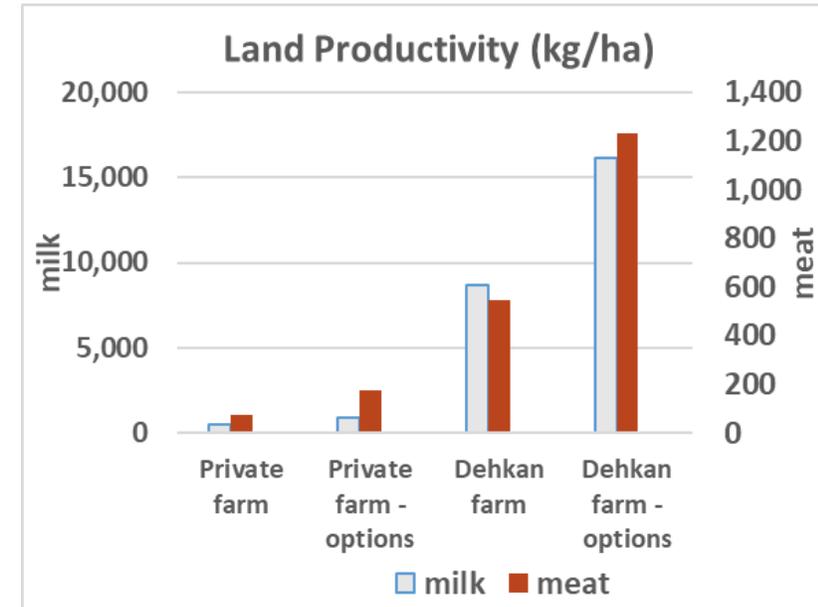
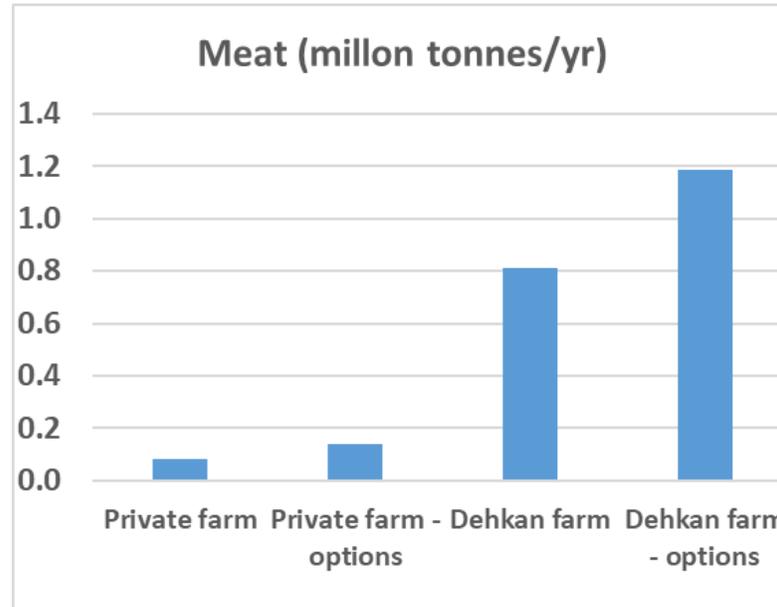
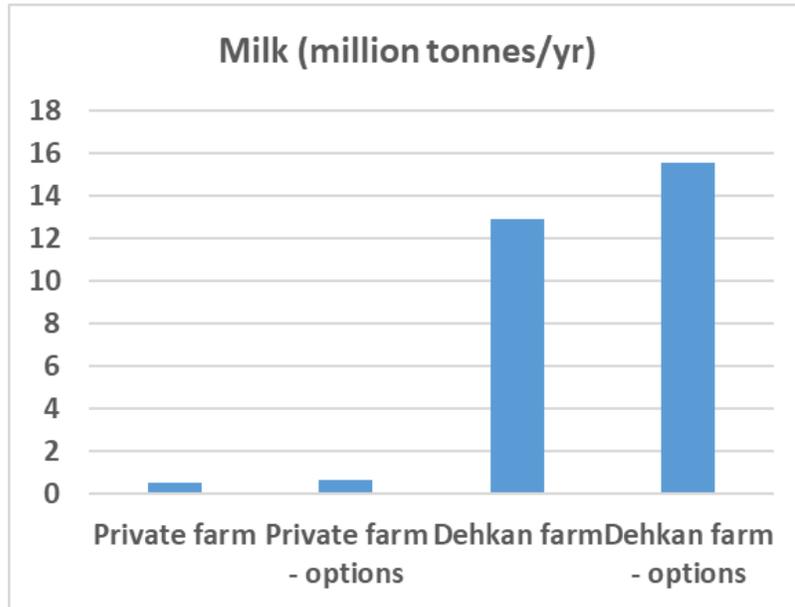
Feed and fodder options - rationale

- Establish silvopastoral systems on private farms and communal lands used by Dehkan households
- 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.

