

Grain Storage Alternatives: An Economic Comparison

File A2-35

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Storing grain beyond harvest has been a common practice in the Midwest for many years. Major reasons for doing so include:

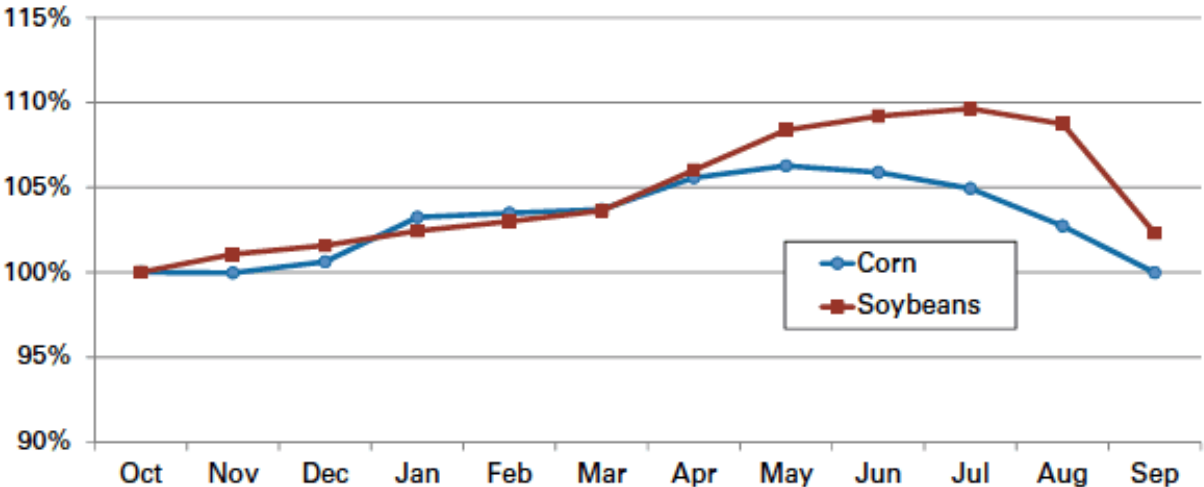
- Grain prices tend to be higher later in the marketing year than at harvest. Storing grain can help you capture the “carry” in the market.
- Flexibility in where and when grain is sold can be maintained.
- Harvesting may progress faster if grain does not have to be delivered to an off-farm location directly from the field.
- Grain may be used gradually throughout the year for livestock feed.

A factor that has surfaced in recent years is the expanding market of corn for production of ethanol. Many ethanol manufacturing plants prefer to buy grain throughout the year rather than store large quantities on-site. Adequate grain storage capacity allows producers to take advantage of this market.

Figure 1 below shows monthly patterns for average Iowa cash prices for corn and soybeans for the 2008 through 2017 marketing years. Holding grain off the market until the following spring resulted in prices five to 10 percent

higher than those available during harvest months, on average. This does not take into account price advantages that may have been gained through the use of futures and options contracts.

Figure 1. Monthly cash prices as percent of October price (USDA NASS, Iowa, 2008-2017)



Nearly one-third of Iowa's corn and 40 percent of Iowa's soybean crops are marketed off the farm during the harvest months of September, October, and November. However, marketing of the rest of the crop is spread out fairly evenly throughout the remainder of the year, as shown in Figure 2. The higher sales in January are likely due to producers deferring taxable income into the next accounting year.

Figure 2. Average percent of Iowa's crops marketed by month (USDA NASS, 2008-2017)

