



# AEM Tier 2 Worksheet

## Management of Dairy Feed Nutrients

### Glossary

**Component Feeding:** Feeding system in which forages and grains are provided separately.

**Digestibility:** Percentage of feed or a feed nutrient that is absorbed through the digestive tract. It can be calculated as:  $[(\text{lbs. nutrient intake} - \text{lbs. nutrient in manure}) \div \text{lbs. nutrient intake}] \times 100\%$ .

**Dry Matter Content:** Also expressed as Percent (%) Dry Matter. The portion of a feed remaining after all the water is driven off

**Dry Matter Intake:** Amount of feed dry matter content a cow will eat in a day. The larger the dry matter intake, the lower the concentration of nutrients required to supply a cow's daily requirements.

**Dry Period:** Period of time in which a cow is not giving milk.

**Feed Inventory** – A quantification of the amounts and types of feed available on the farm to feed to the herd throughout the year.

(Continued on Page 2)

### Background

Effective management of nutrients is a primary goal of Comprehensive Nutrient Management Plans (CNMPs). These plans aim to reduce a livestock farm's risk of releasing nutrients to surface and ground waters. Improving a farm's nutrient mass balance (the amount of nutrients imported compared to the amount of nutrients exported) will reduce the amount of nutrients that have the potential to be lost to the environment. Although feed management is not always a component of CNMPs, changes in the feeding program can have a significant influence on farm nutrient management. Reducing nutrient imports to a farm is a critical way to improve a farm's nutrient mass balance. While it varies widely by farm type and management, a substantial portion of the nutrients annually delivered to livestock farms in the form of purchased (imported) feeds, and to a lesser degree fertilizers, often remains on the farm where they may accumulate in farm soils and may be lost to air and water resources. Farms that intensively manage their feeding program reduce nutrient excretion in the manure, increase feed nutrient utilization, and subsequently improve the farm's mass nutrient balance.

From an environmental perspective, four areas of feed management significantly influence effective feed nutrient use:

1. Digestible nutrient content of homegrown forages produced and fed;
2. Accuracy of estimating feed nutrient intakes, and feed inventory;
3. Employment of scientific standards to determine nutrient requirements and ration levels; and
4. Inclusion level of homegrown feeds (forages and/or grains) in the diet.

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### AEM Principle:

Providing adequate, not excess, nutrients to the animal through the integration of feeding and crop management can reduce nutrient excretion in manure and nutrient accumulation in soil; lowering potential pollution risks to water and air resources and improving farm profitability.

## Glossary Continued...

**Forages:** Feed containing the vegetative parts of a plant. Hay crop forages (e.g. alfalfa and/or grass hay or silage) do not contain any grains, while grain crop forages (e.g. corn silage) contain both vegetative and grain portions of the plant. Cattle feeds are generally classified into forages or concentrates (grains).

**Forage Acre per Cow:** A rough measure of whether a farm has an adequate land base for more intensive homegrown feed production and feed management. Generally, a farm with 1 to 2 forage acres/cow has the land base for more intensive management.

**Forage Quality:** A qualitative measure of the nutritive value and digestibility of a forage. **Wet Feeds:** The moisture content of forages, grains, or by-product feeds (generally with less than 87% dry matter) can vary significantly over time or between batches (e.g. ensiled forages, high moisture corn, wet brewer's grains).

**Milk Urea Nitrogen (MUN) Values:** Milk urea nitrogen reflects the amount of urea found in milk and these values are closely correlated with the concentration of urea found in the blood. MUN values are one tool nutritionists and veterinarians can use to monitor the nutritional status of dairy cows.

**Ration Balancing** – the process of formulating cattle diets that 1) identifies farm specific animal nutrient requirements and 2) meets those requirements using a mix of homegrown and purchased feeds.

**Total Mixed Rations (TMR):** Feeding system in which forages, grains, protein, vitamins and minerals are weighed and blended to meet nutritional requirements. Each mouthful is considered to have complete nutritional balance.

## Background Continued...

Digestibility of nutrients in a forage is one measure of forage quality, which determines the amount of that forage cattle can consume. Forage quality is largely managed by forage species/variety selection and harvest management. The greater the quality and quantity of homegrown forages produced, properly stored and accurately fed, the less purchased feed nutrients must be imported to achieve production. Maximizing the use of homegrown feeds more effectively recycles nutrients from the crop, to the cow, to the manure, to the soils and back to the crop.

Inaccurate estimates of feed consumption can lead to large imbalances in nutrient intake. Rations regularly balanced to supply required nutrients will result in high production and a smaller proportion of feed nutrients excreted in the manure.

General animal husbandry is also critical to insure effective feed nutrient utilization. A feeding program will best perform when animals are kept healthy, comfortable, and housed in a stress-free environment. Furthermore, clean, fresh feed and water must be readily available to achieve maximum feed intake and the projected level of milk or meat production.

