MISSISSIPPI SOYBEAN PROMOTION BOARD
PROJECT NO. 11-2015 (YEAR 2)
2015 Final Report

Title: Soybean Storage Profitability and Marketing Strategies for Mississippi Soybean Growers

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EXECUTIVE SUMMARY

An available option for soybean producers to take advantage of market cycles is self-storage in an on-farm facility. In this case, storage costs are internalized to the operation and producers have the opportunity to build asset equity rather than renting space from elevators.

The primary objectives of this project were: 1) Examine the marketing alternatives and advantages associated with on-farm soybean storage; 2) Estimate the costs associated with storing and drying soybeans in on-farm facilities; and 3) Distribute results in the form of extension publications and extension presentations.

Four volume scenarios were included in the study. They ranged from 10 thousand bu of storage potential up to 500 thousand bu storage potential. Each volume scenario included a low end configuration (moveable augers), intermediate cost configuration (Loop System), and a high end option (conveyer system). This essentially created 12 distinct options for size and configuration.

Based on land-valuation survey results, the addition of a grain storage system does not add any value to the land itself. Rather, the value of the grain storage system must be recaptured through its use in gaining a marketing advantage. When looking at the marketing advantages from a grain storage system, all of the systems we included will pay for themselves over the course of 10 years if a proper marketing plan is in place.

On average, if the bin is used at its maximum capacity, the additional revenue generated from storage with the small bin system in this study would pay for the entire construction cost in just over 3 years if the grain is stored until the following June and sold on the cash market. Under the same scenario, the large system that includes a dryer evaluated in this study can be paid for in just over 2 years with the additional revenue generated from storage. By using the future market in combination with storage, these pay-off times would be even shorter.

The results from this study suggest that the construction of an on-farm grain storage system has the potential to be a smart investment for Mississippi soybean producers who are also willing to formulate a marketing plan that will best utilize the storage system.

BACKGROUND AND OBJECTIVES

Soybean markets tend to vary cyclically, as market prices with fall contract expiration months are typically lower than contract months expiring in spring or summer. Mississippi's cash basis is also typically higher in spring and summer than around harvest time, thereby increasing the premium from marketing beans in spring or summer.

The ability to take advantage of higher soybean prices forward-contracted for the spring or summer months requires the ability to store beans for intended delivery during said months.

One available option for producers is a storage agreement with a local soybean elevator that requires the payment of a monthly storage fee. However, producers opting to use elevators and market their beans far enough in the future may see storage fees erode any potential profits from forward contracting, and the distance from field to elevator along with unloading waiting times can be logistically challenging.

Another available option for soybean producers to take advantage of market cycles is self-storage in an on-farm facility. In this case, storage costs are internalized to the operation and producers have the opportunity to build asset equity rather than renting space from elevators.

The primary objectives of this project are:

1. **Examine the marketing alternatives and advantages associated with on-farm soybean storage.**
2. **Estimate the costs associated with storing and drying soybeans in on-farm facilities.**
3. **Distribute results in the form of extension publications and extension presentations.**

BACKGROUND AND PROCEDURES

Objective 1: Examine the marketing advantages and alternatives associated with on-farm soybean storage.

Proper marketing is an essential part of operating a grain farm. Markets have become increasingly volatile in recent years, which further emphasizes the need to have a marketing plan in place. Developing a realistic plan to avoid price discounts, manage price risk, and obtain the best available price for the crop is necessary to avoid situations where the health or survivability of an operation is compromised.

An effective marketing plan should be based on what would "normally" be best and should focus primarily on risk management. One of the best pieces of advice when it comes to marketing one's crops is that if one can pencil in a profit, just do it.

There are several options when marketing corn or soybeans. The first option is selling the crop on the cash market with no other strategy in place. While this is a common option used by many producers, it is also the most risky.

Another option when marketing grain is to use forward contracts. A forward contract is defined as an agreement to buy or sell an asset at a certain time for a certain price. More specifically, a grain farmer using a forward contract is entering an agreement with his/her local grain elevator to sell their grain at a certain price, with the producer delivering the grain to the grain elevator at harvest time. This agreement is typically made during the growing season, but can easily be made before the crop is even planted.

A third option is to use the futures market. The futures market is similar to a forward contract in that it is an agreement between two parties to buy or sell an asset at a certain time in the future

for a certain price. However, futures are usually traded in exchanges and have mechanisms put in place by the exchange to guarantee that the contract will be honored. When a grain producer uses the futures market to market his/her crop, it is called a hedge. To place a hedge, a grain producer will sell a futures contract, typically sometime during the growing season and will then buy it back at a later date, usually when the crop is sold on the cash market.

