

# From feed deficits to opportunities: The role of forage seed systems in transforming livestock systems

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## Introduction

- Livestock productivity in many tropical regions is constrained by persistent shortages of high-quality feed.
- Improved forages can substantially increase animal productivity, resilience, and sustainability, but adoption remains limited.
- Weak forage seed systems are a major bottleneck, restricting farmers’ access to affordable quality planting material.
- Strengthening forage seed systems is therefore essential for sustainable livestock intensification, food security, climate resilience, and rural development across the tropics.

## Objectives

**Assess** the magnitude of ruminant feed deficits across tropical regions.  
**Quantify** the forage seed, land, and farmer requirements needed to close these deficits.  
**Identify** institutional, policy, and market barriers limiting forage adoption.  
**Highlight** opportunities for developing resilient and scalable forage seed systems.

## Methodology

- Literature synthesis of livestock development strategies and forage seed systems.
- Estimation of regional feed deficits using ruminant populations and dry matter requirements.
- Scenario modelling of forage seed demand, cultivated area, farmer participation, and economic value.
- Review of the global tropical forage seed industry.
- Comparative assessment across **countries Sub-Saharan Africa** (Tanzania, Kenya, Ethiopia, Nigeria, Sudan, Mali, South Sudan, Somalia, Uganda, Zimbabwe, Zambia, Senegal, Malawi, Mozambique, Rwanda, Burundi) and **Southeast Asia** (Vietnam, Thailand, Laos, Cambodia, Timor-Leste).

## Discussion and Conclusions

- Across tropical regions, **feed shortages** are driven less by a lack of forage technologies than by weak forage seed systems, limiting farmers’ access to quality seed and constraining large-scale adoption.
- **Closing the ruminant feed gap requires** integrated investments in local seed production, extension services, private-sector engagement, access to finance, supportive policies, and regional seed harmonization, alongside farmer capacity building.
- **Brazil demonstrates** that long-term breeding investments, coordinated public-private partnerships, and strong seed value chains can create globally competitive forage seed industries and accelerate technology diffusion.
- An important question remains: **Who can provide the seeds necessary to close the feed deficits in Southeast Asia and Sub-Saharan Africa?**
- Strengthening forage seed systems represents a high-impact pathway to simultaneously increase livestock productivity, improve rural livelihoods, enhance food security, and build more **climate-resilient livestock systems** across the tropics.

## References

- Burkart, S., Mwendia, S., & Mugo, P. (2026). Transforming livestock through forages: Opportunities, barriers, and strategic priorities in sub-Saharan Africa. Crop, Forage & Turfgrass Management, 12(1), e70110. doi: [10.1002/cft2.70110](https://doi.org/10.1002/cft2.70110)
- Burkart, S., Mwendia, S., Karimi, P., Atieno, M., Dao, H. T., & Philp, J. (2025). Seeding solutions: Closing the ruminant feed gap through forage innovation in Southeast Asia. Crop, Forage & Turfgrass Management, 11(2), e70072. doi: [10.1002/cft2.70072](https://doi.org/10.1002/cft2.70072)

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## Results

### Cultivated forage deficits, forage seed requirements, and seed market opportunities

- Nearly 40% of annual ruminant feed demand remains unmet in both Sub-Saharan Africa (Figure 1, Burkart et al. 2026) and Southeast Asia (Figure 2, Burkart et al. 2025).
- This deficit will grow over time: demand for ASF, climate change, low regional forage quality.
- Closing the feed gap offers major opportunities for seed systems, forage adoption, jobs, and economic growth, but requires overcoming land constraints, engaging millions of smallholders, and strengthening seed supply chains.