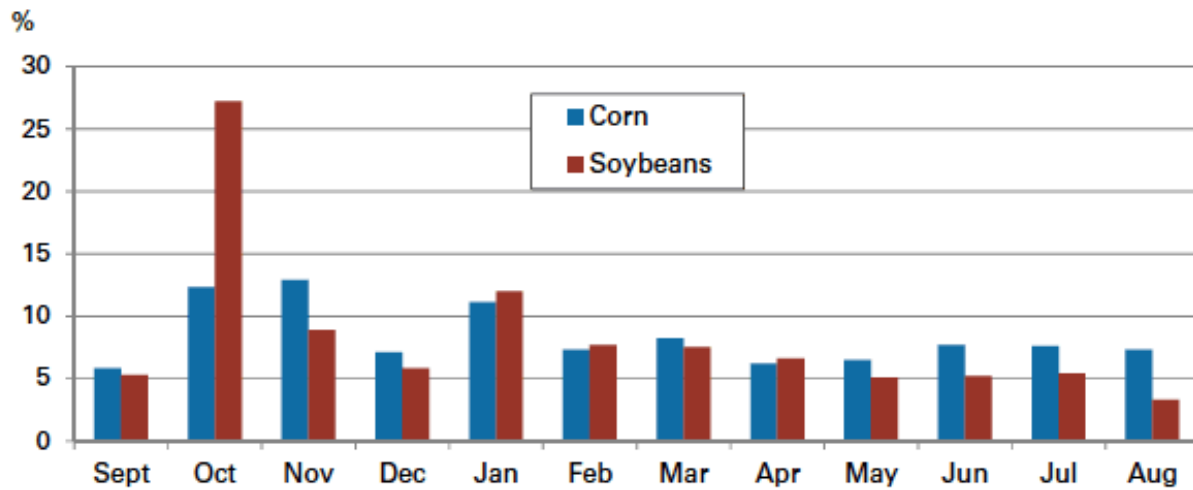
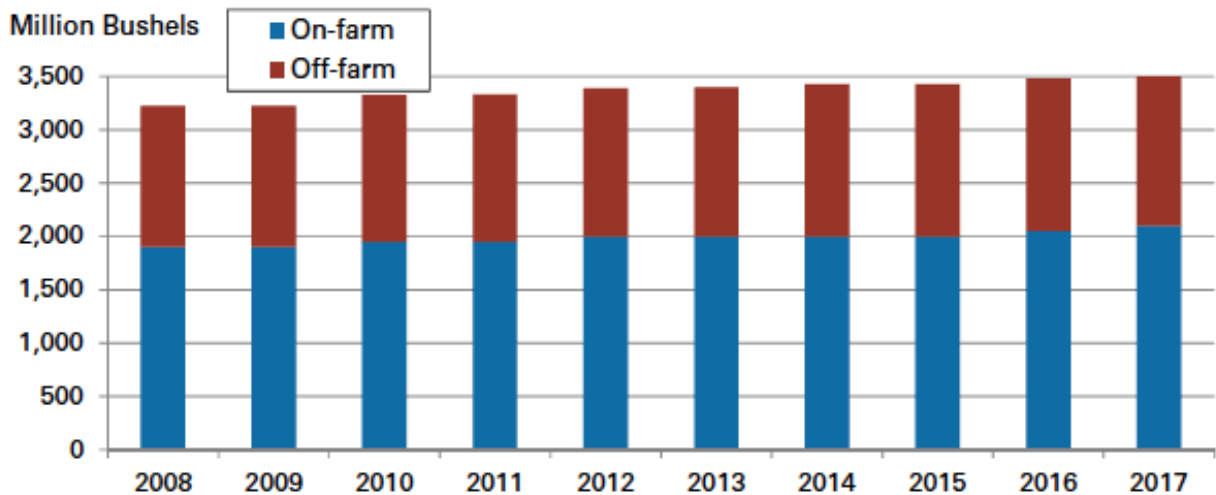


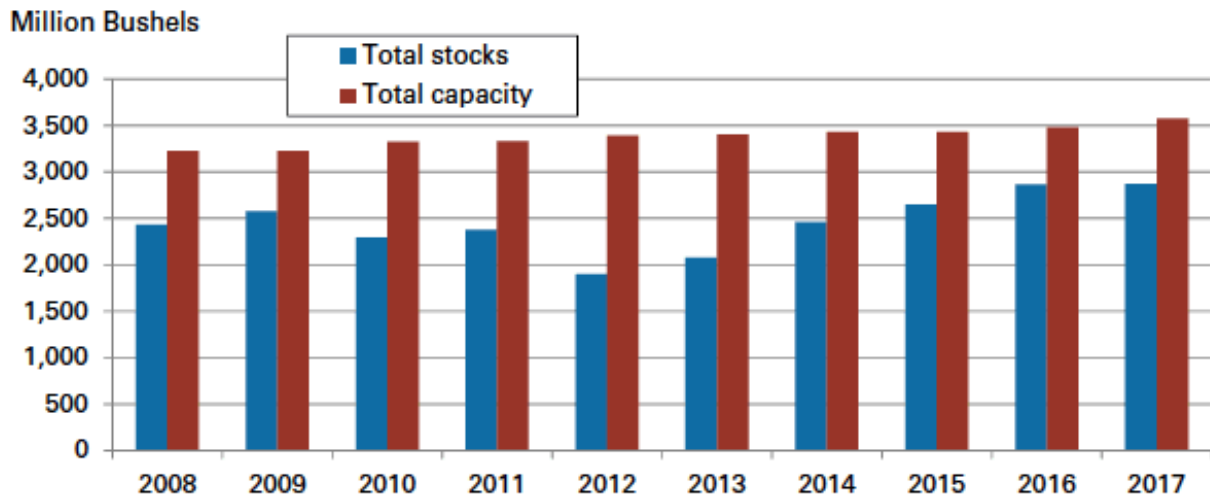
Figure 3. Iowa's grain storage capacity (USDA NASS)



