



Feedyard Manure: A Farmland Fertilizer August 2008

Since the 1950's cattle feeding has been a part of the agricultural economy of the Texas High Plains. Many factors helped the cattle feeding industry grow and prosper in this region, including the ample supply of grain and other feedstuffs. Feedyards are a major local, regional and national market for growers who produce grain, silage and hay crops.

Feedyards produce a renewable resource—*manure*—which can be used as fertilizer and return some of the harvested nutrients back to the soil. Using manure as a fertilizer merits serious consideration, particularly on cropland near feedyards.

Advantages

- Feedyard manure increases organic matter and improves soil structure. That, in turn, improves the cohesiveness of soil particles and stimulates plant growth by improving aeration and root penetration.
- Feedyard manure increases the water infiltration rate and water holding capacity while reducing soil bulk density, evaporation rate and compaction problems.
- Feedyard manure improves the availability of micronutrients such as iron and zinc.
- Manure can be very cost-effective. A soil test is necessary to determine which nutrients are needed to produce the target yield for each crop. While commercial fertilizer can be precisely blended to meet the needs of a particular crop, the price increases with each element added.
- Feedyard manure contains nitrogen, phosphorus, potassium, calcium, magnesium, sodium and the trace elements iron and zinc. When deciding whether or not manure is affordable, consider the distance it will be hauled, the cost per ton and what nutrients are required to meet the needs of the planned crop.

Precautions

- Soluble salt accumulations in manured soil shouldn't be a problem on irrigated land if application rates are designed to meet the nutrient needs of the crop. On dryland crops salt accumulation might be a concern, depending on rainfall amounts. As manure undergoes microbial decomposition, many types of salts are released. Rainfall or irrigation tends to move the salts deeper into the soil profile, thus reducing soil salinity.
- Weeds can be introduced to a field through the seeds in manure. The composting process maintains temperatures high enough to kill almost all weed seeds. Some reduction of weed seed content is attained through temperature increases in stockpiled manure. Modern crop herbicide programs using both pre-emergence and post-emergence products make weed seed content in manure much less of an issue than 20 years or even 10 years ago.
- Foreign objects such as pieces of pipe, concrete, or rocks occasionally find their way into manure and, consequently, onto farmland. In recent years, feedyards have dramatically improved manure harvesting practices to minimize debris in manure.

(over)

Nutrient Makeup

The nutrient makeup of feedyard manure will vary slightly depending on the ration fed and the manure handling practices of the feedyard. However, a typical analysis should be available from each feedyard. The table below shows the composition of manure from 100 samples collected and analyzed in 2007.

	Average (%)	Standard Deviation	lbs. per dry ton	lbs. per wet ton	
Nitrogen	1.9	+/- 0.53	38.5	26.3	NOTE: "lbs. per wet ton" represents the pounds of nutrients contained in one ton of typical manure "as-applied" to the land.
Phosphorus (P₂O₅)	2.0	+/- 0.62	40.8	27.7	
Potassium (K₂O)	1.8	+/- 0.67	36.1	24.6	
Zinc	0.03	+/- 0.01	0.5	0.4	
Iron	0.46	+/- 0.17	9.2	6.3	
Moisture Content	31.7	+/- 9.70	-----	-----	

Many nutrients in manure are organic and must go through microbial degradation before plants can utilize them. Typical nutrient availability for two key macronutrients in manure, nitrogen and phosphorus, are listed below.

	1st Year	2nd Year	3rd Year	
Nitrogen	45%	25%	15%	(Assumes 15% nitrogen loss)
Phosphorus (P₂O₅)	70%	20%	5%	(Assumes 5% phosphorus loss)

Recommended Practices

- Determine application rates using an annual soil test, manure analysis and fertilizer recommendations for a particular crop and yield goal. Develop a fertilizer program to allow for manure applications every 2 or 3 years. This will reduce application and incorporation costs.
- Don't apply manure within 150 feet of any private water well or within 500 feet of any public water well. Spread the manure and control runoff water so that any receiving water will not be affected.
- Apply manure after harvest but before initial land preparation for planting. This will reduce soil compaction because the land can better support equipment.
- Disc the manure into the soil within 48 hours after application. This will break up and incorporate the material into the soil to prevent nitrogen loss and to ensure placement of phosphorus in the root zone. If you cannot disc the land within 48 hours of application, allow a 100-foot buffer zone between the application area and any surface water.

Economics

An online Manure Value Calculator is available on the Texas Cattle Feeders Association website at www.tcfa.org. The online calculator can estimate the value for manure based on current commercial nitrogen and phosphorus prices and compare the costs of "Commercial Fertilizer Only" vs. "Manure + Commercial Fertilizer."