Grain storage can offer additional marketing alternatives for producers who have the necessary facilities. The general idea behind grain storage is that grain prices are often cyclical. Prices are typically at their lowest point of the season shortly after harvest because that is when there is the highest quantity of grain available. As the season progresses and the supplies of grain begin to dwindle, prices begin to rise and will typically peak in late summer. By storing grain until a later date, a producer can wait out the seasonal price dip around harvest time and market his/her grain when prices are on the upswing. There are exceptions to this rule, but on average the highest prices are sometime in mid-to late July and the lowest prices are typically in October and early November.

We compared several marketing alternatives both with and without storage to find how much more a producer could receive from his/her grain when compared to simply selling at harvest time. We assume that harvest time is in October for both corn and soybeans. While an October harvest may be late for many Mississippi producers, it takes into account any harvest delays that may occur. Other than selling the grain on the cash market at harvest time, we looked at one other alternative marketing plan that does not include storage; i.e., using the futures market to place a hedge sometime between the first week of January and harvest time.

For producers who wish to use on-farm grain storage, several additional marketing alternatives become available. The first option that we looked at is storing the grain and marketing it at a later date on the cash market. This option gives a producer the flexibility of marketing the grain at any point in which he/she feels they can receive the best available price. The second option we looked at is placing a hedge sometime during or after the growing season to sell the grain at a later date. The sale dates we looked at are the last weeks of February, April, and June. Those dates were chosen to coincide with the March, May, and July futures contracts for both corn and soybeans.

Objective 2: Estimate the costs associated with storing and drying soybeans in on-farm facilities.

Data were collected on the impact of storage facilities on land values and we met with grain bin manufacturers (Hutchinson Myrath & MFS) and facilitated their cooperation in estimating construction costs for various grain bin configurations. They completed storage configuration scenarios that included loop, conveyer, and moveable auger systems; storage volume options and scale savings; and multiple drying options including rapid drying systems, dryer bins, and stirring systems. Alternative drying power options are also evaluated including natural gas vs. electrical powered dryers.

Four volume scenarios were included from 10 thousand bu of storage potential up to 500 thousand bu storage potential. Each volume scenario included a low end configuration (moveable augers), intermediate cost configuration (Loop System), and a high end option (conveyer system). This essentially creates 12 distinct options for size and configuration.

Associated with each configuration are separate drying options such as dryer bins, stirrers, and rapid drying systems which will be add-on options for any configuration and volume potential. Storage volumes were selected based on recommendations from Global Industries sales reps, which were based on their observations from farmers in Mississippi. Major grain elevators located in the Mississippi Delta were contacted to gather the costs of storing grain at their own facility as well as the dock in price associated with marketing grain that is not fully dry. Miscellaneous costs not directly associated with storing and drying, including hauling, equipment wear and tear, and time commitment for each storage option, were also collected and analyzed

RESULTS AND DISCUSSION

Objective 1: Examine the marketing advantages and alternatives associated with on-farm soybean storage.

As shown in Fig. 1, the additional price for soybeans that can be received by using the futures market to place a hedge sometime between the first week of January and harvest time, while using no grain storage, has ranged from an average loss of $0.20/bu when the hedge is placed late in the growing season to an average gain of more than $1.00/bu when the hedge is placed in June or July.

As shown in Fig. 2, storing soybeans and marketing them at a later date on the cash market gained an average of $1.35/bu more when the grain was stored until the following summer, and can gain an additional $0.50/bu by storing soybeans until April when compared to selling them on the cash market straight out of the field. Using a combination of grain storage and hedging on the futures market can further boost marketing options for producers.

Storing soybeans until late February while placing a hedge in July during the growing season using the March futures contract gained an average of $1.50/bu more than simply selling directly out of the field (Fig. 3). Holding onto soybeans for an extra couple of months and storing them until late April while placing a hedge in July during the growing season using the May futures contract gained an average $1.00/bu more than simply selling directly out of the field (Fig. 4). Finally, storing soybeans until the following June and placing a hedge in July during the growing season using the following July futures contract gained an average of nearly $2.00/bu more than simply selling directly out of the field over the last three years (Fig. 5).

