



Hedging strategies aim to reduce price risk

AgriThought

AgriBank provides financial solutions to meet the needs of production agriculture in America's heartland. We feature our research and analysis in AgriBank Insights as part of our AgriThought initiative to help inform the financial decisions among those we serve.

Contents

- 2 Hedging primer
- 3 Marketing plans
- 3 Price volatility
- 4 Marketing tools
- 5 Hedging example
- 8 Glossary
- 9 For more information

Since 2006, the volatility of market prices has shifted significantly higher for most agricultural commodities. More recently, key agricultural commodity prices across the United States peaked, buoyed by growing global demand. For example, corn, a major crop in the 15-state AgriBank District, reached prices of \$6.50 to \$7.00 per bushel in 2012-2013 — nearly twice the 10-year average of \$3.51. However, following bumper crops in 2013, lower prices for corn, as well as soybeans and other commodities, are expected to substantially reduce the profitability of crop producers in 2014. Such market volatility underscores the need for crop producers to minimize price risk— with hedging strategies offering an effective solution.

Highlights

- **CROP PRICES DECLINE.** Key crop prices have moderated while most input prices have held steady or increased — likely to result in tighter profit margins for crop producers.
- **HEDGING AFFORDS PROTECTION.** Locking in a crop price through hedging can guarantee some level of profit — and protect producers if prices decline.
- **SWAPS OFFER FLEXIBILITY.** Less traditional price risk management tools such as swaps, which are similar to futures, may provide crop producers more flexibility.

Hedging primer: An effective strategy to manage price risk



Prices for corn, soybeans and other crops have moderated from recent highs, while supplies are abundant. Some inputs, such as fertilizer, have experienced price reductions. Meanwhile, prices for fuel and other inputs have held steady or increased. The result: Crop producers could face tighter profit margins than in recent years. A hedging strategy designed to lock in prices can help protect producers from volatile markets.

Why hedge?

Crop producers are in business to raise corn, soybeans or other commodities and sell them at a profit. Many variables affect profitability, including production costs, growing conditions and the uncertainty of future crop prices. Some years may be profitable, others may not.

Will crop prices rise or fall? No one can predict for certain — but prices inevitably will change along with changes in supply and demand. Producers have various marketing tools at their disposal to protect themselves from the financial risk of price volatility. One effective tool is hedging, which enables producers to hedge a price for a crop before or after harvest. Hedging in a price that guarantees some level of profit — or at least a break-even point — protects producers if prices decline. Producers won't benefit from any gain if prices rise after they hedge in a price — but the goal for financially prudent producers who use hedging is to protect against downside price risk for a future cash sale (or upside price risk for a future cash purchase of an input), not enhance margins.

What is a hedge?

Defining a hedge requires understanding the two separate but related markets for farm products: the local cash market and the futures market.

- **LOCAL CASH MARKET** — the physical market such as an elevator, ethanol plant, processor or terminal where a farmer sells an actual crop or other product
- **FUTURES MARKET** — any exchange on which futures and options contracts are traded for future delivery of a commodity at a specific date, grade, place, price and quantity

Producer hedging of a produced commodity involves selling commodity futures contracts as a temporary substitute for selling in the local cash market, since the commodity will ultimately be sold in the cash market. The producer may also hedge future purchases of input commodities (such as a feedlot that feeds cattle) by buying futures as a temporary substitute for the future cash purchase.

The term *basis* refers to the difference between the local cash market price and the futures market price. For example, a bid of \$4.00 per bushel for corn in the local cash market may be derived from a futures market price of \$4.20 and a basis of 20 cents under the futures.