Grain storage in Iowa has traditionally included a mixture of off-farm (commercial) storage facilities and on-farm bins. Figure 3 shows estimates of the total capacity for each type of storage existing in Iowa since 2008.

The need for storage has varied from year to year, depending on the mix of acres planted to each crop and the yields attained. Higher yields have increased the demand for storage capacity in recent years. Recent changes in the ratio of the price of corn to the price of soybeans have caused additional acres to be placed into corn production, increasing the total number of bushels to be stored even more. Figure 4 compares the estimated amount of storage capacity available to the reported stocks of corn and soybeans in Iowa as of December 1 each year. The highest level of stocks ever recorded came in 2016. High stock levels put a lot of pressure on the grain handling system at harvest.

Figure 4. Iowa grain storage capacity and December 1 corn and soybean stocks (USDA NASS)



Storage Options

Grain producers have several choices available to them for storing grain:

- Invest in on-farm storage structures
- Invest in condominium storage space built by commercial elevators
- Rent storage space from commercial elevators
- Rent on-farm storage space from other farmers or landowners

Each of these choices has advantages and disadvantages, related to the initial investment, the annual operating costs, income tax considerations, the amount of time required for grain management, long-term availability of storage space and marketing flexibility.

Investment in On-farm Storage

Building storage bins on their own farmstead has traditionally been the favored approach to increasing storage capacity by grain producers. It provides maximum flexibility and control. Care must be taken that additional storage structures fit well into the existing drying, handling and storage system, though.

Advantages of on-farm storage include:

- Allows the producer flexibility with regard to when and where the crop is marketed.
- Guarantees the producer that the space will be available each year.
- Management of the stored grain is convenient.
- Corn at different moisture levels can be blended.
- Separation of grain that needs to have its identity preserved is possible.
- The time needed to transport and store grain during harvest may be less.
- Low cost financing for storage structures is available from the USDA Farm Service Agency.
- The initial investment is eligible for Section 179 income tax expensing in the year placed in service, within IRS limits.

The major disadvantages to building on-farm storage are the size of the initial investment, the need to monitor grain throughout the storage period and the difficulty of disposing of bins if the need for storage capacity decreases later.

Investment in Condominium Storage

Condominium storage has been offered by commercial elevators for many years, but opportunities to invest in it tend to come about when there is a strong need for additional storage capacity in the state. Generally, the producer must make an initial investment to reserve the right to use a fixed volume of storage. The producer may actually own the storage space, or may sign a long-term lease. The commercial elevator manages the grain and guarantees grade and quality factors, usually for a service fee based on the number of bushels stored or the capacity owned.

Advantages of condominium storage include:

- Commercial elevators may be able to build storage capacity at a lower cost per unit than producers can build on-farm storage.
- The elevator manages the grain and guarantees quality.
- If the grain is ultimately merchandised through the same elevator, no additional transportation and handling is required.
- Producers farming a large amount of rented land may not wish to build storage capacity on it without a long-term lease.
- Storage capacity can be sold if it is no longer needed, or leases are not renewed.

The tax consequences of condominium storage depend on the specific lease or ownership structure offered. The major disadvantage of this option is that it may be difficult or uneconomical to market the grain to any other buyer or processor once it is placed in the condominium storage. The resale value of the storage space is also unknown.

Renting Commercial Storage

Many producers depend on the availability of commercial storage space to supplement their own storage when grain production is above normal, due to either higher than expected yields or increased acres. The location and accessibility of the commercial storage are key factors in how well it fits into the overall harvesting and handling system. The length of time that grain will be stored affects the cost of renting commercial storage relative to owning on-farm storage, since rental fees are usually charged by the day or the month. Usually, the grain is eventually sold to the facility that provides the rental storage.

