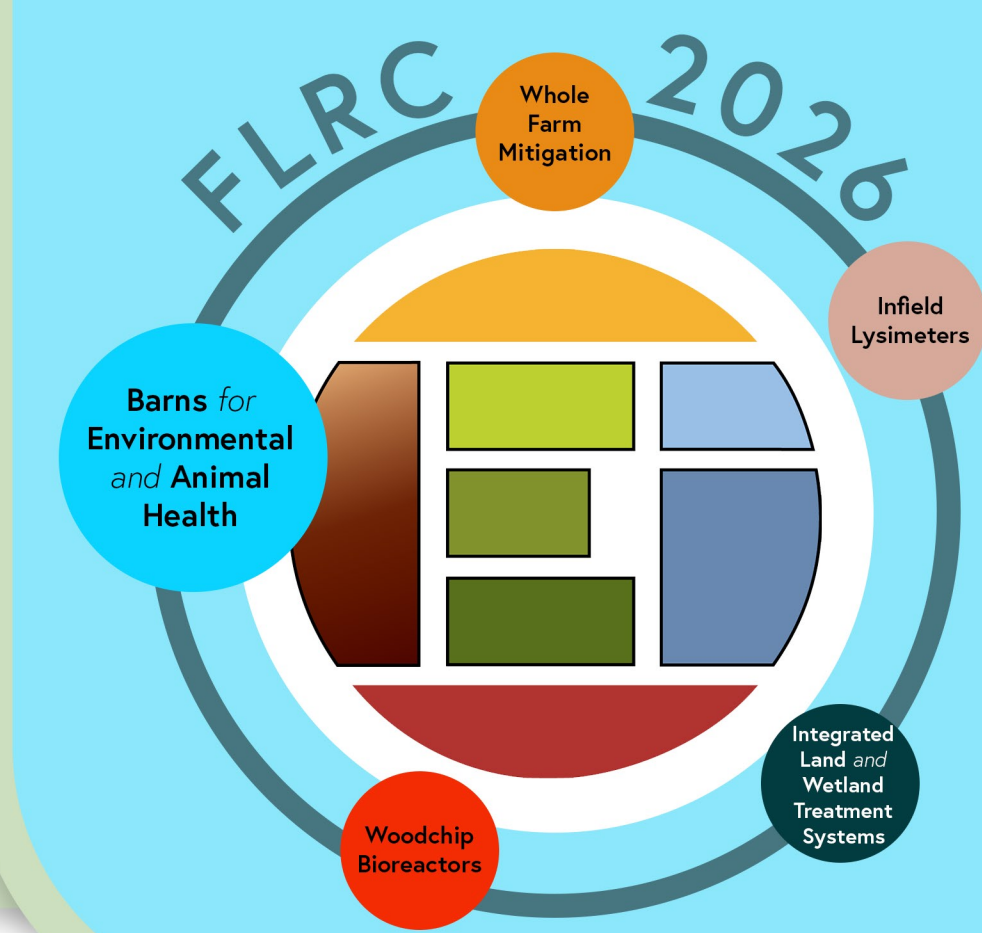
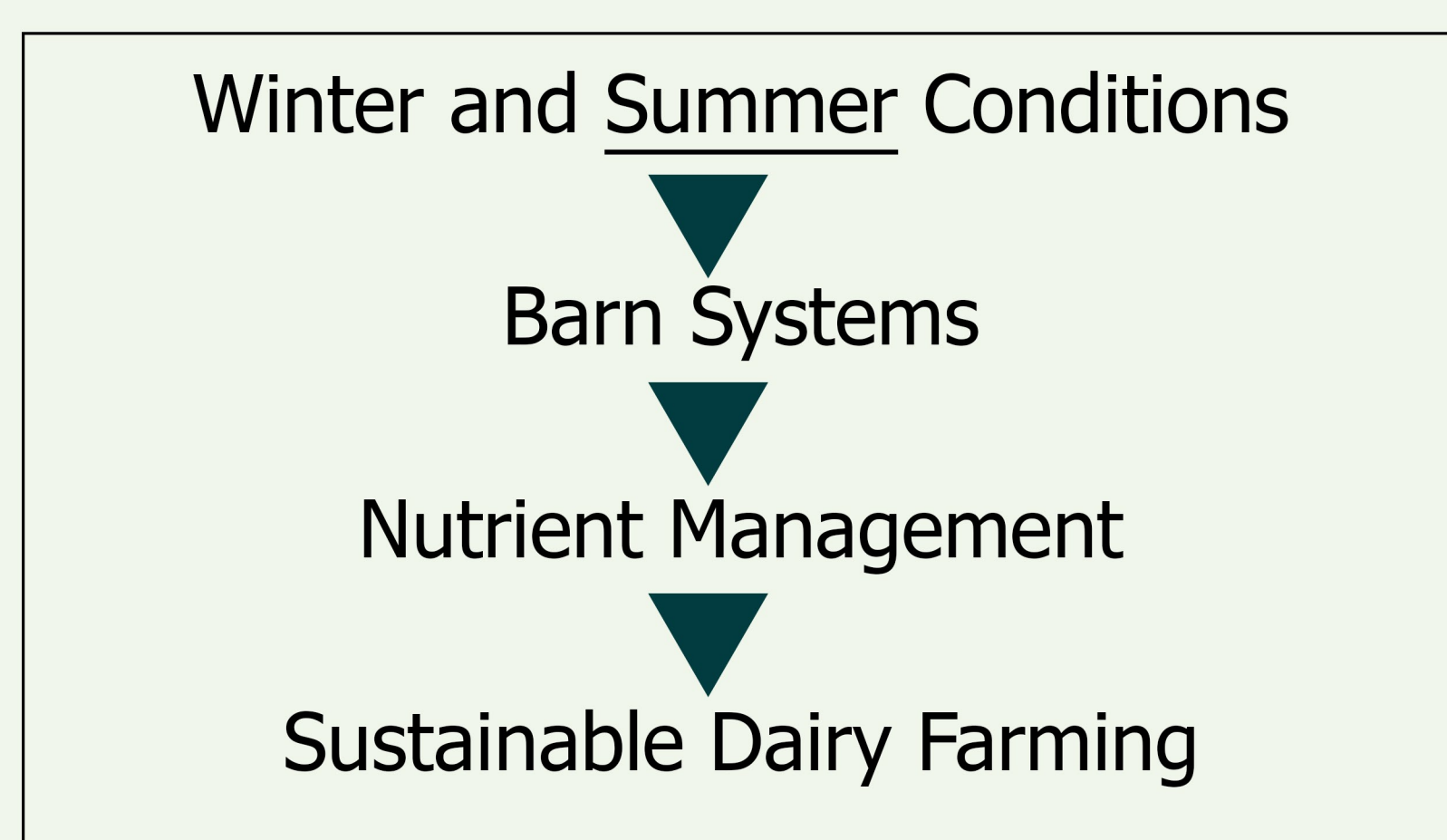


