

Nutrient Management Plans (NMPs) are an effective way for farmers to maintain farm profitability while minimizing negative impacts to the environment. Nutrient management plans combine general landscape characteristics, farm specific production practices, and economic factors into a comprehensive plan for managing nutrient applications.

Nutrient management plans include:

- **Soil sampling** to determine the fertility levels of fields.
- **A conservation plan and nutrient application maps** to identify sensitive areas in the landscape that require a high level of management to minimize negative environmental impacts.
- **Annual nutrient budget** that specifies crops grown, nutrient application rate, nutrient sources, and application timing for each field.

For farm operations with livestock, the main focus of a nutrient management plan is to determine the amount, timing, and application method for manure that will be applied to fields.

Manure storage

Manure storage structures are constructed near cattle housing facilities to hold manure temporarily before application to cropland. Systems for manure storage include:

- **Walled enclosure** are vertical concrete structures that serve as above ground manure storage for solid or semi-solid manure.
- **Manure ponds or lagoons** are in ground structures built to store semi-solid or liquid manure. They are usually lined with plastic, clay, or concrete to prevent leakage into groundwater. Manure ponds or lagoons can be very large and store manure for up to a year.
- **Above-Ground tanks** are liquid manure storage systems built out of prefabricated metal.

Manure digesters are used to collect biogas (such as methane) from some manure storage structures. Anaerobic digesters must be airtight for digestion to occur and to allow for the collection of biogas. The collected biogas is usually burned to produce electricity for either on farm or off farm use.

Pros: Turning manure into a renewable energy source, improving air quality, limiting greenhouse gases, improving water quality by reducing pathogens, reducing farm energy costs, tax savings for farmers who qualify for carbon credit payments.

Cons: Start up costs are expensive, maintenance costs are expensive, the cost of producing the energy is expensive, no off farm market for electricity produced, only feasible on large farming operations.

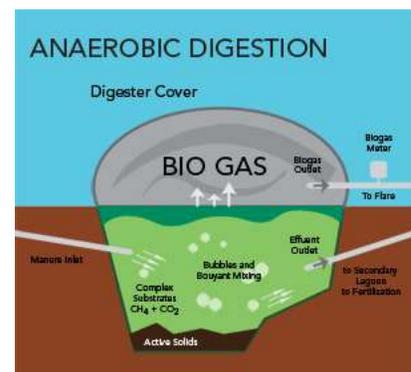


Photo: www.pisales.co.uk

Nutrient management plans not only identify where farmers will apply manure, but they also specify how they will apply manure. Application methods include:

Surface application

Manure spreaders are typically used for solid manure. They are relatively inexpensive and low maintenance, but make it difficult to apply manure uniformly on fields.



Wikimedia.org

Tank wagon spreading is used for liquid manure and is great for uniform application, however, soil compaction can be significant and odor is often a problem.



Wikimedia.org

Draglines are used for liquid manure. They are hoses connected from the manure storage unit to a tractor in the field. The manure is pumped to the field where it is surface applied.



talk.newagtalk.com

Manure irrigation is used for liquid manure. Manure is applied by using existing irrigation system to surface apply liquid manure.



Extension.org

Incorporation

Draglines can also be used for incorporation. This technique connects the draglines to an implement on the tractor that incorporates the manure immediately into the soil.



Photo: agweb.com

Tank wagon with knives or disks are used in the same situation as tank wagons. The difference is that knives or disks mounted on the wagon inject the manure into the soil, reducing odor concerns.



Photo: jameswayfarmeq.com

For sensitive environmental areas, incorporation is better than surface applications. Surface applications risk nutrient and manure runoff after severe storm events and during spring snow melt. Incorporation places the manure under the soil surface, reducing runoff risks.

Source: Schulte and Walsh. *Management of Wisconsin Soils*. UW Extension publication A3588

For more information please visit Dunn County UW-Extension website at dunn.uwex.edu or <https://fyi.uwex.edu/wimanuremgt/>