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White Paper

Re-Introduction of a Grain Sorghum Futures Contract by the CME Group

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Agricultural Commodity White Paper

Re-introduction of a Grain Sorghum Futures Contract by the CME Group

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Acknowledgements

Dedicated to the memory of Jerry J. Barre, 1946 – 2002, manager of Louis Dreyfus Commodities, Kansas City. I wish to acknowledge Jerry for his mentoring to myself and many young industry professionals throughout their professional journeys during his short 29 years of dedication to the commodities trade. Known as "Doctor Delivery", his instruction and tutelage provided a fundamental understanding of commodities markets and applied trading principles.

- *Dedication by Guy H. Allen.*

This document is also dedicated to Dr. Robert N. Wisner, an Iowa State University Emeritus Professor whose career at ISU covered 41 years (1966 – 2007). Wisner worked as a grain and biofuels economist for ISU Extension and was also a valued mentor to other applied grain and bioenergy economists. Wisner has been a leader in educational programming among university grain marketing economists across the United States.

- *Dedication by Daniel M. O'Brien.*

Executive Summary

This white paper considers whether the CME Group should reintroduce a physically deliverable Grain Sorghum Futures contract.

The intent of this white paper was to provide a body of information to support informed consideration and discussion on the topic.

Background and Key Drivers

This paper was initiated with a concern that the current U.S. grain sorghum market, without an effective grain sorghum futures contract, is lacking effective price discovery, along with a forward pricing curve and appropriate price-risk management tools.

At present, grain sorghum is largely priced and cross-hedged against CME Corn futures. While corn futures have price transparency and deep liquidity, and are familiar to the grain sorghum industry, and while grain sorghum is a substitutable input for feed and ethanol usage, corn market fundamentals differ sufficiently from grain sorghum that corn futures present challenges as a satisfactory cross-hedge. While corn futures may be used to offset broad coarse grains complex directional price moves and trends, corn does not adequately capture grain sorghum's unique and predominantly Western Corn Belt-focused set of crop production risks and rail-based delivery economics.

Grain sorghum production is concentrated in the Western Grain Belt of the United States, where regional crop moisture constraints, drought, and crop acreage competition can impact grain sorghum production, which are inconsistent with the broader central and eastern U.S. Corn Belt. Additionally, commercial movement of grain in the western corn belt is more dependent on rail transportation, as compared to barge transportation in the east, making western supply chains more disposed to shuttle capacity, car availability, and western rail export lanes, rather than on the Mississippi River System and Illinois Waterway Delivery System (IWDS) in the central and eastern corn belt. This is highlighted by the CME corn futures price being anchored in a delivery mechanism based on the IWDSA Illinois Waterway Delivery System in the eastern corn belt.

Additionally, export demand and trade in grain sorghum differs significantly from corn. Trade exposure for U.S. grain sorghum is frequently concentrated with Chinese imports, where U.S.-China trade and tariff policy, and geopolitical trade shifts, can significantly differentiate grain sorghum's market value. As a result, a significant portion of sorghum's market price risk remains outside of the corn-based cross-hedge.

The principal argument against the reintroduction of CME Sorghum futures is that any new contract could fall back into the same "liquidity trap" that undermined earlier sorghum futures contract introduction efforts. A contract can be economically justified and can still fail if it does not attract enough two-sided participation by the trade to provide reliable pricing, manageable bid-offer spreads, and confidence that commercial hedges can be entered into and exited from without undue cost.

The weakness of the current system of cross-hedging grain sorghum price risk in corn futures is therefore not that it lacks liquidity, as is now offered by corn futures. Rather, sorghum lacks a sufficient market "fit" with corn, resulting in unacceptable basis volatility – a result of the "sorghum – corn" spread.

Additionally, the present corn market does not provide the grain sorghum sector with adequate "price risk" management, along with a clearly defined forward price curve built on grain sorghum's own supply-demand fundamentals. Instead, it provides a corn market-based forward price curve with adjustments for sorghum market factors that are frequently unstable, locally variable, and influenced by sorghum-specific risks that are not directly represented in the broader U.S. corn futures market trade.

This present set of circumstances weakens price discovery and hedging performance for sorghum markets.

Proposed Solution and Contract Features

The reintroduced CME grain sorghum futures would provide the opportunity to improve the price discovery processes, hedging effectiveness, and basis clarity for physical cash grain sorghum markets.

An underlying Kansas-based delivery system in the Western Corn Belt is fundamental to the present proposal. By mirroring the revised CME Kansas Hard Red Winter Wheat delivery framework that is rooted in a Western Corn Belt rail-based grain transportation system, a reintroduced grain sorghum futures contract delivery system would more closely match the flow of U.S. grain sorghum to primary export markets at the Texas Gulf, Center Gulf, and Mexico, with the possibility of extending into the Pacific Northwest when economics justify this movement.

Current plans proposed by the CME Group for grain sorghum futures are to be based on U.S. No. 2 Grain Sorghum, use the standard 5,000-bushel contract size, contract months aligned with corn futures, and physical delivery through shipping certificates cleared via CME Clearing. The proposal is also cautious about the inclusion of No. 3 Grain Sorghum as deliverable. Note that final details are still pending final CME and regulatory approval.

To help address this concern, at least initially, the CME Sorghum futures contract would be quoted as a differential to corn, rather than solely as a flat-price grain sorghum futures instrument, with the aim to leverage the liquidity of the existing corn futures into grain sorghum futures without leaving sorghum subordinate to corn as a pricing proxy. Other approaches are also being considered by the CME to address the concern of contract liquidity.

Anticipated Impacts

With the successful reintroduction of a CME Grain Sorghum Futures Contract, grain sorghum producers and end users alike would have a more robust forward pricing mechanism and set of risk management tools. Country elevators and terminal merchandisers would have a more effective hedging mechanism that is better suited to managing the risks across the cash markets in which they currently operate. Exporters and importers of grain sorghum would benefit from improved supply chain planning, along with more effective means to manage risk tied to freight, destination values, and China-driven demand shocks. Lenders of trade finance would have a more reliable basis for valuing sorghum inventories and marketing positions.

Conclusion

A re-established CME Grain Sorghum Futures Contract, modeled on recent changes to Kansas HRW Wheat Futures, offers significant benefits to the sector.

A reestablished CME Grain Sorghum futures contract will succeed only if it provides the trade with a price determination mechanism that is commercially more effective than the present proxy cross-hedging system provided via corn futures. If successful, the grain trade would gain a grain sorghum market with increased price transparency, improved price discovery, an improved hedging mechanism with reduced basis volatility, and reduced market asymmetry.

Readers are encouraged to further review the comments in Section VII. Initial Conclusions, Findings, and Recommendations.

The intent of this white paper is to provide a body of information to support an informed discussion and consideration of the topic. Ongoing feedback from industry stakeholders is encouraged to continually refine the proposal and if adopted, to ensure its long-term viability.

I. Introduction

Initial Thoughts on a Proposed Sorghum Futures Contract

Initially, it is believed that there were several possible approaches to take to introduce new grain sorghum derivatives and futures markets, with two possible underlying delivery pricing methods to consider.

The underlying delivery component of a futures contract is integrally important to a new contract's success. It must provide a fair and functional mechanism for market participants to either "make" or "take" delivery as market conditions allow, leaving domestic and international sorghum market participants with the means to more effectively manage hedging their futures contract positions with reduced local cash basis risk.

Initial conversations between KSU IGP staff and the CME Group in February of 2025 indicated that they would consider the idea of reintroducing a CME Grain Sorghum Futures Contract. However, at this time, there are no undertakings or assurances given by the CME Group as to their final decision, but full and sufficient consideration of approval or not would be based on their commercial assessment of the situation.

A. Concept Narrative

It is proposed that now is an opportune time for a Grain Sorghum Futures Contract to be reintroduced by the Chicago Mercantile Exchange (CME Group).

This opportunity follows from recent constructive operational changes made by the CME to the Kansas HRW Wheat delivery process, which could be directly applicable to a reintroduced Grain Sorghum Futures contract.

It is suggested that creating a Grain Sorghum Futures Contract that "mirrors" the revised Kansas HRW Wheat Futures Contract would establish a functionally viable derivatives market for grain sorghum.

In an effort to create understanding and support for this effort, KSU is drafting a white paper: "**Re-introduction of a Grain Sorghum Futures Contract by the CME Group".** This White Paper will be a persuasive, in-depth report presenting the critical need for more effective price discovery and transparency for grain sorghum in both cash and futures markets, analyzing how the development of a well-designed CME Grain Sorghum Futures Contract can address this need.

Furthermore, the white paper will argue for the agricultural commodities derivative and futures industry to re-establish an updated version of the Grain Sorghum Futures Contract that avoids the structural problems that undermined the effectiveness of previous versions of the contract.

During this effort, KSU project leaders Guy H. Allen and Daniel O'Brien will work closely with both the grain industry contacts and the CME to draft a White Paper addressing relevant issues associated with the "Reintroduction of a Grain Sorghum Futures Contract by the CME Group".

The target audience for this White Paper spans the scope of the sorghum industry, including:

- Farm Gate / Grower
- Country / Terminal Elevators
- Domestic End User
- Large Commercial Trade
- Exporter / Importer
- Proprietary Trade
- Speculator
- Banking and Finance
- Consideration for Natural Resources

Early in this effort, it was noted that the wide range in the depth of understanding of both physical cash markets, as well as derivatives and futures, varied greatly among various industry participants and sectors. As such, the content and information presented in this White Paper is extensive, ranging from very basic to a more in-depth technical discussion of a topic. This resulted in more voluminous writing than originally envisioned, but necessary to achieve an appropriate understanding. Additionally, in an effort to provide sufficient underlying information, a rather large section of supporting Supplemental Information (38 pages) has also been included.

B. What is a White Paper…?

A white paper is an authoritative, in-depth report or guide that informs readers about a complex issue, proposing a specific solution, product, or methodology to address it. Used in business and government, these documents blend technical expertise with persuasive, evidence-based arguments, acting as marketing tools to educate stakeholders and support decision-making.[i] This effort is presented in a manner to help readers understand an issue, solve a problem, and develop an informed conclusion.

The term originated in the 1920s to mean a type of position paper or industry report published by a department of the UK government. Since the 1990s, this type of document has proliferated in presenting current issues to business.

In other words, a white paper is a persuasive, in-depth report or guide, typically used in business and politics, to educate readers and help them make decisions. It's a marketing tool that presents a problem and proposes a solution, often involving the company's product or service. White papers are known for being data-driven, research-backed, and informative, aiming to establish the issuing company as an expert in the field.

A typical white paper outline follows a problem-solution format, often including sections like an executive summary, introduction, background, problem statement, proposed solution, conclusion, and references. The specific structure can vary depending on the topic and purpose of the paper.

1. Academic White Papers

The most prolific publishers of white papers are corporate and academic organizations. Organizations produce these documents based on the outlines and data that an internal industry or academic experts develop and provide. White papers will often follow strict industry styles and formats with a central goal of persuading target readers, within a profession, to agree with their conclusions.

Academic authors of white papers intend to consult with industry to deliver a more balanced research-based perspective on the issue. In addition, one of the objectives of this paper is to encourage comments and feedback from both academia and industry, as they may accept or reject this White Paper's conclusion. The findings of both academia and industry sources will be considered and relied upon to provide the necessary "check-and-balance" for this White Paper's reliability.

As a result of this discussion, and with the support of the evidence presented, the CME Group will be asked by the authors of this paper to consider the reintroduction of the Grain Sorghum Futures Contract and related Options.

2. White Paper's Statement of the Aim and Objectives

The specific aims and objectives of this effort would be to provide relevant information and thoughts that encourage informed discussion and public consideration of establishing a viable futures and options market for grain sorghum to improve the price discovery and the price risk management processes associated with agricultural producers, end users, and commercial trade.

This effort would have the potential impact on both domestic (particularly in the Western Corn Belt) as well as international markets where U.S. grain sorghum is a competitive food and feed grain source.

In addition, it is envisioned that an efficient and effectively functioning CME Grain Sorghum Futures Contract would also provide improved forward price discovery in the marketplace, providing improved pricing signals and hedging opportunities for producers, country elevators, processors, exporters, importers, and consumers alike.

A new CME Grain Sorghum futures contract would also present opportunities for a credible volume of cross-futures spread trading with both CME Corn and Kansas HRW Wheat futures, as well as grains on other international grain futures trading exchanges.

Upon completion, this White Paper will be released to the grain industry and the trade participants for broader consideration and comment. From this process of discussion and evaluation, the CME Group would then be in a better position to make an informed decision on whether to list a redesigned Sorghum Futures Contract.

II. Problem Statement

A. Problem Statement

The lack of a dedicated sorghum futures or derivative contract creates several grain market-related problems, primarily centered on increased price risk management challenges and the necessary use of the corn futures contract as a less effective substitute. It also results in several problems for farmers, end users, and the market, primarily centered on increased price risk and reduced risk management efficiency.

Key Potential Impacts and Concerns Include:

Each of the following topics of concern is discussed in more detail in Section V.

Pricing Functions

A. Price Risk: Without a futures market for sorghum, producers and end users alike, as well as market participants across the supply chain, are more exposed to market price risks and volatility. The introduction of a well-constructed and designed derivative and futures market for grain sorghum can better allow participants to hedge, or lock in a price for grain sorghum at a future date, thereby better managing the risk of prices moving up or down before a physical transaction occurs.

B. Efficient Price Discovery and Transparency: A primary trait of a well-organized and regulated derivative and futures market it that the public prices for a commodity reflect the collective expectations of all market players, integrating information on supply, demand, input costs, and alternative uses. Without this transparent and public price discovery mechanism, it is more problematic for the market to determine grain sorghum's true market value, particularly when attempting to determine a forward grain price.

Ultimately, the lack of a dedicated futures contract leaves sorghum producers and the wider supply chain with fewer formal tools to manage risk, relying instead on less efficient methods such as cross-hedging with corn futures, forward contracts with buyers that are also based on corn futures, or crop insurance.

Market Functionality

C. Access to Information and Market Asymmetry: Market Asymmetry refers to situations where there is an imbalance in information, **market power**, or price transmission between participants, resulting in inefficient, non-linear market behaviors.

Market Asymmetry will frequently manifest itself as a divergence from theoretical, perfect market models where all traders have identical information and where prices move symmetrically up or down. Timely market information is of fundamental importance, allowing market participants to make informed, rational decisions that ideally lead to a more efficient allocation of resources.

In the context of market information and **market power**, the current grain sorghum market is asymmetrical in its timely availability of market information and pricing of physical cash

commodity. The current concern is whether the introduction of a grain sorghum derivative and futures contract will add to, or reduce, the asymmetry in the market.

D. Potential Market Liquidity and Activity: The primary reason for the failure or absence of a futures market is insufficient liquidity and trading volume, which means the market struggles to attract a sufficient volume of competitive market participants to function effectively.

The uncertainty surrounding future prices and the high degree of basis risk left to the physical cash trade make both producers and elevators more hesitant to engage in forward contracting.

A well-constructed and designed derivative and futures market for grain sorghum can provide increased market liquidity, allowing for a greater ability to easily buy or sell grain sorghum and to better manage risks, without significantly impacting the price.

E. Potential Impact on Market Volatility: Market volatility refers to the speed and magnitude of price changes for securities or market indices, representing the degree of risk and instability in the market. There is concern among some market participants that the introduction of a CME grain sorghum derivative and futures contract may increase price volatility.

Factors Impacting the Physical Supply Chain

F. Inefficient Hedging Mechanism (Increased Basis Risk): Without a direct sorghum futures contract, sorghum producers and buyers must "cross-hedge" using corn futures, which creates greater "basis risk" for grain sorghum (the difference between the local cash price and the futures price) than would exist if a direct sorghum contract were available.

A key question is: “Does the introduction of a CME grain sorghum derivative and futures contract provide a more efficient and effective mechanism for hedging the price risk for grain sorghum? “

G. Impact on Warehousing and Storage Rates: The introduction of a grain sorghum derivatives and futures contract is likely to have an impact on the returns to warehousing and storage. Will the situation improve the ability of the industry to capture these returns more efficiently in storage and warehousing? The possible impact may be observed in both the tariff storage rates as well as the commercial returns to storage achieved through merchandising strategies.

H. Challenges in Securing Financing: The inability to effectively hedge price risk can make it more difficult for producers and end users, as well as other holders of grain sorghum inventories to secure credit, as lenders may view the operation as a higher risk due to a more unpredictable valuation of these crop inventories.

Does the introduction of a CME grain sorghum derivative and futures contract provide an improved mechanism for hedging the price risk, and therefore improving financing arrangements for grain sorghum inventories and trade finance arrangements?

Other Impacts and Concerns

I. Potential Impact on USDA Farm Programs: The primary goal of farm programs is to provide a safety net, and the programs' reference prices are often established by the Farm Bill legislation.

The introduction of robust derivatives and futures contracts for grain sorghum could potentially impact USDA Farm Programs by enhancing price discovery and providing farmers

with improved risk management tools. This, in turn, has the potential to influence the parameters and payment triggers for programs like Agriculture Risk Coverage (ARC) and Price Loss Coverage (PLC).

However, direct impacts on the *structure* of the programs would likely be minimal without public policy and legislative changes. If this is deemed to be the case, the situation lies outside of the purview of the applied economic functions of a futures market, and this white paper, as the issue lies squarely in the political arena of public policy.

J. Consideration for Natural Resources – Land and Water Use:

The introduction of derivative and futures markets for grain sorghum has the potential to provide an added benefit for land use and conservation by creating financial incentives for sustainable practices, pricing environmental impacts (like carbon), managing climate-related risks for businesses, and funding conservation through mechanisms like carbon credits, which allow landowners to earn revenue for protecting or restoring ecosystems, shifting focus from purely extractive use to valuing natural services. The introduction of these instruments will further enable markets to adopt "nature-based solutions," attracting investment by making ecological benefits financially quantifiable and tradable, helping to fund long-term stewardship like reforestation and biodiversity protection that otherwise wouldn't be profitable.

K. Measuring Success of a Derivatives and Futures Market: Measuring the success of a newly listed agricultural futures or derivatives contract involves evaluating its ability to attract liquidity, serve as a hedging tool, and achieve high adoption rates within the physical commodity market. Key indicators would likely include Average Daily Traded Volume (ADTV), Open Interest (OP), and the Bid / Offer spread, along with the correlation of the relationship between the futures price and the underlying physical cash prices, i.e., its effectiveness as a hedging tool.

While the temptation is to make a comparison to CME Corn, a more appropriate comparison in terms of production vs average daily volume and open interest may actually be to CME Rice or Oats.

B. Underlying Fundamentals for Grain Sorghum are Sufficiently Different

Although corn and grain sorghum are both feed grains heavily utilized by the feed and ethanol sectors, there are several other underlying fundamentals that make grain sorghum notably different from corn.

In both the United States and international markets, grain sorghum is generally consumed as a feed grain, pricing itself into a particular feed ration based on its relative energy and protein content relative to corn. Similarly, in the U.S. domestic markets, grain sorghum will price itself into the ethanol grain base on its starch => ethanol yield and the value of its co-product yield. In both sectors, grain sorghum will price itself at a relative value to corn of roughly between an 85% to 95% discount to the values of corn.

Whole corn typically has a higher energy value, averaging 88% Total Digestible Nutrients (TDN), compared to unprocessed grain sorghum at roughly 70% TDN. While corn is more nutrient-dense and higher in starch, processed sorghum (rolled or ground) can reach 86% TDN, making it an efficient, cost-effective alternative for cattle feed. In addition, the protein in grain sorghum is significantly less digestible for some livestock (approx. 46%) compared to corn (73%), necessitating more intensive processing (like steam-flaking) to be an effective feed. [ii]

However, there are a number of additional unique features of grain sorghum that can result in a more volatile and greater pricing differential to corn.

1. Unique Set of Production and Biological Issues

Early sorghums were more drought-tolerant, dual-purpose varieties, planted for grazing, baled for feed, or the seed harvested as livestock feed. The Texas Agricultural Experiment Station Bulletin No. 13, published in 1890s, reported 23 varieties (i.e., cultivars) of sorghum available to Texas producers. This publication noted that farmers valued both the stalk and grain as feed stuffs. The need for more drought-tolerant crops in the arid plain states resulted in the majority of early plant improvement in grain sorghum being accomplished in Texas, Oklahoma, and Kansas. [iii]

Grain sorghum possesses extensive diversity in its phenotype and genotype, largely rooted in Northeast Africa, with over 45,000 accessions preserved globally. This diversity spans varying plant heights (2–20 ft), head shapes, and grain colors, enabling adaptation to arid climates. Genetic studies have identified significant diversity in grain traits (yield, test weight) and high-value nutritional components like flavonoids. These traits continue to influence the genetic improvements in grain sorghum.

Types of Sorghum Varieties

- **Grain Sorghum:** Short, combined-height plants with high yields.
- **Forage Sorghum:** Includes brown midrib (BMR) types with high biomass.
- **Sweet Sorghum:** Characterized by high sugar content in the stalks, divided into historical syrup and modern sugar types.

Early farmers in the more arid area of the U.S. plains of Kansas, Oklahoma, and Texas quickly realized the difficulty of producing corn for livestock feed, which required higher levels of rainfall and soil moisture. They turned to the more drought-tolerant grain sorghum.