The results of this study have several implications for Mississippi's soybean producers. First, the results emphasize the importance of having a marketing plan in place. Even without a grain storage system, producers could have gained as much as an extra $1.00/bu for soybeans by hedging in advance using the futures market. That translates into an extra $45 in revenue per acre assuming yields of 45 bu/acre.

Grain storage systems have the potential to further enhance a producer's revenue stream. Over the last three years, soybean producers who chose to store their grain could have gained an extra $1.35/bu without using the futures market compared to selling out of the field, or an extra $0.35/bu when compared to a producer without storage who used the futures market to hedge his/her price risk. When combining storage and hedging, a soybean producer could have realized as much as $2.00/bu more than a producer with no marketing plan and $1.00/bu more than a producer who had a marketing plan but did not have an on-farm grain storage system. That

translates into an average annual increase in revenue of $90/acre from using a combination of storage and hedging to market one's soybean crop.

While it is difficult to know definitively how much price improvement one of these marketing scenarios will gain producers in individual years in the future, it is reasonable to expect similar trends when averaged over several years. Markets can and likely will occasionally deviate from these trends in individual years, but market fundamentals will always return to similar seasonal cycles in the long term. It is these long-term cycles that producers should use when making marketing decisions.

Objective 2: Estimate the costs associated with storing and drying soybeans in on-farm facilities.

Costs for storing and drying soybeans in an on-farm facility will vary greatly by bin size. A single small 27-foot grain bin with a capacity of just under 10,000 bushels has a total construction cost of $41,118 per bin. This includes a heater, five-horsepower fan, two stirring augers, and an auger for filling the bin. The cost to construct this bin is approximately $4.19/bu, but when spread over 10 years with a 6% interest rate, the cost per bushel per year is $0.57. This bin would be sufficient to store production from 218 acres of soybeans or 54 acres of corn assuming yields of 45 bu/acre for soybeans or 180 bu/acre for corn.

A single large 48-foot grain bin with a capacity of just over 31,000 bushels has a total construction cost of $110,664 per bin. This includes heaters, two 30-horsepower fans, three stirring augers, and an auger for filling the bin. The cost to construct this bin is approximately $3.57/bu, but when spread over 10 years with a 6% interest rate, the cost per bushel per year is $0.48. This bin would be sufficient to store production from 689 acres of soybeans or 172 acres of corn assuming yields of 45 bu/acre for soybeans or 180 bu/acre for corn.

There is a cost savings when constructing multiple bin systems. A system consisting of three large 48-foot grain bins with a capacity of 150,000 bushels has a total construction cost of $417,000. This includes two 40-horsepower fans on each bin, a 10-inch loop between bins, towers, and a manwalk. The cost to construct this bin is approximately $2.78/bu, but when spread over 10 years with a 6% interest rate, the cost per bushel per year is $0.38. This bin would be sufficient to store production from 3,333 acres of soybeans or 833 acres of corn assuming yields of 45 bu/acre for soybeans or 180 bu/acre for corn.

Similarly, a system consisting of four large 48-foot grain bins with a capacity of 286,600 bushels has a total construction cost of $353,000. This includes two 40-horsepower fans on each bin, a 10-inch power sweep loop system, a hopper tank for loading trucks, and a manwalk. The cost to construct this bin is approximately $1.20/bu, but when spread over 10 years with a 6% interest rate, the cost per bushel per year is $0.16. This bin would be sufficient to store production from 6,355 acres of soybeans or 1,592 acres of corn assuming yields of 45 bu/acre for soybeans or 180 bu/acre for corn.

Finally, a system consisting of two large 54-foot grain bins and a 33-foot wet bin with a total capacity of 260,000 bushels has a total construction cost of $703,000. This includes a 2,200 bu/hour dryer bin, a 12-inch loop system, and two legs to transfer grain to and from the dryer. The cost to construct this bin is approximately $2.70/bu, but when spread over 10 years with a 6% interest rate, the cost per bushel per year is $0.37. This bin would be sufficient to store

production from 5,777 acres of soybeans or 1,444 acres of corn assuming yields of 45 bu/acre for soybeans or 180 bu/acre for corn.

Based on our land-valuation survey results, the addition of a grain storage system does not add any value to the land itself. Rather, the value of the grain storage system must be recaptured through its use in gaining a marketing advantage. When looking at the marketing advantages from a grain storage system, all of the systems we included will pay for themselves over the course of 10 years if a proper marketing plan is in place.

