

Topic

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Strategies to reduce silage storage losses

Technical efficiency
Economic resilience

Animal welfare,
Environment



Background

Strategies to reduce silage storage losses are key to achieving high forage quality and farm resilience. Appropriate harvesting and packing methods, as well as optimising storage conditions, can significantly reduce losses in silage quantity and quality. These strategies are based not only on modern technologies, but also on careful monitoring and planning of silage production. This comprehensive approach improves animal performance and the environmental sustainability of agricultural production.

Key strategies to reduce DM and silage quality losses



Packing to Improve Silage Density

- High silage density improves fermentation by limiting oxygen, which is the basis of silage spoilage processes.



Silage Additives

- Some additives promote lactic fermentation and improve the pH and stability of silage. Others inhibit the growth of microorganisms that cause silage spoilage.



Plastic Cover

- The films protect against oxygen, so choose those with a high oxygen barrier, apply carefully, check integrity regularly, and respond to damage.



Feed-Out (Unloading) Rates from the Silo

- Maintaining the proper discharge rate and uniformity, limits air access and reduces the risk of silage spoilage.

Positive features

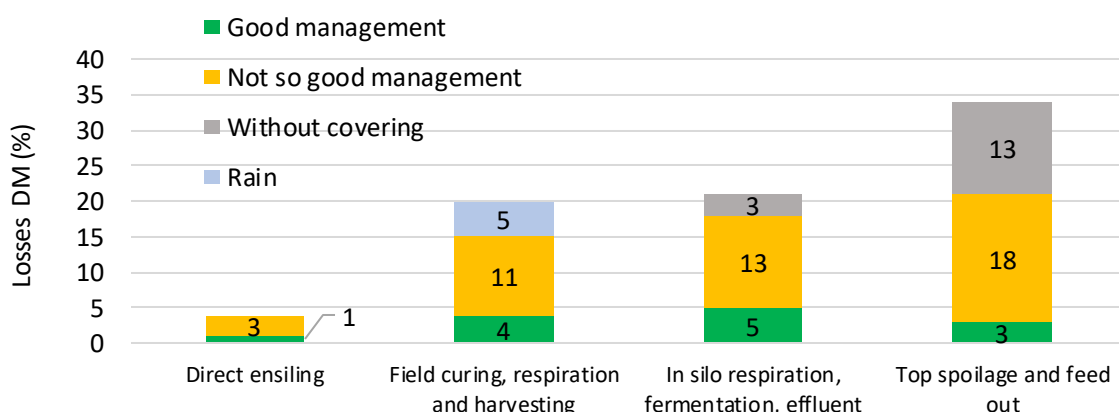
- **Increase feed utilisation efficiency** through better digestibility and nutritional value.
- **Improve animal health and productivity** through a stable and high-quality diet.
- **Reducing feed losses and feeding costs**, through better protection of feed from spoilage.
- **Ability to better manage feed stocks**, enabling balanced feeding throughout the year.

Be careful, especially on these points

- Don't underestimate the importance of any aspect of the process - from harvesting to fermentation to storage.
- **Don't act in haste!** This can have a huge impact on the quantity and quality of silage you get.
- To avoid disrupting the natural fermentation process, **choose the right fermentation additives** and **follow dosage recommendations**.
- Collect agricultural film and use local **recycling programs** to minimize environmental impact

See the pros and cons of basic silage preparation and storage methods in the appendix

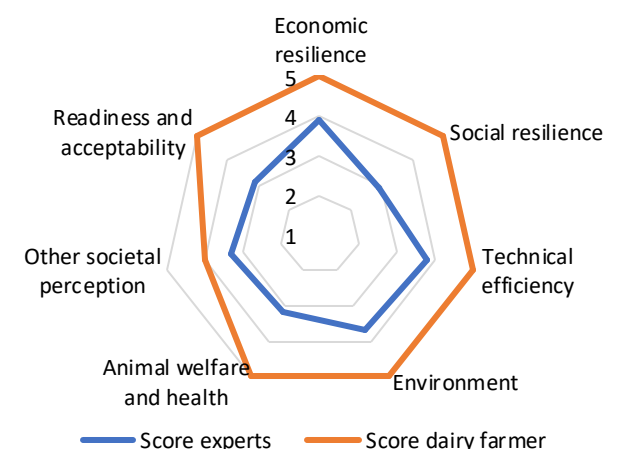
Why is this so important?