Feed and fodder options

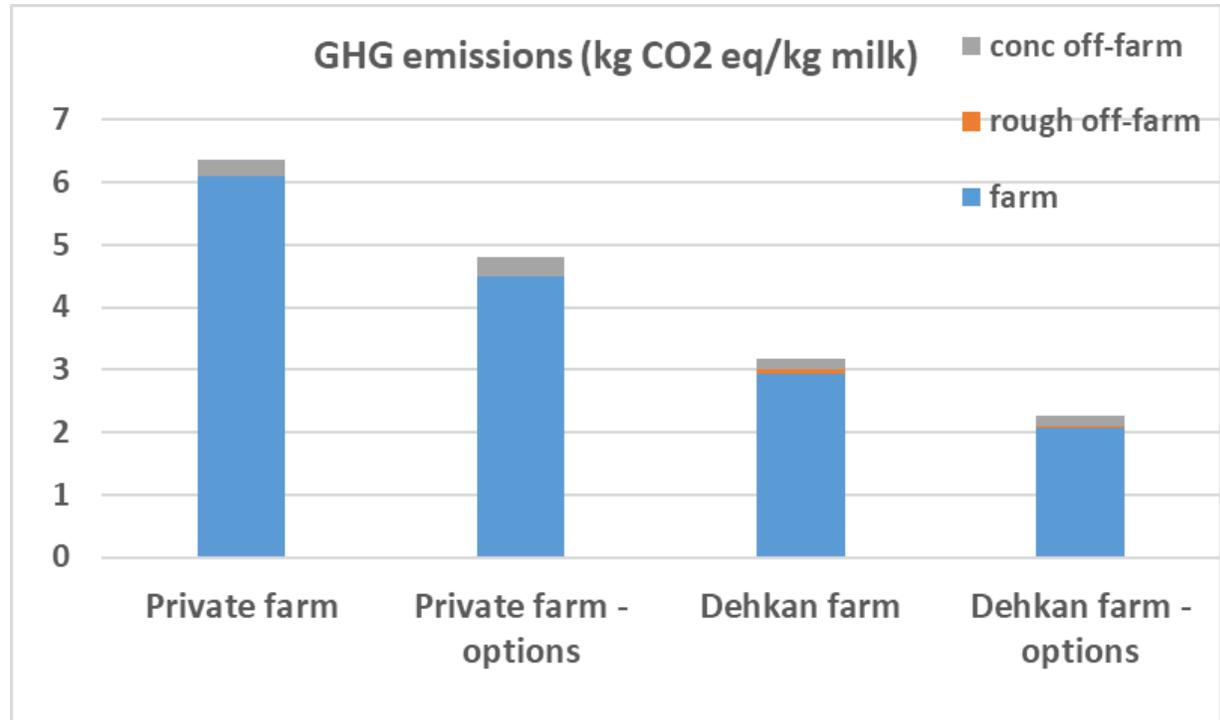
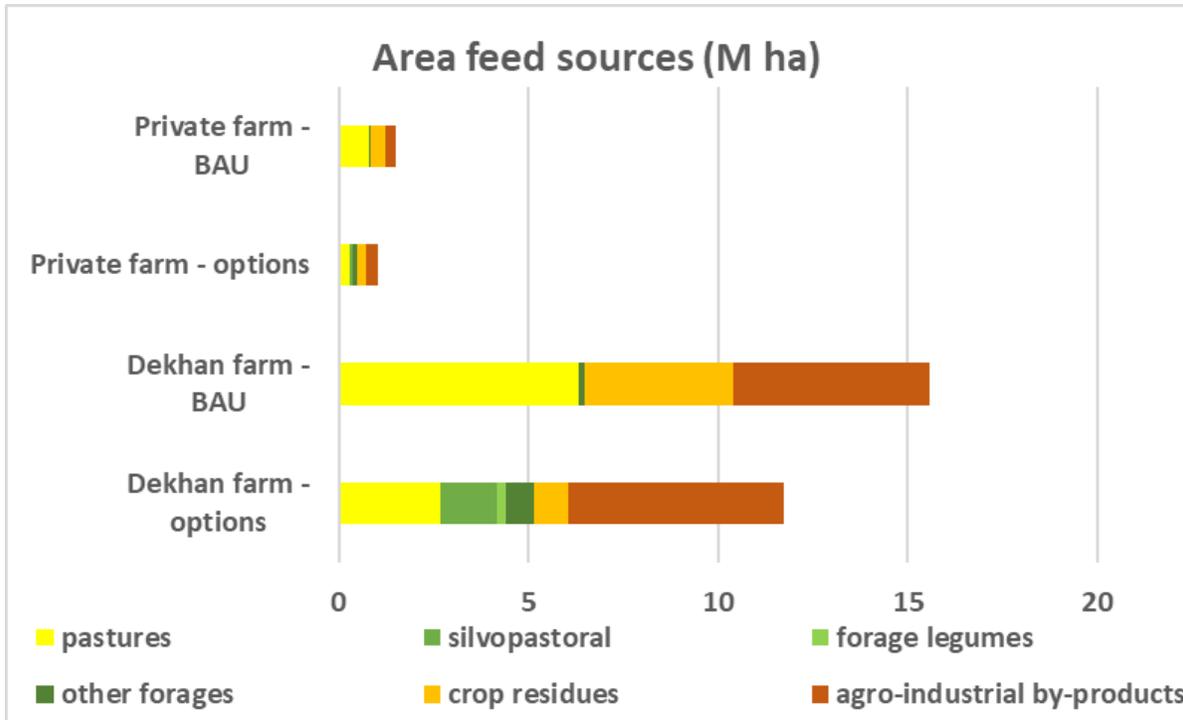
	Private farms BAU	Private farms options	Dehkan farms BAU	Dehkan farms options	Rationale of proposed feed/forage options
Pastures and silvopastoral options					
Natural pastures	34%	15%	32%	15%	reduce overgrazing, dependency low-quality feed
Atriplex spp.	0%	10%	0%	15%	forage tree/shrub: feed quality, 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					locally/nationally produced agro-industrial by-products: increase feed quality, productivity
Cotton seed cake	3%	10%	2%	15%	
Rice bran	0%	0%	5%	5%	
Wheat bran	9%	10%	11%	10%	