Sound marketing plans address price risk management

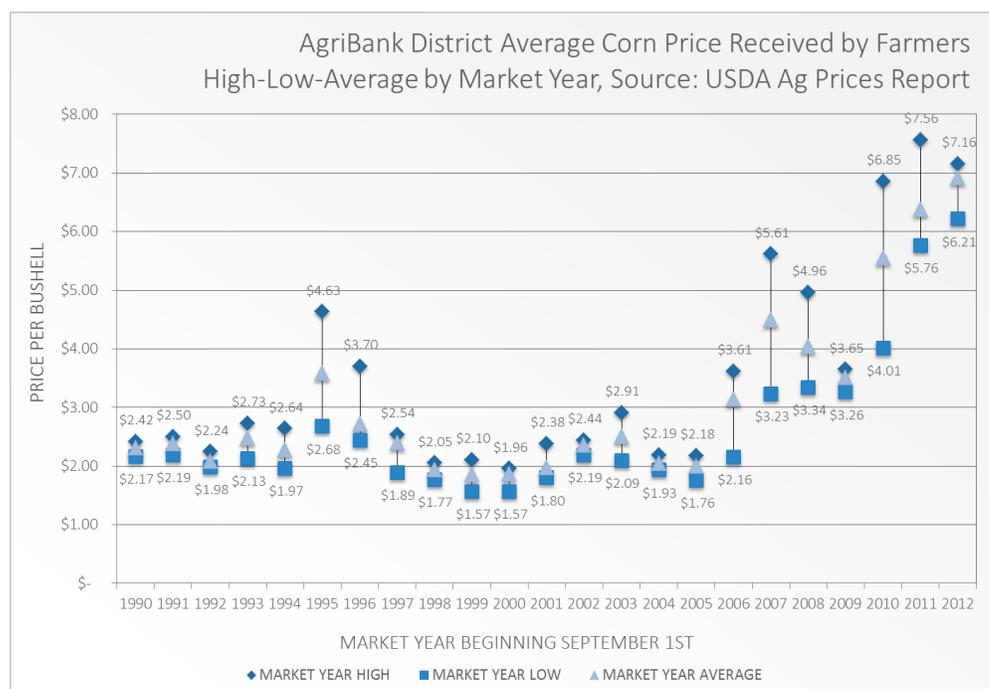
The greatest benefit of a marketing plan is to minimize emotional involvement. A well-planned strategy can help accomplish short-run measurable objectives and long-run business goals.

Following are five necessary components of producer marketing plans:

- **WELL-DEFINED GOALS AND OBJECTIVES** — must be reasonably attainable given the current production and financial characteristics of the farming operation
- **THE PRODUCTION INFORMATION FOR THE PARTICULAR ENTERPRISE** — the producer should know both the fixed and variable costs of production, which are necessary to establish pricing targets within the marketing plan. Also, for hedging an uncertain future production level (such as before harvest of a planted crop), it is important to know the historical yield and the level/type of crop insurance that is put in place in order to determine the size of the hedge position.
- **A GENERAL DISCUSSION OF THE FUTURE COMMODITY PRICE OUTLOOK THAT TAKES INTO CONSIDERATION ALTERNATIVE SCENARIOS, NOT JUST MARKET FORECASTS** — should include (at a minimum) the baseline, worst-case and best-case forecasts based on possible directions of the market
- **A MARKETING TOOLBOX THAT CONTAINS THE STRATEGIES APPROPRIATE TO THE PRODUCER AND THE OPERATION** — include only those tools where the level of risk is appropriate to the financial risk-carrying capacity of the business and to the comfort level of the owner or management team
- **AN IMPLEMENTATION PLAN THAT PROVIDES THE ROADMAP TO REACHING THE GOALS AND OBJECTIVES OF THE MARKETING PLAN** — should contain enough flexibility to adjust to changing market conditions, as well as take into account the typical production cycle of the commodity and any seasonality that may be present

Commodity prices: Increasingly volatile

Recent years have seen an increase in the price volatility of commodity markets. The accompanying chart shows the high-low average corn price received by farmers by market year from 1990 to 2012, with especially increased price volatility since 2006.



