



Management of Feed Nutrients

Introduction

Nutrients are essential to a farm's productivity, viability, and sustainability. However, nutrients can also be the source of a farm's issues and concerns. When nutrients are managed effectively, imported nutrients and nutrients with the potential to be lost to the environment will be decreased. One way nutrients can be managed is through feed management. Feed management assesses the nutritional quality of homegrown forages, determines the nutritional needs and current intakes of livestock, evaluates what feed sources are available on farm, and determines the nutritional requirements and ration levels for specific groups of livestock. An intensively managed feeding program will utilize on farm nutrient sources, which limits the need for imported nutrients. It will also prevent the overfeeding of nutrients by determining the correct rations of feed for livestock which will reduce the amount of nutrients excreted in manure by.

Environmental Concerns

Excess concentrations of nutrients can often be a cause of water quality degradation. If nutrients are not properly managed on a farm, the potential for them to be flushed into the environment during runoff events greatly increases. Controlling the quality and quantity of nutrients consumed by livestock, the amount of excreted nutrients in manure can be limited. When nutrient laden manure is applied to fields/pastures nutrients can accumulate in the soil which can lead to nutrient runoff and water contamination. Reducing the accumulation and potential loss of nitrogen and phosphorus in manure from farms will protect water resources, improve soil health, and promote better air quality.

Potential Economic Benefits

Feeding the herd is the single largest cost of producing milk. Approximately 40-60% of operating costs on most farms goes to feed and feeding mechanisms. Most farms grow their own forages and purchase all or most of their grains and supplements. Growing and feeding high quality forages and grain on the farm greatly decreases costs associated with importing feed supplies. By feeding high quality forages



and grains and regularly evaluating the nutrient intake of the animals, the amount of nutritional supplements purchased can also be decreased. By closely monitoring the nutrient intakes of the animals, as well as, the nutritional quality of the feed, production will be increased, thereby increasing farm profits.

Summary of Best Management Practices

- Produce and Feed High Quality Homegrown Forages
 - Timely harvest, proper handling, and proper storage of forages ensure the availability of high-quality forage for the herd.
 - Producing feed on the farm ensures what nutrients come from the farm stay on the farm.
 - Reduces nutrient imports to maintain nutrient mass balance.
- Test Feeds for Nutrient Content
 - Utilize laboratory analysis to determine feed nutrient content to ensure accurately balanced rations.
- Ensure Feed Nutrient Intake is Accurate
 - Nutrient requirements are expressed in total quantity per day to meet the maintenance, growth, production, and reproductive needs of an animal or group of animals.
 - Know how much animals eat and delivering a proper ration will meet the animals' nutritional needs.
- Feed Balanced Rations to Meet Animal Requirements
 - Employ scientific standards to determine nutrient requirements and ration levels.
 - Nutrient requirements are based on animal age, size of animal, level of milk production, butterfat content of milk, and stage of pregnancy.
 - Current standards are made available by the National Research Council.
- Practice Sound Animal Husbandry
 - Sound animal husbandry regimens promote animal health and improve levels of performance.
 - Provide clean, comfortable housing for animals, as well as, clean, fresh feed and water.
 - Maintain effective health and vaccination protocols to ensure disease prevention.
- Eliminate Use of Phytase
 - Phytase is an enzyme that allows nonruminants (i.e. swine and poultry) to absorb phosphorus more readily.
 - Cattle naturally produce Phytase.
 - Adding Phytase to feed for cattle is not necessary or recommended.

For More Information

Penn State Extension – [Feed Management for Producers](#)

Cornell University Cooperative Extension – [NRC Recommendations for Dairy Cows](#)

Cornell University Cooperative Extension – [Whole Farm Nutrient Management, A Dairy Example](#)

Summary of Regulations

There are no regulations requiring specific feed nutrient management practices. With the cost of feeding animals being such a critical factor in dairy farm profitability, there is strong economic incentive to utilize feed nutrients most efficiently. The USDA Natural Resources Conservation Service lists feed management as one of the six components of a Comprehensive Nutrient Management Plan.

For More Information

USDA NRCS [Nutrient Management Standard \(590\)](#)

USDA NRCS [Feed Management Standard \(592\)](#)

Background Information for Worksheets

In a typical year, when do you start mowing hay in the spring?

In a typical year, grasses should first be mowed by May 15th in Southern NY or May 20th in Northern NY. Legumes should first be harvested by May 25th in Southern NY and June 1st in Northern NY.

Harvesting forages as early in the year as possible will ensure that the feed is high quality and has a high nutrient content. Feeding and producing forages with high nutrient contents will reduce the amount of nutrients needing to be imported to the farm. Reducing the amount of imported nutrients



limits the nutrients excreted in manure that can accumulate in soils or runoff into nearby water resources.

In a typical year, how many cuttings do you harvest each year?