Sorghum vs Milo

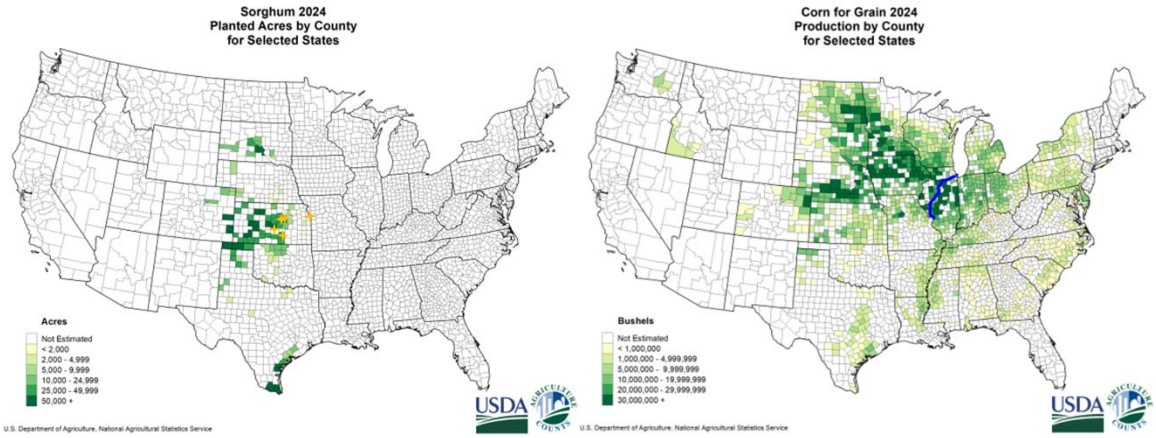
"Milo" is a common term in the United States for various types of grain sorghum (Sorghum bicolor) originally cultivated for livestock feed. The term possibly originates from Portuguese *"milho"*, from Latin milium, millet. [iv] It was most likely introduced as its cultivation expanded throughout the United States since the 1880s.

Milo is a specific type of grain sorghum, often used interchangeably in American agriculture. Grain sorghum (milo) is shorter (dwarf varieties) for easy harvesting, while other types, like forage sorghum, can grow 8-15 feet tall. Milo grain often appears in shades of red, bronze, white, and yellow. Milo is renowned for its ability to grow in hot, dry climates (e.g., Kansas, Texas, Oklahoma) with less water than corn.

Essentially, all milo is grain sorghum, but not all sorghum is milo.

Technically, the USDA FGIS standards define grain sorghum as *Sorghum bicolor (L.) Moench.* [v]

Production: The geography of U.S. grain sorghum production is primarily in the far western edges of the corn belt, where rainfall and available water will not support extensive corn production. Localized rainfall and production events will have a greater impact on grain sorghum production, as well as prices, than on the much broader geography underlying U.S. corn production.



When hedging grain sorghum hedged in corn, these unique production fundamentals are overwhelmed by the dynamics of corn across the whole of the corn belt, and most specifically, corn production fundamentals in the central corn belt immediately adjacent to the CME Illinois Waterway Delivery System (IWDS).

Biological Issues: Sorghum has a specific set of biological, production, and physical pest-related challenges that corn does not. These unique dissimilarities will influence the pricing of grain sorghum in a different way than corn through the growing season.

Seedling Vigor and Size: Sorghum seedlings are much smaller and weaker than corn seedlings, making them more vulnerable to soil crusting and deeper planting.[vi] Sorghum seed costs are significantly lower ($15/ac) compared to corn ($100/ac), offering a major advantage in low-rainfall or high-risk areas.[vii]

Weed Control Limits: Fewer herbicide options are available for in-season weed control in sorghum compared to corn, making robust pre-emergence herbicide application critical. [viii] Sorghum requires more precise scouting, especially during heading, to prevent head worms and grain-feeding bugs. [ix]

Sorghum continues developing in temperatures up to 100 °F, whereas corn development typically halts at 86 °F. [x] Water Requirements: While more drought-tolerant than corn, sorghum still requires consistent moisture during the first 30–40 days for optimal root establishment. [xi]

Harvest Moisture Management: Sorghum often requires desiccation (drying) to ensure even maturity and lower moisture levels, whereas corn tends to dry down more consistently. [xii]

2. Unique U.S. Domestic Trade Dynamics – Eastern vs Western Corn Belt

CME futures markets (i.e., CBOT Corn vs Kansas HRW) are driven by distinct geographical, logistics-based, and seasonal factors.

When hedging grain sorghum hedged in corn, these unique production fundamentals are overwhelmed by the dynamics of corn across the whole of the corn belt, and more specifically, corn production fundamentals in the central corn belt immediately adjacent to the CME Illinois Waterway Delivery System (IWDS). The Central/Eastern grain belt (Illinois) uses river barges, focusing on Gulf export demand and seasonal waterway navigation.

In contrast, the U.S. western grain belt (Kansas) relies on rail transportation to move grain to export and domestic markets, making basis sensitive to rail rates and supply chain congestion.

a. Central/Eastern Grain Belt Logistics and Transportation - Barge Driven

Across the Central and Eastern Grain Belt, transportation and logistics are primarily driven by barge transportation on **the** Mississippi River System, including the Illinois and Ohio Rivers, as it moves grain primarily to the Center Gulf for export.

Primary drivers of barge transportation include:

- export demand at Gulf export elevators,
- barge freight rates (which are a traded market),
- River water levels (low water = lower barge capacity, higher rates) or (high water/flooding = restricted barge movements from flooding).

Basis values and behavior are heavily influenced by the seasonal demand for barge freight, directly impacting the “inland waterway" price for grain.

While high export demand can strengthen inland waterway basis values and price, a “low water” event on the river during harvest, further restricting capacity, can severely weaken inland waterway basis values,

i. Illinois Waterway Delivery System (IWDS)

CME Corn futures are fundamentally tied to the Illinois River barge system, or the **Illinois Waterway Delivery System (IWDS),** which serves as the primary artery for moving grain from the heart of the Corn Belt to the Gulf, more specifically to the **CIF NOLA** barge market *(Delivered on barges “Costs, Insurance and Freight” - New Orleans, Louisiana LA)*.

The CME corn delivery mechanism, and its related delivery facilities, are strategically located in the IWDS, ranging from Chicago and along the Illinois River down to St. Louis.

Barge transport is the most economical way to move massive volumes to New Orleans for export, providing a significant economic advantage in the supply chain and transportation costs. In terms of fuel and operational efficiency, barges offer a massive advantage in ton-miles per gallon, which directly translates to lower base freight rates for corn in the Illinois River corridor compared to rail-dependent movement of grain from Kansas or the western grains belt.

In addition, barge transportation is readily available and priced via a long and well-established market, providing a transparent cost of transportation, and delivering a very efficient allocation of a limited resource to its highest and best use.

The CME River Delivery mechanism provides sufficient capacity that enables robust pricing to facilitate **“convergence”** of futures and the underlying physical cash price “basis” CIF NOLA.

To ensure a fair and balanced delivery process across the delivery zone, the CME Group applies an established set of fixed **Location Differentials** to facilities along the IWDS, such that downstream locations (closer to the NOLA US Gulf) have higher loading premiums than those nearer to Chicago.

As such, IWDS dynamics are significantly influenced by barge transportation costs and **river conditions** (i.e., high/low water levels).

- **Low Water**: Restricts barge drafts and tow sizes, forcing a shift to more expensive rail and widening the "Gulf spread" (local price vs. export price).

- **High Water**: Can halt navigation entirely, disrupting the delivery of Shipping Certificates.

b. Western Grain Belt Logistics and Transportation - Rail Driven

In contrast, the western grain belt transportation and logistics are primarily driven by the BNSF and Union Pacific railroad networks. Grain moves to Center and **Texas Gulf** ports, as well as directly to Center Gulf ports at New Orleans, and the **Pacific Northwest (PNW)** ports for Asia (via these two rail lines).

Rail freight rates (tariff + fuel surcharge), rail car availability (shuttle train capacity), and drought-related production volatility have a significant impact on the price of grain sorghum and other grains and oilseeds as inventories move to various markets. In addition, western rail logistics often face winter-time capacity constraints.

When transportation capacity becomes limited or railcar shortages occur, relevant basis values at destination markets will proportionately strengthen, while relevant basis values closer to origination points will weaken. This is typically observed when Pacific Northwest demand spikes relative to the Gulf due to increases in demand into China and far eastern Asia.

i. Western Grain Belt Rail Delivery System

In contrast to the IWDS and the Mississippi River System, the geographical dynamics of Kansas-based CME Futures (as currently demonstrated by **CME Kansas HRW Wheat Futures**) are defined as a rail-centric system for the U.S. western grains belt.

As the intent of the CME Group is to “mirror” the CME Kansas HRW Wheat Futures delivery process for a reintroduced grain sorghum futures contract, related delivery issues and concerns should be similar with minimal difference.

In contrast to CME Corn futures, which are fundamentally tied to the **IWDS,** the CME Kansas HRW Wheat derivatives and futures are tied to **“Class 1 Rail”**, BNSF and UP rail service, which is the primary artery for moving grain from the heart of the Western Wheat Corn Belt to export markets, more specifically to the **Texas Gulf** and directly to Mexico by rail. At times, price relationships may also facilitate deliveries to the **Pacific Northwest (PNW)** export markets on the West Coast.

The CME delivery mechanism and its related delivery facilities are strategically located on Class I Railroads across Kansas, providing sufficient capacity that enables robust pricing to facilitate **“convergence”** of futures and underlying physical cash prices.

In addition, rail transportation is available through direct relationships with servicing rail lines (BNSF and UP) as well as a well-established secondary rail freight market, providing a transparent cost of transportation.

To ensure a more balanced delivery process across the delivery zone, the CME Group applies an established set of fixed **Location Differentials** to facilities “regular” for delivery.

In contrast to IWDS dynamics, which are heavily influenced by river conditions, rail transportation has its own unique set of logistical concerns and impacts.

ii. Western Grain Belt: Rail Dominance

The underlying example of CME Hard Red Winter (HRW) wheat, which is primarily grown in the Central and Southern Plains (Kansas, Oklahoma, Texas), relies almost exclusively on rail

transportation for delivery and export, whether this be Texas Gulf or the Pacific Northwest (PNW) ports. HRW wheat production areas are often over 150 miles from navigable waterways, making barge transport impossible or cost prohibitive.

Similarly, grain sorghum is primarily grown even further west, in areas of even lower rainfall and more marginal production conditions. Grain sorghum production areas are often well over 200 miles from navigable waterways, making barge transport impossible, and relying even more heavily on rail transportation.

As such, Kansas-based futures pricing is highly sensitive to rail transportation costs, railcar availability, secondary rail freight bids, and railroad performance, with the BNSF and Union Pacific being the dominant rail transportation service providers.

As the intent of the CME Group is to "mirror" the CME Kansas HRW Wheat Futures delivery process for a reintroduced grain sorghum futures contract, related transportation and logistical issues and concerns should be similar with minimal difference.

Primary Rail Destinations:

- **Texas Gulf Ports**: Shipped via unit trains to export terminals.
  Center Gulf Ports: UP Rail houses will override to NOLA ports.
- **Pacific Northwest (PNW) Ports**: Shipped via unit trains to export terminals.
- **Interior Exports to Mexico**: Connected directly by rail, making it the top import market for HRW wheat.

c. Transportation and Logistics – Barge vs Rail

In terms of cost-per-bushel efficiency, barge transportation is the most economical mode for long-distance grain movement, often costing significantly less than rail when waterways are at optimal levels.

Cost Comparison (Per Ton-Mile) [xiii]

Under normal operating conditions, the cost structure reflects these efficiencies:

- **Barge**: Approximately **$0.97** per ton-mile.
- **Rail**: Approximately **$2.53** per ton-mile.
- **Truck**: Approximately **$5.35** per ton-mile.

The strategic threshold for barges typically becomes the most economical option for distances exceeding 1,341 miles.

Fuel and Operational Efficiency [xiv]

For movement of grain over long distances, barges offer significant advantages in "ton-miles per gallon", which directly translates to lower base freight rates for corn in the Illinois River corridor compared to rail-dependent Kansas wheat.

- **Barge**: Moves one ton of cargo approximately **514–647 miles** on one gallon of fuel.
- **Rail**: Moves one ton approximately **202–500 miles** per gallon.
- **Truck**: Lags far behind at roughly **59–145 miles** per gallon.

Dynamic Pricing and Secondary Markets

Both modes of transportation utilize secondary markets that can rally sharply during peak demand or logistical disruptions, and trade at discounts when seasonal demand wanes.

Barge Freight

The cost of barge freight is determined each business day based on the daily market value (bid/offer) for freight.

Rates are quoted as a percentage of a 1976 benchmark "tariff." This typically includes a “spot” rate for a barge that is immediately available for loading, along with freight available in forward periods (i.e., TW – This Week, NW – Next Week, and forward up to 12 months).

Barge Secondary Market: During the 2022 drought, St. Louis spot rates hit a record $105.85 per ton, momentarily erasing the barge's cost advantage over rail.

The lower "floor" for the cost of barge freight is based on operating costs versus the prevailing market value.

Rail Freight

By contrast, US Class 1 Railroads establish tariff freight rates primarily through **market-based pricing, along with** customized contracts. Marketing departments establish these set rates based on the commodity, demand, and competition (specifically with both barges, road trucks, and competing railroads). Railroads compare potential rates to estimated operational costs, including fuel, labor, equipment ownership (private vs. railroad-owned), and track maintenance.

Railroad Freight Rates are usually quoted on a per-car basis rather than by weight and are often determined as a single through-rate for interline shipments.

Rates are often negotiated as private, confidential contracts based on shipment frequency, volume, and equipment needs. Rates are largely tailored to individual customer needs via private, confidential contracts or publicly published tariffs for smaller, less frequent shipments. Railroads also use "differential pricing," charging higher rates on cargo that can bear them (and have fewer alternatives) while providing competitive rates for cargo that is highly competitive, ultimately aiming to maximize overall profit.

Shuttle Train Discounts: Large elevators loading 100+ cars (unit trains) can receive discounts of $8 to $10 per ton, narrowing the gap with barge efficiency for high-volume western wheat shippers.

Rail Secondary Market: For the BNSF shuttle (common for HRW wheat), secondary car values can swing wildly; for instance, October 2024 saw averages of $1,400 per car, while July 2025 dropped to $763 per car.

While secondary markets for barge freight are generally more well-defined, with transportation usually available in the nearby “spot” period, secondary rail freight markets are usually less well-defined, with more challenges in securing “spot” freight. This makes arbitraging the misalignment of price relations in related rail markets for rail shipments more difficult.

Regulatory Oversight: The Surface Transportation Board (STB) monitors rail rates to ensure they are reasonable, particularly when a shipper is "captive" (served by only one railroad).

Historical Note: The **Staggers Act** transformed the **"Storage-In-Transit" (SIT)** billing system, which had historically made Kansas City a natural warehouse for grain delivery. By the time the KCBT launched its revised grain sorghum contract in 1989, the railroads' shift to “shuttle trains” had already begun rerouting the physical trade, leaving the contract "stranded" at a terminal market that was no longer a primary stop for the commodity. This ultimately led to the delisting of the contract in 1999.

[Ref: Section III. Background B. Changing Kansas City Rail Transportation Business Model – page 32]

d. Drying, Storage, Warehousing Space Dynamics

Drying: Sorghum kernels are smaller and pack more tightly than corn. This makes it harder to dry and easier to "overburden" artificial driers, requiring more intensive management to prevent spoilage.

Storage and Warehousing: In addition, the dynamics of competition for storage space in the areas of sorghum production are more influenced by HRW Wheat production.

In the physical cash corn market, forward “calendar” spreads (carries) are driven by the relationship between local supply, storage availability, and the "pull" of usage.

While cash markets in both regions of the **Eastern Corn Belt (ECB)** and the **Western Corn Belt (WCB)** use “carries” to incentivize storage, the primary drivers of these intra-commodity “calendar” spreads differ. The ECB is typically driven by intense processing demand, whereas the WCB is driven by larger storage capacity and logistics to export markets and port terminals.

These intra-commodity “calendar” spreads would be more accurately reflected in a new Kansas-based gain sorghum futures contract than what they currently are in CME corn.

[Ref: Section V Potential Impacts and Concerns, F. Likely Impact on Warehousing and Storage Rates – on page 96]

e. Key Differences in Fundamental Drivers

Grain prices across the **Central/Eastern grain belt** are highly sensitive to the Mississippi River System logistical efficiency and global demand at NOLA and the Center Gulf.

More specifically, **CBOT Corn derivatives and futures** are priced off of the Illinois Waterway Delivery System (IWDS) and CIF NOLA Corn Barge market.

CME Kansas Wheat (and implied for CME Kansas Grain Sorghum) is heavily influenced by regional weather and crop conditions (i.e., drought), along with western logistics and rail transportation costs to Texas Gulf and PNW export terminals.

Differences in logistical bottlenecks are highlighted by seasonal eastern barge transport issues and summer/fall water-level issues (low water), while western rail often faces seasonal winter-time capacity constraints.

The geographical dynamics of Kansas-based CME Futures (as currently demonstrated by CME Kansas HRW Wheat Future vs Corn Futures) are defined by two distinct “logistical systems": a rail-centric system for Western grains and a barge-centric system for the Central/Eastern grain belt.

Key Market Dynamics During Low Water

1. **CIF NOLA Spikes**: to compensate for higher barge freight costs, while interior corn prices drop. The price of corn delivered to the Gulf (CIF NOLA) surges as it becomes so expensive.
2. **Export Shift**: Exporters may shift export shipments from NOLA Center Gulf to Texas Gulf or the Pacific Northwest (PNW).
3. **Divergent Basis**: Corn prices in the Central/Eastern grain belt weaken, while values in the Western belt remain relatively stable.

Rail vs River Logistics Comparison – Recent Case in Point: (Low Water on the Lower Mississippi)

Because corn relies heavily on the Mississippi/Illinois river system, low water levels create an immediate economic "bottleneck" that does not directly affect Kansas HRW wheat execution, as well as other grains, in the same way.

Low Mississippi water levels act as a powerful driver in barge transportation costs that will increase the "locational" price spread between barge loading locations along the whole of the navigable Mississippi River system, significantly impacting the interior price of grain across the barge-dependent Central/Eastern grain belt.

When river levels drop, impacting barge drafts and barge tow size restrictions, barges must carry lighter (smaller) loads (e.g., 15% +/- less) and move in smaller barge tows, which drastically increases the per bushel cost of transportation to the NOLA Gulf. Low water has been seen to cause barge rates to spike from lows of by 300% of tariff to as much as 2,000% of tariff.

These increased costs are passed back from the NOLA Gulf export markets to the interior grain belt through higher transportation and supply chain costs, causing a lower cash price in Illinois or Iowa to drop by $0.30 to $0.60 per bushel as elevators lower bids to offset the higher cost of freight.

N.B., CME Corn is priced off an interior value of grain delivered to the IWSD against the CIF NOLA Barge Corn.

Summary Table: Logistical Comparison

Feature	KC HRW Wheat (Western)	CME Corn (Central/Eastern)
Primary Mode	**Rail**	**Barge**
Delivery Zones	Kansas City, Salina, Wichita, etc.	Chicago, Northern Illinois River
Key Variable	Railcar Freight Secondary Markets	Barge Freight Secondary Markets and river conditions and water levels

Major Export Path	Rail to Texas Gulf, PNW, and Mexico	Barges down the Mississippi to NOLA

Relative Immunity of Kansas HRW Wheat and Corn

In contrast, Kansas Hard Red Winter wheat is largely insulated from Mississippi River volatility due to its western rail-centric logistics. This also would apply to western corn, HRW wheat, and grain sorghum cash markets.

A divergence in cash corn prices can be observed as corn prices "at the river" are declining due to high barge freight costs, Kansas grain prices remain more firmly anchored to rail freight costs and availability. This can lead to a scenario where Kansas gains in value relative to the river simply because its transportation corridor is still fully functional.

In addition, direct export rail movements to Mexico and the Texas Gulf, which move primarily via shuttle trains, are contractually steadier and do not fluctuate as much based on river conditions.

(However, it is important to note here that indirectly, higher transportation costs in barge freight do encourage more rail movements, increasing demand for rail movements and supporting higher rail car costs.)

3. Differing Global Trade Dynamics

International trade dynamics for grain sorghum are quite different than those observed in corn.

Grain sorghum imports are with China, Mexico, the European Union, and Japan taking well over 90% of the imports annually. China will often dominate global imports, taking over three-quarters of annual trade in some marketing years.

[Ref: Section Supplemental Information A. Fundamental Supply & Demand of Grain Sorghum 1. International Fundamentals – page 143]

Chinese Import Demand

Unlike corn, which has a broad global and domestic demand base, the U.S. sorghum market is uniquely tied to China.

However, it is important to note here that grain sorghum is not the only commodity that relies heavily on China. Similar dynamics can be seen in cotton, barley, soybeans, and other commodities, where China may hold the position as the dominant global importer.

Chinese total domestic usage for grain sorghum has varied greatly over the past 10 years, between 3.6 mmts – 2018/19 to 14.3 mmts in 2021/22; with a mostly steady 2.1 mmts to 3.3 mmts in Food, Seed and Industrial (FSI) usage; with the balance being consumed as feed (as estimated by the USDA).

China's import demand has varied greatly over the past 10 years, between 0.7 mmts in 2018/19 to a record 11.0 mmts in 2021/22 (as estimated by the USDA).

While the FSI sector will pay a modest premium over the feed sector, there are other policy issues driving the premium for grain sorghum into China that are rarely acknowledged.

What drives this premium over corn for grain sorghum into China?

Since 2001, as part of its commitments upon joining the World Trade Organization (WTO), China has applied a 65% out-of-quota tariff on corn imports. This 65% rate acts as the "second tier" duty for any imports exceeding the established Tariff Rate Quota (TRQ) of 7.2 mmts, which carries a lower 1% normal duty.

