Mind your **P**s & **N**s for economic and environmental **SUSTAINABILITY**!

Nutrients, such as nitrogen and phosphorus, can be lost at many different times in the on-farm nutrient cycle.

Saving nutrients leads to improved **economic** sustainability for the dairy producer -- fewer purchases of protein supplement for the herd and fertilizer for the field.

Saving nutrients also leads to improved **environmental** sustainability -- fewer nutrients such as P & N finding their way into surface water, groundwater, and air.
Research to maximize \( \mathbf{P} \) & \( \mathbf{N} \) utilization (and minimize loss) is a major goal at the U.S. Dairy Forage Research Center.

**Nutrient Losses**

**Examples of USDFRC research**

- **Feed loss during storage**
  - Testing bunker cover materials, methods
  - Measuring DM loss due to heating -- in large bales, both hay and baleage

- **Indigestible fiber**
  - Selecting & modifying forage plants for increased NDFD
  - Identifying & quantifying rumen microbes that digest feed

- **Underutilized protein**
  - Seeking ways to reduce protein degradation of alfalfa -- in the rumen and during ensiling
  - Determining protective nature of tannins and PPO/o-diphenols

- **Unbalanced rations**
  - On-farm, daily monitoring of forage moisture
  - Fine-tuning protein requirements
  - Developing new standardized starch analysis

- **Farmstead and field volatilization and runoff**
  - Determining and measuring fate of ammonia
  - Determining N&P losses in runoff from corn and alfalfa

- **Soil erosion from cropland**
  - Intercropping of legumes and corn

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**Mind your \( \mathbf{P} \)s and \( \mathbf{N} \)s with the...**

**Snap-Shot Assessment of Nutrient Use Efficiency**

Measure and monitor... feed, fertilizer, and manure use on dairy farms.

These materials and more are available on the USDFRC web site:

[www.ars.usda.gov/mwa/madison/dfrc](http://www.ars.usda.gov/mwa/madison/dfrc)

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**U.S. Dairy Forage Research Center**

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