



# IS FERTILIZING IRRIGATED PASTURES, HAYFIELDS, A WASTE OF MONEY?

*Dallas Mount*

Irrigated pasture or hayfield owners may be considering fertilizer to increase production. How much fertilizer should, or should not, be applied? The right answer depends on several factors and may change year to year.

Considerations include:

- Intended use of the pasture/hayfield,
- Nutrients in the soil,
- Plants present in the pasture/hayfield,
- Expected irrigation water supplies, and
- Price or value of crop and cost of fertilizer and application.

## **Intended Use of the Pasture/Hayfield**

Hayfields have a higher fertilizer requirement than pastures. Hay harvested from a field and fed to livestock in another location extracts nutrients from the field. Each ton of grass hay contains approximately 40 pounds of nitrogen and 20 pounds of phosphorus. Some can be replaced through natural cycles, but if the productivity of the site is to be maintained, then a large portion needs to be replaced. About half of the nitrogen in the hay or forage is returned to the soil if grazing the forage or feeding the hay at the same location. The other half is lost to the atmosphere.

## **Nutrients in the Soil**

Start with a soil test. This will determine the texture of the soil (i.e. sand, loam, clay) and nutrients present. Most farming communities have a fertilizer dealer or farmer's co-op that will take and analyze soil samples. Sometimes, this service is free with the expectation fertilizer will be purchased from them. Several labs are available that will test the soil if you prefer taking the samples yourself. Contact a local University of Wyoming Extension office for soil sampling tips and plant or fertilizer recommendations. Many extension offices also have soil probes available to make taking soil samples easier. Follow recommended practices in taking the soil sample or the results from the lab will not be very useful. Here is a guide for taking an accurate soil sample <http://bit.ly/soil-sampling>. The information allows you or the soil testing lab to determine annual fertilizer recommendations.

## **Plants Present in the Pasture or Hayfield**

What will be grown will determine what nutrients are needed. Grasses generally have a high nitrogen requirement, and this will increase with more productive grasses. Alfalfa and other legumes have a symbiotic



*Fertilizer can benefit hayfields but considerations include the field's intended use, nutrients in the soil, expected water supplies, and the price of crop and of fertilizer.*

relationship with bacteria that fix atmospheric nitrogen. The nitrogen requirement is reduced with more legumes present; however, most legumes have a higher phosphorus requirement. Phosphorus is usually more expensive than nitrogen to add, but it also stays in the soil until used by a plant. Note: Phosphorous is plant available only very close to the root zone. It also is chemically unavailable to a large degree in alkaline soils. It stays in the soil, but most is unavailable in our soils.

Nitrogen tends to leach through the soil with water or volatilize into the atmosphere unless quickly used by the plant. A legume and grass mix is ideal if the site is a pasture, but often these mixes create other management challenges, such as bloat in some livestock. These challenges can be overcome with careful management. Legumes such as clovers are an option to fix nitrogen for the grasses.

### **Expected Irrigation Water Supplies**

A check of the irrigation water outlook is prudent before determining fertilizer rates. Recent years of drastically above-average irrigation water supplies followed by a year of extreme shortages shows the natural variation of our climate. Irrigators depending upon snowpack should have a pretty good indication of water supplies by mid- to late March. If your area is likely to be short or run out of water early in the growing season, then decrease the amount of nitrogen applied to grass hay meadows. Nitrogen will volatilize into the atmosphere if not incorporated into the soil. It can also leach deeper into the soil profile if too much water is applied to a fertilized field. The goal is to place the nitrogen at rooting depth in a timely manner. Nitrogen application is a waste of money if there is no available soil moisture for plants to use.

### **Price or Value of Crop and Cost of Fertilizer and Application**

The question of fertilizer comes down to economics. You need the following information: What impact will fertilizer have on yield? How much will the fertilizer and application cost? What is the value of the crop?

Your local extension office can help obtain the answers. Let's run an example.

#### **Apply 80 pounds of nitrogen to grass hayfield**

Yield without fertilizer: 1.2 tons per acre

Yield with fertilizer: 2 tons per acre

Cost of fertilizer: \$0.80/pound nitrogen or \$65 for 80 lb plus \$5/acre application cost = \$70/acre

Value of one ton of hay: \$150.

Value of additional 0.8 ton: \$120

Value of additional 0.8 ton less fertilizer cost = \$120 - \$70 = \$50

Applying 80 pounds of nitrogen resulted in an additional \$50 value from the acre of ground. If this is harvested hay, the additional costs of harvesting the additional 0.8 ton should also be considered.

This example is not to suggest you will have similar costs or increases in yields. Use your own estimates based on soil type, soil fertility, water availability, plant potential, current cost of fertilizer, and current value of the crop.

Fertilizing irrigated pastures and hayfields can be an important tool to increase the productivity of the site; however, fertilizer should not always be used, and careful consideration should be given to ensure you have the right plants to meet productivity and economic goals.

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