In Southern NY, hay cropland should be cut a minimum of 4 times a year. In Northern NY, hay crops should be cut a minimum of 3 times per year. Frequent cuttings reduce the number of days of regrowth resulting in forage that has higher nutrient content. Producing high quality forages will improve the farm's "nutrient mass balance" which is the amount of nutrients imported compared to the amount of nutrients exported.

What percentage of forages fed do you purchase?

It is important for farms to produce homegrown, high quality feed. When high quality feed is available, the more a herd will consume. When the herd's nutrient requirements are met with homegrown forage, the fewer nutrients will have to be purchased and imported on to the farm. Ideally, no feed should be purchased. Purchasing feed from outside sources increases the amount of imported nutrients on the farm. The more nutrients imported on to the farm, increases the amount of nutrients that will be excreted through manure. As a result, the amount of nutrients that could potentially contaminate soil and water resources increases.

How many acres of grain are grown annually? Is the grain being used on the farm?

If grain is being fed, it is ideal to grow and produce it on the farm. Many farms that produce grain crops, will often sell the commodity instead of using it as feed. As stated in the previous question, producing your own feed can result in grain and forages that have a much higher nutrient content that is better consumed by the herd. If feasible, it is better to recycle the nutrients found on the farm by feeding the grain, rather than selling it or importing additional food sources.

What is the forage acre/cow ratio for the farm?

The ideal forage acre to cow ratio for the farm should be 1-2 forage acres per cow. If the ratio is less than 1 acre per cow, the fields may be being overloaded with nutrients. This could result in poor soil absorption of nutrients which could cause any runoff to become polluted. This also may suggest that the farm should reevaluate its herd size or consider acquiring more land. If the ratio is greater than 2 acres per cow, this can indicate that farm is not getting the quality of forage needed for the animals and production is not being optimized. A simple formula can be used to determine the forage acre per cow ratio. This formula can be found on the last page of the AEM Tier 2 Management of Dairy Feed Nutrients Worksheet.

For More Information

NYS SWCC AEM Tier 2 Worksheet – [Management of Dairy Feed Nutrients](#)

Background Information for Worksheets

Is the farm interested in feeding more homegrown feed in the diet?

It is beneficial for all farms to feed more homegrown forages and grains. This reduces the amount of nutrients being imported and brought onto the farm. Recycling nutrients already present on the farm, by producing homegrown feed, will maintain the farm's mass nutrient balance protecting soil and water quality.

Are animals fed in groups?

Animals that are separated into groups such as high productivity, low productivity, dry cows, transition cows, and multiple heifer groups are fed unique rations formulated specifically for each group's needs. Feeding animals in groups, such as those listed previously listed, will help to maximize nutrient usage and reduce the amount of excess nutrients found in manure. Limiting the excess nutrients in manure will reduce the accumulation of nutrients in the soil when manure is land applied. This will decrease the potential for nutrients to runoff or leach from the fields or pastures.



For More Information

Cornell University Cooperative Extension – [Dairy Herd Forage Needs Worksheet](#)

NRCS – [Effects of Diet and Feeding Management on Nutrient Content of Manure, “Feed Management Factors”](#)

Cornell University Cooperative Extension – [Grouping Dairy Cows](#)

How closely are the recommendations of the nutritionist followed?

If the farm operation is working with a nutritionist, the recommendations for feed rations should be followed very closely. The recommendations will provide accurate feeding rations that will allow for the nutrients available on the farm to be maximized. It is important to consult with a nutritionist regularly to adjust the feed rations as necessary. This will not only enhance the usage of on farm nutrients and feed sources, but provide for healthier, more productive animals.

How often are feed rations balanced?

Feed rations should be balanced monthly to ensure that animals are receiving required amount of nutrients. If the quality of the feed changes, feed rations should be balanced more frequently. If no balancing is done, the nutrient intake could be inaccurate suggesting that animals are consuming too few or too many nutrients. Balanced feed rations will result in a higher productivity, as well as, a smaller proportion of nutrients excreted in the manure.

For More Information:

NRCS – [Feed and Animal Management for Dairy Cattle, “Diet Formulation”](#)

Background Information for Worksheets

How often are forages tested for quality?

The quality of forages should be analyzed for nutrient content a minimum of four times a year, but monthly or more frequent analysis is desirable. Analyzing forages for nutrient content will ensure that the rations are balanced and that the animals are receiving adequate nutrition to support high productivity.

For More Information

Penn State University – [Forage Quality Testing: Why, How, and Where](#)



How much of your stored feed do you typically discard due to quality issues (e.g. mold, spoilage)?

Ideally, less than 5% of feed stored on the farm should be discarded due to quality issues. Proper management practices such as, timely harvesting, adequate covers and roofs on all storages, and clean water exclusions will help preserve the quality of forages. If greater than 40% of stored feed is being discarded, evaluation will be needed to determine the reason so much feed is being lost.

For More Information

NRCS – [Feed and Animal Management for Dairy Cattle, “Feed Management”](#)

Cornell University Cooperative Extension – [Silage and Dry Hay Management](#)

How often is dry matter content of wet feeds determined?

