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Critical Review: Reassessing the '75% Farmland Reduction' Claim in the Context of Livestock, Labour, and Circular Economy

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Abstract:
This paper critically evaluates the claim that global adoption of vegan diets could reduce farmland use by 75%. It analyses the empirical basis, socio-economic impact, and circular-resource role of livestock, comparing data from the Oxford ECI (2025) and FAO (2020–2024). The study highlights livestock's biogas and nutrient recycling potential as key to a balanced sustainability transition.

Keywords — Livestock, Circular economy, Farmland, Biogas, Labour shift, Sustainable agriculture.
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1. Introduction
The widespread claim that global adoption of plant-based diets could reduce farmland use by up to 75% has attracted both attention and controversy. While this figure is derived from idealised land-use modelling studies, it often neglects the socio-economic and circular-resource dimensions of animal farming systems. This critical review evaluates the empirical basis of the 75% reduction claim, contrasts it with the 2025 Oxford Environmental Change Institute (ECI) study on agricultural labour, and examines the broader implications for global livelihoods, emissions, and nutrient circularity.

2. Origin and Misinterpretation of the 75% Farmland Reduction Claim
The 75% reduction figure originates from global land-use analyses, particularly Poore and Nemecek (2018), which show that removing livestock feed and pasture use could free large areas of land. However, this estimate assumes full vegan adoption, homogeneous yield efficiencies, and the conversion of grazing land into productive cropland — conditions unrealistic for most global regions. Pastures, which account for nearly two-thirds of agricultural land, are often unsuitable for cropping due to soil or terrain constraints. Hence, the 75% land reduction is a theoretical upper bound, not an achievable forecast.

3. Oxford ECI Study: Labour Shifts in Dietary Transitions
The 2025 Oxford ECI study, published in The Lancet Planetary Health, estimates that transitions toward plant-based diets could reduce global agricultural labour by 5–28% while adding 18–56 million full-time horticultural jobs. The model suggests a reallocation rather than elimination of labour but does not factor in the existing 1.3 billion people dependent on livestock systems.

4. Livelihood Dependence on Livestock Systems
Livestock-based systems support approximately 1.3 billion people worldwide (FAO, 2020; HLPE, 2020). These systems provide livelihoods to smallholders, pastoralists, and mixed-farming households across Africa, Asia, and Latin America.

Livestock contributes around 40% of global agricultural GDP, with about 600 million smallholder farmers depending on animals for draught power, income, and manure. The Oxford projection of 56 million new horticultural jobs represents less than 5% of those reliant on livestock, underscoring a large socio-economic imbalance.

5. Livestock Resource Circular Economy: Biogas and Organic Fertiliser Potential

Beyond food, livestock excretions are valuable renewable resources. With 50% dung recovery, global biogas yield could reach ~52 billion m^3 per year (containing ~26 billion m^3 methane), equivalent to 21 million tonnes of LPG. Simultaneously, nutrient recovery from manure could replace 45% of global NPK fertiliser use, reducing fossil-fuel dependence in urea and ammonia synthesis.

6. Emission Reduction from Biogas and Organic Fertiliser Conversion

Based on FAO manure emission data (~1.4 Gt CO_2e in 2018), converting 50% of manure to biogas and organic fertilisers can avoid approximately 0.36 Gt CO_2e annually: 139 Mt CO_2e from methane abatement, 64 Mt CO_2 from LPG substitution, and 161 Mt CO_2e from avoided ammonia production. This estimate excludes feed-related and oil-meal-linked emissions, focusing solely on manure management and fertiliser substitution.

7. Comparative Summary

8. Discussion and Implications

This comparative evaluation highlights a severe asymmetry between potential horticulture labour gains and the livelihoods supported by livestock. While global plant-based transitions may reduce emissions and labour costs, they risk displacing vast rural populations without equivalent alternative employment. Circular livestock integration—through biogas, composting, and organic fertilizer production potentially offers a balanced pathway that maintains rural livelihoods while achieving emission mitigation. Further detailed studies by agricultural experts and environmental experts together could provide a practically viable road map for implementation.

9. Conclusion

The 75% farmland reduction narrative oversimplifies global agricultural systems. Livestock not only sustains over a billion people but also provides renewable energy and fertiliser potential that can reduce global emissions by 0.36 Gt CO_2e per year. The Oxford study's 56 million horticultural jobs, while valuable, cannot offset this socio-economic scale. Hence, the realistic sustainability path lies in livestock repurposing—maximising biogas and organic recycling—rather than livestock removal.

10. Conflict of Interest & Funding

The author declares no conflict of interest.

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