On average, if the bin is used at its maximum capacity, the additional revenue generated from storage with the small bin would pay for the entire construction cost in just over 3 years if the grain is stored until the following June and sold on the cash market. Under the same scenario, the large system that includes a dryer can be paid for in just over 2 years with the additional revenue generated from storage. By using the future market in combination with storage, these pay-off times would be even shorter.

The results from this study suggest that the construction of an on-farm grain storage system has the potential to be a smart investment for Mississippi soybean producers who are also willing to formulate a marketing plan that will best utilize the storage system.

FORTHCOMING END PRODUCTS

Four Extension publications prepared and in review

One Master of Science thesis

Figure 1. Difference between hedging with November Futures Contract and no storage vs. selling out of field in October (Soybeans)

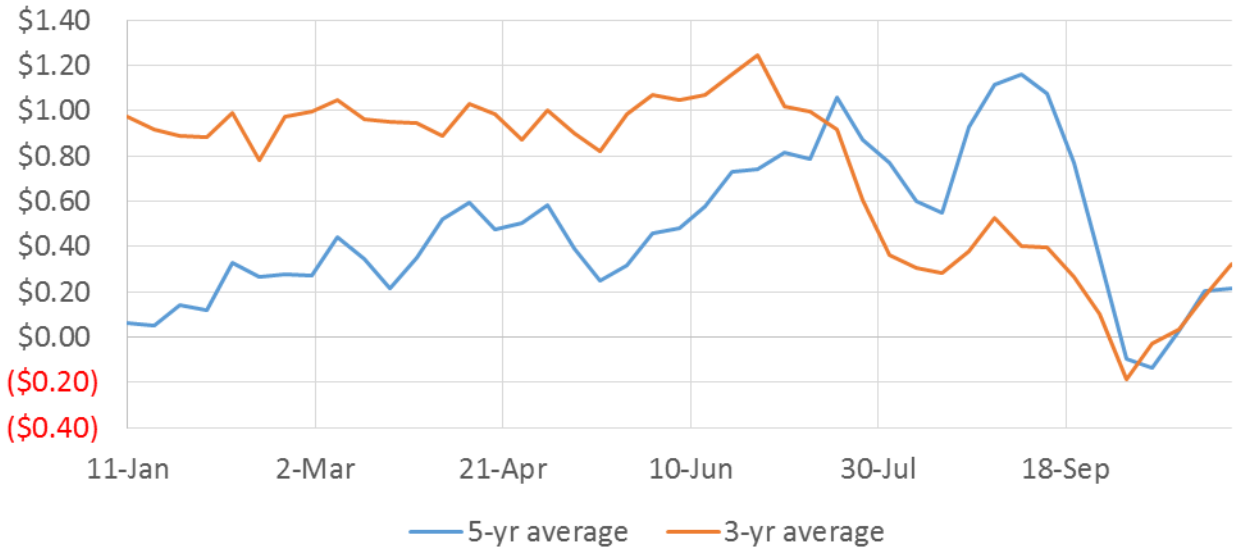


Figure 2. Difference between cash sales out of field in October and Storing and selling on Cash market at a later date (Soybeans)

