

Grain Storage: Cost Comparisons

Investment in grain storage is a necessary, but costly part of a farm operation. As farms get bigger and average yields increase, older storage systems need to be replaced. The decision as to what system or combination of systems to use can be overwhelming. Taking the time to pencil out all factors can assist in making a sound investment decision.

Along with the purchase price other factors such as setup cost, site prep, labour and type of physical storage system needs to be considered for the total project cost

Depreciation is an important aspect when determining costs. Depreciation is generally considered to be the result of aging, wear and tear, and obsolescence. It represents a decrease in the potential economic benefits that can be generated by the capital asset. This is very important in determining which system is the best for an operation.

Repairs and maintenance are also key to the decision, since some storage systems are relatively maintenance free while others require a lot more upkeep. Even if the option chosen has the most economical purchase price it may have the highest maintenance and repair costs.

Financing interest is also important to consider. If the investment in a storage system has a high upfront cost and money needs to be borrowed, a substantial amount of cash can be lost to interest. The high cost of interest on a system may not make sense for a particular operation. As well the lost opportunity of using that money for an alternative investment needs to be considered.

Certain storage systems will usually have some grain spoilage, while others if managed properly will provide relatively unspoiled product. This expected loss should be calculated into the total cost of the system.

Below is a comparison of five different storage options, based on the following assumptions.

- The operation needed to add 25,000 bushels of storage. This example includes temporary storage systems such as grain bin rings and tarps and grain baggers.
- It was assumed that the grain bin ring and tarp held a capacity of 25,000 bushels while grain baggers have unlimited storage capacity by adding more bags.
- The permanent structures are five, 5000 bushel steel bins with corrugated hoppers, corrugated flat bottom or smooth walled with hoppers either on gravel on concrete bases.
- Insurance, energy, labor and tractor requirements were equal for all storage options.
- Augers are already an asset on the farm and require no additional investment.
- Aeration systems have not been installed for any of the options.
- The years' of use was calculated using an estimated life expectancy. Grain bins you can expect a 30-40 year life span with proper maintenance and care.
- Depreciation was calculated using Canadian Revenue Agency classes of depreciable property.

Since this is an example to analyze costs, it is best to calculate for each individual farm and situation.

