

The Cost of Wet Corn at Harvest

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Producers with slowly maturing corn—either from a shortage of growing degree day units or from weather damage—face increasing unit costs of production due to potential grain drying. Corn in storage needs to be 85% dry matter before long-term storage is considered. Corn stored with moisture levels higher than 15% will mold, spoil, and bridge.

Corn producers with cattle have a few more options than cash grain farmers. Silage and wet corn piles can provide feed for the operation with

no additional drying costs. However, you still need to consider moisture levels for each of these storage options before choosing a storage method (fig. 1).

The most-common options available to producers include taking a dock for shrink at the elevator, heat drying on the farm, air-drying the corn in the grain bin, or a combination of those options. The most cost-effective option for you depends on your estimation of the energy needed to drop the moisture content.

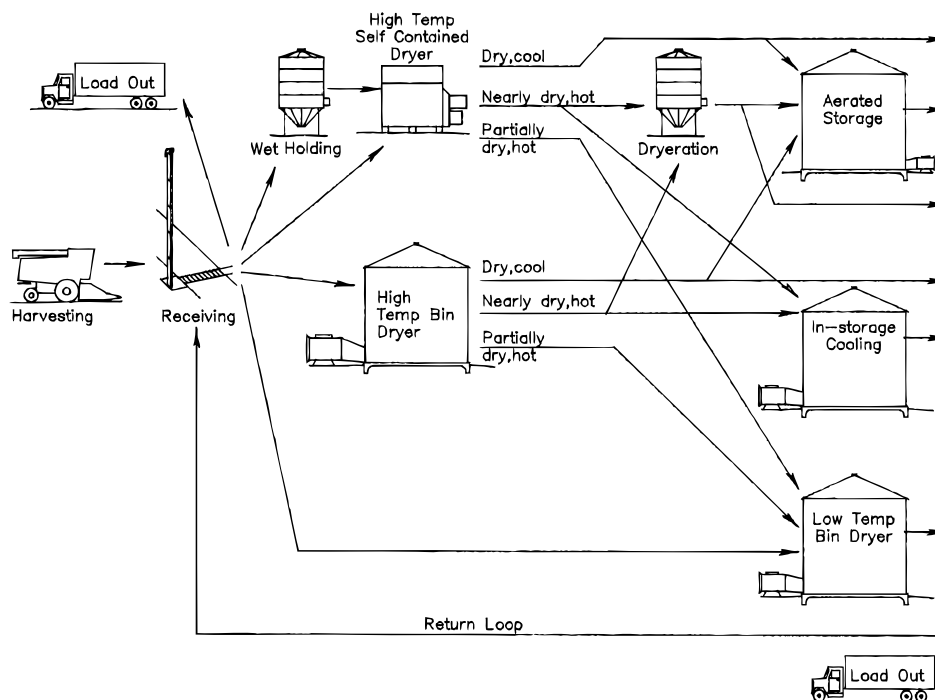


Figure 1. Grain drying options

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Taking a dock for shrink

For producers without dryers and/or natural airflow bins, taking a dock at the elevator may be the only option. Shrink is the weight lost due to the loss of moisture as the corn dries. Consequently, the wetter the corn, the higher the percentage shrink.

The dollars per bushel (\$/bu) dock will depend on the elevator. Dock rates can vary and be anywhere from \$.03 to \$.06 per bushel per point of moisture removed. The rate will likely go up as the elevator continues to receive more high-moisture corn. This increase in dock rate will help the elevator cover bushel losses that are due to a reduction in quality and quantity from molds and piles on the ground.

Example 1

If your corn is harvested at 25% moisture, the elevator needs to drop the moisture level 10 points. Based on a \$.03/bu/point drop dock, the reduction for shrink is \$.30/bu. If the elevator price of corn were \$2.50/bu, your price would be \$2.20/bu.

(Harvest moisture level – 15%) = points needed to lose

Points to lose x dock/bu = dollars/bu loss

Harvest price – dollar/bu loss = selling price

Heat drying on farm

Producers with the right equipment can use the batch-drying method to remove moisture (fig. 2). For this publication, we are going to assume

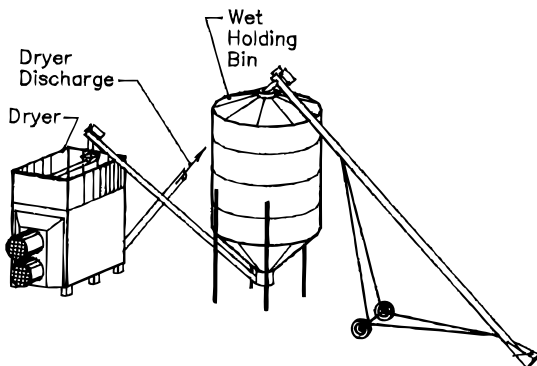


Figure 2. High-temperature, self-contained batch

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that all the needed equipment—dryer, holding bins, augers, fans, etc.—is already purchased.

On-farm drying gives you longer control of production. This control may be beneficial if your production is forward contracted or if you are hedging your production with the expectation that the market price will be more favorable later in the year.

Once the grain is dried to 15% moisture, it can be stored on farm to fulfill contract obligations, to feed livestock, or to be sold later.