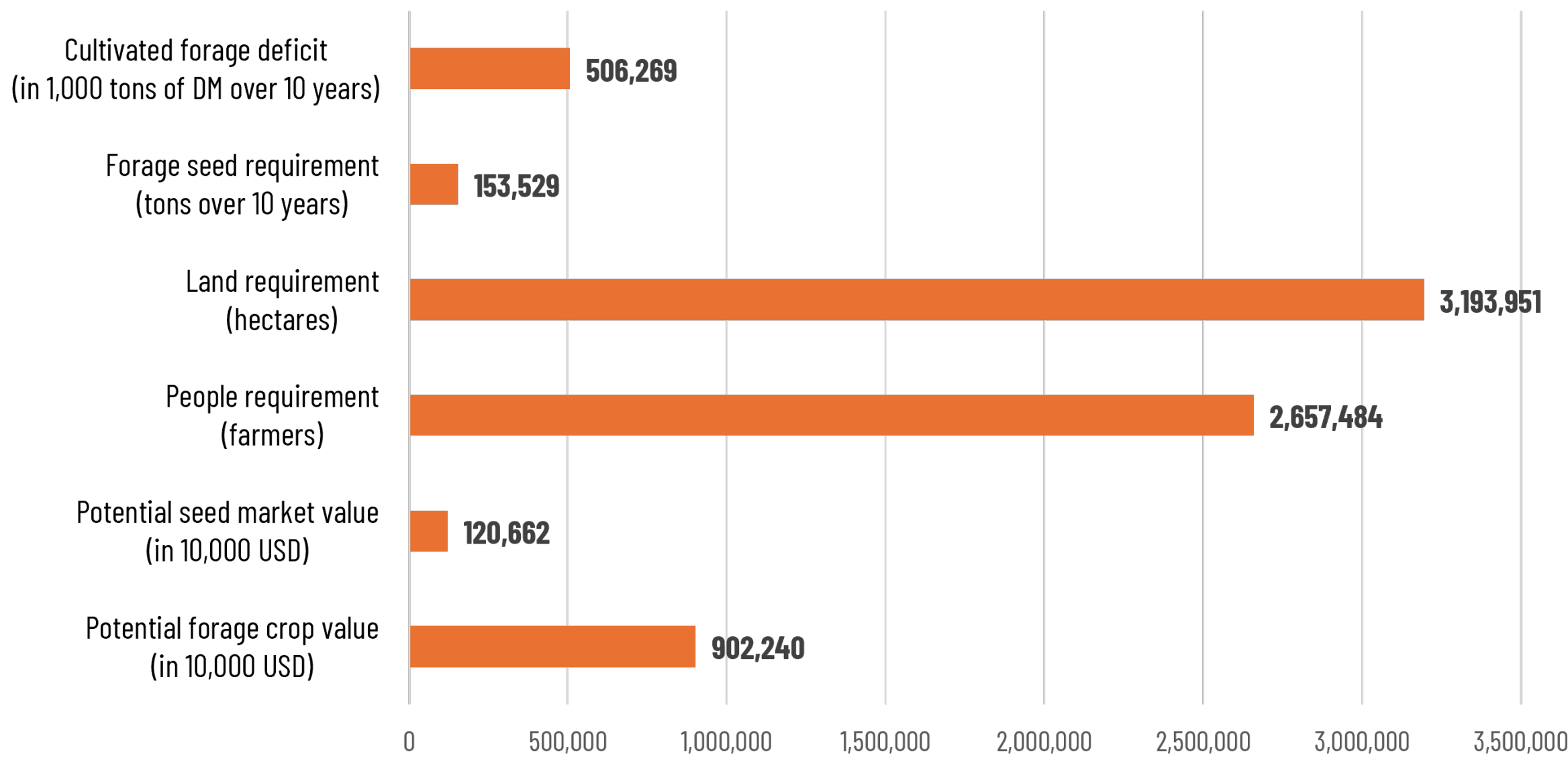


Figure 1. Closing the cultivated forage deficit Sub-Saharan Africa.