Potential DM losses during silage-making stages

Source: Borreani, G., Tabacco, E., Schmidt, R. J., Holmes, B. J., Muck, R. A. (2018). Silage review: Factors affecting dry matter and quality losses in silages. *Journal of Dairy Science*, 101(5), 3952-3979.

Assessment of method



Quote of the farmer:

"With the same resources, the efficiency of my operations increased significantly, as did the health and productivity of the herd"



Silage storage methods vs. loss reduction strategies



Silage Stack, Pit Silage, Silage Clamp

Pros

- Lower cost of production per ton of feed
- Ability to ensile Maize, Corn, and Grass silage
- Compact storage space
- Time savings when feeding large volumes – due to not needing to unwrap bales
- More control over length of chopped feed

Cons

- Higher storage and handling losses (Typically 20-23%)
- Higher capital equipment and investment costs for storage
- More vulnerable to operator error, resulting in poor fermentation of the silage
- Costly feeding equipment

Alternative Options:

- Silage Bags – reduced capital costs, flexibility of storage locations



Baled Silage, Balage Haylage

Pros

- Reduced storage and handling losses (Typically 8-10%).
- Bales retain their oxygen free condition through the entire storage period and the silage is perfectly preserved until feed-out.
- Flexibility and the ability to sell surplus feed.
- Smaller fields can economically be baled, at the critical maturity period
- Flexible storage locations

Cons

- Higher production costs per ton of feed
- Higher capital equipment and investment costs for machinery
- More storage space required
- Higher chance of damage caused by bad bale handling
- Disposal of wrapping and netting waste

Alternative Options:

- Tube wrapped/inline wrapped bales – save cost compared to individual wrapped bales, how loose – ability to sell surplus feed
- Maize bales – ability to sell surplus ensiled Maize or Corn Silage

Source: <https://www.hustlerequipment.com>

Equipment and materials involved in strategies

Machinery



- **Heavy Compaction Equipment** like rollers or bulldozers to achieve the right silage density.
- **Silage Distributors** to evenly spread and layer the silage.
- **Loaders** for mechanically removing and transporting silage to the feeding area.
- **Silage Block Cutters** for precise and hygienic extraction of silage, minimizing exposure to air.



Photos:
<https://agro-center.de>
<https://www.grrrobotics.ca>

- **Round or Square Balers:** Specifically designed for wet forage to create dense bales that can be wrapped.
- **Bale Wrappers:** For enclosing baled silage in several layers of plastic to create an anaerobic environment.
- **Bale Handlers/Transporters:** To move and stack baled silage safely without damaging the wrapping.
- **Bale Feeders or Bale Slicers:** For efficiently feeding out baled silage to livestock, minimizing waste and exposure to air.



Photos:
<https://www.goeweil.com>

Additives

The choice of an appropriate additive depends on the type of forage being ensiled, storage conditions, and the nutritional goals of the herd.

Lactic acid bacteria (Lactobacillus spp., Pediococcus spp., Enterococcus spp.),

Enzymes that accelerate the breakdown of fiber,

Chemical preservatives, such as propionic acid or sodium benzoate, which prevent the growth of molds and yeasts,

Buffering agents that stabilize the pH of the silage,

Nutritional enhancers like molasses or protein additives.

Plastic Cover

- High-strength polyethylene films, multi-layer films that enhance oxygen barriers, and UV-stabilised films to protect against sunlight damage.
- Environmentally friendly options include biodegradable films that can be processed more easily after use, reducing environmental impact.

- For baled silage, use stretchable, UV-resistant silage wrap films, including polyethylene films.
- Biodegradable or oxi-degradable options are available for environmental sustainability.