

Spreading Layer Manure

Layer manure (caged layer manure and barn litter) is a highly valuable nutrient source and soil conditioner when spread at suitable rates. However, good spreading techniques are needed to realise the potential value of this resource. Spreading needs to occur at the optimal time to maximise nutrient availability and minimise potential adverse soil impacts like compaction. Using the right equipment and information, simplifies management and improves production.



4. Take the mass of manure weighed (kg/m^2) and multiply by 10,000 to convert to kg/ha .
5. Divide the result by 1000 to get tonnes (t) per ha.

This process can be repeated for several passes to check the average spreading distribution and width.

Distribution

Poor distribution of manure by spreaders can cause uneven application and irregular plant growth. Distribution can be affected by manure consistency, the type of spreader and the operator. Generally, manure with a moisture content of 25–30% will spread best. Dust can be a problem from dry manure (<15%). However, if the moisture content exceeds about 35%, bridging will be a problem in many spreader designs. For most spreaders, an application rate of at least 2t/ha is needed to achieve an even spread. For some spreaders, higher application rates may be needed to achieve good performance. Operator efficiency may also strongly influence manure distribution.

Spreading Rates

A nutrient budgeting process is the best way to find the optimal long-term manure spreading rate (see the 'Layer manure – setting application rates' fact sheet in this series). Once the target spreading rate is known, the spreader needs to be calibrated to ensure the manure is applied at the correct rate evenly across the paddock. One way to check spreader calibration is provided in the following example.

Example: Measuring Your Spreading Rate

1. Take a strip of builder's plastic or tarpaulin (ideally 10m x 2m) and lay it down in path of the spreader.
2. Run the spreader over the drop sheet at the correct operating speed.
3. Weigh manure from 1 x 1m squares at several points across the width of the spreading pattern.

Some spreaders alter the application rate with the forward speed of travel, which can also cause variability in application where operators are not adequately trained.

Compaction

Compaction is caused by the movement of large implements/ vehicles/machinery across paddocks. Compaction is most likely to occur when soils with a moisture content close to field capacity are subjected to heavy loads (via machinery etc.). Ideally, spreading would occur when the soil is quite dry. Compaction of crop land can be reduced by setting up the spreader to run on controlled traffic lines. Spreading manure on a three to five year rotation and supplementing with inorganic fertiliser as required also reduces the compaction risk and saves money by reducing the application frequency.

Timing

The optimal timing of manure applications depends upon multiple factors. These include:

- crop or pasture nutrient requirements,
- field conditions (soil moisture),
- wind conditions, and
- timing of other management events (i.e. cultivation and sowing).

The application of layer manure 2–6 weeks before sowing (or peak pasture demand) is recommended to allow time for nutrients to mineralise from the organic matter in the manure. If the manure has been correctly composted, the timing of application is less critical, and the risk of nutrient drawdown is minimal. Ideally, manure spreading should occur when the risk of compaction is minimised.



Social and Environmental Considerations

Manure spreading can disperse dust and odour over considerable distances. If manure is spread close to neighbours or other sensitive areas, this should occur when the wind speed is low and ideally on weekdays. Consulting with neighbours about the best time to spread manure may reduce nuisance and help avoid complaints. Odour releases can be reduced by incorporating manure soon after spreading or by irrigating after spreading.

The risk of environmental harm must be considered before spreading manure. Manure should only be spread on the intended area.

Do not spread manure and spent litter near watercourses and drainage lines, or on steep slopes where erosion losses may occur. The planting of appropriate vegetative filter strips and trees can also be useful in intercepting nutrients, dusts and other particles. While a small amount of rain following application can be useful, spreading when heavy rain is forecast is not recommended.

Refer to the *Egg Industry Environmental Guidelines* (Edition II, McGahan et al., 2018) for more information on risk factors associated with nutrient loss to surface and groundwater.

Food Safety and Biosecurity

Allow a minimum of three weeks between application of manure and spent litter before grazing. Relevant state biosecurity regulations may specify longer times.

Where applying manure to horticultural crops greater controls are required. Only apply properly composted manure or treated proprietary organic products that contain less than 100 E. coli per gram, as side dressing.

Refer to *The Freshcare Code of Practice – Food Safety and Quality* (Freshcare, 2016) and the *Australian Guidelines for On-farm Food Safety and Fresh Produce* (DAFF, 2004) for information regarding the application of organic manures to vegetable crops.

Maximise the time between application and crop harvest. Do not apply untreated animal

manure where direct or indirect contact may occur with the edible part of the crop. Do not apply manure and spent litter to the foliage of crops to be consumed by humans. Refer to state biosecurity and biosolids application guidelines to determine appropriate by-product utilisation practices. Visit www.biosolids.com.au/guidelines for links to relevant state guidelines.

Options for Spreading Manure

There are many options for getting manure spread, including: engaging a contractor, purchasing a spreader with others in a farmer group or purchasing a spreader for your own use. Contractors may operate on an hourly rate or a 'tonnes spread' basis. Rates quoted by contractors range from \$12t to \$20/t (2018), depending on the distance of transport from stockpile to spreading area and other conditions. As spreaders are used infrequently, they are a good item for a farmer group to purchase and share, reducing the capital cost for each owner. There are several factors to consider when selecting a spreader to buy. Most important are the type, moisture level, and amount of manure which will be spread. Some design features to be considered include:

- **Spreading pattern and width:** To ensure an even spreading pattern and application rate are achieved.
- **Vertically vs horizontally mounted beaters:** Vertically mounted beaters generally spread over a larger area with each pass, throwing manure beyond the width of the spreader. Whereas horizontal beaters usually only spread about the width of the spreader.



- **Spinners:** Generally provide a wider and more accurate spreading pattern than beaters alone.
- **Floor width:** The maximum moisture content of manure that can be spread without bridging depends upon the floor width and the width of the rear door of the spreader. Generally, the belt driven machines cannot spread manure with a moisture content exceeding 40%.
- **Conveyor belt vs moving floor chains:** These can be either hydraulic or PTO driven. Conveyor belts may need to be replaced more often as the belt wears more easily than chains.
- **Rotation speed:** The rotation speed of the beaters affects the width of spread and application rate.
- **Size:** Spreaders vary greatly in size, from 1t capacity to over 20t capacity. The smaller capacity spreaders (1–2t) are unsuitable for spreading large amounts of manure because of the time spent loading and travelling. Larger capacity trailing units are probably the best option for on-farm use. Trailing units vary in size from less than 5t to over 20t capacity. Dual purpose units can be used for spreading other products such as lime and fertilisers, which may offset the cost, however these require a more consistent manure with lower moisture levels.
- **Price:** The size of a spreader generally determines the price. As a guide, prices for some trailing (tow behind) spreaders in 2018 are:
 - 1–4m³ – \$10,000–\$15,000
 - 10–16m³ – \$50,000–\$65,000

Spreaders can also be truck mounted, pricing varies depending on the truck type and fitting costs.

References and Further Reading

DAFF (2004) *Guidelines for On-Farm Food Safety for Fresh Produce*. Canberra: Commonwealth of Australia.

Freshcare (2004) *Freshcare Code of Practice - On-farm Food Safety Program for Fresh Produce*, 2nd Edition edition. Sydney: Freshcare Ltd.

McGahan, E., Wiedemann, S. G., & Gould, N. (2018) *Egg Industry Environmental Guidelines*, Edition II. Australia, Australian Eggs Limited.