<b>AEM Tier 2 Worksheet: Management of Feed Nutrients</b>		<b>Potential Concern</b>			
<b>Factors Needing Assessment:</b>	<b>Lower 1</b>	<b>2</b>	<b>3</b>	<b>Higher 4</b>	
<b>In a typical year, when do you start mowing hay in the spring?</b>  *add 5 days if high elevation.	Grasses* May 15 <sup>th</sup> in Southern NY May 20 <sup>th</sup> in Northern NY Legume* May 25 <sup>th</sup> in Southern NY June 1 <sup>st</sup> in Northern NY (*add 5 days if high elevations)	Grasses* May 20 <sup>th</sup> in Southern NY May 25 <sup>th</sup> in Northern NY Legume* June 1 <sup>st</sup> in Southern NY June 5 <sup>th</sup> in Northern NY (*add 5 days if high elevations)	Grasses* May 25 <sup>th</sup> in Southern NY June 1 <sup>st</sup> in Northern NY Legume* June 5 <sup>th</sup> in Southern NY June 10 <sup>th</sup> in Northern NY (*add 5 days if high elevations)	Grasses* June 1 <sup>st</sup> in Southern NY June 5 <sup>th</sup> in Northern NY Legume* June 10 <sup>th</sup> in Southern NY June 15 <sup>th</sup> in Northern NY (*add 5 days if high elevations)	
<b>In a typical year, how many cuttings do you harvest each year?</b>	Hay cropland is cut: More than 4 times per season in Southern NY  OR More than 3 times per season in Northern NY	Hay cropland is cut: 4 times per season in Southern NY  OR 3 times per season in Northern NY.	Hay cropland is cut 2 times per year.	Hay cropland is cut less than 2 times per year.	
<b>What percentage of forages fed do you purchase?</b>	0%	1-25%	25-50%	Greater than 50%	
<b>How many acres of grain are grown annually? Is the grain being used on the farm?</b>					
<b>What is the forage acre/cow ratio for the farm?</b> (Complete calculation on page 6)					

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<b>Factors Needing Assessment:</b>	<b>Lower 1</b>	<b>2</b>	<b>3</b>	<b>Higher 4</b>	
<b>Is the farm interested in feeding more homegrown feed in the diet?</b>					
<b>Are animals fed in groups?</b>	High producing cows, low producing cows, dry cows, transition cows, and multiple heifer groups are each fed separately or distinct rations as individuals.		Lactating, dry cows and heifer groups are each fed separately or distinct rations as individuals.	No	
<b>How closely are the recommendations of the nutritionist followed?</b>	Very closely	Closely	Somewhat closely	Do not interact with a nutritionist on a regular basis.	
<b>How often are feed rations balanced?</b>	Rations are balanced monthly or more often as feed quality changes.	Rations are balanced at least 4 times a year or more often if forages change.		No regular ration balancing is done.	
<b>How often are forages tested for quality?</b>	Forages are analyzed for nutrient content monthly or more often if forages change.	Forages are analyzed for nutrient content at least 4 times a year or more often if forages change.		Forages are not regularly analyzed.	
<b>How much of your stored feed do you typically discard due to quality issues (e.g. mold, spoilage)?</b>	Less than 5%	Less than 10%	Less than 25%	More than 40%	

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<b>Factors Needing Assessment:</b>	<b>Lower 1</b>	<b>2</b>	<b>3</b>	<b>Higher 4</b>
<b>How often is dry matter content of wet feeds determined?</b>	Weekly	Every 2 weeks		Not regularly determined.
<b>How often is dry matter intake measured or estimated?</b>	Weekly	Monthly		Not regularly measured.
<b>Are the <u>M</u>ilk <u>U</u>rea <u>N</u>itrogen (MUN) values between the normal range of 8 to 12?  Do you use this information to make management decisions?</b>				
<b>Do you use a Total Mixed Rations (TMR) or a Component Feeding, system?</b>				
<b>Is grazing used on the farm?</b>  Lactating Cows? Dry Cows? Heifers?				
<b>Does your farm have any challenges with:</b>  Herd health and performance issues? Cow comfort and stress issues? General nutrition and feeding issues? Heifer growth issues?				
<b>Is the farm satisfied with its level of milk production?</b>				
<b>Would you be interested in talking with a feed management specialist?</b>				

Benefits to other resources can also be possible while working toward improved water quality. Taking stock of how existing and future management affect **soil, water, air, plants, animals, energy, greenhouse gases, people, and economics** can result in more effective plans and additional benefits to farms and communities both now and into the future.

**Additional Comments:**

**Formula for Calculating Forage Acre Per Cow**

Step 1:								
_____	+	_____	+	_____	-	_____	=	_____
Cropland Acres (from Tier 1)		Grazed Land Acres (from Tier 1)		Permanent Hayland Acres (from Tier 1)		Grain Acres (from Page 3)		Forage Acres
Step 2:								
_____	÷	_____	=	_____				
Forage Acres (from above)		Number of Mature Dairy Cows (from Tier 1)		Forage Acres/Cow				