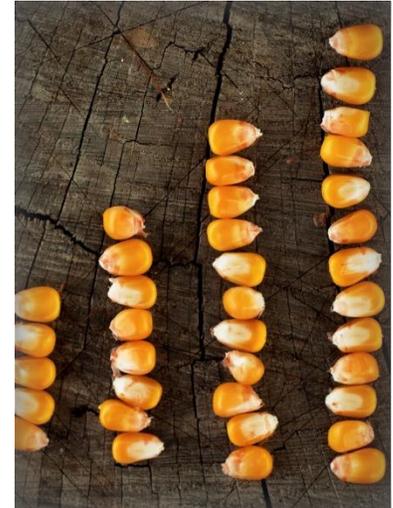
Marketing toolbox contains a variety of hedging tools

Commonly used hedging tools for producers include:

- **FUTURES.** These are standardized (all specifications are fixed except for price) forward contracts that trade via open outcry (pit) or electronic auction at one of the commodity futures exchanges such as the Chicago Mercantile Exchange (CME). Producers can protect against a decline in their future sale price by placing a **short hedge** — selling futures as a placeholder for the future cash sale. When the cash sale does occur, the futures contract is usually offset (bought back), and the financial gain (if prices fall) or loss (if prices rise) is added to the revenue from the cash sale. Since cash prices will typically not move totally in lockstep with the futures (due to differences in time, location and quality), the futures hedger will be subject to **basis risk**, which is the fluctuation in the difference between the local cash and standardized futures prices.
- **OPTIONS.** Like futures, these are standardized contracts that trade on the futures exchanges in a similar manner. Unlike futures, options allow producers to set a **floor** (put options) on their sale price with the advantage of participating in favorable price moves to the upside. In exchange for this flexibility, the producer must pay a **premium** that represents the lone negotiable item on the contract. Producers can choose from various levels of price coverage (deductibles) by choosing from a list of available **strike prices** on the option. If prices fall below the strike price, the producer will receive a payout equal to the difference between the strike price and the lower futures price. This payout is usually embedded in the option's market premium (called **intrinsic value**), which the producer can recover by reselling the purchased put option at the market premium to offset the option position (or they can **exercise** the option but they give up any **time value** that may still be embedded in the premium). Producers may also set a ceiling on the price of a future commodity input purchase (such as a cattle feedlot operation) by purchasing a call option.
- **SWAPS.** In terms of the financial payout, these contracts are very similar to futures; however, they typically have a higher level of customization and flexibility. These contracts are available either on the futures exchanges (such as the CME's Clearport electronic marketplace) or outside the exchanges in what is known as the **over-the-counter** (OTC) marketplace. A swap is simply a contract that calls for the exchange of cash flows between two parties that are based upon a particular market price or index value. The most common kind of swap used in commodities is the **fixed-floating** swap, where one party pays a predetermined fixed price and the other party pays a market-determined floating price. For hedging a future cash sale, a producer will take the float side of the swap. As prices go below the fixed price, the producer will be credited with the price difference (receives the higher fixed price, pays the lower floating). As prices go above the fixed price, the producer will be debited equal to the price difference (pays the higher floating, receives the lower fixed). Therefore, as a hedge, the swap will perform in a similar manner to a futures hedge. Producers who hedge a future commodity input purchase would take the opposite (pay fixed, receive floating) side of the swap transaction.



- **CASH FORWARD CONTRACTS.** These contracts are between the producer and a local buyer (elevator, ethanol plant, processor, etc.) and unlike the previous three categories, are always settled by physical delivery of the commodity. A *fixed price* forward contract requires the producer to deliver the contracted quantity in the future for a fixed cash price payment. Under this contract, both the futures and basis components of the selling price are fixed. A *basis contract* fixes the basis on a future delivery but leaves the futures price component open. The producer can fix the futures component at a later time either through exercising a provision in the cash contract or by selling futures against the contract. A *hedged-to-arrive* contract fixes the futures component of the selling price and usually allows the producer to fix the basis component at a later date. A *minimum price* contract specifies future delivery at a minimum cash price with a premium either paid directly by the producer or deducted from the sale price. All of these cash contracts essentially obligate the producer to deliver the contracted amount of the commodity to a predetermined cash market outlet.



In selecting the appropriate hedging tool, producers should consider:

- What buyer, price and tools are reasonably available for my particular commodity and local cash market venues?
- What tools are appropriate given the knowledge level and expertise that I currently possess (or are present in my management team)?
- What tools are appropriate given my financial ability to take on risk and my personal risk tolerance?

Producers may wish to consult an accountant, broker, lender and/or other experts to help choose the hedging strategies right for them.

