# Managing manure

TEAGASC research has tracked changes in manure management practice across Irish farms.

Agriculture accounts for 33 % of greenhouse gas (GHG) emissions and 99 % of ammonia emissions in Ireland (Duffy *et al.*, 2020; EPA, 2019). The manure management elements of agricultural production account for 10 % of agricultural-based GHG emissions and 77 % of ammonia emissions. Bovine animals account for the majority of these manure management-based emissions – 66 % in the case of GHGs and 81 % for ammonia. Hence, management of this component will play an important role in meeting Ireland's national emissions reduction targets in the future.
Teagasc recently published a report on manure management practices covering the 2016-2018 period using results from the Teagasc National Farm Survey (NFS). The Teagasc NFS has been adapted in recent years to collect a wider suite of management data relevant to the environment. The last major comparative survey of manure management practices was conducted by Teagasc in 2003 (Hyde *et al.*, 2008). Results from this latest report are compared with those from 2003 to explore changes in farm-level manure management practices over the intervening period.

## Methodology

The recently published report (Buckley *et al.*, 2020) is based on analysis of farms with bovine animals over the 2016 to 2018 period, using data collected by the Teagasc NFS. The sample size is 876 farms, representing circa 90,000 farms nationally. The report provides detail on: the duration of bovine animal housing periods; the prevalence of different types of slurry and farmyard manure storage facilities; the proportion of manures generated by different animal types; the extent of seasonality of manure application; and, the extent to which various slurry application and manure storage methods are employed.

## Results

**Table 1** presents results from the recent report and compares them with results from the 2003 survey. However, it should be noted that different sampling frames were employed for the two surveys.

Compared to the 2003 results, the new report indicates that some categories of animals were winter housed for longer (suckler cows, heifers, cattle 0-1, cattle 1-2 and cattle > 2 years) and some for shorter periods (dairy cows and bulls).
Across all bovine categories (except cattle 0-1 years), the recent report indicates that a greater proportion of manure is stored in slurry form compared to what prevailed in 2003. This is to be expected, as there has been significant investment in storage facilities in the intervening period. The aforementioned investment in facilities is also reflected in changes in manure management storage method, where results from the recent report indicate that 87 % of slurry is now stored under a roofed slatted tank compared to 71 % in 2003.
Estimates from the new report indicate a higher level of early season application of slurry (44 % of total) compared to the situation in the 2003 report (35 %). Conversely, there were higher levels of summer and autumn slurry application in 2003 (44 % and 16 %, respectively) compared to the recent report (40 % and 13 %, respectively).
Finally, the 2003 report indicated that at that time, 98 % of slurry was applied by the splash plate method and only 1 % by a band spreader. Results from the recent report confirm that farmers have started to transition towards low-emission slurry spreading methods (trailing shoe, trailing hose and injection), with these methods accounting for 4 % of aggregate slurry applied over the 2016-2018 period. This is very important in that as farmers implement farm management practice change, such as adoption of low-emission slurry spreading, it is important that we are able to capture this change and reflect this activity in the GHG and ammonia national inventory accounting systems in the future.

## Conclusion

Comparing results from the recent Teagasc report on manure management practices with the last major survey on this topic in 2003 indicates that there has been a substantial move towards more manure storage in slurry form as well as slurry storage under a roofed

Table 1: Results of manure management practices surveys – 2003 versus 2016 to 2018.

| | Teagasc 2003 report | Teagasc 2016-2018 report |
|---|---|---|
| **Days housed** | | |
| Dairy cows | 129* | 121 |
| Suckler cows | 129* | 150 |
| Heifers in calf | 135* | 149 |
| Cattle 0 to 1 years | 138* | 147 |
| Cattle 1 to 2 years | 141* | 149 |
| Cattle > 2 years | 144* | 148 |
| Bulls | 141* | 121 |
| **Proportion of manure stored as slurry** | | |
| Dairy cows | 94 % | 94 % |
| Suckler cows | 73 % | 82 % |
| Cattle 0 to 1 years | 68 % | 56 % |
| Cattle 1 to 2 years | 80 % | 87 % |
| Cattle > 2 years | 59 % | 85 % |
| Bulls | 30 % | 81 % |
| **Method of slurry storage** | | |
| Under a roofed slatted tank | 71 % | 87 % |
| Covered over ground tank | 4 % | 3 % |
| Unroofed underground tank | 16 % | 5 % |
| Uncovered over ground tank | 6 % | 4 % |
| Lined lagoon | 1 % | 1 % |
| Unlined lagoon | 2 % | 0 % |
| **Time of slurry spreading** | | |
| January-April | 35 %** | 44 % |
| May-July | 44 %** | 40 % |
| August-September | 16 %** | 13 % |
| October-December | 6 %** | 3 % |
| **Slurry application method** | | |
| Splash plate | 98 % | 84 % |
| Injection | - | 1 % |
| Low-emission slurry spreading | 1 % | 3 % |
| Umbilical | - | 10 % |
| Other | 1 % | 2 % |

**Reported in months (30 days is assumed here)*

***This was reported as spring, summer, autumn and winter*

slatted tank. Additionally, more slurry is now applied in early season and by low-emission slurry-spreading methods. Through the methods documented in this new report, the framework is now in place to capture changes in farm-level manure management activity data collected by the NFS. This development has the potential to be used in the national inventory accounting framework going forward.

## References

Buckley, C., Moran, B. and Donnellan, T. (2020). 'Teagasc National Farm Survey – A Report on Bovine Manure Management, Application and Storage Practices in Ireland'.

Duffy, P., Black, K., Fahey, D., Hyde, B., Kehoe, A., Murphy, J., *et al.* (2020). 'Ireland national inventory report 2020 greenhouse gas emissions 1990-2018 reported to the United Nations framework convention on climate change'.

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