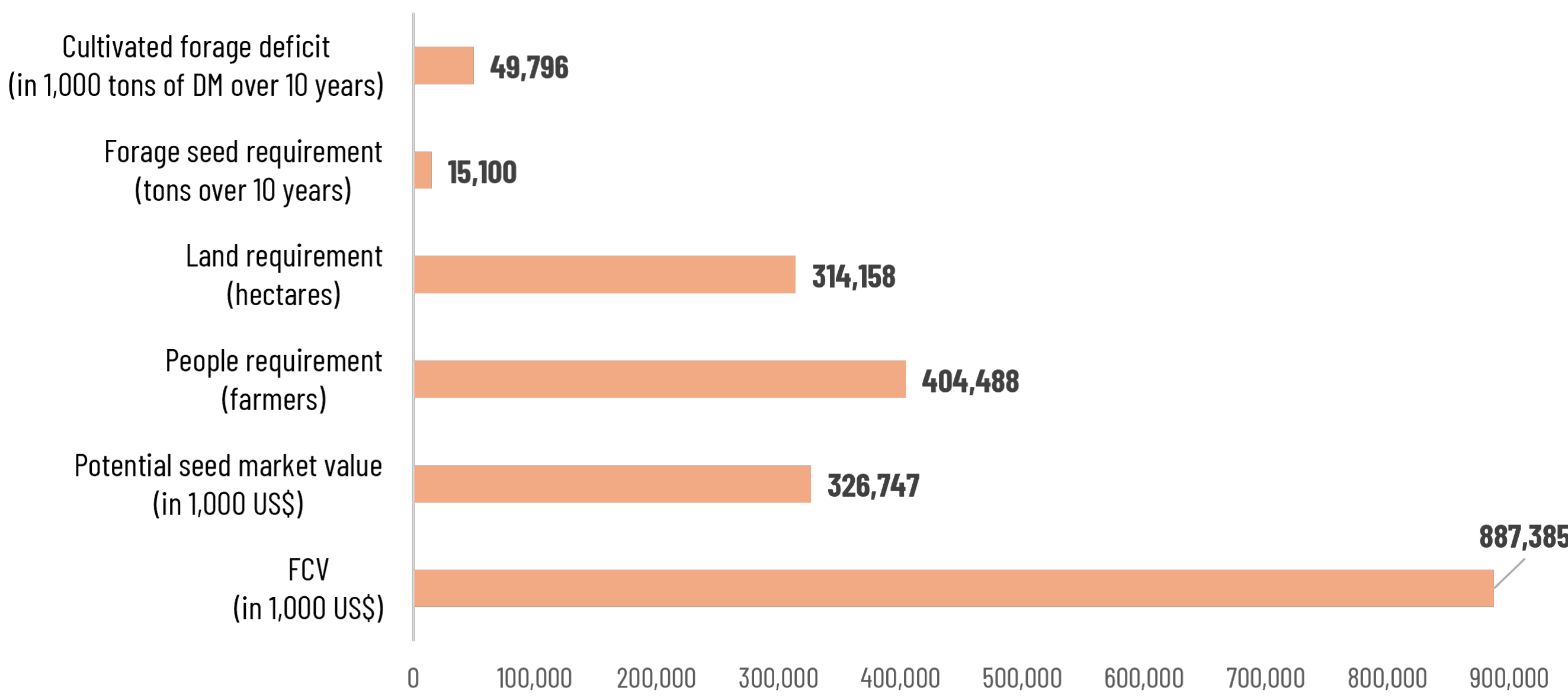


Figure 2. Closing the cultivated forage deficit Southeast Asia.

### Cross-regional constraints for scaling forage technology

- Weak seed systems.
- Limited access to quality seed.
- Insufficient private-sector investment.
- Fragmented policy support.
- Limited access to information (extension, technical assistance).
- High number of adopting farmers required.

### Can Brazil's tropical forage seed industry fill this gap?

- Brazil's tropical forage seed industry has become the global benchmark, with exports increasing from US\$34.7 million (2019) to US\$74.9 million (2025).
- Success factors: strong breeding programs, coordinated public-private partnerships, scalable seed multiplication systems, and expanding international markets.
- However, only 23% of all seeds produced in Brazil are being exported.
- Limited international competition.



Tricot Trials with improved forages in Sobchie Village, Laos. Credits: Alie Galeon / CIAT

## Related work

Burkart, S., & Mwendia, S. (2024). Forage seed systems to close the ruminant feed deficit in Eastern Africa. Grasses, 3(4), 333–354. doi: [10.3390/grasses3040025](https://doi.org/10.3390/grasses3040025)

Burkart, S., Sandoval, D., & Junca-Paredes, J. J. (under review). Brazil's tropical forage seed industry: Scale leadership, structural risks, and the shift toward innovation-driven competitiveness. Manuscript under review.

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