Topic	Topic
Technical efficiency	Environment ,society friendly

Low emission slurry spreading by application of slurry directly on the ground or beneath the sward of grass

Background

The application of slurry to match to grassland needs means applying slurry at the right place and time to provide readily available nitrogen (i.e., ammonium nitrogen) to support gassland growth and increase the organic matter content of the soil. The targeted use of slurry can partly reduce the need for highly energy-intensive chemical fertilisers based on non-renewable inputs. Using **low-emission slurry spreading** equipment **(LESS)** is a way to reduce ammonia emissions, improve water quality, reduce odour and increase the environmental and economic efficiency of growing grass.

Low emission slurry spreading systems

Trailing hose spreading system

- applying slurry to the soil and spreading it at the base of the grass without slowing down its growth
- less contamination of grass

Trailing shoe spreading system

- the grass is spread with a shoe and the slurry is applied in created trenches on the soil surface
- delivering nutrients close to the ground without splashing grass leaves

Slurry injection system (shallow)

- two types: with cutting skids and with cutting disc
- the cutting part cuts a groove in the ground
- slurry is usually injected into max. 6 cm deep

Machinery images source: joskin.com

Nitrogen losses as ammonia

Splash plate **80-100%**	Trailing hose spreading system **60-70%**
Trailing shoe spreading system **30-50%**	Shallow injection system **≈30%**

Quote of farmer:

"Efficient slurry spreading improves the environment, fertilizer efficiency, grass yields and good social relations"

What should you know?

Pay attention when you choosing a system	Positive features
▪ some systems works well only on grassland, some on grasland and arable crops, ▪ kind of soil and topography (soil texture, stone content and ground contours) ▪ required equipment: tanker fitted to spreader system with sufficient capacity, a tractor with enough power ▪ working and transport width of spreading booms or meadow injector ▪ work rate and maintenance costs	▪ increase fertilizer value from slurry ▪ equal distribution of slurry ▪ increase in grass yields ▪ reduce artificial fertilizers use ▪ less nitrogen loss to waterways ▪ reduce odour ▪ reduce grass contamination ▪ decrease silage contamination and faster accessibility to pasture

see Annex

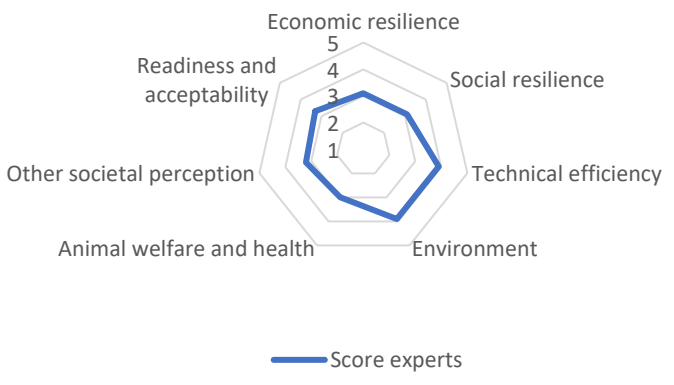
Be careful, especially on these points:

- Slurry application system must be compatible with the dairy production system and machinery available
- Effectiveness of each system will depend on slurry characteristics, application rates and weather conditions – e.g. slurry injection in warm, dry conditions can cause grass scorching
- Tractor operator should have the skills to operate slurry spreading machines - lack of attention costs a lot e.g. reverse the tractor and forget to lift trailing shoe, you'll bend it
- Low emission slurry spreaders may be able to qualify for subsidies under various schemes

More info:

https://www.youtube.com/watch?v=vhXDyn0cQA8
https://www.youtube.com/watch?v=hmy2muDdO2A

Assessment of method



Resilience 4 for Dairy

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Annex








Slurry application system comparison				
	Splash plate	**Trailing hose**	**Trailing shoe**	**Slurry injector (shallow)**
Soil/Topography	–	Suits most ground types (hilly and very often wet)	Heavy clay soil and works well in grass longer than 8cm	Best of short sward, not applicable to very stony soil or very shallow or compacted soils
Grassland/arable crop	–	Grassland/ arable crops	Grassland and arable land (preseeding) and row crops	Grassland/stubble, growing crops
Relative easy of use	●●●	●●	●	●
Relative risk of grass sward damage	●●	●	●	●●
Relative odour	●●●	●●	●	No odour
Typical range of dry matter (DM)	Up to 12%	<9%	<6%	<6%
Requires separation or chopping	No	Yes (if DM>6%)	Yes	Yes
Relative work rate	●●●	●●	●●	●●●
Relative precision application	●	●●	●●	●●●
Relative suitability where field slopes >15%	●●	●	No	No
Relative sensitivity to stones	●	●●	●●●	●●●
Relative runoff risk	●●●	●●	●	●
% increase grass yield over splash plate system	–	19%	21%	25-30%
Ammonia reduction	0%	30-40%	50-70%	≈70%
Necessery application of artificial fertilizer (kg CAN*/ha) to reach yield by slurry injector	61.4 kg CAN	30.6 kg CAN	16.3 kg CAN	Grass yield ≈10,000 kg DM per hectare
Cost CAN* to reach yield by slurry injector (€)	68 €/ha	34 €/ha	18 €/ha	
Capital costs (spreading width) *prices for 07/2023*	🪙 –	🪙🪙 13,700 € (6m) 35,000 € (18m)	🪙🪙🪙 15,000 € (6m) 51,000 € (18m)	🪙🪙🪙 19,500 € (3m) 40,000 € (7,7m)
Hose distance/row spacing	–	25-30 cm	25 cm	18.75-21.50 cm
Top producers in Europe	Bomech, Joskin, Veenhuis, Vogelsang, Vredo			

Machinery images source and capital cost estimation: joskin.com

Prices include the equipment needed to connect to the slurry tanker

**Calcium ammoniun nitrate (source of CAN cost and CAN requirement data: https://www.vredo.com)*

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