'Barn Storming' - The Use of Barns in Managing Environmental and Animal Health



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Outline



Objective

- Assess and consider implications for how barns improve animal welfare and protect soils by reducing pasture damage, nutrient losses, and winter stress; and identify the environmental challenges of a barn system.

Introduction

- Increasing milk production has driven greater pressure on soils, freshwater, and animal welfare.
- During wet winter conditions, soil structural degradation can have long-term consequences for pasture performance, nutrient cycling, and environmental outcomes.
- Shelter from wet and hot conditions, and a reduction in energy use from less walking, have assisted in increasing milk production.
- Several Southland farmers during winter months and in summer during periods of hot weather have cows in barns almost 24 hours daily, and the rest of the year, cows spend some time grazing outside.



Figure 1: Indoor Calving with Remote Farmer Monitoring

Beneficial Use of Barns

- Barns are beneficial for calving, assisting survival, animal welfare and staff resourcing (Figure 1).
- Barns contribute to nutrient reductions by reducing environmental concerns such as nutrient leaching and runoff.
- Having cows off the paddocks reduces soil compaction and improves soil physical condition by limiting treading during winter, which reduces pasture damage¹. It also avoids direct leaching losses through cracked soils in summer.

Barn use also results in:

- Improved feed utilisation
- Reduced lameness risk

Milk Production and Animal Welfare

Observed production increase under barn system:

- ~440 kg MS/cow/y (pasture-based – Southland average),
- ~850 kg MS/cow/y (barn-based – last two seasons).

- Barn systems provide greater comfort for cows and protection during adverse weather conditions.

Key Environmental Challenges

- Effluent and manure accumulation, and effect on nutrient cycling in the system (Figure 2).
- High potassium (K) loading of manure and effluent (~170 kg K/ha) when compared to nitrogen (N) (~90 kg N/ha).

High K application can result in:

- Accumulation in soils;
- Reduce magnesium uptake; and
- Increase metabolic disorder risk.