Since 2001, China's tariff on grain sorghum imports has generally been significantly lower than that of corn, often being only a 2% normal duty.

It is this differential in China's import duty of corn vs. grain sorghum that drives the price they are willing to pay for grain sorghum in world markets.

While consumption economics do not vary much between local consumers, showing grain sorghum typically sells at a discount to corn of roughly 85% to 95% of corn's value, China's application of import tariffs can significantly impact the relative value in global markets, causing sorghum to trade up to a 35% premium over corn. This will temporarily price sorghum out of the domestic and international feed and ethanol sectors.

For Example: If the price of Corn C&F China is $5.25/bu (US$206.63/mt), add on the 66% Chinese Import Tariff, the landed price in China is $8.71½/bu (US$343.00/mt).

If we assume an 85% value of grain sorghum relative to corn at $8.71½/bu, the grain sorghum equivalent value equals $7.40¾/bu. If I adjust this back for the 2% Chinese Import Tariff, grain sorghum has a corn equivalent value of $7.26¼/bu; or a $2.01¼ premium to corn.

Thus, we can clearly see how China's differentials in import tariffs can significantly impact the relative value of grain sorghum vs. corn in global trade.

It is also very important to note here that COFCO Group (China National Cereals, Oils and Foodstuffs Corporation) is a massive "State-Owned Enterprise" (SOE), directly administered by the central government of China. As China's largest food processor, manufacturer, and trader, it is a key state-backed entity focused on national food security, controlling trade, and operating globally across agriculture, food, finance, and real estate.

Add into this equation the recent volatility in geo-political trade policy and China's desire to exert political pressure through selective trade, and we have the recipe for significant volatility in grain sorghum that we do not see in corn.

Price Premia vs. Discounts: The above example simply explains one of the greatest dichotomies between the fundamentals of grain sorghum vs. corn.

- ***When grain sorghum is traded as a basis relative to CME Corn, the "grain sorghum vs. corn" spread is included as a component of the basis.***
- ***If grain sorghum were to be traded as a basis relative to CME Grain Sorghum, the "grain sorghum vs. corn" spread is not included in the basis but would be expressed in the difference between the grain sorghum futures price vs. corn futures price.***

Export Volatility: Historically, China will often purchase a vast majority of its grain sorghum imports from the U.S. Other seasonal supplies can come from Argentina and Australia. When trade relations are strained, sorghum exports can drop significantly, leading to a price drop that will encourage usage back into the U.S. domestic feed and ethanol markets.

Another major importer of grain sorghum can be Mexico. However, Mexico will have the same consumption economics as the U.S. as it prices itself primarily into its poultry rations.

[Ref: Section Supplemental Information A. Fundamental Supply & Demand of Grain Sorghum 1. International Fundamentals – page 143]

C. Why address this issue now and what has changed…?

Recent adjustments to CME Kansas HRW Wheat Futures involve operational rule changes for "shuttle" train loading/delivery, which becomes effective in September 2026 and beyond, reflecting a focus on quality, logistical efficiency, and global linkages, with overall long-term market trends showing potential for tighter world wheat supplies.

- **Market Structure**: The current price spread between SRW and HRW Wheat highlights the significant impact of quality specifications (i.e., protein content) on futures pricing, even overriding general supply/demand factors.
- **New Spread Futures (Launched October 2024)**: CME introduced Euronext Milling Wheat spread futures, linking KC HRW and Chicago Wheat prices directly to Euronext, allowing for more efficient global price exposure management.
- **Operational Rule Changes (Effective September 2026)**: New rules for "shuttle train" loading/unloading of HRW wheat (Rule 703) introduce premiums for faster loading and clearer processes for 110-car trains, aiming to provide incentives to improve logistics and convergence with physical markets. Restated, these changes aim to enhance the efficiency of the delivery process by incorporating modern logistics, specifically for unit trains.

Ref: For a detailed review of the amendments, participants can refer to the official CME Group Special Executive Report (SER-9483) and the updated Chapter 14H KC HRW Wheat Futures rulebook.

Corresponding Changes to CME Kansas HRW Wheat Futures

Changes to CME Kansas HRW Wheat Futures aim to enhance the efficiency of the delivery process by incorporating modern logistics, specifically unit trains. Proposed CME Grain Sorghum Futures are designed to follow the pattern established in updated CME Kansas HRW Wheat Futures. The primary changes for the contracts that become effective for the September 2026 expiry and beyond include:

Load-Out Procedure Changes (Unit Trains)

- **Shuttle Load Outs**: Specific rules for placing 110-car unit trains have been included in the regulations for regular warehouses and shipping stations.
- **Premium**: A new premium of **14 cents per bushel** will apply to all shuttle loadouts.
- **Load-Out Rate**: The new rules set a specific loading rate of **one shuttle per 24-hour period**.
- **Pre-Advice Window**: A pre-advice window of 5 to 10 days is now required for scheduling shuttle loading.
- **Obligation Limit**: The obligation to load shuttles is limited to once (one time) per week.
- **Assignment of Responsibilities**:
    - Demurrage responsibility is assigned to the "stopper" (the buyer who stops the shipping certificate for load out).

- Railroad loading incentives are the responsibility of the "issuer" (the warehouse or facility).

Storage Charge Adjustments

- **Increased Storage Rate Premium**: A premium of **10/100ths of one cent per bushel** over the prevailing storage rate will be paid by the stopper to the issuer for each day of loading saved due to the increased cadence of unit train loading.
- **Base Storage Rates Harmonized**: The Exchange will also harmonize the base storage rates of the wheat contracts to approximately **8 cents per bushel per month**. This specific change is effective after December 2026 expiry (17th December 2026).

D. Statement of potential impact, and commercial viability with U.S. Sorghum Markets

1. Current Hedging of Grain Sorghum

Since historically a viable Grains Sorghum Futures contract has not always been available, CME Corn Futures has been widely used by elevators, feedlots, and farmers to hedge grain sorghum price risk. This practice easily aligned with the generally accepted practice of utilizing CME Corn Futures to hedge corn price risk, and that grain sorghum was easily substituted for corn as a cross-hedge for many of its uses.

However, basis risk when cross-hedging in corn or other commodity futures is greater than when directly hedging in grain sorghum futures. Distance to the nearest CME corn delivery location (i.e., St. Louis, Mississippi River location) in a primarily corn but limited grain sorghum production area may also hinder the effectiveness of using corn futures as a cross-hedge opportunity for sorghum.

Since, by definition and design, a commodity cross-hedged in another commodity is not deliverable, the price of the underlying commodity being cross-hedged in, and the alternative commodity may not converge with the hedging instrument.

Price convergence does not occur when cross-hedging (spreading) futures contracts for two different commodities. This is because, unlike intracommunity “calendar” spreads within a single commodity, the two different commodities are driven by two unique sets of market fundamentals, logistical constraints, and market-specific structures that prevent their prices from aligning even at expiration.

As such, the situation can arise where there may not necessarily be a high degree of expected correlation between the prices of the two different commodities.

Key reasons for non-convergence in inter-commodity spreads include:

- **Unique Market Structure & Liquidity**: As can be seen in corn vs. grain sorghum, disparities in market liquidity or trading volume between the two commodities can cause one to exhibit significant volatility while the other remains stable, preventing a smooth cross-market price alignment.
- **Divergence in Fundamental Drivers**: Different commodities (e.g., corn vs. grain sorghum) have independent supply & demand fundamentals, weather, and geopolitical

drivers. A drought affecting one region may not impact the other, or demand may arise in non-substitutable sectors (i.e., usage in China **baijiu**), causing their prices to diverge further rather than converge.

- **Different Quality/Specifications**: Even if related, two commodities may have distinct USDA grades, quality specifications, or transportation requirements, meaning they are not perfectly substitutable.
- **Transportation & Logistics Bottlenecks**: Localized disruptions in supply chains (e.g., pipeline issues for energy, lack of rail cars for grain) can cause the spot price of one commodity to spike, while the other remains unaffected, preventing convergence as originally anticipated for the cross-hedge.
- **Storage Fee Discrepancies**: In agricultural markets, non-convergence often arises because the storage cost for the physical commodity in the cash market exceeds the storage fee for the delivery instrument, which is set by the exchange. This encourages holding delivery instruments rather than taking physical delivery, creating a persistent market wedge between cash and futures prices.
- **Lack of Direct Arbitrage Link**: Inter-commodity spreads rely on the assumption that a ratio (e.g., soybean-to-corn price ratio) will revert to a historical mean. However, if market fundamentals change (e.g., new U.S. biofuel industry and/or market policy), the structural relationship may change permanently, making price convergence an inappropriate assumption.

Using Corn Futures and Basis Risks

Many sorghum producers, cash merchants, and traders use corn futures to cross-hedge grain sorghum instead of a dedicated sorghum contract. This practice would suggest the residual basis risk between corn futures and cash sorghum was manageable.

In this approach, a basis value for grain sorghum is priced off an underlying corn futures contract. Elevators and other grain buyers will use the corn contract to hedge their inventory if they are holding sorghum. So, it is the difference between the cash price at that location versus the CME board futures price.

Using Wheat Futures

In some regions and locations, cash merchants may also use wheat futures to cross-hedge price risk on grain sorghum. This was frequently the case in Australia, where the absence of sufficient quantities of locally produced corn, and where wheat is the basis of the domestic feed complex, wheat futures may be frequently utilized as an effective hedge.

While at times hedging grain sorghum in a related wheat futures contract may historically demonstrate a better degree of correlation, it still faces the same problematic issues as does cross-hedging in corn futures.

2. Potential Impact on U.S. Domestic Grain Sorghum Markets

The re-established CME Grain Sorghum Futures Contract would impact U.S. domestic grain markets by introducing an improved **price discovery** process for grain sorghum and increasing **price transparency** through access to the price determination process.

An effectively functioning CME Grain Sorghum Futures Contract would also create a direct pricing benchmark for sorghum and provide more information on price-influencing supply/demand dynamics and price relationships within the related feed grains complex, relative to the impact of corn market factors.

a. Enhanced Price Discovery and Transparency for Grain Sorghum Markets

Direct Price Discovery: The futures contract would provide a national and international price benchmark specifically for grain sorghum, reflecting its unique domestic and foreign supply and demand factors (e.g., specific export demand from China or use in both U.S. livestock feed and ethanol production). Currently, sorghum prices are often determined as a discount or premium to corn prices, which does not always accurately reflect sorghum-specific conditions.

Reduced Basis Risk: Participants (farmers, elevators, end users) are currently relegated to **"back-to-back trading"** of grain sorghum, or cross-hedging sorghum using corn or another commodity futures, which introduces "basis risk". This basis risk can be significantly greater than when a commodity is directly hedged in a futures contract of the same commodity, as the price movements between the two different commodities are, by definition, less correlated.

A dedicated sorghum futures contract would reduce this risk, as local cash prices would more reliably converge with the futures price at expiration, leading to more stable and predictable local pricing.

b. Impact on Other Domestic Grain Markets

With a more clearly defined forward price curve for both futures and related cash grain sorghum prices, the expected profitability of sorghum versus corn, soybeans, wheat, or other competitive crop commodities would become clearer to farm decision makers. In addition, a viable futures market would allow these forward price-driven production decisions to be hedged and locked in, increasing the confidence in profitable marketing outcomes for grain sorghum.

Substitution Effects on Demand

Grain sorghum is a close substitute for corn and other feed grains in livestock feed rations and ethanol production. The new futures contract would provide a more well defined and transparent forward pricing curve for end users. This increase in efficient pricing for grain sorghum will potentially lead to more rapid substitution between the two feed grains in feed formulations and ethanol plants based on real-time price comparisons.

Planting and Acreage Decisions

With a more transparent and manageable price signal, growers and producers are increasingly likely to adjust their annual grain sorghum production and planting decisions. In combination with increased certainty in pricing outcomes through improved price signals and hedging efficiency, the result will be a greater responsiveness to grain sorghum’s annual profitability.

With a more well defined forward price curve and transparency in a forward price for grain sorghum, this would likely lead to increased sorghum acreage and production in suitable regions, which would conversely impact the overall supply of competing grains.

Price Relationship and Arbitrage

With the establishment of a CME Grain Sorghum Futures Contract, the price relationship between corn and sorghum, as well as other grains, would become more accurate and efficient. Arbitrageurs would quickly capitalize on any mispricing between the two futures markets. A similar arbitrage opportunity would occur in the underlying physical grain markets, ensuring their prices stay aligned based on their relative feeding and other use values, and other market factors.

It is expected that a re-established CME Grain Sorghum Futures Contract will be comprised of a viable underlying delivery mechanism to ensure convergence of grain sorghum cash and futures price interrelationships at the time for futures contract delivery. Delivery of grain sorghum cash and futures prices will serve to attract domestic participation in the futures contract in the marketplace. This would include participation from domestic producers, country elevators, processors, exporters, importers, and consumers who would gain a more effective and efficient sorghum cash-futures price relationship over time.

Ref: Also see comments in Section – Supplemental B. Convergence and Delivery Execution 2. Convergence and Arbitrage Opportunities, on page 156.

3. Potential Impact on International Trade, and Other Considerations

It is expected that an effectively re-established CME Grain Sorghum Futures Contract, comprised of a viable underlying delivery mechanism ensuring convergence of sorghum cash and futures price interrelationships at delivery, will attract both domestic as well as international participation in the marketplace.

A well-functioning CME Grain Sorghum Futures Contract will improve price discovery and risk management capability in regard to grain sorghum markets, attracting market participation from domestic producers, country elevators, processors, exporters, importers, and consumers.

Regarding the U.S. position in the World Sorghum market that is likely to impact contract interest and volume, we note the following:

- The U.S. is the largest global producer of grain sorghum, making up 14% of world production. In addition, the U.S. is the largest exporter of grain sorghum, making up 57% of global trade, followed by Australia – #2 / 20%, then Argentina – #3 / 17%, with the three of these countries making up over 90% of world sorghum exports.
- The major importer of grain sorghum is currently **China**, making up over 85% of the world's imports, followed by **Japan**, Sudan, **Mexico**, and **South Africa**.
- The **Johannesburg Stock Exchange** currently lists a successful grain sorghum futures contract. This would offer cross-exchange spread trading opportunities between these two futures contracts.
- The **Australian ASX** delisted its grain sorghum futures contract in 2019.

Given the position of U.S. grain sorghum in global trade, a newly designed and effective CME Grain Sorghum Futures Contract would have direct relevance to international grain market participants in their sorghum pricing and risk management activities.

We at Kansas State University are under no delusion that the volume traded in a CME Grain Sorghum Futures Contract would reach the higher trade volume levels of corn, soybeans, or even the reduced volume Hard Red Winter Wheat futures contract. However, we feel it is likely that a grain sorghum futures contract will serve a much-needed price discovery and risk transfer

function and contract spread opportunity in the grain futures market and should reach sufficient volumes to be economically viable for the Chicago Mercantile Exchange.

Ref: Also see comments in Section – Supplemental A. Fundament Supply & Demand of Grain Sorghum 2. International Fundamentals of Grain Sorghum, on page 143.

N.B., For another comparison; CME continues to maintain a viable oats futures contract, with world oats production is approximately 22 – 24 mmts, with U.S. oats production is 0.9 – 1.0 mmts, while world grain sorghum production is approximately 57 – 63 mmts (2.5 times +/- oats), with U.S. grain sorghum production is 8 – 11 mmts (8 to 11 times +/- oats). [xv]

However, we do acknowledge here that this is underpinned by a robust import trade into the U.S. of oats produced in Canada.

E. How a derivatives or futures market might "help" or "hurt" a physical market?

1. How might grain sorghum derivatives or futures "help" physical cash markets?

Derivative markets and futures contracts support physical commodities markets primarily through **risk management (hedging)**, providing **price discovery**, and enhanced **market liquidity**.

Commodity futures and derivative markets support the underlying physical cash market by providing essential **risk management** (hedging) functions. Commodity futures markets allow producers/consumers to lock in forward prices, and facilitate more efficient **price discovery**, revealing market expectations and guiding resource allocation. Effectively functioning commodity futures provide **market liquidity** and enable market speculation, which in turn encourages financial capital flows into the sector, which enables markets to be more efficient and stable. They allow such activities as enabling farmers to sell wheat forward by helping to guarantee a future price through hedging activities, or an airline to buy oil futures, reducing input prices and associated financial uncertainty for businesses, which helps such businesses and the broader economy to function more efficiently.

a. Risk Management (Hedging)

Producers and consumers use futures and derivatives to manage and mitigate the risks associated with volatile commodity prices. This process, known as hedging, allows businesses to operate with less uncertainty over their future revenues and costs.

- **Producers (Sellers)**: A farmer can sell futures contracts for their crop (like wheat or corn) before harvest, effectively "locking in" a predetermined forward selling price subject to local basis risk. This protects them from potential losses if market prices decline.
- **Consumers / End-Users (Buyers)**: Companies that rely on procuring raw materials in their business activities, such as an airline needing jet fuel or a feed manufacturer needing corn, can buy futures contracts to secure a future purchase price. This protects them against sudden input price increases, helping to stabilize their operating margins and final product pricing.

b. Price Discovery

The futures market serves as a central, transparent platform where the collective expectations of numerous buyers and sellers regarding future supply and demand can be aggregated to help determine current market prices.

- **Information Aggregation**: Prices in the futures market constantly react to new information, such as weather forecasts, geopolitical events, and supply chain reports.
- **Spot Market Influence**: Futures trading reflects the collective expectations of thousands of participants about future supply and demand, creating a transparent, real-time price benchmark for the physical commodity (i.e., **"spot market"**).

  Changes in futures prices typically appear first in the derivatives market and then transmit to the "spot" or cash market (where commodities are traded for immediate delivery), helping to inform current decisions across the entire supply chain.
- **Forward Markets**: Prices in the forward curve of futures markets provide crucial information for long-term planning, investment, and resource allocation for businesses and governments.

c. Liquidity & Market Efficiency

The participation of various market players, including hedgers and speculators, is vital for broader market health and/or effective market function. As such, an organized futures exchange such as the CME Group has significant incentives to design a derivative or futures contract such that it will attract the widest possible participation throughout the industry.

- **Standardization and Regulation**: Commodity exchanges provide standardized contract terms and operate under regulatory oversight (like the CFTC in the U.S.), which enhances market transparency, reduces counterparty risk, and fosters a robust trading environment.

  Standardized contracts traded on exchanges attract many buyers and sellers, increasing liquidity. This allows for quick transactions and efficient price adjustments, reducing volatility in the physical market.
- **Speculator Role**: Speculators, who seek to profit from price movements by taking on risk, are essential for providing the necessary liquidity (i.e., an adequate number of traders needed to provide for ease of buying and selling) that hedgers require to transfer their risk efficiently. They ensure a consistent presence and quantity of buyers and sellers at any given time.

  Successful speculators help by buying during surpluses (storing/selling later) and selling during shortages (providing supply), balancing distribution. Essentially, speculators "bet" on subsequent price movements, adding capital investment and liquidity into the market sector.

Financial market derivatives such as futures and options provide a transparent, regulated mechanism for managing price risk, discovering true market value, and allocating commodities efficiently across time and geography, which strengthens the underlying physical market for goods like oil, grains, oilseeds, and metals. Market derivatives are defined as any financial instrument that derives or obtains its value from the price of another asset or financial instrument.

2. How might grain sorghum derivatives or futures “hurt” physical cash markets?

While the intent of reestablishing a grain sorghum derivative and futures market is to improve and stabilize grain sorghum markets, if not done appropriately, they can "hurt" physical cash markets through price distortion, increased financial strain on producers, and potential market destabilization.

The risk of trading futures and options can be substantial. Financial products and services such as agricultural commodity derivatives and futures are offered in accordance with the applicable laws within the jurisdictions in which they are provided and are subject to specific regulations, terms, conditions, and restrictions. Not all products and services are available in all countries. The products and services offered involve risk of loss and may not be suitable for all parties who may wish to participate, and reference should be made to appropriate regulatory disclosures.

With this said, grain sorghum market participants throughout the supply chain are resilient, being generally quite familiar with dealing across a range of risks as they trade in many types of physical cash and futures markets, across a range of commodities and products.

a. Price Distortion and Non-Convergence

- **Decoupled Pricing**: If futures and cash prices fail to converge at contract expiration (i.e., non-convergence), the futures market provides an inaccurate representation of the expected physical price.

  This is why it is imperative that particular attention must be given to the underlying contract “delivery” function when establishing a new futures contract that will facilitate “convergence” of cash and futures contracts at futures contract expiration.

- **Misleading Signals**: Non-convergence can send misleading "storage signals" (i.e., “calendar” spreads). This may result in an inefficient amount of grain being stored, which can either artificially depress or inflate local cash prices relative to otherwise efficient market conditions.

- **Basis Risk Vulnerability**: Even with a dedicated contract, hedgers remain vulnerable to basis risks. If the basis weakens significantly, the net price received/paid can fall well below expectations, creating a gap in market price protection even if the hedging position itself is successful.

This is why it is imperative to understand price relationships, along with a working understanding of the delivery process and “delivery value equivalents” (i.e., DVEs).

b. Potential Financial Strain

Exchange-traded derivatives and futures are leveraged financial instruments that significantly amplify risk exposure. In addition, they are often traded on borrowed capital. As such, they can cause significant financial strain if not used appropriately.

- **High Complexity and Cost**: Managing derivatives and futures requires specialized marketing knowledge and understanding. Managing them involves brokerage

commissions and interest on margin money, which may increase the overall cost of doing business.

However, if a physical grain sorghum position is currently being crossed-hedged in corn or another commodity, these associated risks and costs are already being assumed.

- **Cash Flow**: Trading derivatives and futures require close attention to maintaining and managing a margin account with the exchange. Sharp price moves can trigger significant "margin calls," requiring immediate cash infusions that can cause severe strain on cash flow requirements.