Advantages of renting commercial storage include:

- The producer pays for only the exact amount of capacity needed. This is significant if the number of bushels produced varies widely from year to year.
- The producer pays for storage only for as long as it is needed, although there is usually a minimum charge.
- The elevator manages the grain and guarantees quality.
- The elevator can dry the grain, as well, possibly at a lower cost than the producer can.
- If the grain is ultimately merchandised through the same elevator, no additional transportation and handling is required.
- If the grain will be fed to livestock and rations will be mixed by the same elevator, less handling of grain is involved.

A major disadvantage to using commercial storage is that harvesting may be slowed down due to longer travel distances and time waiting to unload. The producer is essentially locked into marketing the grain to the elevator that provides the storage, as well. If grain is routinely stored into late spring or summer, commercial storage costs may exceed on-farm storage costs.

Renting On-farm Storage

Many rented farms have storage and even drying facilities already in place. The use of such facilities may be a part of the farmland lease, or they may be rented separately. Advantages of renting on-farm storage include:

- Storage capacity may be conveniently located close to the source of production, avoiding delays in harvesting.
- On-farm rental rates may be lower than commercial rates.
- Rental agreements are usually for only one year at a time.
- Flexibility is maintained as to when and where the grain is marketed.

Of course, the producer is usually responsible for managing the stored grain in an on-farm rented facility. If the rented grain bins are not well-maintained or do not incorporate current technology, the renter may be reluctant to upgrade them without a long-term contract. Finally, if the lease for the farmland is not renewed, the producer may find it difficult to store grain past March 1.

Cost Analysis

The costs for any type of grain storage can be classified as either fixed or variable. Fixed costs are those that occur regardless of the degree to which the capacity is utilized and for how long. Variable costs are those that increase or decrease in relation to the number of bushels stored and the length of time they are stored. Generally, investing in on-farm or condominium storage involves both fixed and variable costs, while renting commercial or on-farm storage involves only variable costs.

The major cost of on-farm storage structures is the initial investment in the bin itself, plus the cost of site preparation, wiring, fans, concrete, transfer legs and augers. However, this investment can be spread over the life of the bin, in the form of depreciation and interest on the capital invested. Twenty-five years is a typical assumed useful life, but many grain bins are perfectly usable for much longer periods. Adding capacity to an existing storage facility will usually cost less per bushel than investing in a completely new facility.

Other fixed costs include insurance, property taxes and maintenance. Note that once on-farm storage is constructed, fixed costs can be ignored when comparing the cost of utilizing it versus other storage options, or when deciding how long to store grain each year.

Variable costs associated with grain storage include electricity to operate fans, insecticides and fungicides, fuel to operate augers, and the operator's time for handling the grain in and out of the bin as well as monitoring grain condition. Labor costs may be ignored if time spent managing grain does not compete with other enterprises. In addition, grain stored on the farm may need to be dried to a lower moisture level than grain sent directly to an elevator, resulting in additional fuel costs and shrinkage loss. Finally, there is some risk of quality losses due to spoilage or additional fines and foreign material from storage on the farm.

Renting storage from other farmers or landowners involves most of the same costs and management considerations as using on-farm storage. The major difference is that no long-term investment is incurred. Instead, a monthly or annual rental rate based on the capacity of the bin is paid. Higher transportation and labor costs may be incurred if the rented storage is located a significant distance from the producer's home base, and grain may not be checked as frequently.

