

Developing and Implementing Manure Management Plans

Kim Sutherland

Nutrient Management Inc. Suite 106 #171-5005 Dalhousie Dr. N.W., Calgary, AB T3A 5R8.
Email: ksuther@ican.net

▪ Introduction

Manure is a valuable resource for livestock producers because proper use of manure can improve the productivity of land. In some parts of Canada, where animal numbers are increasing on individual farms or total animal numbers are increasing within some geographical locations, more attention must be paid to the management of manure. Careful manure management will help to avoid creating environmental problems and will ease public concern about the effects that expansion of the livestock industry will have on the quality of the environment. Therefore, in general, governments are requiring or advising livestock producers to design a manure management plan for their specific operation as a means of ensuring that deleterious impacts on the environment do not occur.

The subject of designing and implementing manure management plans is very broad. The purpose of this paper is to give the producer a general conceptual understanding of this subject. Producers can take the general concepts outlined in this paper and, in consultation with the agricultural experts in their area, apply them to their particular situation.

▪ Developing Manure Management Plans

Manure management plans require putting together various pieces of information. The level of detail needed in the design of a plan will depend on government requirements (if it is government or regulator policy that a manure management plan is required for the operation) and producer needs. The following may be some of the components a producer may want to consider including in a manure management plan.

Background Information

Standard requirements include recording the quantity of manure produced at your facility and the capacity of your storage system. To make a manure management plan, you will need to know the quantity of manure available for each spreading event. You will need to analyze manure and soil nutrient content and have a good idea of the crop rotations you will be growing on the land receiving manure (Olson and McKenzie, 1998).

If regulators or the public need information to ensure that environmental quality is not being affected, additional background information such as climatic and topographical information, surface water drainage patterns, groundwater quality and groundwater vulnerability may be necessary.

Application rates

The manure management plan should list how and when manure is to be applied. It should also state how much inorganic fertilizer will be applied in addition to the manure. Application rates of manure and inorganic fertilizer need to be recorded for each field. The quantity of manure produced and application rates will affect the acreage needed for manure application. This information should be included in the manure management plan, to ensure that the required acres are available.

Depending on a producer's situation, making a manure management plan that has different application rates in the short, medium and long-term may be feasible. Producers may prefer to apply manure to meet the nitrogen requirements of the crop. However, this application rate may eventually lead to phosphorus accumulation in the soil or other negative effects. Therefore, application rates may have to be reduced to supply the crop phosphorus requirement (for example) in the long-term.

Restrictions

A manure management plan includes all restrictions on the spreading of manure. Restrictions are designed to prevent problems occurring from pollution or odour and are included in guidelines or regulations governing the operations of that particular farm (permit restrictions) or that type of farm in the region (Codes of Practice). The restrictions generally include incorporation guidelines, time of year guidelines and setback requirements to residences and surface water (AAFRD, 1995). They may include additional factors depending on the environmental sensitivities of the site. It is important to note these details, because they will affect the land base for spreading and nutrient content of the manure.

Monitoring

Generally a good monitoring plan is recommended. A monitoring program will provide a check on how well the plan is working plus indicate any possible environmental problems that could occur over time.

A monitoring program includes taking detailed background information on the soil profile, including criterion such as soil texture, organic matter, pH, electrical conductivity, and major and perhaps minor plant nutrients. Monitoring surface soils on fields where manure has been spread can reveal changes in these parameters. It is generally a good idea to monitor soils below the root zone for leaching of nitrogen and possibly sulfate.

▪ Implementing Manure Management Plans

Implementing manure management plans is quite straightforward. It requires sampling, analysis, record keeping and interpretation of the data. Generally, separate records are required for each field. If the manure management plan is properly implemented, the program can be evaluated and improved and environmental impacts can be anticipated and assessed.

Nutrient Input and Removal

The nutrient input of inorganic fertilizer and manure compared to nutrients removed in the crop and nutrients remaining in the soil provides the producer with a good check on how effectively the manure management plan is working. Records of nutrient input from manure and fertilizers and removal of nutrient by harvesting the crop need to be kept for each field.

Manure analysis and application rates plus any inorganic fertilizer applied will give the nutrient inputs for that year. Records of nutrient removal by crops can also be kept. In some cases, tissue tests may be combined with yields to determine nutrient removal. The soil monitoring program will show nutrient remaining in the soil.

Data on nutrient inputs, nutrient exports and soil tests for each field are effectively recorded and analyzed on spreadsheets. Various spreadsheet programs for this kind of record keeping are available through government, academic and industry sources.

Analysis

The value of the record keeping system is that increases in parameters such as phosphorus and electrical conductivity can be detected in the surface soil and

excess nitrate can be detected below the root zone. By examination of the records and making adjustments to manure application rates, the producer can keep the soil at optimum production capacity. As well, the producer can anticipate environmental problems before they become serious and adjust fertilizer and manure application rates accordingly.

■ Conclusion

A well designed manure management plan will help pork producers optimize the use of manure as a fertilizer while helping maintain good environmental practices on the land. It can be used to demonstrate to the public and to regulators that good land stewardship is being practiced. It can allow producers to anticipate possible soil and environmental impacts before these problems become serious. Good manure management programs are a vital part of building a large and sustainable intensive animal industry.

■ References

- AAFRD.** (1995) *The Code of Practice for the Safe and Economic Handling of Animal Manures*. Alberta Agriculture, Food and Rural Development Publishing Branch, 7000-113 Street, Edmonton, Alberta, Canada. T6H 5T6.
- Olson, B. and R. McKenzie** (1998). *Manure Nutrient Management: a balancing act. Worksheets*. (unpublished). Alberta Agriculture, Food and Rural Development, Lethbridge, Alberta, Canada.