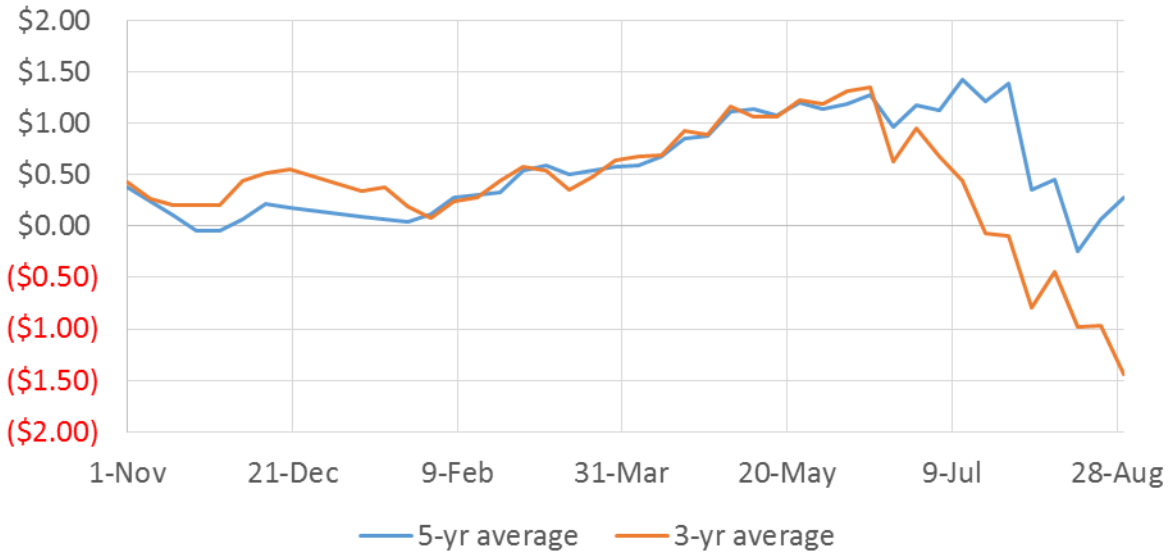


Figure 3. Storing grain and hedging for sale the last week of February vs. selling directly out of field in October (Soybeans)

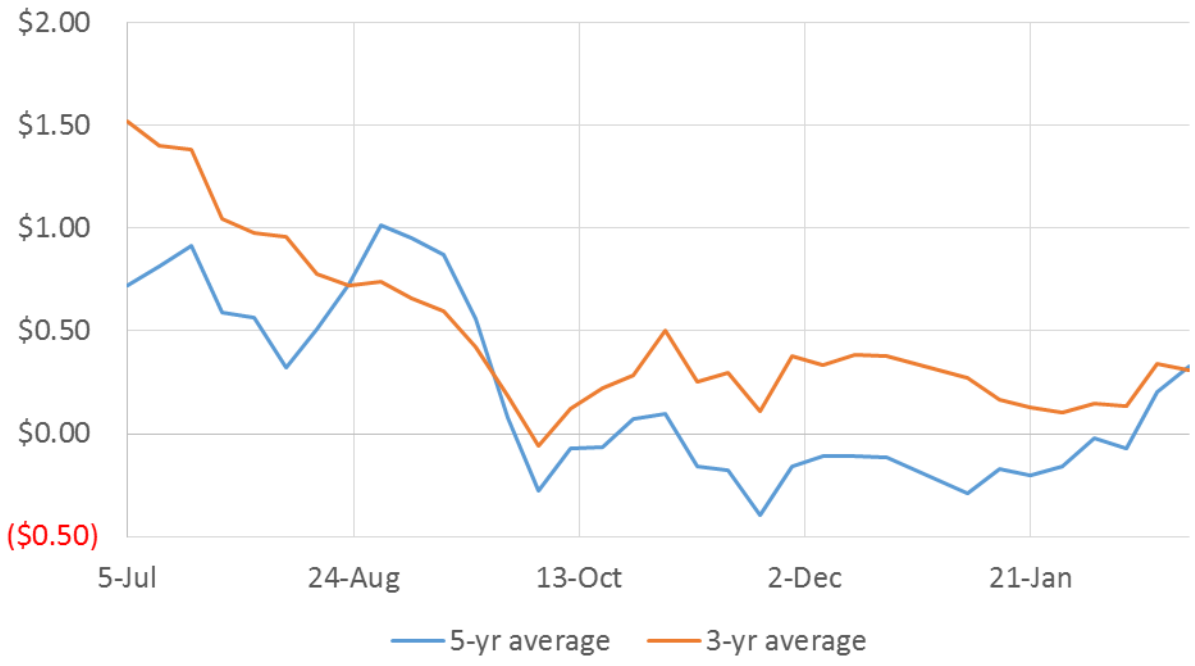
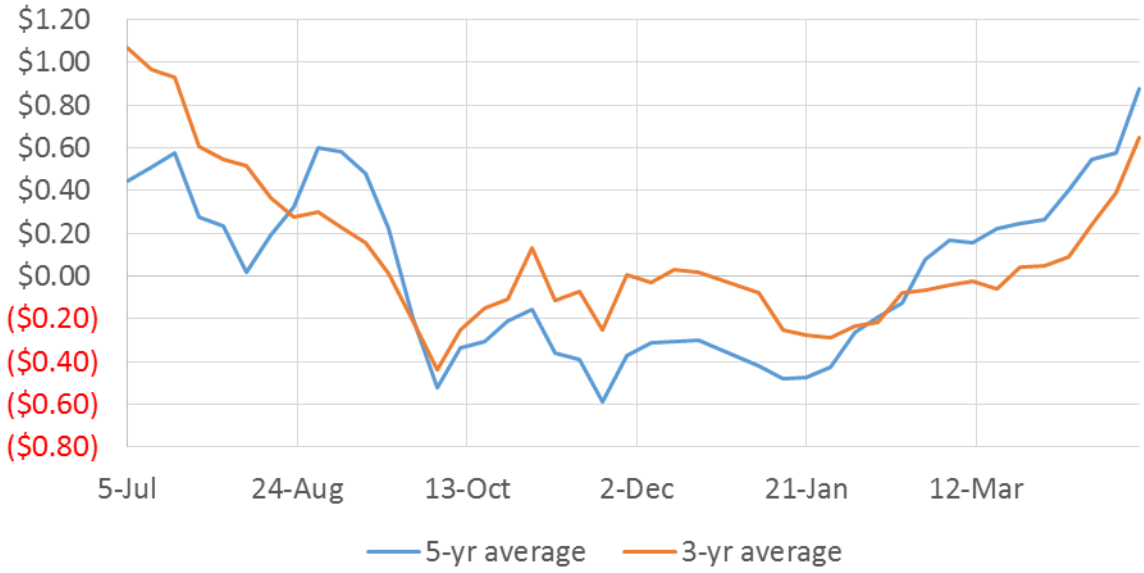