  Hedging costs (such as the need to post margin money as the account may fall below exchange-determined minimum requirements) can sometimes become prohibitive, potentially limiting their ability to manage risk effectively.

  However, if a physical grain sorghum position is currently being crossed-hedged in corn futures or another commodity, these associated risks and costs are already being assumed.

- **Opportunity Costs**: Because hedging "locks in" increased certainty for price expectation, the action does not allow a participant to benefit from a subsequent favorable change in underlying physical cash prices that rise after the hedge is placed.

- **Financial Safeguards & Clearing**: To manage “counterparty risk”, CME Clearing acts as a neutral counterparty to every trade, ensuring financial integrity even if a participant fails to meet their financial obligations relative to the trading account. It continuously monitors clearing member capital and risk-management policies to promote the overall resilience of the trading transaction.

c. Potential Market Destabilization

Currently, physical cash grain sorghum markets have very little surveillance or regulatory oversight when compared to other agricultural commodities with futures such as wheat, corn, soybeans, etc. The introduction of a grain sorghum derivative and futures contract would bring additional oversight by the CFTC and others to this market.

- **Speculative Volatility**: Speculative trading, while adding market liquidity, can also lead to amplified price swings as traders seek a level of market price equilibrium. This futures market volatility can sometimes destabilize the underlying spot cash market (e.g., some studies show increased volatility for certain commodities).

- **Algorithm-Driven Whiplash**: High-frequency trading algorithms can trigger dramatic, near-instantaneous selloffs in futures markets—often without a change in fundamental supply/demand—which can erode local cash bids overnight.

- **Liquidity Traps**: Historically, grain sorghum futures have struggled with low trading volume. A lack of liquidity makes it difficult to exit positions quickly, potentially leading to extreme price slippage and "trapping" participants in unfavorable trades.

CME Group prevents market manipulation and destabilization through a multi-layered oversight framework centered on real-time surveillance, strict position management, and aggressive risk-mitigation interventions. Strict limits on the number of contracts a single entity can hold to prevent anyone participant from cornering a market. Large trader reporting requirements ensure regulators have transparency into potential concentration risks.

CME Group’s Market Surveillance team monitors “large trader” positions and price relationships between futures and underlying physical markets 24 hours a day. This allows them to detect and prevent manipulation attempts, such as building excessively large positions to unfairly influence prices. Dedicated teams investigate disruptive trading practices like spoofing, wash trades, and illegal non-competitive trades. These investigations can lead to significant sanctions, settlements, or referrals to federal law enforcement.

In essence, futures markets provide powerful tools for managing price uncertainty, but their complexity and speculative elements can introduce new risks and dynamics, creating a balance between market stability and potential instability.

III. Background

A. Historical Context

Though there have been a number of past attempts to establish a grain sorghum futures contract, currently, there is not an actively traded grain sorghum futures contract in the U.S.

Historically, during the 1970's, grain sorghum futures traded at the Chicago Mercantile Exchange (CME) and the Kansas City Board of Trade (KCBT) for three years. There was very little trading interest among grain market participants in either contract at that time.

Then, in 1988, KCBT revised its grain sorghum futures contract and resubmitted it to the Commodity Futures Trading Commission (CFTC). The second KCBT grain sorghum contract was expected to succeed where previous versions had failed, as it attempted to correct the underlying contract design and delivery process problems that existed in the earlier contract. These contract changes are included:

1. Adding three more delivery points in addition to Kansas City;
2. Restricting the standards for delivering No.3 sorghum; and,
3. Allowing that "Storage-In-Transit" (SIT) rail billing through a terminal market, as opposed to freight paid to a final destination.

At the time, the KCBT believed the revised sorghum futures contract would succeed as a pricing and risk-management tool because of the change USDA in agricultural policy toward more market orientation following the introduction of the USDA Freedom to Farm Program; *"As market factors become ascendent, inherent [price] risk increases, stimulating a greater need for a viable hedging mechanism" (*Kansas City Board of Trade, 1989).

The revised KCBT's contract was approved in February 1989, and trading began on the 5th of May 1989. The contract was launched with the goal of providing a specialized hedging tool for the sorghum industry, which was (and remains) heavily concentrated in the Southern Plains, particularly Kansas and Texas. The KCBT intended goal of the new contract was to eliminate this basis risk by offering a contract that settled against the specific supply and demand fundamentals of grain sorghum. The new grain sorghum contract mirrored the CME corn futures contract, with a designated contract size of 5,000 bushels, with delivery points primarily located in the Texas Gulf and Kansas.

Despite initial industry optimism, the contract struggled to gain traction and was eventually delisted in 1999. By the mid-1990s, trading volume had dwindled to near zero. This failure was primarily due to the changing dynamics and paradigm shift in the rail transportation business model *[Reference Section III Background, A. Historical Context, 4. Changes in transportation and its impact on the KCBT Sorghum Futures on page 31, and B. Changing Kansas City Rail Transportation Business Model on page 32]*, as well as a number of structural flaws in the delivery process related to delivery locations and location differentials.

The KCBT eventually suspended and delisted the contract as it became clear that the industry preferred to use the corn market as a benchmark.

The history of the Kansas City Board of Trade (KCBT) grain sorghum futures contract is often cited by market historians and agricultural economists as a classic case study in why some commodity contracts fail despite a clear economic need for them.

The failure can be attributed to several overlapping factors:

1. The "Liquidity Trap"

The contract faced inadequate trading volume and low market liquidity issues, as many users elected to cross-hedge with corn futures instead of a dedicated sorghum contract. In the derivative and futures market, contract liquidity and trading volume are important issues. Without adequate liquidity, the derivative cannot generate the needed trading volume for the markets to function effectively and efficiently. This is the most common reason for new contract failure.

For a derivative or futures contract to work, it needs two key groups of market participants: **Commercial Traders** (i.e., hedgers) and **Speculators**.

Commercial traders provide the critical link to the underlying physical cash markets, bringing hedging activity to the daily trading activity. In addition, this group helps to assure **convergence** between the future's derivative delivery period and the underlying "spot" physical cash market.

It is important to note here that during the period of KCBT grain sorghum futures from 1989 through 1999, the contract suffered from challenges in the underlying delivery process, as well as a paradigm shift in the related rail transportation markets.

Reference the following Section III. Background A. Historical Context 4. Changes in transportation and its impact on the KCBT Sorghum Futures, on page 31.

Speculators provide the liquidity that allows hedgers to enter and exit large positions without moving the price too much. Because sorghum was a "niche" market compared to corn, it failed to attract enough speculative volume. Without speculators, hedgers found the "bid-ask spread" too wide to facilitate much trade, making it too expensive to enter and exit the market.

2. Concentration of the Physical Market

The sorghum market is highly concentrated in the Southern Plains, particularly across Kansas and Texas. In the late 80s and 90s, most of the sorghum trade was facilitated among a handful of large companies consisting of a few large exporters and feedlots. More recently, large ethanol producers have also become a major domestic buyer of grain sorghum.

When a physical market is dominated by a few players, they often trade "off-exchange" (forward contracts) rather than using a public futures market, which further starved the KCBT contract of volume.

This situation results in **market asymmetry,** where there is an imbalance in information, power, or price transmission between participants, resulting in inefficient, non-linear market behaviors.

Export Sensitivity

Sorghum prices can be extremely sensitive to export demand (historically from Mexico, and more recently, China) as international tender offers and trade come to the market in larger quantities or "chunks". These sudden larger orders can cause sharp price movements in a thin market. The resulting volatility, combined with low depth of liquidity, made the contract risky for many small to medium-sized commercial "**flat price**" traders. However, the grain sorghum contract's ability to more clearly define and minimize **basis risk** for hedgers was a noted benefit.

3. Corn – the "Good Enough" Proxy

Most grain sorghum is utilized for livestock feed or finds its way into the ethanol grains. Because U.S. and world corn production by volume (425 mmts and 1,296 mmts, respectively) dominates

grain production and is a primary ingredient in feed rations, as well as in the production of ethanol, its price discovery in related markets is incredibly robust.

Many market participants found that while cross-hedging sorghum in corn was not perfect, the **deep liquidity** of the corn market outweighed the **basis-risk protection** of the illiquid sorghum market. As sorghum is a "niche" market compared to corn, it failed to attract sufficient volume.

It is important to note here that at the time the KCBT Grain Sorghum Futures were introduced, CME corn derivatives and futures were based on Chicago “in-store” warehouse delivery.

4. Changes in transportation and its impact on the KCBT Sorghum Futures

The 1980 Staggers Rail Act and the subsequent transition from Storage-In-Transit (SIT) rail billing to shuttle trains fundamentally altered the logistics of the Kansas City terminal market, creating a structural environment that contributed to the failure of the 1989 KCBT Sorghum Futures Contract.

The timing of the 1989 contract launch of the KCBT grain sorghum contract coincided with the rapid adoption of these new rail efficiencies, as the rail transportation sector was in the midst of a paradigm shift with significant changes occurring across the grain industry.

It would be suggested that these changes undermined the success of the contract in several ways:

- **Erosion of Physical Deliverable Stocks**: As shuttle trains incentivized moving grain directly from western Kansas or Texas to the Gulf, grain stocks no longer "piled up" in Kansas City. A futures contract requires a reliable supply of deliverable physical grain to ensure price convergence; without the SIT billing "subsidy," those stocks moved elsewhere.
- **Reduced Terminal Relevance**: The KCBT's role as a price discovery center for both wheat and grain sorghum was weakened when the physical flow of the commodity shifted from terminal hubs to direct export corridors.
- **Failure of Convergence**: With physical grain bypassing the exchange's delivery points, the link between the futures price of KCBT grain sorghum futures and the physical cash price at the U.S. (Texas) Gulf weakened, making the contract an ineffective hedging tool compared to the deeply liquid corn futures market.

In summary, the Staggers Act destroyed the **SIT billing system** that had historically made Kansas City a natural warehouse for grain delivery. By the time KCBT launched its revised sorghum contract in 1989, the railroad’s shift to **shuttle trains** had already begun rerouting the physical trade, leaving the contract "stranded" at a terminal market that was no longer a primary stop for the commodity.

Understanding this history in the evolution of rail transportation is key to understanding when the Kansas City Board of Trade Grain Sorghum Futures Contract, introduced in 1988, struggled to gain market acceptance and liquidity.

It has only been recently that the CME has updated the Delivery Rules for the Kansas HRW Futures contract, making it more compatible with current “shuttle train” operational practices for moving grains and other agricultural commodities to key destination markets.

B. Changing Kansas City Rail Transportation Business Model

1. Understanding the Historic Rail "Storage-In-Transit" (SIT) Through Kansas City

Historically, rail "Storage-In-Transit" (SIT) billing through Kansas City was a specialized freight arrangement that allowed commodities (most notably grain and livestock) to be stopped, processed, and then reshipped while maintaining a single, continuous "through rate" from the original source to the final destination.

Before deregulation, the railroad rate structure utilized "through rates" or **SIT billing**, which allowed grain to be shipped from a country elevator to a terminal market (like Kansas City), unloaded for storage or processing, and then reloaded for shipment to a final destination (such as the Gulf Coast) under the same original rate.

This system turned Kansas City into a "primary market" rather than just a pass-through point, defining its growth as a national logistics hub:

The Nature of Transit Billing

- **Support for Terminal Markets**: SIT billing made terminal markets like the KCBT essential logistical "hubs." Because there was no financial penalty for stopping grain in Kansas City, terminal elevators could easily accumulate the physical stocks necessary to back a futures contract.
- **Storage-In-Transit**: Goods could be held in Kansas City warehouses or grain elevators to wait for better market prices or seasonal demand without losing the through-rate shipping discount.
- **Milling-in-Transit (Grain)**: This was the most common form. Grain from the western "grain belt" could be unloaded in Kansas City, milled into flour, and then reloaded onto trains to the Eastern manufacturing belt. The shipper paid the lower long-distance through rate instead of two separate, more expensive short-haul rates.
- **Feeding-in-Transit (Livestock)**: The Kansas City stockyards utilized transit privileges to allow cattle to be stopped for feeding, watering, or sale before continuing to Eastern packing houses.

Strategic Impact

Historically, these "Storage-In-Transit" (SIT) rates allowed Kansas City to act as a giant "pause button" where grain could be stored cheaply while maintaining a through-rate. These “transit” privileges incentivized the building of massive grain elevators, flour mills, and the Kansas City Stockyards, making the city a "crucible of innovation" for the agricultural industry and becoming an economic magnet. By the early 20th century, the Kansas City Terminal Railway and various "belt lines" were established to handle the complex switching required to move cars between the transit facilities of different railroads.

Before the 1980s, grain was primarily moved in single-car shipments or small blocks (1 to 49 cars). Railroads picked up individual cars from small "country elevators," assembled them at classification yards into larger trains, and then dismantled them at the destination. This "stop-and-go" movement was slow and inefficient, requiring massive labor for switching, and kept expensive railway cars idle for long periods.

The development of this gateway dominated the movement of agricultural commodities from the western grain belt to the east and beyond. This system ensured that the economic viability of the

underlying "delivery" component of the KCBT futures contract as grain stored in Kansas City was already "in transit" toward major export markets.

It is also important to note here that from the 1980's through until the 1995 Freedom to Farm Act, us grain markets were carrying large tonnages of U.S. government-owned grain. Through this period, the largest part of revenue generated by the farmer, country elevator, warehouse operator, and supply chain participants was through the storage of surplus grain and government programs.

As such, the long-standing "Storage-In-Transit" (SIT) railroad model suited the current business environment very well from the 1980s to 1995.

2. 1980s and the shift to "Shuttle Trains"

By 1976, one-third of the railroads in the United States were bankrupt or nearly bankrupt, due in part to decades of industry regulation. The **Staggers Rail Act of 1980** deregulated the transportation industry,[xvi] allowing railroads to offer lower rates for large-volume shipments. The Act had profound and complex effects on grain transportation, allowing railroads to move toward **efficiency-based pricing**, specifically **shuttle trains** (typically 110-car units).

- **Bypassing the Terminal**: Shuttle trains are designed for direct, point-to-point movement from large origination elevators to export terminals or major processors, completely bypassing intermediate terminal markets like Kansas City.
- **Logistical Penalty for Stops**: Bypassing classification yards and intermediate stops (like those required for SIT) reduced rail costs by approximately **15%**. Conversely, stopping a train in Kansas City became a significant logistical and financial disadvantage compared to direct shuttle shipments.
- **Drastic Decline in Rates**: Inflation-adjusted rail rates for grain declined significantly, as railroads used their new flexibility to offer lower rates for higher-volume, efficient shipments.

  Soon following, the railroads began incentivizing **Unit Train** shipments of 50 to 74 cars moving from a single origin to a single destination. In addition, railroads began offering massive discounts, sometimes 15% to 23% lower, specifically for shuttle movements that did not stop for transit.[xvii]

  Inflation-adjusted rail rates for grain have declined significantly since 1980, with some studies showing a drop of more than 40% over several decades.
- **Regional Disparities**: The impact varies by geography. In the **Great Plains**, where railroads have a near-monopoly on grain transport, rates fell more dramatically as railroads competed for high-volume routes. In the central and eastern **corn belt**, competition with barges had already kept rates lower.
- **Shift to Unit Trains and "Shuttle" Facilities**: To achieve efficiencies, railroads incentivized the shift from single-car loads to "unit trains" (long trains hauling a single commodity) and large, modern grain loading facilities (shuttle trains) that can load 50+ cars.
- **Rural Route Abandonment**: Eased abandonment rules led to the loss of many "branch lines" serving small, rural elevators. While some were taken over by short-line railroads, many farmers were forced to truck grain much further to reach high-capacity rail hubs.

The movement to abandon unprofitable branch lines and focus on high-efficiency, long-haul routes led to the abandonment of thousands of miles of track, forcing smaller local grain elevators to close or rely on trucking to reach larger, central grain terminals.

- **Increased Market Concentration**: The Act led to massive consolidation of the industry (moving from 39 Class I railroads in 1980 to 6 today). In the grain sector, this reduced competitive options in some regions, leading to concerns among farmers in the Plains states about "captive" shippers having limited options to market their grain.
- **Improved Efficiency, Profitability, and Investment**: The railroads' financial health improved, allowing them to reinvest billions into their networks, increasing capacity, and reducing grain car shortages. Greater profitability allowed railroads to reinvest billions into more durable tracks and modern locomotives, improving the overall reliability of the grain supply chain.

Over time, the Staggers Rail Act provided significant cost savings and efficiency for many in the agricultural sector. While initially more efficient locomotives were still dispatched at the country elevator, the "through-rate" consisting of "transit" stops (like Kansas City) persisted as the dominant commercial model into the early 1990s. Eventually, the Staggers Rail Act saved the rail industry by allowing it to operate as a modern, profitable business. forcing a difficult structural adjustment for local, branch-line-dependent rural grain elevators and their communities as the evolution of "shuttle train loaders" took hold.

Advent of Shuttle Trains

The evolution of the "shuttle" train represents a shift from slow, decentralized rail networks to high-velocity, closed-loop systems that revolutionized the grain supply chain starting in the late 20th century. A "**shuttle" or "unit" train** (typically exceeding 100 - 120 cars) directly undermined the economics of "Storage-In-Transit" (SIT) rates by prioritizing velocity and volume over the traditional model of regional processing and storage. The "Shuttle Train" destroyed the "Transit" model.

In 1996, BNSF Railway launched its first true "shuttle trains", a system that further optimized the unit train model. The efficiency of shuttles led to infrastructure consolidation across the agricultural landscape. Large terminal elevators (i.e., shuttle loaders) replaced large numbers of smaller country elevators. Shuttle trains (then typically 75 to 110+ cars) moved as a dedicated, closed-loop set, where locomotives and crews stayed with the cars during loading and unloading. Elevators were given incentives to load the entire 110-car train in under 15 hours.

Gains in Operational Efficiency

Operationally, traditional SIT Rates relied on a labor-intensive process by the railroads where individual cars were detached from a train, switched to a local elevator for storage, and later re-integrated into a new train.

From a grain merchandising perspective. SIT Rates were a tool for market timing, storing and holding grain until prices (i.e., terminal basis) improved.

The introduction of shuttle trains shifted the business's priorities and focus away from being a tool for merchandising and storage, over to an asset utilization focus.

Shuttle trains were designed to stay together as a single unit, originating from a single point of loading, and then moving efficiently to a single destination for unloading (e.g., from a Kansas country elevator directly to the Gulf Coast or PNW Port).

Inventory Storage vs Velocity

Breaking a shuttle train apart to store grain in Kansas City would negate the efficiency gains that make the shuttle rate profitable for the railroad, as it requires "classification" work that the railroads are financially motivated to eliminate. Shippers found that the deep discount for a "point-to-point" shuttle was cheaper than paying the older SIT through-rate plus the storage and switching fees in Kansas City.

- **Cost Efficiency:** Shippers using shuttle facilities often receive rates up to 23% lower than traditional rail users.

  By 2010, over 50% of all rail-hauled grain moved via shuttle trains, compared to just 12.9% in 1994.

- **Velocity and Cycling Speed**: (Time and Distance) Shuttle cars cycle 2.5 to 3 times faster than non-shuttle cars, allowing railroads to move much larger volumes of grain with fewer total railcars, i.e., cost efficiency.

- **Inventory Costs**: By moving grain faster, railroads reduced "in-transit inventory costs," making it more profitable to keep the grain moving than to let it sit in a Kansas City silo.

This change transformed Kansas City from a processing and storage terminal location where grain was "held" in high-speed through-put facilities to a location where now large shuttle trains simply “roll-through" on their way to export or major end user locations.

As a result, grain began by passing Kansas City's massive mid-transit elevators entirely, moving directly from large "shuttle-loader" facilities in rural areas directly to final markets.

Today, traditional transit billing has largely been replaced by modern intermodal logistics and deregulated rate structures. However, its legacy remains, leaving Kansas City in a position as one of the largest rail centers by tonnage in the United States.

In summary, the Staggers Act destroyed the SIT billing system that had historically made Kansas City a natural warehouse for grain delivery. By the time the KCBT launched its revised sorghum contract in 1989, the railroad’s shift to shuttle trains had already begun rerouting the physical trade, leaving the contract "stranded" at a terminal market that was no longer a primary stop for the commodity.

IV. Currently Proposed Contract Terms and Delivery

With the CME's recent changes to the Kansas HRW Wheat contract, it would be suggested that the industry has moved a good way toward eliminating several of the underlying issues with the previous delivery process that plagued the Sorghum Futures Contract in the past.

The approach of following the existing template of the CME Kansas HRW Wheat Futures contract in re-designing a CME Sorghum Futures contract would more readily allow for easier regulatory approval.

A. Delivery Market Location

It was originally considered that there are a number of possible approaches to take to introduce a new grain sorghum contract, with two possible underlying delivery locations and pricing points to consider.

It is an important component of a new contract that it provides a functional mechanism for market participants to effectively "make" or "take" delivery as market conditions allow, leaving domestic and international sorghum market participants with the means to more effectively manage their futures with reduced local cash basis risk.

Currently, there are two possible approaches to working delivery market locations that can be considered. These include "River" delivery, as can be seen with CME Corn, Soybeans, and Wheat; as well as "Inland Rail" delivery, as can be seen with CME Kansas HRW Wheat.

Through early discussions with the CME Group, it was determined that mirroring the CME Kansas HRW Wheat model was the much better approach, given the geographical location of grain sorghum production, and that Kansas was the largest state for production.

1. River (Illinois) Waterway Delivery System

A pricing point that should be properly considered is the Illinois Waterway Delivery System (IWDS) delivery point.

