



Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

FEED MANAGEMENT

CODE 592

(au)

DEFINITION

Manipulating and controlling the quantity and quality of available nutrients, feedstuffs, ingredients, or additives fed to livestock and poultry.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Water Quality.—Prevent excess nutrients in surface and ground water by reducing the quantity of nitrogen, phosphorus, sulfur, salts, and other nutrients excreted in the manure.
- Water Quality.—Prevent excess pathogens and chemicals from manure, biosolids, or compost applications by reducing their quantity and viability in manure.
- Air Quality.—Reduce emissions of ammonia, odors, greenhouse gases, volatile organic compounds, and dust from animal feeding operations.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to livestock and poultry operations—

- With a whole farm nutrient imbalance, with more nutrients imported to the farm than are exported and utilized by crops in rotation on the farm.
- That have a significant accumulation of nutrients in the soil.
- That land apply manure and do not have a land base large enough to allow nutrients to be applied at rates recommended by soil test and utilized by crops in the rotation.
- Where animal diets are not analyzed and balanced.
- Seeking to improve nutrient use efficiencies and reduce manure pathogens, odors, emissions of greenhouse gases, volatile organic compounds, or dust.

CRITERIA

General Criteria Applicable to All Purposes

Supply sufficient nutrients to maintain the health, growth, production, performance, and reproduction of livestock and poultry.

Develop diets for specific species of animals according to current recommendations from one of the following:

- National Research Council (NRC).
- Land grant university (LGU), science-based governmental agency, or institution of higher learning.

Use laboratory analysis on the formulated diet, or on all feed ingredients used to formulate the diet, to determine its nutrient content.

Conduct feed analysis as often as necessary to adjust diets for changes in chemical composition of the feeds being fed.

Use laboratories for feed analyses whose tests are accepted by the LGU, State departments of agriculture, or another appropriate body in the State in which the feeding strategy will be implemented. Data from analyzed feed ingredients and/or appropriate historic feed analysis information for the operation may be used for adjustments of ration formulation.

Determine nutrient use and excretion using manure analyses or calculated nutrient intake and excretion rate. If manure analyses are used they must be conducted by—

- Laboratories whose tests are accepted by the LGU,
- State departments of agriculture, or
- Another appropriate body in the State in which the feeding strategy will be implemented.

Nutrient intake and excretion calculations from spreadsheets or computer models are also acceptable methods of monitoring nutrient intake and excretion. The calculations used in these spreadsheets and computer models must be science-based and developed from standards outlined in current recommendations of the NRC or LGU.

Use professional animal scientists, independent professional nutritionists, or other comparably qualified individuals in the development of diets and feed management strategies.

Formulate diets to provide the quantities and correct relative ratios of available nutrients required by the animal species to meet the goals for which the plan is being developed.

Provide adjustments to nutrient levels to meet specific genetic potential, environmental demands, and requirements to ensure health, well-being, and productivity of the animal.

Use one or more of the following feed management practices or diet manipulation technologies to reduce nitrogen, phosphorus, or other excreted nutrients, pathogens, ammonia, odors, greenhouse gases, volatile organic compounds, and dust, while maintaining the health, well-being, and productivity of the animal.

- Formulate diets closer to animal requirements, complemented by feed management that results in grouping animals according to requirements and consistent delivery of the formulated diets to the correct group of animals.
 - Implement group feeding based on physiological or production status.
 - Implement phase feeding.
 - Implement split-sex feeding.
- Reduce or eliminate phosphorus supplements.
- Reduce protein and supplementation with amino acids (nonruminants).
- Reduce protein in ruminant diets by formulating rations to meet rumen nitrogen and amino acid requirements.
- Manipulate the crude protein and energy (carbohydrate and fat) content of the diet to enhance the availability of amino acids (ruminants). This includes shifts in carbohydrates, fats, and types and quantities of protein utilized.
- Use highly digestible feeds and forages, as appropriate, in the diet.
- Use phytase or phytase combined with scientifically supported enzymes to improve phosphorus availability and reduce the supplemental phosphorus content of the diet (nonruminants).

- Reduce the phosphorus content of the diet of ruminants when phosphorus is being overfed. It is recognized that phosphorus levels in some diets will exceed NRC recommendations because of high phosphorus levels in forages, grains, and food byproducts being fed.
- Use selected scientifically supported enzymes or other products to enhance feed digestibility or feed use efficiency.
- Use scientifically supported and environmentally benign growth promotants, ingredients, and additives as allowed by law.
- Use other feed processing, management, additives, ingredients, or diet manipulation technologies demonstrating the ability to reduce manure nutrient content, pathogens, ammonia, odors, greenhouse gases, volatile organic compounds, or dust.
- Improve form or method of delivery of feeds.
- When livestock are obtaining their diet by grazing pastures as well as mechanically harvested and processed feeds, test pasture forages for nutrient content and account for these nutrients in the feed ration and balance of nutrients. Include all feeds, including grazed pasture, in an analysis to meet nutritional requirements of livestock and avoid excess nutrients being fed. Forage tests must meet the LGU acceptance and certification process.
- Modify cropping strategies or utilize alternative feed sources to provide nutrients that more closely match animal requirements.