Figure 4. Storing grain and hedging for sale the last week of April vs. selling directly out of field in October (Soybeans)



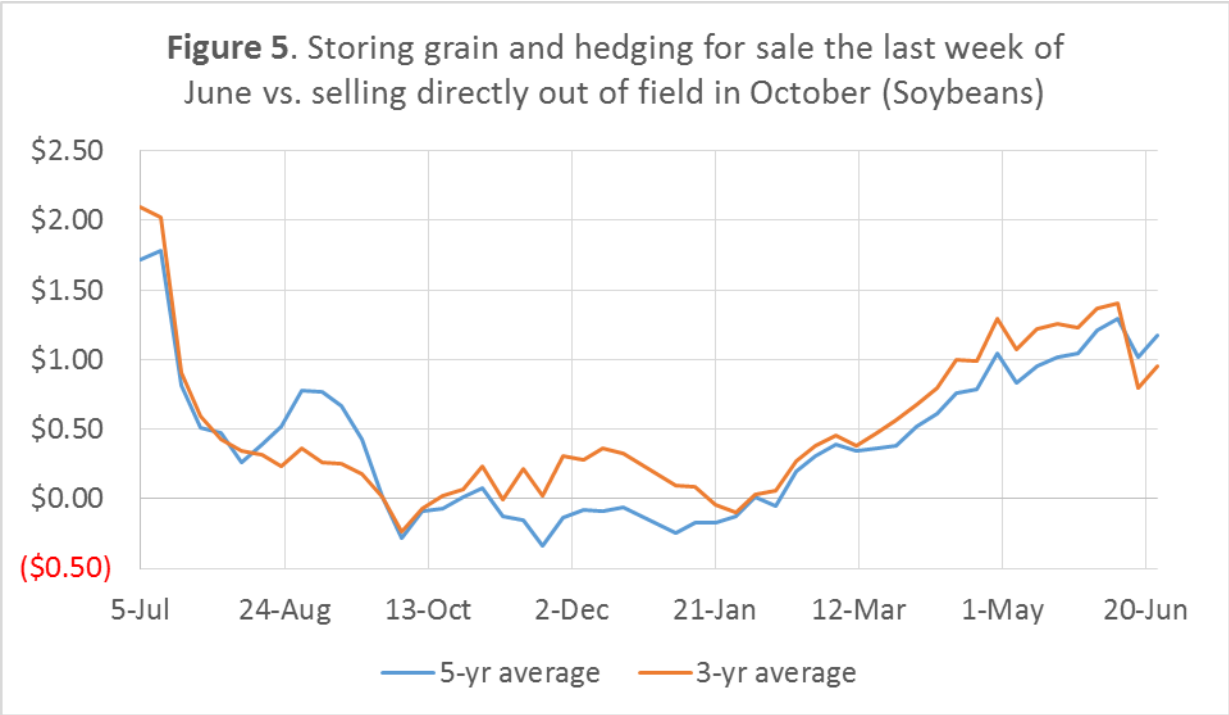


Figure 5. Storing grain and hedging for sale the last week of June vs. selling directly out of field in October (Soybeans)
$2.50
$2.00
$1.50
$1.00
$0.50
$0.00
($0.50)
5-Jul
24-Aug
13-Oct
2-Dec
21-Jan
12-Mar
1-May
20-Jun
5-yr average
3-yr average