Producer hedge example comparing forward, futures and swap

Imagine you're a producer wanting to compare three price risk management alternatives for your recently planted corn crop. Your primary goal is to lock in a price that can reasonably cover your cost of production plus provide some additional profit margin.

You already have purchased Revenue Protection (RP) crop insurance at the 80 percent coverage level. Your actual production history (APH) yield is 156 bushels per acre; therefore, the crop insurance coverage yield (at 80 percent coverage) is 125 bushels per acre with 1,600 acres currently planted. The RP insurance effectively gives you replacement coverage for any yield shortfall below 125 bushels per acre.

The following pages illustrate several potential hedging alternatives and outcomes.

Hedging alternatives

You want to lock in a price on the 200,000 bushels (yield of 125 bushels per acre multiplied by 1,600 acres planted to corn) covered by the Revenue Protection crop insurance policy. The December (new crop) corn futures price is currently trading at \$5.00 per bushel. You're concerned about the potential negative impact on the markets of recent news reports regarding improving corn production in Argentina and Brazil along with declining domestic livestock feed demand. You have three alternatives available to protect the price of your growing crop:

FORWARD

Enter into a forward contract from the local grain cooperative elevator, which offers a fixed cash delivery price of \$4.25 per bushel (implies a forward basis of 75 cents under futures)

- You enter into contract directly with the local elevator.
- You know the delivery price with certainty (\$4.25 per bushel), as both the futures and basis components of the price are fixed in the contract.
- No margin deposit is required up front.
- You are contractually obligated to deliver 200,000 bushels of corn to the local elevator. If you harvest less than that, you must either purchase the remaining corn balance in the cash market for delivery or buy out the balance at the current local cash price.

FUTURES

Sell corn futures contracts listed on the CME

- You sell 40 contracts (5,000 bushels per contract) in the December delivery (new crop) contract at the current futures price of \$5.00 per bushel. The local forward contract price of \$4.25 mentioned at left implies a forward local basis of -\$0.75 per bushel (forward contract price minus futures price).
- You place your order locally either through an independently owned Introducing Broker or an Associated Person employed with a Futures Commission Merchant firm. The order is either routed to the trading floor to be filled in the futures pit or placed electronically via CME's electronic GLOBEX marketplace.
- The broker charges a round-turn brokerage fee, which is generally deducted from your brokerage account when the futures position has been offset. In this example, assume a brokerage fee of \$50 per contract or \$0.01 per bushel.
- You are required to deposit initial margin (typically between 5 to 10 percent of the total contract value for each contract) with the broker. If the December corn futures price moves above \$5.00 per bushel, you would be required to make up any mark-to-market losses through additional deposits called margin calls.
- You are responsible for financing both initial margin and any additional margin calls through use of cash reserves and lines of credit, incurring some interest costs.
- You are not contractually tied to a particular physical delivery market for your crop.
- You effectively remove the futures portion of your cash price risk but still face the risk of adverse movements in the generally less volatile basis.

SWAP

Enter into a pay variable, receive fixed swap contract that uses the CME December corn futures as the variable index price ("futures lookalike swap")

- You enter into enough swaps to cover the 200,000 bushel cash exposure.
- You place your order either directly or indirectly (via electronic platform) with a firm that is registered as a designated Swap Dealer (SD) by the Commodity Futures Trading Commission.
- Fixed price equals the current December futures price of \$5.00 per bushel.
- As a derivative contract, the swap includes all the standardized terms of the CME corn futures contract.
- The swap is marked-to-market on a daily basis through the netting of the swap cash flows. The producer will either run an accumulated credit or deficit with the Swap Dealer firm. Cash deposits will be required by the producer if the account has an accumulated deficit (in a similar manner to margin calls on a futures position). However, some lenders offer producers a price risk management tool that combines a standard loan with a commodity swap product. Any potential account deficit is covered through the tool, and only mark-to-market adjustments are settled to your account at expiration of the swap when the final financial settlement is made. Rather than the brokerage fee and uncertain interest expenses affiliated with a futures position, the cost of the swap is covered by a one-time fee (which is deducted from the swap fixed price). In this example, suppose the fee is 7 cents per bushel, so the net fixed swap price is \$4.93 per bushel after deducting from the current \$5.00 market price.
- As with futures, you are not tied to a particular physical delivery market.
- You still have basis risk equivalent to the basis on a similar futures hedge since the swap inherits the standardized characteristics of the underlying futures contract.