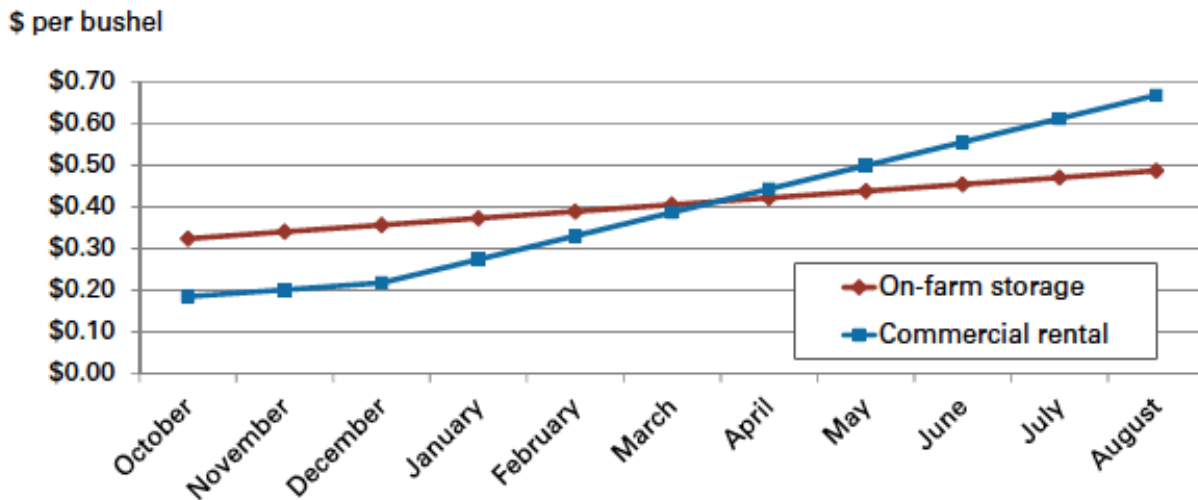
The cost analysis for renting commercial storage or investing in condominium storage is more straightforward. Rental charges are based on the number of bushels actually stored, for the length of time they are stored, usually by the day or by the month. If corn is delivered at above number 2 moisture level, some drying and shrinkage costs will be incurred, as well. Condominium storage may include both a fixed investment cost, which can be amortized over a period of time, an annual service charge regardless of how much the storage space is used, and/or a management charge for the bushels actually stored. There also may be a handling fee if grain is withdrawn from the condominium storage instead of being sold to the same merchandiser.

A final cost that must be considered in any grain storage decision is the time value of money. When grain sales are delayed beyond harvest, funds are not available as soon to pay down debt or invest in an interest-earning account. The interest expense, either added interest from a loan or interest foregone from an investment, will depend on the length of time the grain is stored and the market price that could have been realized at harvest. This cost will be the same regardless of the type of storage utilized. However, it should be considered in the decision to store grain or sell it at harvest, or the decision about how long to store grain.

Figure 5 shows an example of how costs for both on-farm and commercial storage can accumulate over time. It is typical for cost of commercial storage to start out lower than the cost of on-farm storage, but to increase faster. Thus, the expected length of time the grain will be stored is an important consideration.

Ag Decision Maker Decision Tool A2-35, [Grain Storage Investment Comparison](#), can be used to compare the costs of grain storage alternatives.

Figure 5. Cumulative storage costs for corn (example)



Income Tax Treatment

The initial investment cost for erecting on-farm grain storage, including the cost of hired labor, can be depreciated as 7-year MACRS property for the farm income tax return. Bins and equipment are also eligible for Section 179 expensing, which means some or all of their cost can be deducted in the year they are placed in service. The initial investment cost of condominium storage may also be depreciable, depending on the legal structure used.

Other fixed costs, such as property taxes and insurance, as well as all variable costs involving a cash outlay are deductible as ordinary expenses. In addition, delaying grain sales beyond the beginning of the tax year creates a tax deferral. Funds that would have been used to pay income tax on grain sales are available for use for an extra year. The value of this deferral can be estimated by multiplying the price of grain at harvest by the farm's marginal income tax rate, times the current interest rate on operating loans or savings deposits. Adjusting the timing of grain sales between tax years is also a useful way to even out taxable income from one year to the next.

Summary

Storing grain beyond harvest greatly increases the marketing opportunities available. The choice of storage options will depend on the relative cost of each one and how it fits into the overall harvesting, handling and marketing system.

Additional Resources

"[Grain Storage Investment Comparison](#)." Iowa State University Extension and Outreach Ag Decision Maker File A2-35 Decision Tool.

"[Condominium Grain Storage](#)." Iowa State University Ag Decision Maker file A2-36.

"[Cost of Storing Grain](#)." Iowa State University Ag Decision Maker file A2-33.

"[The Economics of On-Farm Storage](#)." MF-2474, Kansas State University Extension. 2007.

"[Grain Drying, Handling and Storage Handbook](#)." MWPS-13, Midwest Plan Service, Iowa State University. 1988.

"[Grain Drying and Storage Publications](#)." North Dakota State University.

"[On-Farm Grain Storage Costs: Consider All the Factors](#)." University of Minnesota.

William Edwards, retired economist. [Questions?](#)

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