Historically, sorghum has been priced against a "basis" relative to corn. It is appropriate for cash market participants, with a river delivery and pricing point directly comparable to CME corn (as well as wheat and soybeans), to also be considered for sorghum futures.

Similarly, it would also make sense to investigate the applicability to Sorghum Futures using the same delivery process now used by the CME Corn Futures contract, perhaps with a focus upon the recently adjusted St. Louis, Missouri Corn Futures contract specs, or even considering the Port of Catoosa near Tulsa, OK. The Port of Catoosa location could be considered as a spatial, logistical extension or appendage of the existing U.S. Mississippi River System grain transportation and delivery system network. However, the Arkansas / Verdigris Rivers are not fully integrated into the Barge Freight Market.

Rail transportation options to NOLA or the Texas Gulf may also be considered.

2. Kansas-Based Delivery System

Given Kansas (#1 – 49%) is the largest sorghum producing state, along adjacent primary production areas in Texas (#2 – 30%), Nebraska (#4 – 4%), Oklahoma (#5 – 3%), Missouri (#9 – 2%), and Colorado (#10 – 1%), and located primarily in the Western Corn Belt. With nearly half of the primary

production area for U.S. grain sorghum located in Kansas and immediately tributary to both U.S. export and domestic markets, it would be feasible to make Kansas the delivery pricing point for the redesigned Sorghum Futures Contract.

Secondly, it would also make sense to copy or imitate the geographic location and logistics associated with the delivery process for the existing CME Kansas HRW Wheat Futures contract, which has a long existing history of success and securely financed and established participating grain industry partners.

a. Expansion of Delivery Locations for CME Kansas HRW Wheat

Expanding the existing locations “regular” for delivery in CME Kansas HRW Wheat Futures has been primarily driven by the need to ensure price convergence between futures and cash markets, particularly during supply imbalances during seasons of low production. While adding delivery points can improve market depth and liquidity, it introduces a more complex logistical, quality, and economic dynamic. This increases the need to have a thorough understanding of **“delivery economics”**.

In 2024, the CME Group announced a significant expansion of delivery locations for Kansas Hard Red Winter (HRW) Wheat Futures (and related Mini-Sized contracts), effective for deliveries beginning after the July 2025 contract month. This expansion (detailed in CBOT Submission No. 24-443 and Special Executive Report (SER) 9483) aims to reduce market concentration and improve convergence between futures and cash prices by adding more delivery capacity.

Key Details of the Expansion (Effective July 2025)**:**

- **Territory Expansion:** The delivery area for Kansas City HRW Wheat has been expanded to include regular facilities located on Class I Railroads up to 75 road miles from the center of current switching districts. The locations and their capacities are noted in the following table.
- **Affected Locations:** The expansion applies to the established switching districts of:
    - Kansas City (MO/KS)
    - Hutchinson (KS)
    - Salina/Abilene (KS)
    - Wichita (KS)

  The locations and their capacities are noted in the following table.

  Pricing Adjustment and Discount Structure: Regular elevators or warehouses located within the newly defined 75-mile territory but *outside* the traditional switching districts are subject to a 1 cent per bushel discount.
- **Effective Date**: These changes apply to deliveries beginning after the **July 2025** contract month (the next "new crop" expiry).
- **Variable Storage Rates (VSR)**: The maximum storage charge for KC HRW Wheat increased in May 2025 from approximately 5 cents to 8 cents per bushel per month to reflect actual storage market conditions.

Market Objectives

- **Improving Convergence**: The primary goal is to tighten the relationship between the futures price and the local cash bid. By adding locations, it is easier for market participants to make or take delivery, which prevents the futures price from diverging significantly from the cash price.

Expanding the number of regular delivery points helps ensure that the futures contract price better reflects the local cash market, reducing the volatility in the wheat "basis" caused by logistical and storage constraints across existing locations.

- **Increasing Capacity**: In addition to increasing capacity and diversifying locations among commercial handlers who participate in the exchange delivery mechanism, "regularity" (**"regular"** for delivery) also requires increasingly strict standards for delivery elevators, including receival and loadout capacity, access to Class 1 Railroads, capital requirements, reporting, etc.

  The expansion aims to attract approximately 6 to 8 new **"regular"** facilities, adding to the existing 17 elevators that provide roughly 164 million bushels of space.

- **Reducing Concentration**: Increasing locations "regular" for delivery also increases competition among commercial handlers who participate in the exchange delivery mechanism, potentially increasing liquidity.

  The previous capacity of CME Kansas HRW Futures delivery locations had a high concentration of storage space (3-firms ratio >67%), which this expansion aims to diversify.

  The Anticipated Impact is expected to bring approximately 6 to 8 new **"regular"** facilities into the system, decreasing the 3-firm concentration ratio. By broadening the pool of deliverable supply, the CME aims to ensure better convergence between futures and cash prices during high-demand periods.

- **Logistical Flexibility:** The inclusion of facilities on Class I railroads within a 75-mile radius allows for greater flexibility in moving physical grain to delivery points.

(It has been assumed here that recent changes in the Kansas HRW Contract have successively addressed the underlying delivery issues involving loadout, transportation, and other related issues.)

b. Further Expansion of Locations "Regular" for Delivery

There continues to be discussions to further expand the **"regular"** delivery locations in Kansas beyond these initial changes.

See the following Table CME Kansas Delivery Locations for further detailed information

Current CME Rules limit Delivery Locations to those positioned on Class I Rail Lines. This is important as it helps to avoid possible complications presented by read access to equipment, as well as broader concerns of less financially viable transportation providers.

Careful consideration must be given to potential changes. Expanding points "regular" for delivery can alter prevailing delivery economics and regional cash basis values. Expanding locations require the CME to define new, accurate **location differentials** to account for transportation costs to terminal markets, changing the regional cash basis map. If a new, more accessible location is added, it may become the new, more efficient point of delivery, shifting the premium/discount structure (e.g., how the 6-12 cent discounts for Wichita/Hutchinson/Salina operate).

Expanding locations requires the CME Group to select grain elevators that can handle, store, and load out large volumes of grain, needing to be equipped to facilitate the loading of 110+ car shuttle trains, as well as consideration of logistics and costs of transporting grain to major destination markets, both domestic and export.

The CME Group also requires status for "regular" warehouses to meet stringent financial and physical requirements. Adding new, qualified locations is administratively slow and requires meeting high capacity and, ideally, rail shuttle-loading capability standards.

These discussions include considering if grain sorghum derivatives and futures would justify a more unique set of locations “regular” for delivery. However, in order to facilitate a more straightforward path through the regulatory approval process, initial efforts for grain sorghum will mirror established locations for CME Kansas HRW Wheat.

Current firms that are “regular” for delivery in major locations and central logistical hubs often resist new, distant locations, as this could dilute their market power and change the flow of grain in the region.

The authors of this white paper agree with the CME Group that a Kansas-based delivery location that mirrors the current CME Kansas HRW Wheat Contract is preferable.

(The authors are assuming that recent changes in the Kansas HRW Contract have successively addressed the underlying delivery issues involving loadout, transportation, and other related issues.)

3. CME Kansas Delivery Locations

Delivery Locations

Kansas Hard Red Winter Wheat / Grain Sorghum

	Current as of:	24-February-2026		gha
	Printed as of:	04-March-2026		14:38:09
CCL Code	**Warehouse**	**Elevator**	**Capacity**	**Location Differential**
	Kansas City Switching District			*(Cent/bu)*
1665	BartlettGrain Company	KCT#1	4,307,000	0
1666	BartlettGrain Company	River Rail	10,039,000	0
1667	BartlettGrain Company	Fairfax	10,031,000	0
1686	Hansen Mueller Co.	Katy	4,545,000	0
	Elevators Outside of Switching District			
1690	Cargill Inc.	Atchison	6,443,000	-1
1691	Cargill Inc.	Crossroads	10,458,000	-1
1692	Cargill Inc.	Gordon	24,157,000	-1
Total	**Kansas City Switching District**		**69,980,000**	
	Wichita Switching District			
1668	BartlettGrain Company	Witchita	12,080,000	-6
1696	Bunge USA Grain LLC	Witchita	30,542,000	-6
1660	Ardent Mills	Witchita	5,682,000	-6
	Elevators Outside of Switching District			
1653	Producer Ag LLC	Milan	7,532,000	-7
1699	The Scoular Company	Wellington	4,029,000	-7
Total	**Wichita Switching District**		**59,865,000**	
	Huchinson Switching District			
1677	ADM Grain Company	Elevator A	3,231,000	-9
1679	ADM Grain Company	Elevator I	6,836,000	-9
1680	ADM Grain Company	Elevator J	18,307,000	-9
1687	Cargill Inc.	Hutchinson	4,394,000	-9
1688	Cargill Inc.	Hutchinson We	4,469,000	-9
	Elevators Outside of Switching District			
1690	Producer Ag LLC	Canton	3,472,000	-10
1691	The Scoular Company	Pratt	5,711,000	-10
Total	**Huchinson Switching District**		**46,420,000**	
	Salina / Abilene Switching District			
1689	Cargill Inc.	Salina	31,409,000	-12
1695	Flint Hils Grain LLC	Abilene	2,152,000	-12
1698	The Scoular Company	Salina	10,703,000	-12
	Elevators Outside of Switching District			
1658	AgMark LLC	Concordia	10,685,806	-13
Total	**Salina / Abilene Switching District**		**54,949,806**	
Grand Total			**231,214,806**	
			231,214,806	

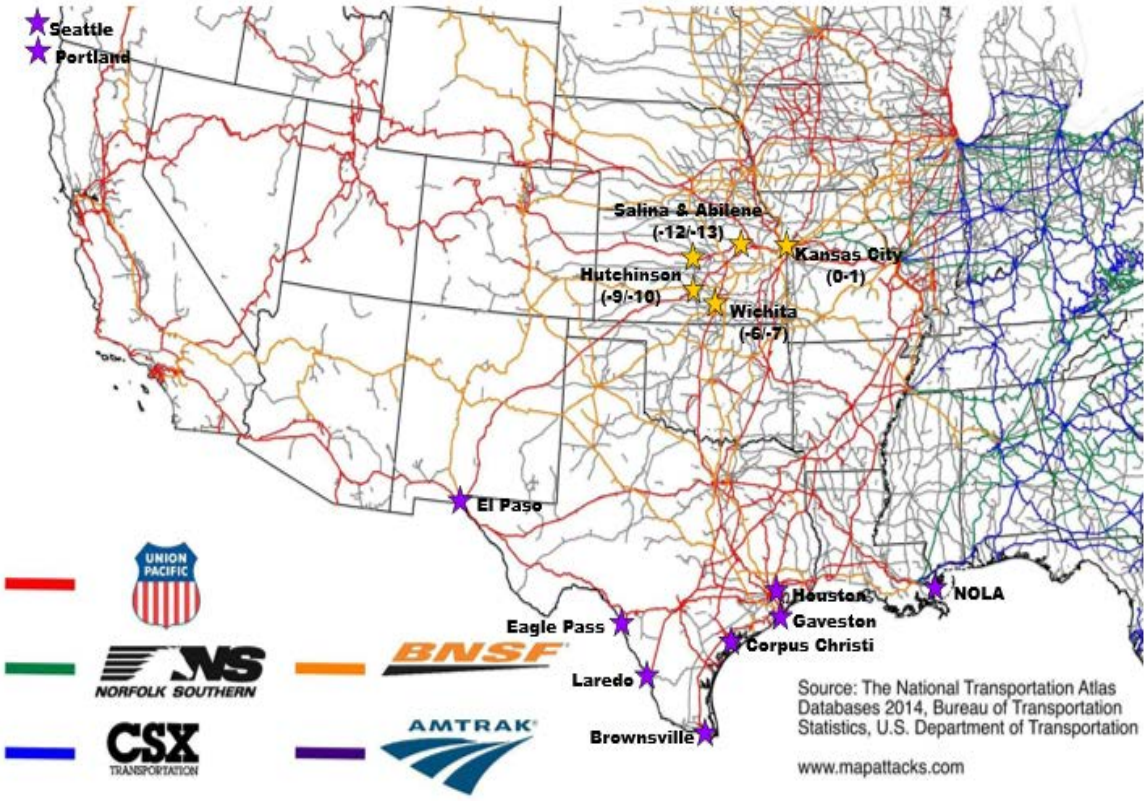
Note: Transportation is conveyance via rail car

Note: A number of K&O Railroad facilities have applied to be regular for delivery, but thus far registratio has not been granted. While not on Class 1 Railroads, they do have Class 1 Rates, as opposed to a switching charge.

Source: CME Group 23 February 2026

a. Rail Execution to Major Export Destinations

CME Kansas HRW Wheat Deliver Locations & Marjor Export Destinations



CME Deliverable Grain Elevator and Warehousing Facilities

The grain industry's familiarity with the existing template of the CME Kansas HRW Wheat Futures contract, mirroring its design and structure in a CME Sorghum Futures contract, would expedite its quicker adoption by the commercial trade and broader industry.

These included the supporting delivery processes, as well as the following Delivery Locations, and the corresponding Locations Differentials outlined in the previous Section for: Kansas City, Wichita, Hutchinson, Salina, and Abilene.

With the CME's recent changes to the Kansas HRW Wheat contract, it would be suggested that the industry has moved a good way toward eliminating several of the underlying issues with the previous delivery process that plagued the Sorghum Futures Contract in the past.

The introduction of a 14-cent per bushel premium for shuttle train loadouts in CME Kansas HRW Wheat futures is intended to enhance market efficiency and encourage the use of more efficient logistics in the delivery process. This change, effective for contract months following the conclusion of the September 2026 delivery period, would likely have several key impacts on the market.

These changes to CME Kansas HRW Wheat would also apply to a re-established CME grain sorghum contract

With the changes made by the CME Group for "Load Out" to rail "Shuttle Trains" of an additional 14 cents per bushel premium (along with other considerations), economic delivery execution to primary export markets in the Texas Gulf is now feasible. This includes Texas Gulf Port locations such as Corpus Cristi, Galveston, and Houston, as well as rail execution to New Orleans port facilities.

PNW (Pacific Northwest): With China historically being the primary importer of grain sorghum, export execution out of the PNW (Pacific Northwest) locations of Seattle, WA, and Portland, OR, is now within the bounds of economically deliverable execution.

Mexico: Additionally, direct delivery execution by rail is now feasible to Mexico, including border crossing locations at El Paso, Eagle Pass, Laredo, and Brownsville.

With a little more effort in trade negotiations and arrangements with Mexico, cross-border trade for corn, grain sorghum, soybeans, wheat, and other agricultural commodities should be as seamless as trading into U.S. domestic markets.

Potential Impacts on the Market

- **Improved Basis and Convergence**: Shuttle-loading facilities typically offer higher cash prices (a stronger basis) to farmers because they benefit from lower per-bushel freight rates from rail carriers. By formalizing this premium within the futures contract delivery terms, the CME reinforces the link between the futures market and these more efficient cash market dynamics, likely improving overall cash-futures price convergence at expiration.
- **Increased Commercial Participation**: The premium incentivizes a wider range of commercial entities, particularly those with shuttle-loading capabilities, to participate in the physical delivery process. This could increase the commercial liquidity of the futures contract itself.
- **Incentivize Shuttle Train Use**: The 14-cent premium acts as a direct financial incentive for elevator operators ("makers" of delivery) to use efficient, high-volume shuttle trains (typically 110-car unit trains) rather than less efficient shipping methods. This encourages faster loading times (one shuttle per 24 hours) and better utilization of rail infrastructure.
- **Logistical Clarity**: The new rules also introduce specific logistical requirements, such as a 5 to 10-day pre-advice window for the "stopper" (taker of delivery) and clear specifications on responsibility for demurrage, providing greater clarity and reducing operational uncertainty during the delivery month.

CME Market Harmonization: This move aligns the Kansas HRW rules more closely with the operational realities of modern grain handling and potentially helps harmonize it with other grain contracts, such as corn and soybeans, where similar logistical incentives exist.

In summary, the 14-cent per bushel premium aims to modernize the delivery process, making it more efficient and better reflective of real-world transportation costs, which in turn should improve the overall function and reliability of the KC HRW wheat futures market for risk management.

b. Possible CME Road Load Out Procedures

Another concept that is under consideration for CME Kansas delivery locations is the possibility of introducing a Road Load Out option.

The introduction of a road load-out option for CME Kansas HRW Wheat futures would likely increase market accessibility and improve cash-futures price convergence by providing more flexible delivery logistics, but it could also introduce new operational challenges and cost structures.

Potential Impacts on the Market

- **Improved Price Convergence**: The possibility of delivery is what forces cash and futures prices to converge at expiration. Adding a road load-out option (delivery by truck) increases the ease and flexibility of physical delivery, which should strengthen the link between the futures price and the local physical cash market price. This helps eliminate non-convergence issues that can arise when the cost of storage in approved elevators is higher than the futures contract storage rate.

  More specifically, a **"Road Load Out"** option (which is concurrently under consideration by the CME Group) would assist in forcing economic delivery values to be assigned to smaller lots of contracts (those less than 40 contracts) and less than a shuttle train quantity, as they may be effectively executed to road destinations.

- **Increased Liquidity**: By attracting more commercial participation in the delivery mechanism, the overall market could see increased liquidity, which generally leads to tighter bid-ask spreads and better price discovery.

- **Reduced Basis Volatility**: Improved convergence and increased market participation help reduce basis volatility, providing farmers and agribusinesses with more effective risk management and crop marketing strategies.

- **Enhanced Market Accessibility**: Road transport provides greater "door-to-door" accessibility than rail or barge, allowing a wider range of commercial participants, including smaller elevators and local processors who rely primarily on trucks, to participate directly in the delivery process.

  A large volume of grain sorghum demand in the ethanol and feed sectors is located immediately tributary to several of the proposed CME Grain Sorghum Delivery Locations. A CME Road Load Out option would appear to be very feasible. It would open the possibility of direct futures delivery execution to potentially more than 2.5 mmts of FSI and ethanol demand, as well as a similar volume into the livestock feeding sector. Encouraging this sector's direct engagement with grain sorghum derivatives and futures would add much-needed liquidity to the market dynamics.

Other Considerations

Road transport presents its own unique set of logistical challenges. While road transport offers flexibility, it can be subject to higher fuel costs compared to bulkier methods like barge transport. There can be a lack of carrier availability during peak harvest times, which could lead to delays and increased transportation costs. Ensuring efficient resource allocation and meeting tight delivery slots can be challenging with truck logistics. These costs would be reflected in the new delivery price dynamics.

However, there are many similar issues faced when dealing with any mode of transportation. As such, there would be an additional, but not unfamiliar, set of dynamics to the delivery process in its effort to achieve convergence.

CME Market Harmonization: In any effort to implement a Road Load Out option, it is important to note that the CME Group has previously aimed to harmonize rules across different grain types (e.g., eliminating the weekly loading obligation for KC HRW to match other grains), so any new road load-out rule would need to be integrated smoothly into the existing rulebook.

As such, it would be suggested that separate Road Load Out Rates would be set for each delivery location.

An early-estimated Road Load Out Charge of between 2 and 14 cents per bushel is within the range of possibilities.

For Reference: The CME Soybean Meal futures maximum charge for loading out by road truck (road load-out) at the delivery point is currently set at 1/25th of one cent per pound (i.e., 2¼ +/- cents per bushel).

This white paper invites further comments and views on adopting a Road Load Out option.

B. Order Placement

1. Outright Absolute or “Flat” Price Buy / Sell Order

Traditionally, the form of trade in a derivative or futures market consists of simple outright or “Flat Price” orders to buy (long) or sell (short) a specific number of contracts, aiming for profit from the underlying asset's directional price movement. This is unlike spreads that trade relative prices between contracts.

Outright long or short positions offer direct exposure to volatility but carry significant risk (as they are not a hedge with an equal and opposite in the physical cash markets), requiring strong directional conviction and risk management for volatile markets.

More specifically, both producers and the large majority of end users are outright absolute “flat” price participants in futures markets.

It would be recommended that CME set up a Grain Sorghum Futures contract such that outright “flat” price orders can be placed.

2. Spread Orders

Spread strategies involve simultaneously buying one futures contract and selling another, trading the price relationship between the two. Often, this approach requires a lower margining requirement than an outright position (i.e., long or short). These are generally entered as a single combination instrument on the trading platform to mitigate "legging risk" (the risk of one leg filling but not the other).

Futures Spreads - Simultaneously buying one contract and selling another (e.g., different months or related products) to focus on relative price changes, reducing overall risk and margin.

Traders engage in **intra-commodity** (same product, different months) and **inter-commodity** spreads (corn vs. soybeans). While an exact, real-time percentage is dynamic, a significant portion of CME Corn Futures, often over a third, involves "calendar" spreads (different months) and other spreads (like inter-commodity), with some reports highlighting over 30% of large trader positions in agricultural spreads, demonstrating that spreading is a crucial part of the market, not just outright trades.[xviii] An even greater percentage (estimated to be over half) of the average daily volume consists of spread trades.

Traders use spreads to profit from price differences between contracts or commodities, reducing risk and margins. An even greater percentage (estimated to be over half) of the average daily volume consists of spread trades.

As such, the active trading or "spread" relationships, both intra-commodity and inter-commodity spreads, generate significant volume and liquidity in any derivatives or futures contract.

a. Intra-Commodity "Calendar" Spread Orders

Definition - A "calendar" spread is a strategy trading futures or corn options, involving buying one contract (e.g., near-month) and selling another (far-month) for different delivery dates, profiting from changes in the price difference (spread) between these months, often exploiting seasonal supply/demand shifts over time.

Intra-commodity: Uses contracts for the same commodity (corn) but different delivery months.

