

GREENHOUSE GAS FROM DAIRY MANURE MANAGEMENT AT THE FARMSTEAD **Part 6: GHG REDUCTION FROM LIMITING SUMMER STORAGE**

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Since the production of methane (CH₄) in manure storage facilities is a biological process that increases as the temperature of the storage increases, limiting the storage of manure during warmer seasons will reduce the amount of CH₄ produced. Less manure will be exposed to the higher MCF values during the warmer seasons, thereby reducing GHG emissions. The reductions in emissions will be proportional to the days not stored.

Advantages

Manure applications during the growing season provide the plant nutrients when they are most needed. During the summer soil is likely to be drier, thus limiting soil compaction associated with manure application and reducing the potential for runoff. By actively emptying the manure storage during the summer the need for fall spreading will be limited and the storage volume will be likely more available for the winter storage period.

Considerations

Odor from spreading operations during warmer periods is more likely to be a concern for neighbors. Managing manure application on growing crops is difficult. Access during a time when the crops will not be damaged will have to be matched with the appropriate application method and the weather at the time. Timing the applications to deliver the nutrients when needed, despite other farm operations or weather constraints, may present operational challenges.

Cost

The cost of summer manure spreading if extraordinary mechanisms are needed may be offset by savings of purchased nutrients. The opportunity cost may be the biggest concern if spreading manure delays other field operations or if weather delays needed nutrient applications.

Planning considerations

Fields that can receive manure applications during the summer need to be identified and chosen in advance. Crops that will allow access and nutrient additions during the growing season need to be selected and the NMP will need to be adjusted to limit the nutrients on the selected field prior to the growing season. Field locations where manure odors may be tolerated, need to be considered. And finally, application equipment that is appropriate for the crop field selected will need to be identified. Contact a Natural Resources Conservation Service office, the local Soil and Water Conservation District office, or a qualified NYS professional for NMP assistance.

Table 1.6 shows the methane conversion factors (MCF), and global warming potential (GWP) as the carbon dioxide equivalent (CO₂eq) per cow per year for a daily spread in the summer manure management system compared to a manure management system that stores the manure both summer and winter. Any reduction in manure storage during the summer will have a reduction in GWP.

Table 1.6 Global warming potential (GWP) estimates² for year round liquid storage compared to liquid storage for the winter 6 month period and daily spread during the summer as the manure management systems

MCF ¹ winter	MCF ¹ summer	Manure Management BMP	Total Annual GWP lbs. CO ₂ eq/cow/yr. ²
	0.5	Daily spread summer only	87
17		Liquid/Slurry without natural crust winter only	2,971
Total Winter storage and summer daily spread			3,058
17	35	Liquid/Slurry without natural crust both summer and winter	9,213

¹Source: IPCC (2006) and EPA (2016) ²Calculated

The assumptions used are that one system only stores manure for the winter and then empties the storage completely so there is no storage during the summer. The other system stores manure for both the summer period and the winter period Also that the nitrogen content of the manure excreted is 0.99 lbs./cow-day, the volatile solids (VS) in manure is 16.9 lbs./cow-day (ASAE), and that in this example, summer ambient

temperature is assumed to be 18°C (64°F) and winter is assumed to be < 10°C (< 50°F) so an average MCF value is used when the storage is used for the whole year.

Because there are larger emissions of GHG from storage during the summer than in the winter, avoiding summer storage will reduce the GWP of the manure management system.

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