FARM Assistance Focus

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Economics of Grain Storage Bags in the Coastal Bend and Upper Gulf Coast of Texas

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Bumper grain crops back up delivery trucks at area elevators, cause harvest delays, and storage capacity can be exceeded.

The Coastal Bend and Upper Gulf Coast of Texas are major grain sorghum and corn producing areas in Texas. Grain storage in the area is largely a "warehouse" approach to temporarily holding grain after harvest until it can be sold. A combined 72.71 million bushels in 2007 and 66.5 million bushels of grain in 2008 were produced in the region. Bumper grain crops back up delivery trucks at area elevators, cause harvest delays, and storage capacity can be exceeded. Producers are left pondering what cost-effective options are available to store grain at harvest.

Historically, producers have had only two storage options—commercial elevators or on-farm bins. The downside of building on-farm storage facilities is the initial capital outlay, possible financing costs, and maintenance required.

Grain storage bags are a relative new technology that offers producers an alternative for short-term storage. Airtight polyethylene bags were first introduced in the United States in the early 1980s to store forage. At that time, there was little interest in storing grain in bags as ample storage was available. Grain bags became popular in the mid-to-late 90s in Argentina. Lack of storage and grain handling facilities hindered growth in grain production. Innovative and cost-effective solutions were required. Use of grain bags started slowly at first, but now approximately one third of the total grain produced in Argentina is being kept in bags.

A renewed interest in grain storage bags has emerged in the United States. Increased U.S. grain production, spurred by a growing world economy and ethanol production, are posing new challenges for handling and storage facilities. The high cost of building new facilities may not be cost-effective for most individuals, users, grain merchants and commercial elevators.

This study provides a comparative illustration of the estimated producer costs for storing and handling grain at local elevators, in on-farm storage bins, and in grain bags. The information is intended to aid in the evaluation of these three storage alternatives. Technical storage issues and marketing strategies are not within the scope of this analysis.

Assumptions

In order to make the illustration relevant to a wide range of grain producers in the Coastal Bend and Upper Gulf Coast, assumptions and operational information were obtained from local producers and elevators. For analytical purposes, the comparisons given are for corn only, but the analysis could also apply to grain sorghum. The assumed market price for corn was $4.03/bushel F.O.B. We are explicitly making an assumption that the value of grain at elevators, on-farm bins and in grain bags is the same. Prices received could vary based on a buyer's willingness to pickup at the farm. Moreover, sufficient quantities may be necessary to encourage buyers to do that. All prices and costs are given on a per bushel basis. The grain storage period was six months.

Off-farm storage and handling charges were based on typical rates

Table 1. Estimated 2009 Costs of Grain Storage Bags, Equipment & Supplies.

Item	Cost
Polyethylene Bag (9 ft. X 200 ft.)	$600
Sampling/Testing Equipment	$600
Loader	$19,686
Unloader	$30,879
70 HP Tractor (Used)	$10,000
Boards & Screws (Per Bag)	$25

Table 2. Estimated 2009 Elevator Storage & Handling Costs for Corn in the Coastal Bend & Upper Gulf Coast of Texas.

Costs		$/BU.
Hauling to Elevator		0.196
Storage ($0.028/bu x 6 months)	0.168	
In & Out Charges	0.308	
Shrinkage (1% x $4.03/bu)	0.040	
Drying Charges (using 14.5%)	0.014	
Storage Costs		0.530
Total Storage & Handling		**0.726**

charged by area elevators. Estimated on-farm grain storage and handling costs were calculated assuming 75,000-bushel bins at full capacity each year. The cost of the storage facilities per bushel were amortized over 20 years. No financing costs were assumed. Other overhead and operating costs, including insurance, labor, maintenance, pesticides, energy, and hauling, were assumed typical for the area. Fumigant for on-farm storage was assumed to be applied every other year at $.06/bushel or $.03/year on average.

Table 1 provides the estimated costs of storage bags, associated equipment and supplies. For the purpose of estimating per bushel costs, it was assumed the equipment was used to handle 75,000 bushels annually and all equipment was depreciated over 10 years. No sharing of the bag loader or unloader, and no financing costs were assumed. Labor, insurance and other costs are producer estimates.

Results

Estimated 2009 storage and handling costs are given in Tables 2-4. Comparative costs were $.726/bushel for elevators, $.331/bushel for on-farm storage, and $.224/bushel for grain bags. Estimated cost savings of grain bags compared to commercial elevators and on-farm storage were $.502/bushel and $.107/bushel, respectively. Costs and savings may vary by location, elevator, age of on-farm storage bins, and individual grain producer. Additionally, the actual cost savings comparing commercial elevators to grain bags and on-farm storage bins could be slightly less when financing or opportunity costs for bins and/or equipment purchases are included.

A decision to use grain bags for short-term storage must also take into consideration "technical" issues. Table 5 provides a list of significant advantages and disadvantages of grain bags vs. commercial elevators and on-farm grain bins. The most significant advantages include harvest flexibility and minimal capital investment in storage facilities. The most significant disadvantages include the inability to warehouse receipt grain stored in bags at this time and bags cannot be loaded or unloaded in wet weather.

Table 3. Estimated 2009 On-Farm Storage Costs for Corn in the Coastal Bend and Upper Gulf Coast of Texas.

Costs	$/Bu.
Bins & Facilities	0.145
Insurance	0.032
Labor	0.018
Repairs & Maintenance	0.004
Pesticides	0.041
Fumigant (treatment every 2 years)	0.030
Shrinkage	0.040
Fuel & Storage	0.021
Total Storage Costs	**0.331**

Under proper handling and management, grain bags provide a viable and cost-effective option for short-term storage.

Table 4. Estimated 2009 Grain Bag Storage Costs for Corn in the Coastal Bend & Upper Gulf Coast of Texas.

Cost	$/Bu.
Bag	0.092
Boards & screws	0.004
Sampling/Testing Equipment	0.001
70 hp Tractor	0.001
Loader	0.026
Unloader	0.041
Insurance	0.030
Labor	0.026
Repairs & Maintenance	0.001
Pesticides	0.000
Fuel	0.002
Disposal Fee	0.001
Total Storage Costs	**0.224**

Summary

The results show that grain bagging has a cost advantage over on-farm and commercial storage. Storing grain in bags can compliment on-farm and commercial storage in any crop year. Grain bags at least offer a viable option for short-term storage during bumper crop years and the potential for reducing harvest delays. With both on-farm grain bins and grain bags, a producer may want to partner with a commercial elevator to weigh and dry grain as needed.

A management decision to store all or part of a crop in grain bags must be weighed based on a producer's ability to handle risk, individual business preferences, labor availability, and marketing issues. Storing grain in bags has its advantages and disadvantages which must also be considered (Table 5). Nevertheless, under proper handling and management, grain bags provide a viable and cost-effective option for short-term storage.

Table 5. Advantages & Disadvantages of Grain Storage Bags.

Advantages	Disadvantages
1 Harvest flexibility--reduced harvest delays & added storage in bumper seasons.	1 Bags are temporary storage; can't warehouse receipt grain stored in bags.
2 Minimal capital investment in storage facilities & equipment.	2 Cannot load or unload bags in wet weather.
3 Reduced storage costs & less moisture loss.	3 Difficult to determine how much grain is stored to calculate farmer & landlord shares.
4 Storage environment greatly reduces stored insect expenses.	4 Rats, birds & other animals can damage bags (special precautions required).
5 Flexibility in crops planted.	5 Cannot harvest & put high moisture grain in bags.
	6 Bags must be placed on hard, level & well drained land.

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