Purpose: Traders use these spreads to trade on the price difference between contract months, which often reflects the cost of storing the commodity.

Examples:

- Bull "Calendar" Spread - Action: Buy a near-month corn futures contract and simultaneously sell a deferred (further out) month contract. Example: (Buy July / Sell December)

- Bear "Calendar" Spread - Action: Sell a near-month corn futures contract and simultaneously buy a deferred (further out) month contract. Example: (Buy December / Sell July)

As such, the active trading or "spread" relationships generate significant volume and liquidity in any derivatives or futures contract.

b. Inter-Commodity Spread Orders

Definition – Inter-commodity Spread is a term primarily used in finance and commodity trading to describe the relationship or spread between two different but related commodities or financial instruments. It refers to trading strategies and products that focus on the price differential between these related assets, rather than their absolute price movements.

Inter-commodity – Uses contracts for the differing commodities (sorghum - corn) but the same months.

Focus on Relative Value – Traders and hedgers using inter-commodity spreads are less concerned with the direction of the overall market and more focused on the relationship or price gap (spread) between the two related commodities. These spreads are used by commodity processors and producers to hedge price risks and by traders to capitalize on price discrepancies (arbitrage) between related markets.

One currently proposed idea is for grain sorghum futures to be priced (and traded) as a differential to corn futures. The product would be quoted, like corn, in cents per bushel, but the price would represent the sorghum's price difference relative to corn rather than a flat price.

Such a contract would allow market participants to hedge premiums or discounts specific to the sorghum market.

A trader could take a position in corn futures and grain sorghum futures to effectively trade flat price grain sorghum or would take a position in only grain sorghum if they were hedging a cash basis contract or only caring about relative value.

Sorghum – Corn

Currently, the vast majority of hedging activity for grain sorghum takes place in CME Corn Futures, as in the U.S., this has offered the highest degree of correlation.

As such, establishing a trading/order entry platform that allows easy and efficient order entry of this spread is important to establish active trade participation. This will assist in generating volume and liquidity.

Sorghum – HRW Wheat

In other international markets, local grain sorghum is sometimes hedged in wheat, i.e., Kansas HRW Wheat.

(This has been seen at times in Australia, where wheat is the dominant crop, with little domestic corn being produced. As such, in Australia, domestic feed rations are wheat-based, with grain sorghum production pricing into feed demand based on its relative values to wheat, rather than corn.)

U.S. grain sorghum production is concentrated in the western corn belt and overlaps with HRW wheat production; it competes for land use and production with wheat, as well as corn. It also competes locally with wheat into feed rations and the feed grains complex. At the country elevator, it also competes with locally produced HRW wheat, as well as corn.

As such, it may be prudent to provide a platform that can facilitate inter-commodity spreading with CME Kansas HRW Wheat, as well.

As such, having the capacity to efficiently place "inter-commodity spread" orders will be imperative to providing depth of bids/offers, generating significant volume and liquidity in any derivative of futures contract.

3. Inter-Commodity Spread - Trading as a differential to Corn Futures

The CME Group is looking for feedback on the development of a Sorghum futures contract.

In an effort to enhance and leverage the volume and liquidity found in the closely related CME Corn Futures, the CME is currently suggesting that the sorghum Futures be traded as a "spread" to the CME Corn Contract. This concept is strongly supported.

a. Concept

(Part of the following is taken from a CME Group Paper)

Most commodity futures contracts are priced at an outright price (i.e., flat price) and can be either physically delivered or cash settled.

Initial CME customer feedback on a potential Sorghum futures contract so far indicates little interest in a flat price sorghum contract, and that cash settlement does not provide any additional benefit compared with the current practice of hedging with corn futures. Therefore, CME is proposing a physically delivered differential contract, which is a new concept in derivatives.

The idea is for sorghum futures to be priced (and traded) as a differential to corn futures. The product would be quoted, like corn, in cents per bushel, but the price would represent the sorghum's price difference relative to corn rather than a flat price. Such a contract would allow market participants to hedge premiums or discounts specific to the sorghum market.

Sorghum vs Corn Spread = Sorghum Price – Corn Price

Establishing a "Flat Price" Position with a "Spread" Contract

As such, a trader could continue to hedge their "flat price" position in Corn Futures, and would take a position in the "Sorghum – Corn" spread to hedge their grain sorghum position.

Or,

As such, a trader could take a position in Corn futures and Sorghum futures to effectively trade flat price sorghum:

- Sell the Sorghum – Corn Spread, plus Sell Corn Futures = Short "Flat Price" Grain Sorghum
- Buy the Sorghum – Corn Spread, plus Buy Corn Futures = Long "Flat Price" Grain Sorghum

The proposed delivery area is where sorghum production is centered, which is the same area and facilities that are already deliverable for the KC HRW Wheat contract. This enables the Exchange to price sorghum off Corn, as it is priced in the cash market, and use KC HRW Wheat futures' existing delivery mechanism and delivery space.

Due to the unique characteristics of the sorghum market, the Exchange is also exploring loadout via trucks in addition to railcars.

b. How it Works

Sorghum futures would trade at cents per bushel differential to Corn futures.

For Example: If the December Corn futures price was 402.50 cents per bushel and the December Sorghum futures contract was trading at -101.00 cents per bushel, the effective price for sorghum delivered on December futures would be 301.50 cents per bushel (402.50 minus 101.00).

The traded price grain sorghum futures would be negative if sorghum is priced lower than corn (the typical case), and positive if sorghum is priced higher than corn. The contract months would always match Corn futures so that the screen-traded price for May Sorghum futures would be at a differential to May Corn futures.

Delivery of the Sorghum futures contract could be made at any registered facility. The eligible facilities would initially include any facility registered for delivery on the KC HRW Wheat futures contract, but could be expanded with time.

The delivery window will need to start before the delivery period for Corn so that anyone wishing to execute delivery on Sorghum futures will be completed before Corn futures go into delivery. Sorghum futures could use Corn Options expiration as the first notice day and have a condensed delivery period.

For Example: On November 21st, 2025 (Corn Option expiration day and first notice day for Sorghum futures), suppose that Corn futures settle at 405.00 cents per bushel and Sorghum futures settle at -36.00 cents per bushel. A registered facility could give a delivery notice on that day, and the effective delivery price would be 369.00 cents per bushel.

The Sorghum futures contract would trade until the first holding day (i.e., position day) for Corn futures, or November 26, 2025. This would enable natural longs and shorts to engage in the delivery of sorghum without the threat of participating in Corn futures during delivery.

[N.B., option expiration day can be on a Friday with the first holding day being on the next Monday, so it is possible to have a delivery period of only 2 days]

All open positions in the Sorghum differential futures contract on its first delivery day would be eligible to make or take delivery and would not need to have a position in Corn futures to affect delivery in Sorghum futures. However, both parties are open to the Corn futures price since it determines, in part, the daily and final settlement price for sorghum.

For Example: If a long position holder has a sorghum position at -45.50 cents per bushel, that price does not need to change for the delivery price of sorghum to change. Effectively, if Corn futures drop from 413.00 cents per bushel to 403.00 cents per bushel, that sorghum position has decreased from a flat price of 367.50 to 357.50 cents per bushel.

The authors of this white paper agree with the CME Group's effort to enhance and leverage the volume and liquidity found in the closely related CME Corn Futures.

The CME is currently suggesting that the sorghum Futures be traded and expressed as an "inter-commodity spread" to the CME Corn Contract. This concept is strongly supported in an effort to leverage liquidity.

However, it is also suggested by the authors of this paper that the sorghum futures contract has the capacity to efficiently trade "Intra-Commodity Calendar Spreads" to facilitate the need of commercial hedgers to effectively manage hedge placements in appropriate delivery months.

It is also suggested by the authors of this paper that expressing a grain sorghum futures contract in its absolute or "flat price" form, just as any of the other agricultural commodities, is important as well. This would be to the benefit of traders (such as producers, end users, processors, consumers, etc.), as well as traders relying on technical analysis to develop strategies that are based on "flat" price directional movements.

The capacity to easily execute and trade all three of these is preferred and important to the success of the grain sorghum contract.

C. Contract Specifications

The following is the current proposed draft contract specifications as of the 4th of December 2025.

Contract Size	5,000 bushels
Price Quotation U.S.	cents per bushel
Minimum Price Fluctuation	1/4 of one cent (0.0025) per bushel = $12.50
Contract Months	March, May, July, September, December
Termination of Trading	First Holding Day for Corn Futures
Daily Settlement	Corn Futures Daily Settlement VWAP plus Sorghum Futures Daily Settlement VWAP (13:14:00 through 13:15:00)
Delivery Period	Corn Options Expiration Day through First Holding Day for Corn Futures
Grade and Quality	#1 Grain Sorghum at a 1.5 cent/bushel premium. #2 Grain Sorghum at contract price; and, ~~#3 Grain Sorghum at a 1.5 cent/bushel discount.~~
Delivery Territory	Facilities registered on the KC HRW Wheat Futures contract
Loadout Conveyance	Shuttle Train or Single Railcars (or Road Trucks?)

1. Grain Quality Specifications

USDA Grades and Grade Requirements for Grain Sorghum - § 810.1404 [xix]

Grading factors	Grades U.S. Nos. [1]			
	1	2	3	4
Minimum pound limits of				
Test weight per bushel:	57.0	55.0	53.0	51.0
Maximum percent limits of				
Damaged kernels:				
Heat (part of total)	0.2	0.5	1.0	3.0
Total	2.0	5.0	10.0	15.0
Broken kernels and foreign material:				
Foreign material (part of total)	1.0	2.0	3.0	4.0
Total	3.0	6.0	8.0	10.0
Maximum count limits of				
Other material:				
Animal filth	9	9	9	9
Castor beans	1	1	1	1
Crotalaria seeds	2	2	2	2
Glass	1	1	1	1
Stones [2]	7	7	7	7
Unknown foreign substance	3	3	3	3
Cockleburs	7	7	7	7
Total [3]	10	10	10	10

U.S. Sample grade is sorghum that:
(a) Does not meet the requirements for U.S. Nos. 1, 2, 3, or 4; or
(b) Has a musty, sour or commercially objectionable foreign odor (except smut odor); or
(c) Is badly weathered, heating or distinctly low quality.

[1] Sorghum which is distinctly discolored shall not grade higher than U.S. No. 3.
[2] Aggregate weight of stones must also exceed 0.2 percent of the sample weight.
[3] Includes any combination of animal filth, castor beans, crotalaria seeds, glass, stones, unknown foreign substances or cockleburs.

a. Definition of Grain Sorghum

The USDA FGIS currently defines grain sorghum as: "…grain that, before the removal of dockage, consists of 50 percent or more of whole kernels of sorghum (Sorghum bicolor (L.) Moench) excluding nongrain sorghum and not more than 10.0 percent of other grains for which standards have been established under the United States Grain Standards Act." [xx]

The CME is currently recommending that the acceptable grade of grain sorghum eligible for delivery be USDA No.2 Sorghum.

The most common grade standard for grain sorghum trade into the U.S. domestic and export market is USDA No.2 Sorghum. It is important to note that these markets most frequently trade on a 14.0% moisture basis, with some USDA CCC business done on 13.5% moisture.

In the secondary markets, trade in both domestic and export destinations, the grade standard is typically USDA No.2 Sorghum, with USDA No.3 Sorghum rarely, if ever, the underlying acceptable quality.

It should also be noted that, previously in the 1989 KCBT Grain Sorghum Futures contract, the allowed application of USDA No.3 Sorghum causes complications with commercially acceptable grain quality, contributing to the lack of acceptance in the new contract.

b. Classes of Grain Sorghum

As per USDA Quality Standards [xxi], there are four classes of sorghum: Sorghum, Tannin sorghum, White sorghum, and Mixed sorghum.

(1) **Sorghum** - Sorghum which lacks a pigmented testa (subcoat) and contains less than 98.0% White sorghum and not more than 3.0% Tannin sorghum. The pericarp color of this class may appear white, yellow, pink, orange, red, or bronze.

(2) **Tannin Sorghum -** Sorghum which has a pigmented testa (subcoat) and contains not more than 10.0% non-Tannin sorghum. The pericarp color of this class is usually brown but may also be white, yellow, pink, orange, red, or bronze.

(3) **White Sorghum -** Sorghum which lacks a pigmented testa (subcoat) and contains not more than 2.0% sorghum of other classes. The pericarp color of this class is white or translucent and includes sorghum containing spots that, singly or in combination, cover 25.0% or less of the kernel.

(4) **Mixed Sorghum -** Sorghum which does not meet the requirements for any of the classes Sorghum, Tannin Sorghum, or White Sorghum.

Ref: United States Department of Agriculture, Agricultural Marketing Service, Federal Grain Inspection Service, U.S. Standards, Subpart I -- United States Standards for Sorghum, June 2008, www.ams.usda.gov/sites/default/files/media/SorghumStandards.pdf

c. Moisture in Grain Sorghum as a USDA Quality Grade Factor

Moisture (i.e., water content) is not a USDA quality grade-determining factor for grain sorghum. It was removed as a grade factor in 1988.

However, in commercial trade, moisture content is an important quality factor. It is measured and reported on all grade certificates because it is crucial for determining value, storability, and potential weight adjustments (shrinkage).

While the official quality "grade" (U.S. No. 1, 2, 3, 4, or Sample Grade) is based on other factors, buyers and sellers use moisture content to negotiate price and ensure the grain is suitable for storage or processing.

The most common standard for moisture for price calculation is typically 14%, with some USDA CCC business transacted on a 13.5% moisture basis.

As such, it would be recommended that the minimum acceptable grade for delivery against a new CME Grain Sorghum Future contract be USDA No.2 Sorghum, or better, with a maximum of 13.5% moisture.

d. CME Deliverable Optional U.S. Origin - Proposed

Currently, for both CME Corn and Kansas HRW Wheat deliveries, upon written request by a taker of delivery at the time loading orders are submitted, a futures contract for the sale of corn shall be performed on the basis of United States origin only.

It is assumed that deliveries against CME Grain Sorghum Futures would carry the same requirements.

e. CME Deliverable Grade / Grade Differentials – Proposed

The CME is currently recommending the Deliverable Grade / Grade Differentials for CME Grain Sorghum follow the same as for CME Corn, and delivery be:

- #1 Grain Sorghum at a 1.5 cent/bushel premium.
- #2 Grain Sorghum at par contract price; and,
- #3 Grain Sorghum at a 1.5 cent/bushel discount.

CME Corn Deliverable Grade / Grade Differentials

As a matter of reference, currently, for CME Corn deliveries, a contract for the sale of corn for future delivery shall be performed based on the grades officially promulgated by the Secretary of Agriculture as conforming to United States Standards at the time of making the contract. If no such United States grades shall have been officially promulgated, then such contract shall be performed based on the grades established by the Department of Agriculture of the State of Illinois, or the standards established by the Rules of the Exchange in force at the time of making the contract.

Current "Corn" Quality Differentials are:

CORN DIFFERENTIALS	
No. 1 Yellow Corn (maximum 15% moisture)	at 1½ cents per bushel over contract price
No. 2 Yellow Corn (maximum 15% moisture)	at contract price
No. 3 Yellow Corn (maximum 15% moisture)	at 2 cents per bushel under contract price if on account of broken corn and foreign material only (BCFM between 3.1 and 4%)
No. 3 Yellow Corn (maximum 15% moisture)	at 2 cents per bushel under contract price if on account of total damage only (total damage between 5.1 and 7%)
No. 3 Yellow Corn (maximum 15% moisture)	at 4 cents per bushel under contract price on account of both broken corn and foreign material (BCFM between 3.1 and 4%) and total damage (total damage between 5.1 and 7%).

Furthermore, upon written request by a taker of delivery at the time loading orders are submitted, CME Corn deliveries shall be performed based on United States origin only.

CME Kansas HRW Wheat Deliverable Grade / Grade Differentials

As a matter of reference, deliveries against a Kansas HRW Wheat futures contract shall be performed based on:

- No. 1 Hard Red Winter Wheat with an eleven percent (11%) protein level or higher deliverable at one and one-half cents (1.5¢) per bushel over contract price.
- No. 2 Hard Red Winter Wheat with an eleven percent (11%) protein level or higher deliverable at contract price. All above grades are deliverable at protein levels equal to or greater than ten and one-half percent (10.5%) but less than eleven percent (11%) at a ten-cent (10¢) per bushel discount to contract price.
- Protein levels of less than ten and one-half percent (10.5%) are not deliverable on the contract.
- Shipping certificates delivered in satisfaction of futures contracts to the Clearing House and registered with the Exchange must indicate thereon if wheat, a maximum of thirteen and one-half percent (13.5%) moisture.
- Shipping certificates delivered in satisfaction of futures contracts to the Clearing House and registered with the Exchange must indicate thereon, for wheat, a maximum of ten (10) IDK (indicating no more than 10 insect-damaged kernels per 100 grams).
- At load-out, the buyer may request vomitoxin testing. Wheat loaded out may contain no more than 2.0 parts per million vomitoxin.

2. CME Tariff Storage Rates

The CME is currently recommending that the tariff storage rate for grain sorghum delivered via a Shipping Certificate against a purchase of a futures contract be assessed at a rate of 8 cents per bushel per month (equivalent to 26.5/100 of one cent per bushel per day).

The storage charges for physically delivered corn must be paid up to the 18th day of the preceding month of delivery. These rates, along with interest costs, help determine the **"Full Financial Carry"**, which is a key factor in managing futures spread risk for market participants. *(Ref: Supplemental Information. C. Defining Full Financial Carry in this white paper, page 160)*

- **Base Storage Rates Harmonized**: The Exchange will also harmonize the base storage rates of the wheat contracts to approximately **8 cents per bushel per month**. This specific change is effective after the December 2026 expiry (December 17, 2026).
- **Increased Storage Rate for Shuttle Train Premium**: A premium of **10/100ths of one cent per bushel** over the prevailing storage rate will be paid by the stopper to the issuer for each day of loading saved due to the increased cadence of unit train loading.

a. Understanding storage rates and their impact

The CME Group sets a tariff storage rate for commodities held in a deliverable position, including corn and wheat, to help determine the **Full Financial Carry**, a key element in managing futures spread risk.

The storage rate is a key part of **Full Financial Carry**, which covers the costs of storing a commodity over time.
(Ref: Supplemental Information. C. Defining Full Financial Carry in this white paper, page 160)

The difference between nearby and deferred futures prices (the **temporal or time spread**) indicates the market's view on the value of storage.

Knowing these rates and their relationship with futures spreads is important for risk management and making informed decisions in grain markets. Wider spreads typically encourage or favor storage, while narrower or inverted spreads discourage storage.

It is also important to note that a range of various commodities available in the local area will compete for the same warehousing storage space, which will impact time spreads and warehousing costs across commodities.

b. Flat Rate - Storage Rates for Grain Sorghum

CME is recommending that the tariff storage rate for grain sorghum be the same as for corn and soybeans on the Illinois Waterway Delivery System (IWDS) are currently at a flat rate of 8 cents per bushel per month.

CME elected not to introduce a Variable Storage Rate (VSR) system for grain sorghum.

For Hard Red Spring (HRS) wheat, the current storage rate is 8 cents per bushel per month and may be considered for VSR in the future.

Interest costs are added to this to determine the **Full Financial Carry**.
(Ref: Supplemental Information. C. Defining Full Financial Carry in this white paper, page 160)

c. Flat Rate - Storage Rates for “River” Delivery Corn and Soybean Futures

The established CME tariff storage rate for corn and soybeans on the Illinois Waterway Delivery System (IWDS) is currently at a flat rate of 8 cents per bushel per month.

CME elected not to introduce a Variable Storage Rate (VSR) system for corn but chose to increase its fixed storage fees in 2008 and 2020.

Interest costs are added to this to determine the **Full Financial Carry**.
(Ref: Supplemental Information. C. Defining Full Financial Carry in this white paper, page 160)

d. Variable Storage Rate (VSR) for Wheat Futures - Storage Rates if “Kansas” Delivery

Unlike corn, the storage rate for Chicago Soft Red Winter Wheat and Kansas City Hard Red Winter Wheat futures contracts can fluctuate based on nearby futures spread performance through the **Variable Storage Rate (VSR)** method. This VSR system helps in assuring convergence of cash and futures markets when warehousing space becomes tight.

In wheat markets specifically, if the “carry” (Intra-Commodity “Calendar” Spread) gets wide enough, the exchange-regulated storage rate increases. This increases the "return on storage" for those with physical assets, as the market must offer an even larger spread to incentivize the storage of grain.

The VSR is calculated by observing nearby spreads relative to the **Full Financial Carry**. The maximum allowable storage charge increases if nearby spreads average 80% or more of Full Financial Carry, decreases if they average 50% or less, and remains the same if they are between 50% and 80%. While there's no upper limit for maximum charges, the minimum rate for Chicago and Kansas City wheat futures is about 5 cents per bushel per month.

The CME utilizes the concept of **“Full Financial Carry”** in its **Variable Storage Rate (VSR)** mechanism for wheat futures, aiming to improve cash-futures convergence at contract expiration. The VSR mechanism adjusts the maximum allowable storage charges based on how nearby spreads relate to Full Financial Carry.

Interest costs are added to this to determine the “**Full Financial Carry**”.
(Ref: Supplemental Information. C. Defining Full Financial Carry in this white paper, page 160)

D. Delivery Execution for CME Grain Sorghum

(per Kansas HRW Wheat)

1. Delivery Execution for Grain Sorghum (as per CME Kansas HRW Wheat)

Delivery on CME Kansas HRW Wheat futures contracts involves a defined process for physical delivery of the commodity. It is essential to understand both the process and the associated costs for participants who hold positions until the delivery period.

