

Alternative Uses of Drought Stressed Corn

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This year, many South Dakota corn fields suffered drought stress and producers have options to weigh out. If you are seeking alternative uses for your corn, please see the following salvage corn options.

Check with your Insurance Agent

- Contact your crop insurance agent before making any plans to salvage or feed your corn crop. Have them assess the situation, and keep in communication with them regarding your plans to salvage your corn crop- communication is key.

Pesticide History

- Before making decisions on alternative uses, be sure to check the history of the chemical products you have used on your field. Rotation, feeding, grazing, and haying restrictions are listed on pesticide labels and need to be followed. A quick guide to feeding, grazing, and haying restrictions is listed at <https://www.ag.ndsu.edu/weeds/weed-control-guides/nd-weed-control-guide-1/wcg-files/16-Haying.pdf>.

Nitrate Toxicity Feeding Concerns

- Dry, hot conditions are a perfect recipe for high nitrate levels in many crops, including corn. Nitrates tend to accumulate in the bottom portion of the stalk (0-20 inches from ground level). The level of nitrogen fertilizer applied can greatly effect nitrate concentration levels in the stalk.
- Take multiple samples of your field and submit to a feed testing lab for nitrate levels.
 - o Take at least 15 random entire plant samples (from the ground up) throughout your field, while avoiding any 'hot spots' or obviously different areas which should be sampled separately.

- o Once samples are taken, cut the bottom 1/3 of the plant stalk off.
- o Combine your 'base of stalk' samples together, and in a separate area, combine the 'top portion of stalk' samples. Keeping piles separate, chop stalks, mix well, and fill a 1-gallon plastic bag with your sample; repeat for the second sample. Have them tested separately to provide adequate nitrate concentration levels throughout plant parts.
- o Send samples to the feed testing lab of your choice as soon as possible. A list of labs can be found at <https://igrow.org/up/resources/02-1000-2015.pdf>.
- o Once results are received, determine if the crop is safe to be used as a forage (Table 1).
- o If you choose to harvest your corn as forage, its good practice to wait 3-4 days following a rain before harvest as nitrate concentrations in the plant spike closely following rains.

Feeding Options

- ALWAYS TEST FORAGES PRIOR TO FEEDING.
- If testing shows that high nitrate issues exists, consider alternative feeding options: <https://igrow.org/up/resources/02-2044-2012.pdf>. If you do not have livestock, consider working with neighbors who may need emergency feed for their livestock. Many operators now work on 'per head per day' lease agreements.
- **Grazing** is an excellent way to provide nutrient cycling to your field and potentially benefit next year's crop by this year's disaster; however, approach this with caution on a drought year. Cattle generally choose the top portion of a corn plant before the base of the stalk, which may allow for grazing in short, well-monitored, rotational

Table 1. Guide for Nitrate Levels in Forage for Mature Cattle.

% Nitrate (Dry matter basis)	Content of Nitrogen (NO ₃ -N) Dry matter basis		Comments
	Percentage	ppm	
Less than 0.44	0.0-0.10	0-1,000	Safe to feed if adequate feed and water are available.
0.44-0.66	0.1-0.15	1,000-1,500	Safe for non-pregnant animals. Limit 50% of total ration dry matter for pregnant animals. Animals may go off feed, have a slow drop in production, some abortions are possible.
0.66-0.88	0.15-0.20	1,500-2,000	Limit to 50% of total ration dry matter for all animals; may experience some symptoms and possible death.
0.88-1.54	0.20-0.35	2,000-3,500	Limit to 35-40% total ration dry matter. Do not feed to pregnant animals.
1.54-1.76	0.35-0.40	3,500-4,000	Limit to 28% total ration dry matter. DO NOT feed to PREGNANT ANIMALS.
>1.76	>0.40	>4,000	Toxic. DO NOT FEED.

intervals if nitrates at the base of the stalk are of concern. Test your crop before grazing; do not turn livestock out on corn hungry, and monitor closely.

- **Ensiling** is the best option for producers looking to salvage drought-stressed corn for feeding later. The feed value of drought-stressed corn ranges from can 60 to 90% of normal silage, depending on the amount of corn grain present. Silage may reduce the presence of nitrates in feed after fermenting for 30 to 60 days. Monitor (test) moisture content at harvest as drought-stressed plants are usually wetter than their color might suggest. Use proven inoculants and take steps to pack the silage thoroughly. Covering the pile to reduce exposure to oxygen dramatically increases the amount of dry matter recovered. Raising the cutting height will reduce the amount of nitrates in the feed.
- **Haying** corn is also an option, but can prove to be quite difficult due to stalk dry-down issues. In South Dakota, dry down times have reportedly varied from 2 weeks to a month; long dry down times generally result in greater leaf loss and poorer feed quality. If hay is put-up improperly, spoilage risk greatly increases. If you choose to hay corn, consider cutting higher than normal if nitrates are highly concentrated at the base of the stalk.

Other Alternatives

- If your crop is exceptionally poor and cannot be used as forage, the option remains to let the corn stand until next year. Short, standing stalks can

serve as a snow catch and provide some cover for soil as leaves deteriorate, this method may also provide some nutrient cycling, especially with potentially high nitrate levels in stalks. The plant material could harbor plant diseases, but a very poor stand with short stalks would leave less residue than what is left on many fields during a typical cropping year.

The Next Step

- Many cool season crops are available in South Dakota and provide excellent forage quality and soil health benefits. Legumes (pea, lentil), brassicas (turnip, forage rape), and small grains (oat, cereal rye, triticale, wheat) are all potential crops that can be grown stand alone or as mixtures following early corn harvest.
- The NRCS has created a cover crop chart and mix calculator to help producers choose what crops fit their needs and window of planting time. The calculator can be found at https://efotg.sc.egov.usda.gov/references/public/SD/SD_JS_340.xlsm.
- Before planting a cover crop, be sure to check herbicide history for rotation and grazing intervals. This will insure a successful stand and that the forage is safe to feed (as it applies).
- Be sure to allow standing corn or previous crops to die before planting cover crops to prevent green-bridging insects and diseases between crops, a 2-week interval is a good wait time after killing the previous crop.