The costs involved with drying corn with heat depend on the cost of propane in your area. Since propane is a product of crude oil, any shifts in the price of the raw material will result in higher or lower propane prices. Price breaks may be available if you prepay for your anticipated fuel needs.

Gas fired dryers use an average of .02 gallons of propane per bushel per percentage point of moisture removed. To determine the cost per bushel to dry on farm, we can use the following equation:

Example 2

Cost/bu = points removed x .02 gallons per bu per point x propane cost (\$/gal)

25% moisture corn dropped to 15% moisture = 10 points of moisture

10 points x .02 x \$1.20/gallon = \$.24/bushel to reduce moisture level by 10 points

Another factor to take into account when using on-farm drying methods is that there will be some electricity used. The dryer ignitions and timers, for example, along with outdoor lights and augers, will add to the total cost. The formula in example 2 only takes into account the \$/bu for propane.

Labor and grain quality issues will also need to be addressed when looking at on-farm drying.

Natural-air bin drying

When looking at the energy costs related to natural-air drying (fig. 3), factor in initial mois-

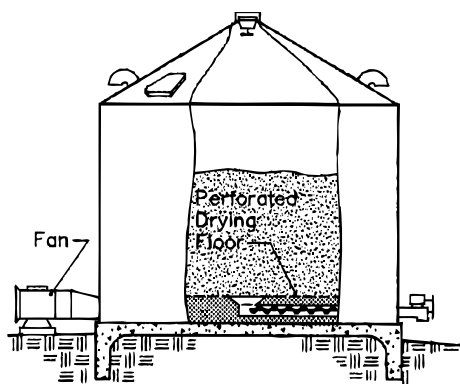


Figure 3. Low-temperature bin

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ture content, weather, airflow per bushel, and fan efficiency. As a rule, South Dakota producers will need enough fan power to supply 1 to 1.25 cfm/bu of corn in the bin.

Corn should not be natural-air dried if its moisture content is greater than 22%.

The weather will make a big difference in how much energy is used to dry the corn. Energy use will be lower for early harvested corn, for more efficient fans, for shallower corn depths, and for lower harvest moisture levels. Conversely, later in harvest, less efficient fans, deeper corn levels, and wetter corn can all increase energy costs.

To calculate energy costs, multiply energy use (kWh/bu) times electricity cost per kilowatt-hour (\$/kWh). It will require .12 kWh of energy to reduce the moisture level in a bushel of corn 1 percentage point.

Example 3

22% moisture corn dried to 15% equals 7 points of moisture to be removed

$$.12\text{kWh} \times 1 \text{ bu of corn} \times 7 \text{ points} = .84 \text{ kWh/bu}$$

$$.84 \times \$0.045/\text{kWh} = \$0.0378/\text{bu to reduce moisture level by 7 points}$$

Combination drying

Given the year producers have been dealing with, corn moisture levels may exceed the 22% maximum for natural-air drying. When this

happens, you may want to use a combination of heat and natural air to help keep drying costs per bushel lower, and thus keep break-even costs down.

Using these drying methods in combination can also help keep the corn rotated through the dryer faster and help keep combining moving along. Dropping the moisture content 5 points in the dryer will be much faster than trying to take all 10 points out in the dryer.

Example 4

30% moisture corn could not be dried in a natural air system; however, in combination with a dryer system, 8 points could be removed in the dryer with the remainder dried in the bin under natural air.

Heat drying

$$(8 \text{ points} \times .02 \text{ gallons per bushel per point removed}) \times \$1.20 \text{ per gallon propane} = \$0.19/\text{bu}$$

Air drying

$$(.12 \text{ kWh} \times 1 \text{ bushel} \times 7 \text{ points}) \times \$0.045 \text{ per kWh} = \$0.0378/\text{bu}$$

Total drying costs

$$\$0.19 + \$0.0378 = \$0.2278/\text{bu to reduce moisture level from 30% to 15%}.$$

Other issues

Several other considerations may need to be taken into account when dealing with high moisture corn this fall. These formulas can be aids in determining your own drying costs and choosing the option that will work best for your operation.

Added expenses such as over-drying the corn need to be avoided to make these drying methods cost effective.

Labor availability is another thing to consider. Monitoring dryers, fans, augers, and other equipment will add to the labor hours needed during harvest. Dryer and bin temperatures will need to be watched to ensure efficient use of your energy products. Over-heating the grain in the dryer or filling the bin too fast for drying to occur will increase costs and decrease grain quality and reduce profitability.

Consider field drying if moisture levels exceed 30%. It takes 15 to 20 growing degree days (GDD) to drop 1 point of moisture. If the temperature range is between 70 and 75 degrees, it will take 1 to 2 days for a 1% drop in moisture (0.5 to 1.0% loss per day).

However, in November, when most of our harvest will occur, temperatures will generally be closer to 50 to 60 degrees F or lower. At the lower temperature, we can expect a 0.1 to 0.3% moisture loss per day, or 4 to 6 days to drop 1 point.

This “free” drydown option has its own drawbacks—when you consider yield losses due to stalk breakage or loss to an early snow and/or ice storm, to name a few potential problems.

For more information on grain drying, contact your local Extension educator and ask for copies of publications from the Midwest Plan Service: MWPS-13, Corn Drying, Handling and Storage Handbook and MWPS-29, Dry Grain Aeration Systems Design Handbook. These two publications contain dryer system designs and costs associated with drying, handling, and storage of corn.

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