In addition, in its initial application to the CME Group Board and CFTC for regulatory approval, the CME Group intends to mirror the existing CME Kansas HRW Wheat contract *(with a few exceptions…),* ***which should help to expedite the process****, as well as minimize start-up costs.*

a. Delivery Process – (if presented as a Standard Operating Grain Contract)

(I.E., similar to CME Kansas HRW Wheat Futures)

1. Intention to deliver (Position Day): Sellers (short position holders) intending to deliver register a shipping certificate with CME Clearing. Buyers' (long position holders) open positions are ranked by how long they've been held, and the oldest positions are matched with the sellers.
2. Matching and invoicing (Notice Day): Both parties are notified of the match, and the buyer receives an invoice detailing the delivery amount.

3. Delivery and payment (Delivery Day): The buyer pays CME Clearing, which then transfers the payment to the seller and the shipping certificate to the buyer.

Once the buyer receives the shipping certificate, they can:

- redeliver or sell the certificate, or
- re-enter the market by selling futures and potentially redelivering the certificate.
- hold it and pay storage fees,
- load out the physical grain,
  (Loading out grain is most efficient when holding enough certificates at one location to fill a barge, and the cash basis supports this as the cheapest option.)

b. Delivery Process – (if presented as a Spread to Corn)

At the time of writing of this paper, this process is yet to be determined by the CME Group and CME Clearing.

- It is important to note here that the intent is to facilitate a "physical delivery" process very similarly as to how it is described immediately above.
- N.B., If the contract is established to trade as a spread to the CME Corn Futures Contract, the delivery process for grain sorghum must occur sufficiently prior to the First Notice Day of Corn Futures.

c. Delivery Costs

At the time of writing this paper, this process is yet to be determined by the CME Group and CME Clearing.

Associated costs include:

- **Delivery**: Delivery against a CME futures contract is made via a **Shipping Certificate** at par value (i.e., a basis of 0).
- **Delivery Location Differentials**: Location Differentials may apply depending on the delivery location.

  For Example: The Location Differential for delivery in Kansas City = 0 (par value) / -1 cent, in Wichita = -6 / -7 cents/bushel, in Hutchinson = -9 / -10 cents/bushel, in Salina / Abilene = -12 / -13 cents/bushel.

  These differentials can change and should be confirmed in the CME Group Rulebook - Chapter 14 Wheat Futures.

- **Load Out Charges**: A load charge of 9 cents will need to be added to the calculation.

At this point in the calculation, the Delivery Value Equivalent (DVE) of grain FOB the delivery point has been determined.

- **Grade and Quality Adjustments**: Delivery price and payments are also adjusted based on the grain quality factors and grade. No. 1 Yellow corn may receive a premium, while No. 3 Yellow corn may be discounted based on factors like broken corn and foreign material.

  For the purpose of these quality calculations, adjustments are usually made until the end of the calculation, such that a comparison can be made to CME quality premium/discount schedules and the prevailing markets.

- **Storage Charges**: If the shipping certificate is held, storage charges accrue daily and are collected and distributed monthly by CME Clearing.

  The set CME tariff storage rate for corn on the Illinois Waterway Delivery System (IWDS) is currently a flat rate of 0.265 cents per day, or approximately 8 cents per bushel per month. It is intended to be the same for CME grain sorghum.

- **Freight and Transportation**: Costs for moving grain will vary based on commodity, transport mode, and distance, with freight rates significantly influencing basis values, particularly into export hubs like New Orleans or Texas Gulf, etc.

  For wheat and grain sorghum, rail rates from the CME Kansas Delivery Market are generally cheaper to the Texas Gulf location, when compared to rates to the Center Gulf location in New Orleans.

  If transportation is to be via a rail shipment, it is very likely that the tariff rate (or contract value) of this freight will need to be adjusted by the current market premium or discounted value in the secondary market.

  N.B., that net weights in rail cars can vary and will typically range from 222,000 to 226,000 pounds (111 to 113 short tons).

  In addition, a CME Shuttle Train premium of 14 cents per bushel may also need to be added.

  It is also likely that a Fuel Surcharge may need to be added to the cost of transportation.

- **Weights & Grades**: An estimated cost of 2 cents per bushel is added for both a Weight Certificate and a Grade Certificate. These documents are required to have a merchantable lot of grain ready for conveyance.

At this point in the calculation, the Delivery Value Equivalent (DVE) for grain **Delivered NOLA / Texas Gulf** has been determined.

At these delivery points, there usually exists a liquid secondary market that will allow the determination of whether the current physical cash market values are above or below DVE.

- By adding additional cost estimates to these calculations, DVE values can be extended to a **FOB Gulf** and/or **C&F** basis.

d. Calculating Delivery Value Equivalents (DVE) – CME Re-Established Grain Sorghum

December CBOT Grain Sorghum Futures		
(Receive Shipping Certificates in Hutchinson, Kansas)		
Take Delivery		+ 0 cents/bu
Hutchinson Discount	- 9	
Storage *(4 cents for 14+/- days)*	+ 4	
Interest *(1 cent for 14+/- days)*	+ 1	
Load Out Charge		+ 9
Shuttle Train Premium	+14	
Weights + Grades		+ 2
DVE FOB Rail		**+21 SZ**
Freight to Gulf	+112	
Rail Tariff - $3,935/car (Shuttle Train)		
Market Prem/Disc - $500/car		
Fuel Surcharge - $0.00/car		
Net Weight *(222,000 lbs/car / 56 lbs/bu)*		
DVE Texas Gulf		**+133 SZ**
Fobbing		+ 28½
DVE FOB Gulf		**+161½ SZ**
Costs and Vessel Freight (US$64.00/mt)		+162¾
Insurance		+ 1½
DVE C&F		**+325¾ SZ**

The DVE for the CME Re-Established Grain Sorghum Contract can be calculated daily using the current rules found in the CME Group Rulebook - Chapter 14 Wheat Futures. The calculation includes factors like the futures contract price, Location Differentials, estimated Storage & Interest Costs, Load Out Charges, Weight and Grade Certificates, Rail Freight, etc.

To determine if the futures market has converged with the underlying physical cash market, the current calculation for DVE is then compared to the current basis value for Delivered Track Texas Gulf; i.e., the physical price for grain sorghum delivered by rail to Texas Gulf.

Other comparisons can also be made to secondary physical cash markets on an FOB and C&F destination countries basis.

The following table on page 61 sets forth an example of the calculations for the range of CME deliverable locations to the Texas Gulf.

e. Market Dynamics of Delivery Execution for Grain Sorghum

Role in Convergence: “Makers” and “Takers” through the delivery process help ensure that cash and futures prices converge at expiration. Their decision to make “delivery” helps link the two markets and keeps their prices in line with each other.

It is this combination of market dynamics, as a delivery period approaches, that also drives both physical cash basis value, as well as the **intra-commodity “calendar” spread**s (i.e., carries).

Making Delivery by the "Short"

Defining a "DVE" (Delivery Value Equivalent) from a "Short" or "making delivery" perspective and its relevance to a "Short" grain sorghum futures position and the physical cash price.

From the perspective of "Deliverable" Grain Elevator and Warehousing Facility

By being "short" a CME futures contract, a company operating a "deliverable" grain elevator and warehousing facility can "sell" in every deliver period a DVE FOB Basis Value for this facility of:

- Kansas City +16
- Wichita +10
- Hutchinson +7
- Salina / Abilene +4

And, at this delivery point (market), in a delivery month, the cash market should always converge to a minimum price of futures delivery value equivalents (DVE).

N.B., The above values do not include the 14 cents per bushel premium for loading a shuttle train. This represents an attractive incentive to load a shuttle train, further increasing elevating margins.

As long as the company can originate grain sorghum below this DVE, they are able to generate a profitable merchandising margin.

- **What does the "short" do when the physical cash basis in the marketplace is bid lower than the CME DVE?**

  In this situation, the company operating a "deliverable" grain elevator and warehousing facility will make delivery of the grain sorghum against a "short" CME futures position.

- **What does the "short" do when the physical cash basis in the marketplace is bid at levels higher than the CME DVE?**

  In this situation, the company operating a "deliverable" grain elevator and warehousing facility will buy back in the "short" CME futures position and then sell the grain sorghum into the physical cash market.

  Or, the CME intra-commodity "calendar" spreads (carry) will widen to pay the market sufficient carrying charges.

  In this situation, the company operating a "deliverable" grain elevator and warehousing facility will buy back in the "short" CME futures position and simultaneously sell a forward CME futures position, locking in the market "carry" revenue, and then carry the inventory forward to the next delivery period.

  This is done at a price level that will cover the costs and interest, as well as generate sufficient returns to the company's available warehouse space.

Taking Delivery by the "Long"

Defining a "DVE" (Delivery Value Equivalent) from a "Long" or "taking delivery" perspective and its relevance to a "Long" grain sorghum futures position and the physical cash price.

From the perspective of an End User or Exporter

By being "long" a CME futures contract, an "End User" or "Exporting" company can be assured of receiving physical grain in a delivery period at any one of the delivery points (seller's option) at a DVE FOB Basis Value:

- Kansas City +16
- Wichita +10
- Hutchinson +7
- Salina / Abilene +4

And at least one of these delivery points, in a delivery month, the cash market should always converge to a maximum price of futures delivery value equivalents (DVE).

N.B., The "Long" is most likely to receive deliveries at the location where its DVE Value is relatively the cheapest to the prevailing market value.

N.B., The above values do not include the 14 cents per bushel premium for loading a shuttle train. This will add an additional cost, but also capture a more competitive rail rate to the final destination, more than compensating for the premium load-out charges. Delivery dynamics will most likely be driven by possible convergence with either the "shuttle train" markets (domestic or export), or convergence with the single car rail market (or if road truck loadout is adopted, with local road truck markets).

- **What does the "long" do when the physical cash basis in the marketplace is offered at levels lower than the CME DVE?**

  In this situation, the company will simultaneously sell the "long" CME futures position and then purchase the grain sorghum in the physical cash market at the lower values.

- **What does the "long" do when the physical cash basis in the marketplace is offered at levels higher than the CME DVE?**

  In this situation, the "End User" or "Exporting" company can be assured of receiving physical grain in a delivery period at any one of the delivery points (seller's option) at a DVE FOB Basis Value.

  In this situation, the "End User" or "Exporting" company will stand in as a strong "stopper" / "taker" of delivery. They will not let the "short" out of their position until such time that the physical cash market has moved to a point where they can purchase grain sorghum at or below DVE values.

  These market dynamics are likely to support the nearby CME futures price, as well as narrowing the **intra-commodity "calendar" spread**s (i.e., narrowing the carries or pushing the market to a greater inverse). These market dynamics both encourage farmer selling with higher physical cash prices, as well as encourage the selling of commercial **hedged stocks**.

f. CME Grain Sorghum Delivery Economics – DRAFT

Kansas - Grain Sorghum

For Export/Import Markets

22-February-2026				gha			
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CORRECTED 22 FEB 2026			**Kansas City**	**Wichita**	**Hutchinson**	**Salina / Abilene**	
			(UP)	(UP)	(UP)	(UP)	
"Stopping" Futures							
Location Differential			0.0	-6.0	-9.0	-12.0	
Load Out Charges			9.0	9.0	9.0	9.0	Note: 8 cents to 9 cents, plus VSR
Quality Prem/Disc*			0.0	0.0	0.0	0.0	*Add or Subtract quality assumptions at the end
Weights			1.0	1.0	1.0	1.0	
Grades			1.0	1.0	1.0	1.0	
Storage Charges			4.0	4.0	4.0	4.0	Note: 1/2 of 8 cents / month
Interest			1.0	1.0	1.0	1.0	Note: 6.0% apr for 2 weeks
FOB WRH Value			**16.0**	**10.0**	**7.0**	**4.0**	
Transportation to Gulf		HGB					
Single Car Rate $/Car			$4,955	$4,935	$4,935	$4,935	Note: This is a market that trades. Single Car vs Shuttle Train Rates
Single Car Additional Cost $/Car			$500	$500	$500	$500	Market Value +/- of Rail Equipment $/Car
Fuel Sir Charge			$0	$0	$0	$0	ADD Fuel Sir-Charge
Car Weigh in lbs			222,000	222,000	222,000	222,000	Net Standard Cars
Cents/Bu.			**137.6**	**137.1**	**137.1**	**137.1**	
Premium for 110 Car Shuttle Train			14.0	14.0	14.0	14.0	Note: 14 cent Lout Out Premium
Shuttle Car Rate Tariff $/Car			$3,955	$3,935	$3,935	$3,935	Tariff Rate per $/Car to Texas Gulf (25 Jan 2026)
Shuttle Car Additional Cost $/Car			$500	$500	$500	$500	Market Value +/- of Rail Equipment $/Car
Fuel Sir Charge			$0	$0	$0	$0	ADD Fuel Sir-Charge
Car Weigh in lbs			222,000	222,000	222,000	222,000	Net Heavy High Capacity Cars
Cents/Bu.			**126.4**	**125.9**	**125.9**	**125.9**	
Spread = Single Car - Shuttle Train		Car	1,000.0	1,000.0	1,000.0	1,000.0	
		per Bu	11.2	11.2	11.2	11.2	
Del Texas Gulf			**142.4**	**135.9**	**132.9**	**129.9**	
FOBing Costs	/mt	$10.00	25.4	25.4	25.4	25.4	Note: In $/mt DVE = cents/bu
Phyto-Sanitary Cert			0.4	0.4	0.4	0.4	
Weights, Grades, Etc...			1.0	1.0	1.0	1.0	
FOB Texas Gulf			**169.2**	**162.7**	**159.7**	**156.7**	

2. Delivery Execution as per CME Kansas HRW Wheat (for comparison)

Delivery on CME Kansas HRW Wheat futures contracts involves a defined process for physical delivery of the commodity. It is essential to understand both the process and the associated costs for participants who hold positions until the delivery period.

In addition, in its initial application to the CME Group Board and CFTC for regulatory approval, the CME Group intends to mirror the existing CME Kansas HRW Wheat contract, which should help to expedite the process, as well as minimize start-up costs (with a few exceptions…).

a. Delivery Process

The delivery process unfolds over three days:

1. Intention to deliver (Position Day): Sellers (short position holders) intending to deliver register a shipping certificate with CME Clearing. Buyers' (long position holders) open positions are ranked by how long they've been held, and the oldest positions are matched with the sellers.
2. Matching and invoicing (Notice Day): Both parties are notified of the match, and the buyer receives an invoice detailing the delivery amount.
3. Delivery and payment (Delivery Day): The buyer pays CME Clearing, which then transfers the payment to the seller and the shipping certificate to the buyer.

Once the buyer receives the shipping certificate, they can hold it and pay storage fees, load out the physical grain, redeliver or sell the certificate, or re-enter the market by selling futures and potentially redelivering the certificate. Loading out grain is most efficient when holding enough certificates at one location to fill a barge, and the cash basis supports this as the cheapest option.

N.B., The delivery process is detailed in the CME Group's Rulebook. Participants considering physical delivery should consult these rules.

b. Delivery Costs

Associated costs include:

- **Delivery**: Delivery against a CME futures contract is made via a **Shipping Certificate** at par value (i.e., a basis of 0).
- **Delivery Location Differentials**: Location Differentials may apply depending on the delivery location.

  For Example: The Location Differential for delivery in Kansas City = 0 (par value) / -1 cent, in Wichita = -6 / -7 cents/bushel, in Hutchinson = -9 / -10 cents/bushel, in Salina / Abilene = -12 / -13 cents/bushel.

  These differentials can change and should be confirmed in the CME Group Rulebook - Chapter 14 Wheat Futures.

- **Load Out Charges**: A load charge of 9 cents will need to be added into the calculation.

At this point in the calculation the Delivery Value Equivalent (DVE) of grain FOB the delivery point has been determined.

- **Grade and Quality Adjustments and Differentials**: Delivery price and payments are also adjusted based on the grain quality factors and grade. This is to be done on the basis of USDA Grade Standards at the time of making the contract, and/or the standards established by the Rules of the Exchange.

  For the purpose of these quality calculations, adjustments are usually made until the end of the calculation, such that a comparison can be made to CME quality premium/discount schedules and the prevailing markets.

- **Storage Charges**: If the shipping certificate is held, storage charges accrue daily and are collected and distributed monthly by CME Clearing.

  Unlike corn, the storage rate for Chicago Soft Red Winter Wheat and Kansas City Hard Red Winter Wheat futures contracts can fluctuate based on nearby futures spread performance through the **Variable Storage Rate (VSR)** method.

- **Freight and Transportation**: Costs for moving grain will vary based on commodity, transport mode, and distance, with freight rates significantly influencing basis values, particularly into export hubs like New Orleans or Texas Gulf, etc.

  For wheat and grain sorghum, rail rates from the CME Kansas Delivery Market are generally cheaper to the Texas Gulf location, when compared to rates to the Center Gulf location in New Orleans.

  If transportation is to be via a rail shipment, it is very likely the tariff rate (or contract value) of this freight will need to be adjusted by the current market premium or discounted value in the secondary market.

  N.B., that net weights in rail cars can vary and will typically range from 222,000 to 226,000 pounds (111 to 113 short tons).

  In addition, a CME Shuttle Train premium of 14 cents per bushel may also need to be added.

  It is also likely that a Fuel Surcharge may need to be added to the cost of transportation.

- **Weights & Grades**: An estimated cost of 2 cents per bushel is added for both a Weight Certificate and a Grade Certificate. These documents are required to have a merchantable lot of grain ready for conveyance.

At this point in the calculation, the Delivery Value Equivalent (DVE) for grain **Delivered NOLA / Texas Gulf** has been determined.

At these delivery points, there usually exists a liquid secondary market that will allow the determination of whether the current physical cash market values are above or below DVE.

- By adding additional cost estimates to these calculations, DVE values can be extended to a **FOB Gulf** and/or **C&F** basis.

c. Calculating Delivery Value Equivalents (DVE) – CME Kansas HRW Wheat

December CME Kansas HRW Wheat Futures		
(Receive Shipping Certificates in Hutchinson, Kansas)		
Take Delivery		+ 0 cents/bu
Hutchinson Discount	- 9	
Storage *(4 cents for 14+/- days)*	+ 4	
Interest *(1 cent for 14+/- days)*	+ 1	
Load Out Charge		+ 9
Shuttle Train Premium	+14	
Weights + Grades		+ 2
DVE FOB Rail		**+21 WZ**
Freight to Gulf	+122¼	
Rail Tariff - $4,0253/car (Shuttle Train)		
Market Prem/Disc - $500/car		
Fuel Surcharge - $0.00/car		
Net Weight *(222,000 lbs/car / 60 lbs/bu)*		
DVE Texas Gulf		**+143¼ WZ**
Fobbing		+ 28¾
DVE FOB Gulf		**+172 WZ**
Costs and Vessel Freight (US$64.00/mt)		+174¼
Insurance		+ 1½
DVE C&F		**+347¾ WZ**

The DVE for the CME Kansas HRW Wheat Contract can be calculated daily using the current rules found in the CME Group Rulebook - Chapter 14 Wheat Futures. These calculations include factors like the futures contract price, Location Differentials, estimated Storage & Interest Costs, Load Out Charges, Weight and Grade Certificates, Rail Freight, etc.

To determine if the futures market has converged with the underlying physical cash market, the current calculation for DVE is then compared to the current basis value for Delivered Track Texas Gulf; i.e., the physical price for grain sorghum delivered by rail to Texas Gulf.

Other comparisons can also be made to secondary physical cash markets on an FOB and C&F destination countries basis.

The following table sets forth an example of the calculations for the range of CME deliverable locations to Texas Gulf:

d. CME Kansas HRW Wheat Delivery Value Equivalents (DVE) – 2026/27 REVISED

Delivery Value Equivalents

Revised - Kansas Hard Red Winter Wheat

For Export/Import Markets

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		Kansas City (UP)	Wichita (UP)	Hutchinson (UP)	Salina / Abilene (UP)	
"Stopping" Futures						
Location Differential		0.0	-6.0	-9.0	-12.0	
Load Out Charges		9.0	9.0	9.0	9.0	Note: 8 cents to 9 cents, plus VSR
Quality Prem/Disc*		0.0	0.0	0.0	0.0	*Add or Subtract quality assumptions at the end
Weights		1.0	1.0	1.0	1.0	
Grades		1.0	1.0	1.0	1.0	
Storage Charges		4.0	4.0	4.0	4.0	Note: 1/2 of 8 cents / month
Interest		1.0	1.0	1.0	1.0	Note: 6.0% apr for 2 weeks
FOB WRH Value		**16.0**	**10.0**	**7.0**	**4.0**	
Transportation to Gulf	HGB					
Single Car Rate $/Car		$5,125	$5,025	$5,025	$5,025	Note: This is a market that trades. Single Car vs Shuttle Train Rates
Single Car Additional Cost $/Car		$500	$500	$500	$500	Market Value +/- of Rail Equipment $/Car
Fuel Sir Charge		$0	$0	$0	$0	ADD Fuel Sir-Charge
Car Weigh in lbs		222,000	222,000	222,000	222,000	Net Standard Cars
Cents/Bu.		**152.0**	**149.3**	**149.3**	**149.3**	
Premium for 110 Car Shuttle Train		14.0	14.0	14.0	14.0	Note: 14 cent Lout Out Premium
Shuttle Car Rate Tariff $/Car		$4,125	$4,025	$4,025	$4,025	Tariff Rate per $/Car to Galvaston
Shuttle Car Additional Cost $/Car		$500	$500	$500	$500	Market Value +/- of Rail Equipment $/Car
Fuel Sir Charge		$0	$0	$0	$0	ADD Fuel Sir-Charge
Car Weigh in lbs		222,000	222,000	222,000	222,000	Net Heavy High Capacity Cars
Cents/Bu.		**139.0**	**136.3**	**136.3**	**136.3**	
Spread = Single Car - Shuttle Train	Car	1,000.0	1,000.0	1,000.0	1,000.0	
	per Bu	13.0	13.0	13.0	13.0	
Del Texas Gulf		**155.0**	**146.3**	**143.3**	**140.3**	
FOBing Costs	$10.00	27.2	27.2	27.2	27.2	Note: In $/mt DVE = cents/bu
Phyto-Sanitary Cert		0.4	0.4	0.4	0.4	
Weights, Grades, Etc…		1.0	1.0	1.0	1.0	
FOB Gulf		**183.6**	**174.9**	**171.9**	**168.9**	

3. Delivery Execution as per CME Corn (for comparison)

Delivery on CME Corn futures contracts involves a defined process for physical delivery of the commodity. It is essential to understand both the process and the associated costs for participants who hold positions until the delivery period.