Implications - 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



- Land requirement decreases by over 10%, of Dekhan farms by a third.
- GHG emissions reduce by almost 15% (lower enteric fermentation as a result of increased feed quality and reduced livestock numbers).
- GHG emission intensity decreases by 30%.
- Silvopastoral options increase annual carbon sequestration up to between 2.5 t CO₂e per ha at Private farms, compensating 75% of GHG emissions, and up to 4 t CO₂e /ha for Dekhan farms (off-farm – communal lands).

Livestock sustainability framework checklist

Core interventions /practices	Environment					Food Security					
	Climate change			Water, soil	Biodiversity	Production			Income		
	Reduce GHG emissions	Increase Carbon stocks	Reduce climate vulnerability	Maintain/ Improve water, air and soil quality	Maintain/ Improve biodiversity	Increase Productivity	Improve Nutrition/ Safety	Animal welfare measures	Reduce poverty	Create jobs	Improve working conditions
Improved forages	++	++	+++	+	+ -	++	++	+	+	+	+ -
Improved use crop residues and Agro-industrial by-products	+	+ -	++	+ -	NA	+	+	NA	+	+	+ -
Integration trees/shrubs	+	++	++	+	++	+	+	++	+	+	+
More efficient water use	NA	NA	+++	+	NA	+	+	+	+	+	+ -
Animal Genetics	++	NA	+	NA	NA	++	++	NA	+	+	+ -

Legend for impact: +++ = High ++ = Medium + = Low - = Negative NA = not applicable

Recommendations

- Investigate possibilities to liberalize land market (ownership, land rights) with focus on Dehkan farms (representing over 90% of livestock production).
- Conducive policy framework: emphasis on knowledge generation, institutional strengthening, scaling sustainable livestock production technologies and practices.
- To further reduce GHG emissions and land and water requirements: look into possibilities to increase the proportion of monogastric livestock, like poultry and fish, as animal source foods: current poultry meat production is less than 5% of beef and mutton.
- 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.
- Establish and improve seed systems - including ensuring availability of seedlings of (leguminous) forage trees for silvopastoral systems