Storage Options Estimated Price Comparison Example

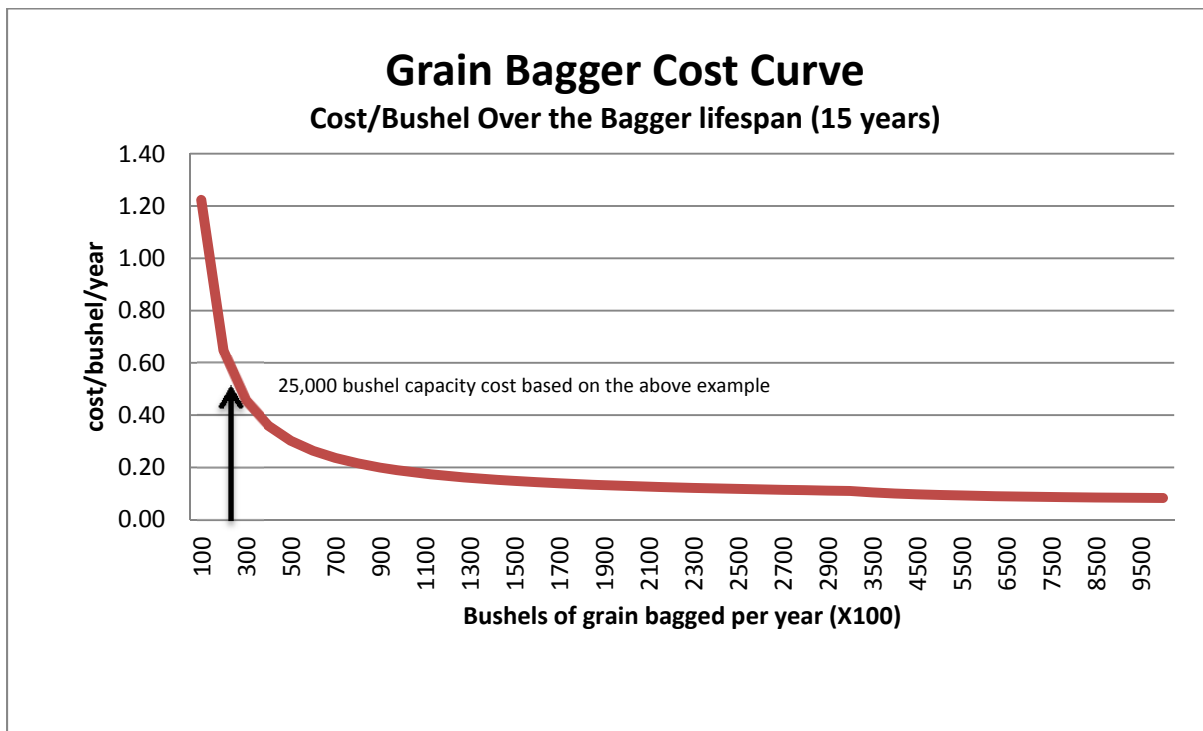
Based on above assumptions

	Grain ring and tarp	Corrugated	Corrugated	Smooth Wall	Grain bagging system	
Base type	soil	hopper on gravel	flat bottom on concrete	hopper bottom on concrete	N/A	
Size (25,000 bushels)	1 ring @ 25,000 bushels	5 bins @ 5,000 bushels/bin			25,000 bushels bagged	
Years of use	10	25	25	25	15	
Cost/bushel (includes equipment, site prep and set up)	\$0.40	\$3.35	\$3.75	\$5.25	\$80,000	Bagger & Extractor
					\$0.07	cost of bag/bushel
Storage cost of purchase including, base, site prep and set-up	\$10,000	\$83,750	\$93,750	\$131,250	\$80,000	Bagger & Extractor
					\$1,750	cost of bags/year
Depreciation	10%	10%	4%	4%	20%	For bagger & extractor
	\$6,320	\$77,404	\$59,259	\$82,962	\$76,833	
Salvage Value	5%	40%	30%	60%	10%	
	\$1,000	\$33,500	\$28,125	\$78,750	\$8,000	
Repairs and maintenance (tarp/ring 10%, bins 2%, equipment 5%)	\$1,000	\$1,675	\$1,875	\$2,625	\$4,000	
Interest on investment (loan rate 5% at 60 months)	\$1,323	\$11,078	\$12,401	\$17,361	\$10,582	
Spoilage 0.5% @ \$5/bushel	\$6,250	\$0	\$0	\$0	\$9,375	
Total investment cost over life span to store 25,000 bushels/year	\$23,893	\$140,407	\$139,160	\$155,448	\$172,790	Bagger & extractor
					\$26,250	Bags
					\$199,040	
Total annual cost for 25,000 bushels of storage	\$2,389	\$5,616	\$5,566	\$6,218	\$13,269.33	
Cost/bushel/year	\$0.10	\$0.22	\$0.22	\$0.25	\$0.53	

This example shows that grain rings and tarps are the most economical solution for grain storage. Unfortunately this system can only be used on a temporary basis as there is a high risk for pest, wildlife and moisture damage and loss. As well, these systems require more maintenance along with assembly and disassembly every year. This increases the work load for the operation. All of the grain bins are the second most economical option. With the smooth walled hopper on concrete slightly more expensive of the three bin types. This is due to the higher initial investment and extra interest. Despite the extra cost smooth walled bins are dual purpose and can be used for fertilizer and seed giving greater flexibility.

The grain bagging system came in as the highest cost to add 25,000 bushels of storage. This was due to the high investment for the bagger and extractor along with high spoilage, depreciation costs and low salvage values. Since grain bagging systems have unlimited storage capacity, the cost per bushel over the lifespan of the asset decreases the more bushels being stored. Grain bagging systems become competitive when more than 70,000 bushels of product are stored per year as shown in the graph below.

Even if an operation is storing more than 70,000 bushels/year, bags have their disadvantages. They are a temporary storage system; grain should not be stored for more than 6-8 months. Damage and punctures can occur to the bags from wildlife, trees and human activity (snowmobiles). Once there is a hole in the bag spoilage can occur very quickly. If bags are stored in the field, it can be difficult to access the site in the winter when snow cover is high. Disposal of plastic waste is also a concern as some municipal waste management centers will not take the plastic or don't have recycling options for it.



By accounting for depreciation, spoilage, interest, repairs and maintenance, an operation can evaluate the entire cost of the storage options being considered. The cost comparison is only one factor to look at when deciding which storage option works best for the operation. Other considerations include the farm's future plans, existing systems and labor availability.

Other Resources:

Grain Storage Considerations

[Management of Cereal Grain in Storage](#)

[Cereal Grain Drying and Storage](#)

[Storage of Canola](#)

[Grain Storage as a Marketing Strategy](#)

References:

Kansas State University. September, 2007. *The Economics of On-Farm Storage*.

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Grains Research & Development Corporation. July, 2013. *Economics of On-Farm Grain Storage: Cost-Benefit Analysis*. <http://www.grdc.com.au/GRDC-Guide-OnFarmStorageEconomics>

Saskatchewan Ministry of Agriculture. February 27, 2013. *Bins vs Bags What Does It Cost?*

<http://www.saskcanola.com/quadrant/media/news/pdfs/producer2013-Humboldt-Payne-Bins-vs-Bags-what-does-it-cost.pdf>