CONSIDERATIONS

Feed management can improve net farm income by feeding nutrients more efficiently.

Consider nutrient requirements for production based on stage of growth, intended purpose of the animal, and type of production (e.g., meat, milk, eggs).

Feed livestock late in the day to minimize dust spikes during critical time periods.

Use management practices described in the NRCS nutrient management (feed management) technical notes for the specific animal species. See “References” below.

Consider alternative feed ingredients (e.g., byproducts) and their potential impacts on the nutrient content of excreted manure.

Analyze the drinking water consumed by the animals to determine its nutrient content, sulfur content, and presence of pathogens, and adjust the diet or treat the water to account for extra elements.

Consider the potential impact of feed management on the volume of manure excreted and on manure storage requirements.

Consider the impact of feed management practices and diet manipulation on manure pathogens, ammonia, odors, greenhouse gases, volatile organic compounds, and dust on animal health and well-being, even if one or more of these are not included in the client’s objectives.

Consider using concentrates and forages grown on the farm to minimize the quantity of nutrients imported to the farm, and to maximize the recycling of nutrients on the farm.

If manure is analyzed, use freshly excreted manure to determine manure nutrient content and to estimate the impact of the feeding strategy.

PLANS AND SPECIFICATIONS

Plans and specifications for feed management must describe the specific feed management practices and/or technologies that are planned for the operation.

The following components must be included in the feed management plan where applicable:

- Type of technology, or technologies, or feeding practices that will be used on the operation and their intended outcome.
- Feed analyses and ration formulation information prior to and after implementation of feed management on the operation.
- Feed weighing, mixing, and delivery to consistently provide the formulated diet that matches the requirements of each group fed.
- Protocols for sampling and preserving feed ingredients, manure, and water, as applicable, prior to sending for analysis.
- Estimated or measured nutrient content of the manure prior to the implementation of feed management on the operation.
- Estimated impact that feed management will have on manure nutrient content.
- Expected impact on pathogen content, ammonia, odor, greenhouse gases, volatile organic compounds, and dust reduction of manure.
- Guidance for how often the feed management plan will be reviewed and potentially revised.
- Quantities and sources of nitrogen and phosphorus that will be fed.
- Identification of the qualified feed management specialist who developed the plan.

OPERATION AND MAINTENANCE

The producer or client is responsible for the operation and maintenance of the feed management plan.

Operation and maintenance activities include—

- Periodic feed management plan review to determine if adjustments or modifications are needed.
- Routine feed analysis to document the rates at which nitrogen and phosphorus were actually fed. When actual rates fed differ from or exceed planned rates, records will indicate reasons for the differences.

Maintain records to document plan implementation. As applicable, records include—

- Feed analysis and ration formulation, including the record of ration formulation used prior to implementing the feeding strategy.
- Records estimating the impact the feeding strategy is having on reducing manure nutrient content and nutrient efficiency.
- Manure analysis that was done after the feeding strategy was implemented to determine manure nutrient content.
- Dates of review and person performing the review, and any recommendations that resulted from the review.

Records of plan implementation will be maintained if required by other Federal, State, or local ordinances, program, or other requirements.

REFERENCES

National Animal Nutrition Program. n.d. "Current National Research Council (NRC) Reports." Accessed May 10, 2021. https://animalnutrition.org/nrc_reports

USDA NRCS. 2020. Nutrient Management Technical Note 1 (Title 190). Effects of Diet and Feeding Management on Nutrient Content of Manure. Washington, D.C. <https://directives.sc.egov.usda.gov/>

USDA NRCS. 2020. Nutrient Management Technical Note 2 (Title 190). Feed and Animal Management for Beef Cattle. Washington, D.C. <https://directives.sc.egov.usda.gov/>

USDA NRCS. 2020. Nutrient Management Technical Note 3 (Title 190). Feed and Animal Management for Swine (Growing and Finishing Pigs). Washington, D.C. <https://directives.sc.egov.usda.gov/>

USDA NRCS. 2020. Nutrient Management Technical Note 4 (Title 190). Feed and Animal Management for Poultry. Washington, D.C. <https://directives.sc.egov.usda.gov/>

USDA NRCS. 2020. Nutrient Management Technical Note 5 (Title 190). Feed and Animal Management for Dairy Cattle. Washington, D.C. <https://directives.sc.egov.usda.gov/>

USDA NRCS. 2021. Nutrient Management Technical Note 8 (Title 190). Animal Diets and Feed Management. Washington, D.C. <https://directives.sc.egov.usda.gov/>

USDA NRCS. 2021. Nutrient Management Technical Note 10 (Title 190). Feed and Animal Management for Horses. Washington, D.C. <http://USDA NRCS. 2020.>

USDA NRCS and USDA Economic Research Service. 2000. Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients: Spatial and Temporal Trends for the United States. Publication No. nps00-0579. Washington, D.C.
https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_012133.pdf