Hedging outcomes

Suppose the following November, you harvest a good crop (256,000 bushels), as your yield (160 bushels per acre) was 4 bushels higher than your APH yield. However, as you feared, the CME December futures price has dropped to \$4.00 per bushel in the midst of an excellent crop nationwide and a large crop coming out of South America and the Ukraine. Depending upon which hedging strategy you initially chose, the outcomes would be as follows:

The futures looklike swap provides the convenience of no margin deposits / calls (as with the forward contract) with the flexibility of delivering your physical crop to the market outlet of your choice (as with the futures contract). The net price of the no margin convenience is essentially \$0.055 (\$0.07 swap service fee minus \$0.015 brokerage fee for futures hedge) per bushel relative to the futures hedge.

FORWARD

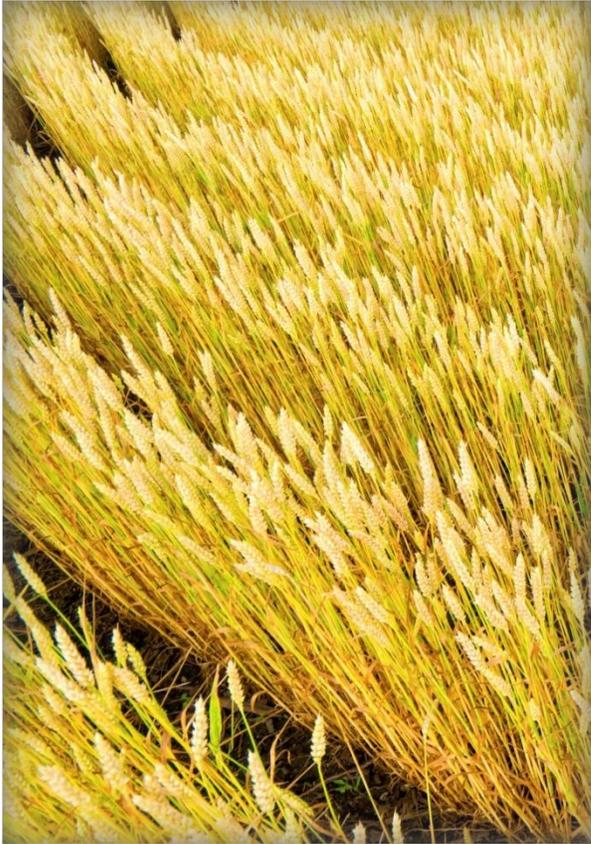
- You deliver 200,000 bushels of harvested corn to the local elevator and receive payment equal to the originally agreed fixed price of \$4.25 per bushel.
- You can either sell the remaining 56,000 bushels on the current spot market or put into storage in hopes of receiving a higher price that more than compensates for the additional costs of storage. As the crop has technically become what is known as old crop, you could also store and then hedge it using either the futures (could use any of the remaining delivery months within the current marketing year) or a futures looklike swap. The difference between the deferred month futures price and the current Chicago futures contract price represents the amount that the marketplace is offering you to store your crop and deliver in the deferred month.
- After shopping around, you find a local ethanol plant offering a very favorable basis of 30 cents under the December futures, or \$3.70 per bushel (\$4.00 futures - \$0.30 basis) for spot delivery. You decide to deliver the remaining corn to the ethanol plant.
- You calculate your total revenue received and net price for your crop as follows:
 - i. Forward contract: 200,000 bushels x \$4.25 / bu = \$850,000
 - ii. Ethanol plant spot sale: 56,000 bushels x \$3.70 / bu = \$207,200
 - iii. Total (i + ii) = \$850,000 + \$207,200 = \$1,057,200
 - iv. Price per bushel (iii / 256,000) = \$4.13 per bushel (rounded to the nearest cent)