The dry matter content of feed should be determined often and on a regular basis. At best, a weekly test of the feed should be completed. The dry matter and moisture contents of the feed can change. Feed rations may have to be altered to account for the changes. If tests are not performed on a regular basis, the animals may be getting too few or too many nutrients creating an inefficient use of on farm feed nutrients.

For More Information

Cornell University Cooperative Extension – [Dry Matter Determination](#)

How often is dry matter intake measured or estimated?

Dry matter intake is determined by multiplying the pounds of feed by the percent dry matter. It is important to perform this calculation weekly or on a regular basis to determine the amount of feed dry matter content a cow will eat in a day. If calculations determine that the intake is high, this will reduce the amount of supplemental nutrients needed to maintain the cow’s daily nutrient requirement. If the intake is low, additional nutrient may need to be added to the feed or rations need to be adjusted.

For More Information

Cornell University Cooperative Extension – [Feed Efficiency and Its Impacts on Feed Intake](#)

Progressive Dairyman – [Managing Your Dairy Cows’ Feed Intake is Under Your Control](#)

Background Information for Worksheets

Are the Milk Urea Nitrogen (MUN) values between the normal range of 8 to 12? Do you use the information to make management decisions?

Milk Urea Nitrogen (MUN) values reflect the amount of urea found in the milk and help to identify if the animal is consuming too much or too little protein. If the value is above the normal range too much protein is being consumed by the animal. If the value is below the normal range, more protein needs to be fed to the animal. These values act as a tool for nutritionists and farmers when they are monitoring the nutritional status of dairy cows. These numbers should be use when determining and adjusting feed rations.

For More Information

Cornell Cooperative Extension – [Strategies to Reduce the Crude Protein Intake of Dairy Cows for Economic and Environmental Goals](#)

Do you use a Total Mixed Rations (TMR) or a Component Feeding system?

When forages, grains, and supplements are weighed and mixed together it is considered a Total Mixed Ration. When feed to the animal, each mouthful has a complete nutritional balance. The opposite of TMR is a component feeding system which involves feeding the forages, grains, and supplements separately. With this system, it can be hard to determine if the animal is receiving balanced nutrition. Using a TMR system can help control rations and optimize the feed and nutrients being used and consumed on the farm.

Is grazing used on the farm?

If grazing is used on the farm is should be managed for nutrient consumption. Different herd groups (i.e. Lactating cows, Dry Cows, Heifers, etc.) have different nutrient requirements and should be grazed according to specific nutrient consumptions.

For More Information

USDA NRCS – [Prescribed Grazing and Feed Management for Lactating Dairy Cows](#)

Cornell Cooperative Extension – [Managing a Grazing System for a Milking Dairy Herd](#)

Does your farm have any challenges with: Herd health and performance issues? Cow comfort and stress issues? General nutrition and feeding issues? Heifer growth issues?

The main goal of every dairy operation is to provide an environment that promotes herd health/performance, cow comfort, good nutrition, and healthy growth. Implementing good feed management techniques will ensure that animals are consuming the necessary nutrients levels to ensure good body condition and health, as well as, optimal production levels. If an operation is experiencing any of the above issues, the operator should consult with nutritional specialists and veterinarians to determine the best methods of remediation.

For More Information

University of Nebraska – [Managing Dairy Cattle for Cow Comfort and Maximum Intake](#)

Background Information for Worksheets



Is the farm satisfied with its level of milk production?

Managing feed nutrients can help boost milk production. If a farm is not satisfied with its level of milk production, they should consider evaluating their feed sources to determine appropriate rations and nutrients levels to improve milk production.

For More Information

Cornell Cooperative Extension - [Dairy Cattle Nutrition of Milking and Dry Dairy Cows](#)

Would you be interested in talking with a feed management specialist?

Farmers should be referred to a feed management specialist if there are interested in implementing feed nutrient management.

For More Information

Cornell Cooperative Extension - [Five Steps to the Development and Implementation of a Feed Management Plan](#)

SUMMARY

AEM Tier 2 Assessments document environmental stewardship and establish benchmark conditions on the farm. They also identify resource concerns and areas of opportunity. The AEM Tier 2 worksheets also help to further establish baseline data that can be used to prioritize issues for Tier 3 planning.

Tier 2 Assessments should be completed on-site with the farmer. When the initial assessment is completed, appropriate feedback in the form of an AEM Tier 2 Worksheet Summary should be provided to the farmer. The summary should include an overall level of concern for the worksheet, explanation of the overall ranking, a list and description of items of greatest concern, as well as, documentation of what is being done well and what areas need improvement. After the evaluation is complete, the farm should be given a ranking which will determine their priority to advance to the AEM Tier 3 planning phase. Appropriate ranking categories that could be used are: High, Medium, or Low Priority. A ranking procedure that has been approved by your local AEM Team should be used to make the ranking determinations.