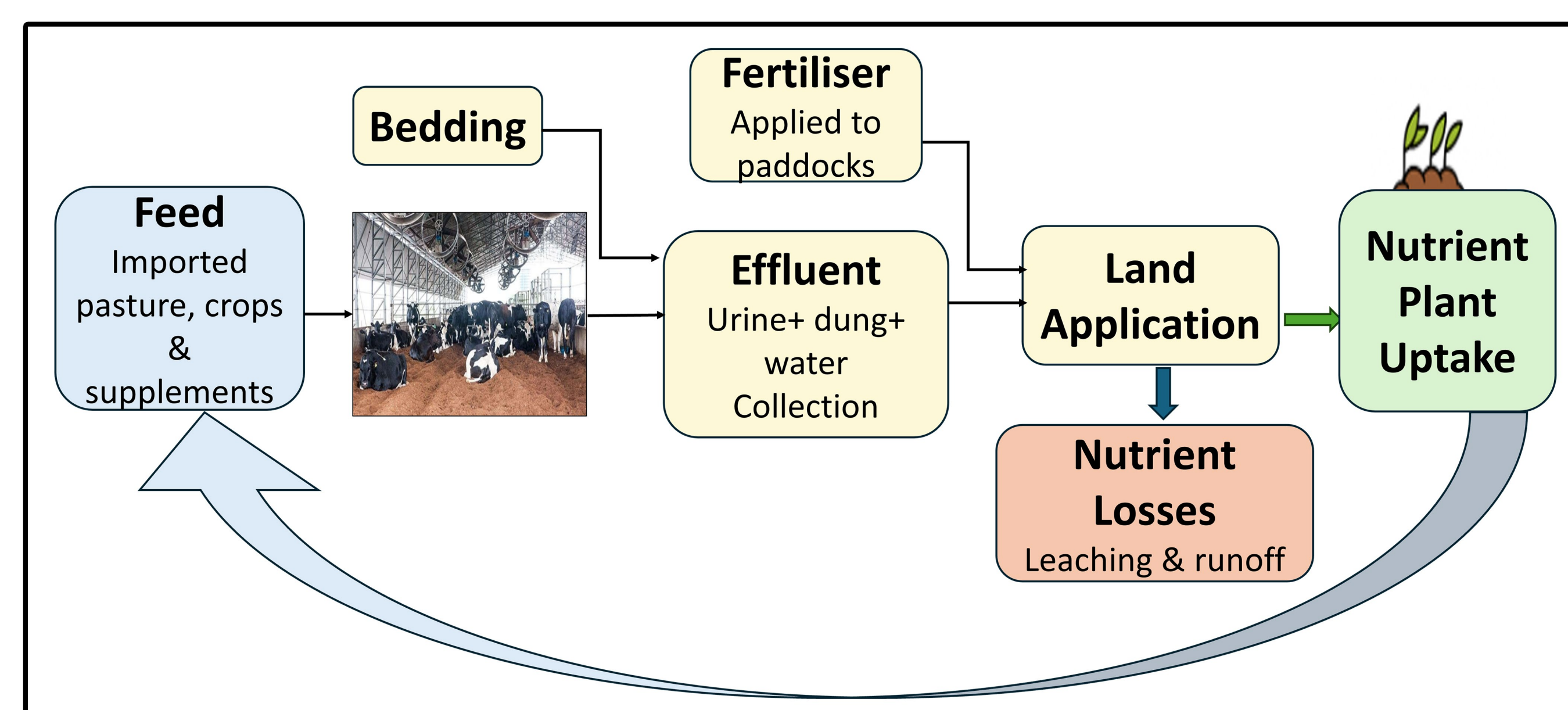


Figure 2: Nutrient Cycling in Barn System

Management Considerations

- Design the effluent irrigation area on the basis of K rather than only N;
- Regular soil and pasture testing;
- Application rates to match plant growth;
- Use larger areas and K 'hungry' crops;
- Barn system requires significant investment in infrastructure; and
- This system is not suitable for every farm, as landscape constraints and the infrastructure requirement of the system may limit its feasibility.

Conclusion

- Barns can protect soils and reduce environmental impacts;
- Housing cows during extreme weather conditions (summer and winter), can improve cow performance and welfare during critical periods such as calving;
- Barn systems can introduce new nutrient-management challenges, especially around effluent and K accumulation; and
- Well-managed barn systems can support resilient New Zealand dairy farming.

References

¹Drewry, J. J.; Paton, R. J. 2000. Effects of cattle treading and natural amelioration on soil physical properties and pasture under dairy farming in Southland, New Zealand. New Zealand Journal of Agricultural Research 43: 377–386