FUTURES

- You can deliver all or any portion of your harvested corn to the market outlet of your choice and decide to take the favorable basis offered by the local ethanol plant and deliver all 256,000 bushels for the spot price of \$3.70 per bushel.
- For the futures hedged portion (200,000 bushels), the favorable basis move (went from a forward bid of -\$0.75 at planting to the current -\$0.30 per bushel) results in a basis gain of \$0.45 above the forward contract price of \$4.25 for a net price of \$4.70 per bushel for the hedged grain (200,000 bushels). This basis gain will be reflected in the addition of the profits from the futures position to the revenue from the spot sale to the ethanol plant.
- You offset the 40 CME December corn futures contracts that you originally sold at \$5.00 per bushel by buying back the 40 contracts at the current December futures price of \$4.00. This results in a gross futures profit of \$1.00 per bushel. You had total interest costs equal to ½ cent per bushel due to the need for outside financing of the initial margin deposit, so accounting for the brokerage fee of \$0.01 per bushel results in a total cost of \$0.015 per bushel on the hedged corn. This reduces the effective net futures profit to \$0.985 per bushel. You receive this net credit to your brokerage account.
- You calculate your total revenue received and net price for your crop as follows:
 - i. Ethanol plant spot sale: 256,000 bushels x \$3.70 / bu = \$947,200
 - ii. Futures net profit: 200,000 bushels x \$0.985 / bu = \$197,000
 - iii. Total (i + ii) = \$947,200 + \$197,000 = \$1,144,200
 - iv. Price per bushel (iii / 256,000) = \$4.47 per bushel (rounded to the nearest cent)

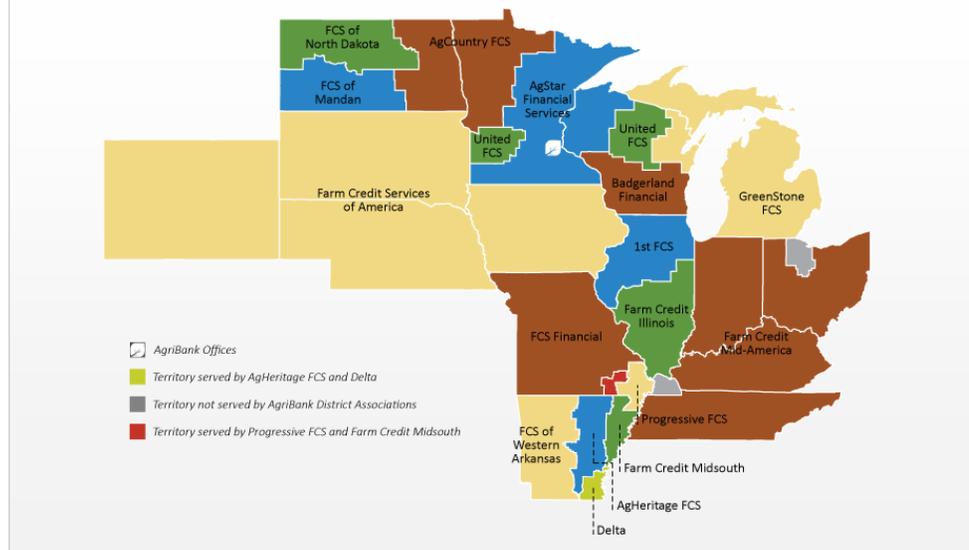
SWAP

- As with futures, you can choose the best market to deliver your harvested corn. You take the favorable basis bid offered by the local ethanol plant and deliver all 256,000 bushels at the \$3.70 spot price.
- On the swap, the accumulation of the daily exchange of cash flows (paying variable CME December corn futures price / receiving net fixed price of \$4.93 after deducting \$0.07 per bushel service fee) results in a net settlement mark-to-market profit of \$0.93 per bushel since you receive \$4.93 from the Swap Dealer and pay the current floating price of \$4.00 per bushel. As with futures, you offset the swap to get out of the position by placing an opposite position order to the one initially placed (for the 200,000 bushels). You owe no other interest or brokerage costs, since the service fee covered all daily mark-to-market adjustments without the need for you to post your own or borrowed funds to assure financial performance on the swap position.
- As with the futures hedge, you benefit from an improvement in the futures basis of \$0.45 per bushel before removal of the \$0.07 service fee for a net basis gain of \$0.38 per bushel.
- You calculate your total revenue received and net price for your crop as follows:
 - i. Ethanol plant spot sale: 256,000 bushels x \$3.70 / bu = \$947,200
 - ii. Swap net profit: 200,000 bushels x \$0.93 / bu = \$186,000
 - iii. Total (i and ii) = \$947,200 + \$186,000 = \$1,133,200
 - iv. Price per bushel (iii / 256,000) = \$4.43 per bushel (rounded to the nearest cent)



