LCA of goat milk production: A case study from Cyprus

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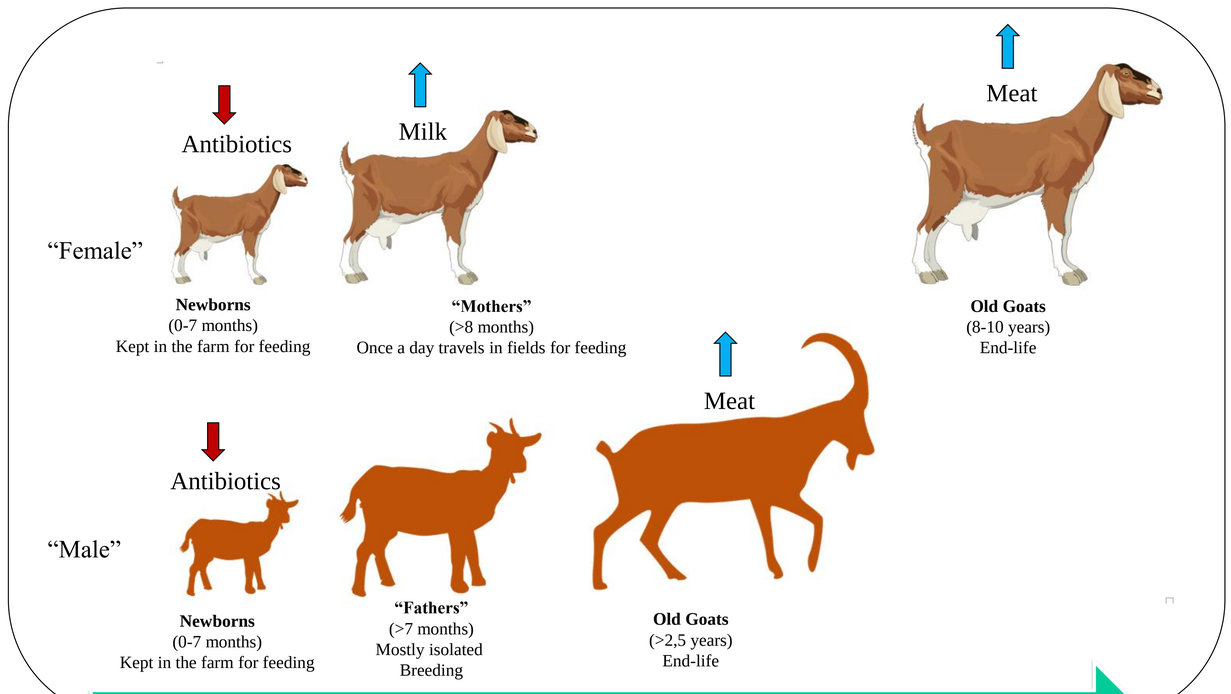
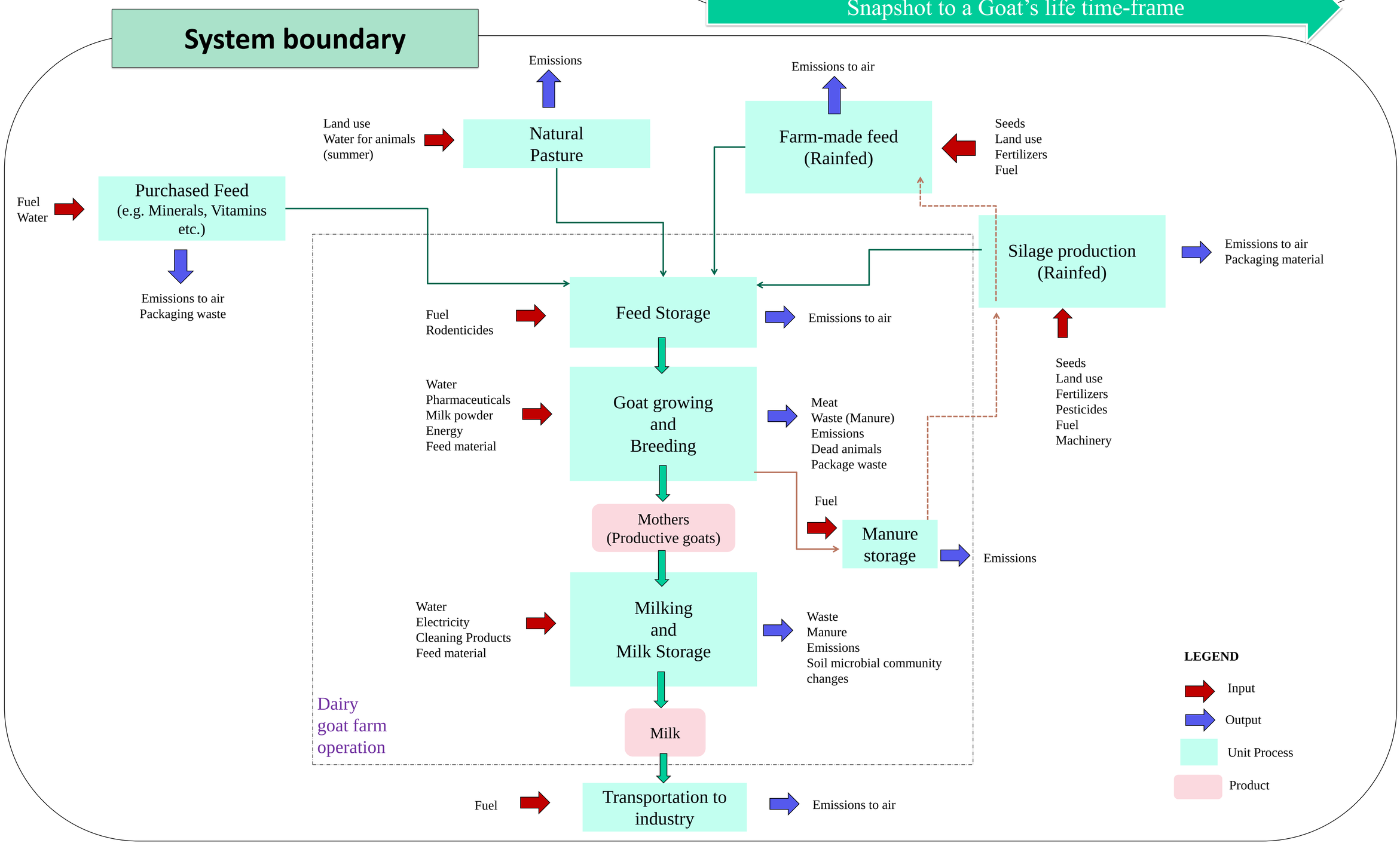
Research scope:

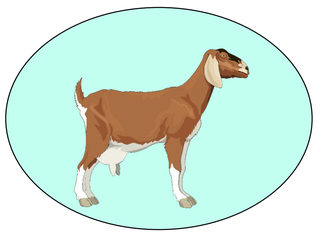
- Goat milk production in Cyprus has gained significant attention in recent years, due to the production of traditional cheese (halloumi), prompting a growing interest in assessing its environmental impacts through life cycle assessment (LCA).
- LCA is a comprehensive methodology that evaluates the environmental burdens associated with a product or process throughout its entire life cycle, from raw material extraction to disposal.
- In the context of goat milk production, LCA can provide valuable insights into the environmental hotspots and potential areas for improvement. It examines various stages such as land use for grazing, feed production, water consumption, energy use, waste management, and transportation.
- Furthermore, the effect on nutrient cycling and soil microbial communities involved in greenhouse gas emissions which may be affected by manure, fertilizer antibiotics and pesticide use in fields is under investigation.
- Tetracycline was found to significantly affect N2O emissions and functional microbial assemblies involved



System boundary



Goat milk production diagram



Milking Parlor → Goat Preparation → Milking Machine → Raw Milk Production → Cooler Tank for Short Storage

Split goats in groups and prepare

Cleaning and Sanitation

Function and functional unit

The product system's function is to provide refrigerated raw milk for primary consumption and raw material for dairy products.
The functional unit considered 1 kg FPCM—fat and protein corrected milk, representing the equivalent milk mass national Dairy Federation, FPCM is calculated by Equation:

$$\text{kgFPCM} = \text{MP} \times [(0.1226 \times \%F) + (0.0776 \times \%P) + 0.2534]$$

where MP is the milk produced, in kg; $\%F$ is the fat content per kg of milk; $\%P$ is the protein content per kg of milk.
The F and P percentages were standardized at 4% fat and 3.3% milk protein, as recommended by the IDF (2015). According to the IDF, the FPCM assures a fair comparison between farms with a different breed or feed management (Carvalho et al., 2022).

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