- **CALL OPTION.** Gives the buyer the right, but not the obligation, to buy futures at the strike price referenced
- **CAP.** A hedge placed by purchasing a call option at a strike price at or near the futures price level that the buyer wants to protect (designed to effectively offset all futures price risk above the chosen strike price)
- **EXPIRATION DATE.** The last date on which an option may be exercised and the point in time at which the terminal value of the option contract value is determined
- **EXERCISE.** The action taken by the buyer of an option if he wishes to assume the position in the underlying futures contract that is provided for in the contract terms of the option contract (put or call, strike price)
- **FLOOR.** A hedge placed by purchasing a put option at a strike price at or near the futures price the seller wants to protect (designed to effectively offset all futures price risk below the chosen strike price)
- **FUTURES PRICE.** The price of a futures contract determined by the collective bids and offers (double auction) of the buyers and sellers on the trading floor of a commodity exchange or through the exchange's electronic trading platform
- **HEDGE.** The buying or selling of financial derivative contracts as an offset to an unavoidable market risk that is part of a normal business activity such as crop production
- **MARGIN.** A bond posted by market participants to guarantee financial performance on an open futures (either bought or sold) or option (sellers only) contract. Note that buyers of options pay their maximum loss up front in the form of the premium; therefore, they do not have to post margin.
- **PREMIUM.** The price paid by the buyer to the seller of an option. In addition to the current market value of the option, must compensate the seller for the risks of insuring the buyer against unfavorable price moves. Ignoring brokerage fees, the premium represents the most that a buyer can lose and the most that the seller can gain on the option contract.
- **PUT OPTION.** An option that gives the buyer the right, but not the obligation, to sell futures at the strike price referenced
- **STRIKE PRICE.** Represents the futures price level at which the buyer of an option will receive the short futures contract (put) or long futures contract (call) position when they choose to exercise the option. The strike price is fixed in the option contract specifications and does not fluctuate with the underlying futures market price.
- **UNDERLYING FUTURES CONTRACT.** The specific futures contract (exchange, commodity, delivery month) that may be bought or sold via the exercise of an option

Associations in the AgriBank District



For more information

Many university extension programs have very good guides and programs on developing a strong marketing plan, including risk management. Following are several links to resources from the University of Minnesota Center for Farm Financial Management.

- Introduction to Risk Management guide: <http://agrisk.umn.edu/Library/Display.aspx?RecID=6639>
- National Ag Risk and Farm Management Library: <http://www.agrisk.umn.edu/>
- Winning the Game marketing workshops: <http://www.cffm.umn.edu/wtg/>

About AgriBank

AgriBank is one of the largest banks within the national Farm Credit System, with more than \$85 billion in total assets. Under the Farm Credit System's cooperative structure, AgriBank is owned by 17 affiliated Farm Credit Associations. The AgriBank District covers America's Midwest, a 15-state area from Wyoming to Ohio and Minnesota to Arkansas. More than half of the nation's cropland is located within the AgriBank District, providing the Bank and its Association owners with exceptional expertise in production agriculture. For more information, visit www.AgriBank.com.

Contacts

MEDIA INQUIRIES

Megan Fairchild Anderson

Senior Marketing and Communications Manager

Megan.FairchildAnderson@AgriBank.com
(651) 282-8635

OTHER INQUIRIES

John Share

Senior Writer

John.Share@AgriBank.com
(651) 282-8634

ADDRESS

AgriBank

30 E. 7th Street, Suite 1600
St. Paul, MN 55101