N.B., that Load Out for CME Corn can only be facilitated by conveyance to a barge.

a. Delivery Process

The delivery process unfolds over three days:

4. Intention to deliver (Position Day): Sellers (short position holders) intending to deliver register a shipping certificate with CME Clearing. Buyers' (long position holders) open positions are ranked by how long they've been held, and the oldest positions are matched with the sellers.
5. Matching and invoicing (Notice Day): Both parties are notified of the match, and the buyer receives an invoice detailing the delivery amount.
6. Delivery and payment (Delivery Day): The buyer pays CME Clearing, which then transfers the payment to the seller and the shipping certificate to the buyer.

Once the buyer receives the shipping certificate, they can hold it and pay storage fees, load out the physical grain, redeliver or sell the certificate, or re-enter the market by selling futures and potentially redelivering the certificate. Loading out grain is most efficient when holding enough certificates at one location to fill a barge, and the cash basis supports this as the cheapest option.

Important Note: The delivery process is detailed in the CME Group's Rulebook. Participants considering physical delivery should consult these rules.

b. Delivery Costs

Associated costs include:

- **Delivery Location Differentials**: Location Differentials may apply depending on the delivery location.

  For Example: Delivery from the Peoria-Pekin Shipping District may have an 8.75 cents per bushel premium, while the St. Louis-East St. Louis and Alton Switching Districts may have a 16.25 cents per bushel premium. These differentials can change and should be confirmed in the CME Group Rulebook Chapter 10 – Corn Futures.

- **Grade and Quality Adjustments**: Delivery price and payments are also adjusted based on the grain quality factors and grade. No. 1 Yellow corn may receive a premium, while No. 3 Yellow corn may be discounted based on factors like broken corn and foreign material.
- **Storage Charges**: If the shipping certificate is held, storage charges accrue daily and are collected and distributed monthly by CME Clearing.

  The set CME tariff storage rate for corn on the Illinois Waterway Delivery System (IWDS) are currently at a flat rate of 0.265 cents per day, or approximately 8 cents per bushel per month.

- Freight and transportation: Costs for moving the corn vary based on transport mode and distance, with barge freight rates significantly influencing basis values, particularly near export hubs like New Orleans.

Important Note: The delivery process is detailed in the CME Group's Rulebook. Participants considering physical delivery should consult these rules.

c. Calculating Delivery Value Equivalents (DVE) – CME Corn

For Chicago Board of Trade (CBOT) #2 Yellow Corn futures, the DVE can be calculated daily. The calculation includes factors like the futures contract price, Location Differentials, estimated Storage & Interest Costs, Load Out Charges, Weight and Grade Certificates, Barge Freight, etc.

December CBOT Corn Futures	
(Receive Shipping Certificates in Ottawa, Illinois)	
Take Delivery	+ 0 cents/bu
Ottawa Premium	+ 6¼
Storage & Interest	+ 3½
Load Out Charge	+ 9
Weights + Grades	+ 2
DVE FOB River	**+20¾ CZ**
Freight to Gulf +49¾	
Illinois River Barge Freight – 350%	
Tariff Rate at Ottawa, Illinois - $5.07/ short ton	
(2,000 lbs/short ton X 56 lbs/bu)	
DVE CIF NOLA	**+70½ CZ**
Fobbing	+.10
DVE FOB Gulf	**+80½ CZ**
Costs and Vessel Freight (US$44.00/mt)	+112
DVE C&F	**+192½ CZ**

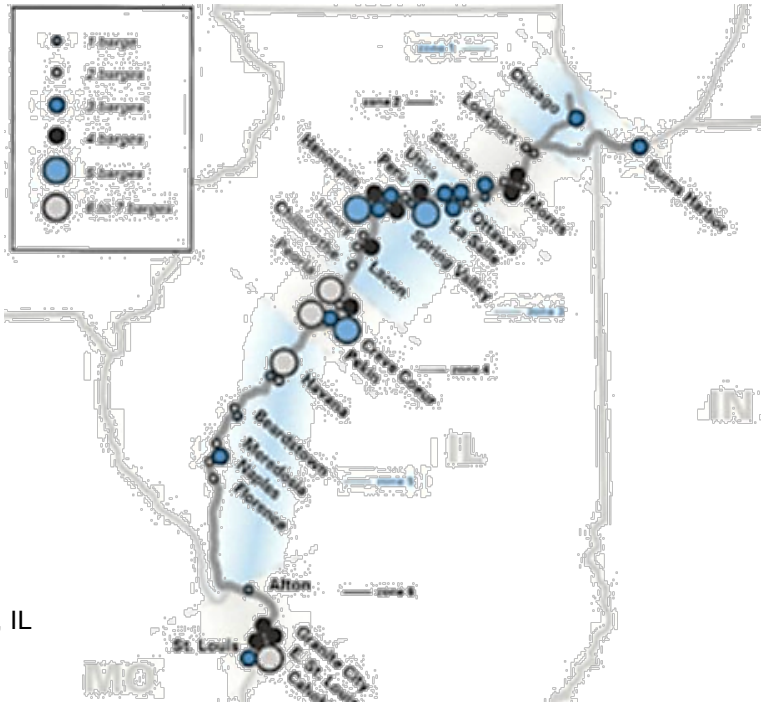
To determine if the futures market has converged with the underlying physical cash market, the current calculation for DVE is then compared to the current basis value for CIF NOLA (Costs, Insurance and Freight - New Orleans, Louisiana) Barge Corn, the physical price of corn delivered by barge to New Orleans.

Other comparisons can also be made to secondary physical cash markets on an FOB and C&F destination countries basis.

i. CME Delivery Location Differentials - Corn

Associated costs include CME Delivery Location Differentials at River Shipping Stations

- Chicago, IL – Burns Harbor, IN
  (to mile marker ILR 304)
  @ Par (0 cents/bu)
- Lockport, IL – Seneca, IL
  (to mile marker ILR 245)
  @ + 4¾ cents/bu
- Ottawa, IL – Chillicothe, IL
  (to mile marker ILR 170)
  @ + 6¼ cents/bu
- Peoria, IL – Pekin, IL
  (to mile marker ILR 151)
  @ +8¾ cents/bu
- Havana, IL – Grafton, IL
  (to mile marker ILR ***)
  @ +10¼ cents/bu
- St. Louis – East St. Louis – Alton, IL
  (to mile marker ILR ***)
  @ +16¼ cents/bu



ii. Tariff Barge Freight Rates for the Mississippi River System

	REGION LEGEND	¢ PER TON
1	Sioux City, IA	925
2	Blair, NE	828
3	Council Bluff, IA; White Cloud, KS; Brownsville/Nebraska City/Omaha/ Plattsmouth/Rock Bluff, NE	796
4	Atchison/Leavenworth, KS; St. Joseph, MO	718
5	Miami/Napoleon/Lexington/Glasgow/ Brunswick/Kansas City/Waverly, MO	648
6	Minneapolis/Red Wing/St. Paul/ Shakopee/Winona, MN; La Crosse, WI	619
7	Dubuque/Guttenberg/McGregor, IA	600
8	Chicago/South Chicago, IL	578
9	Catoosa, OK	564
10	Muscatine/Davenport, IA; Albany/ Rock Island/Keithsburgh/New Boston, IL	532
11	Lockport, IL	531
12	Muskogee, OK	526
13	Joliet/Morris/Seneca, IL	524
14	Gregory, MO; Greenbay Landing/ Meeker's Landing/Montrose/ Burlington, IA; Dallas City/Meyer Light/Nauvoo/Oquawka/Warsaw, IL	508
15	Chillicothe/Hennepin/Henry/Lacon/ LaSalle/Ottawa/Peru/Spring Valley, IL	507
16	Hannibal/LaGrange/Louisiana/ Winfield, MO; Quincy, IL	484
17	Creve Coeur/Kingston Mines/ Pekin/Peoria, IL	481

	REGION LEGEND	¢ PER TON
18	Ft. Smith, AR	472
19	Cincinnati, OH; Silver Grove, KY	469
20	Beardstown/Florence/ Frederick/Hardin/Havana/ Meredosia/Naples, IL	464
21	Louisville, KY	446
22	Owensboro, KY	404
23A	Mid-Mississippi River; Cape Girardeau/St. Louis, MO; Alton/Chester/ E. St. Louis/Fults, IL	399
23B	Ohio River; Evansville/Mt. Vernon, IN; Henderson, KY; Shawneetown, IL	399
24A	Ohio River; Cairo, IL; Hickman, KY	380
24B	Lower Mississippi River; Birds Point/Linda/New Madrid, MO	380
25	Heloise/Boothspoint/ Cottonwood Point, TN; Caruthersville, MO	354
26	Gold Dust/Hale Point, TN; Barfield Landing/Huffman/ Osceola, AR	351
27	Memphis, TN	314
28	Greenville/Mayerville/ Natchez/Vicksburg, MS; Grand Lake/Lake Village/ Cracraft Landing, AR	229

iii. Example of Market Barge Freight Rates for the Mississippi River System

Transportation					
	TW/NW/Aug	Sep	Oct	Nov	Dec
St. Paul Savage	425/425/425	425	450	450	
Dub South	425/425/425	425	450	425	
St. Louis 12'	400/390/400	390	400	350	275
Illinois	425/450/425	450	440	400	350
OH/Jeff/Cinn	325/325/325	325	425	375	300
Gulf/PNW	$0.650 / bushel				
BN Shuttles	-50/-100/-100	-150	-200		100
UP Shuttles	//	-125	-150	-150	88

The term **CIF NOLA** (**Cost, Insurance, and Freight New Orleans**) means the seller is responsible for all costs, insurance, and freight of the cargo delivered to the port of New Orleans.

The cost of barge freight is typically calculated as a function of a **percentage of the benchmark tariff rate** *(dollars per short ton or 2,000 lbs.)* plus various surcharges, primarily based on current market conditions, fuel costs, and river conditions.

Calculation Method

To determine the rate in dollars per ton, multiply the current market rate (expressed as a percentage of the tariff) by the established 1976 benchmark rate for the specific location on the river.

In the Example Above: For a barge loading on the Illinois River in Ottawa, IL, the Region (between Ottawa and Chillicothe, IL) par benchmark Barge Tariff Rate is **$5.07 per short ton** , with the current market rate is 350% of the tariff for a December southbound barge, would result in a Cost of Barge Freight to be **3.5 times the Tariff Rate = $17.745 / short ton or – $0.49¾ / bushel of corn** ($17.745/short ton / 2,000 lbs/short ton X 56 lbs./bushel of corn).

E. Current Proposed Timeline for Listing

The currently anticipated timeline for the listing of a new grain sorghum derivative and futures contract by the CME Group is yet to be determined and will be publicly announced when appropriate.

V. Potential Impact and Concerns

The introduction of a viable and successful Grain Sorghum Future contract would present several significant opportunities for not only the related derivative and futures markets, but also for the underlying physical cash market. These would include, but not be limited to:

- Greater independent pricing of grain sorghum, separate from that of corn, provides a more transparent, centralized price discovery mechanism that better reflects national and international supply and demand dynamics.
- The increased capacity of the trade to establish sufficient liquidity to sustain a viable grain sorghum derivative and futures contract.
- Price volatility can be expected to decline as futures markets tend to stabilize prices by improving market completeness and allowing for the transfer of risk.
    - More effective price discovery for both “spot” and “forward” markets.
    - A more robust cash market with a well-defined forward curve in both cash and futures.
- Greater market transparency and efficient price differentiation of inter-commodity spreads.
- A more well-defined, active, and robust **“basis”** pricing across the grain sorghum marketing system, along with decreasing basis volatility, while improving certainty in hedging strategies. This will extend throughout the supply chain, extending from the producer through to the end user, including the exporter and importer.
- A more effective hedging mechanism for grain sorghum, along with a significant reduction in basis risk in the physical cash markets.
- Improved margins for storing and warehousing.

However, the situation would also come with several risks and concerns. As such, consideration will be given to their potential impact throughout the following section.

The following are a number of general impacts and concerns arising from the re-establishment of a Grain Sorghum Futures Contract that have not been adequately discussed above.

Later in the white paper, more specific issues arising are discussed in Section VII. Initial Comments and Concerns from the Trade, on page 114.

A. Price Risk

The impact of futures markets on the stability of commodity prices remains a topic that prompts much discussion. Academic literature generally suggests that the introduction of futures markets acts as a stabilizing force on agricultural commodity prices through improved price discovery, efficient inventory management, and risk transfer.

The broadly accepted standard in agricultural economics regarding the interrelations between futures and spot markets for agricultural commodities is that the introduction of futures markets allows for more efficient price discovery by market participants, facilitating the transfer of risk from hedgers to speculators, along with a more orderly allocation of commodities over time. The distribution of products through time, price discovery, and risk transfer associated with the presence of commodity futures are believed to help alleviate some of the erratic price movements, or volatility, that are common in commodity markets; hence, futures markets have stabilizing effects on spot market prices for storable commodities (e.g., Tomek and Kaiser, 2014; Ferris, 2005 [xxii]).

This question has inspired a large body of empirical work on the impact of futures markets on commodity price stability. Worth noting here are the studies using the introduction (or abolishment) of futures markets, such as the ones for onions (Working, 1960; Gray, 1963), pork bellies and beef (Powers, 1970), live cattle (Taylor and Leuthold, 1974 [xxiii]), wheat (Netz, 1995[xxiv]), and potatoes (Morgan, 1999). In almost all cases, the authors conclude that in the years following the introduction (abolishment) of a futures market, the volatility in the commodity spot prices were lower (higher) than in the years before. These results suggest that a stabilizing effect of futures markets does exist and can be dominant, at least in a certain period following a futures market's introduction.[xxv] However, it should be noted that there remain opposing views as well.

Without a futures market for grain sorghum, producers, end users, and supply chain participants are more exposed to price risk and market volatility than they would be if there were an adequately functioning grain sorghum derivative and futures market.

Another impediment to developing a more robust grain sorghum industry supply chain is the lack of a readily available, transparent, and dynamic forward pricing curve capable of sending market signals to producers, through to the end users.

Restated, the lack of a dedicated futures or derivative contract for grain sorghum results in several problems for farmers, end users, and the market, which are primarily centered on increased price risk and reduced risk management efficiency.

With a directly related derivative and sorghum futures market, participants would be able to lock in futures prices for a future date, thereby enabling hedging and managing price risks.

The lack of a dedicated sorghum futures or derivative contract creates several market problems for grain sorghum. These are primarily centered on price risk management challenges and the use of the corn futures contract as a less effective cross-hedging substitute.

Ultimately, the lack of a dedicated futures contract leaves sorghum producers and the wider supply chain with fewer formal market tools to manage risk, relying instead on less efficient methods like cross-hedging with corn futures, forward contracts with buyers, or crop insurance.

The reintroduction of new CME grain sorghum derivative and futures contracts would likely lead to a reduction in price volatility in the physical cash market due to better risk transfer and price discovery, while its impact on the futures market volatility itself is theoretically debatable; however, current thought would generally lead one to assume an increased market price stabilization.

1. Impact on Futures Markets

Economic literature and theoretical evidence are not entirely conclusive on whether futures trading increases or decreases the volatility of the underlying asset itself.

- One viewpoint argues that futures markets stabilize prices by improving market completeness, allowing for the transfer of risk and the allocation of commodities over time. (e.g., Tomek and Kaiser, 2014 [xxvi])
- The opposing theory suggests that futures markets can attract less informed traders who, due to leverage, might increase volatility. (e.g., Johan de Jong, Joep Sonnemans, Jan Tuinstra, 2022 [xxvii])

The futures market provides a transparent, centralized price discovery mechanism that better reflects national and international supply and demand dynamics, which improves **market efficiency** and helps stabilize local cash prices.

2. Impact on Physical Cash Markets

- **Reduced Basis Risk**: The primary impact in the physical market would be a significant reduction in basis risk (the difference between local cash price and the futures price). A direct futures contract ensures better convergence of cash and futures prices as the contract expiration approaches, which in turn reduces local price volatility and uncertainty for farmers, elevators, and end-users.

  The net result will be:

  - A less volatile and more well-quantified sorghum “basis” when calculated against CME grain sorghum futures;
  - A large portion of the previous volatility in the grain sorghum basis (when priced vs. corn) is now being expressed in the “Inter-Commodity Spread” between CME Grain Sorghum vs. CME Corn;
  - And the net combined volatility of the two (CME grain sorghum futures, plus the grain sorghum basis) is less than before.

  [Ref: Section Supplemental Information C. Component Pricing – page 153]

- **Inter-Commodity Spread Volatility**: With the reintroduction of a new CME grain sorghum derivatives and futures contract, grain sorghum will be priced as a separate and unique commodity compared to corn, decreasing the risk of inter-commodity spread volatility.

  Inter-commodity spread volatility can complicate hedging efforts and increase the risk of financial loss if market trends move against a trader's position.

  As such, a significant portion of the grain sorghum basis volatility (i.e., inter-commodity spread volatility) experienced when pricing grain sorghum against corn will be reduced or eliminated.

- **Enhanced Hedging Effectiveness**: With a direct hedging instrument for grain sorghum, participants can better offset their cash market positions, transferring price risk to speculators and mitigating the impact of large, unexpected price fluctuations on their bottom line.

  This will provide greater price transparency, with reduced risk and greater security for all stages of the supply chain.

B. Efficient Price Discovery and Transparency

Price Discovery is the uninterrupted process of determining a common market price or value for an asset through the continuous interaction of buyers and sellers.

Futures Prices established on a well-regulated exchange reflect the collective expectations of all market players, integrating information on supply, demand, input costs, and alternative uses. This applies to both nearby “spot” prices, as well as forward prices extending into the foreseeable future.

This market action represents the point where supply (i.e., offers) and demand (i.e., bids) curves intersect, providing a reliable signal for efficient allocation of the limited agricultural assets of grains, oilseeds, and other agricultural products.

These concepts are consistent with the **Efficient Market Hypothesis** (EMH), popularized by Eugene Fama in the 1970s, which states; “financial asset prices reflect all available information…”. EMH implies that market prices are always fair, and only new information causes prices to move.

Price Transparency refers to the universal and real-time availability of market information to all participants, regardless of their size or location.

- **Visibility**: Market participants can see the same information at the same time, such as the exact prices and times at which trades are executed, as well as "market depth" (typically the top five levels of bids and offers).
- **Equal Access**: A small country elevator in the corn belt, as well as a large institutional firm in New York, sees the same prices, alongside the bid and ask quotes simultaneously.
- **Public Reporting**: Transparency is maintained through mandated reporting of large trade positions by the CFTC and the exchange’s dissemination of volume and historical data.

1. Supporting Exchange Activities

In organized agricultural markets, such as those run by the CME Group, futures contracts help establish prices and ensure transparency. The exchange acts as a centralized, high-speed auction for a variety of commodities, enabling real-time reporting of prices and trading volumes.

Centralized Price Discovery

Within an organized futures exchange like the CME, all trades are recorded, and active bids and offers are gathered and publicly posted. This provides all participants with a highly visible real-time overview of real-time market activity and available grain prices.

Because the exchange information is electronically published and accessible worldwide, a trader in Europe and a farmer in the U.S. see the same real-time live quotes simultaneously, ensuring a fair and competitive environment.

With established standardized contract terms, including quantity, quality, and delivery location, the market removes all variables except price. This allows market participants to focus solely on

"price discovery" and the value of the commodity rather than negotiating each unique set of individual contract terms.

Market participants have the capacity to rapidly integrate new information and data, such as USDA WASDE reports or weather forecasts, into exchange-traded futures prices. This makes the futures more timely and accurate in reflecting the current market "consensus" of the prevailing current price.

Enhancing Market Transparency

Transparency for prices of commodities traded on an organized exchange, including current bids and offers, ensures that all market participants have equal access to the information that drives prices.

Exchanges such as the CME Group publish real-time bid/ask prices, along with historical data and other supporting information. This prevents "information asymmetry," where large players might otherwise have an unfair advantage over smaller producers.

An Exchange's Role in Forward Pricing of Physical Cash Markets

Futures prices serve as the primary benchmark for the physical cash market. Farmers, country elevators, and end users alike use the corresponding "futures price" as a starting point for valuing grain, with the local cash price then adjusted against the related futures price via a locally determined "basis" value. This "basis" value takes into account local fundamentals of supply and demand, logistics, transportation, etc.

Central Counterparty (CCP) Clearing

Exchange-regulated Clearing Houses provide anonymity to participants while virtually eliminating counterparty risk. This encourages a more open and confident trading environment. This helps to eliminate "counterparty risk" by allowing more participants to enter the market, increasing liquidity and the accuracy of price signals.

Daily Mark-to-Market: Through the clearing process, contracts are settled daily, meaning gains and losses are transferred twice a day. This frequent "reset" keeps market prices grounded in current financial realities.

In addition, this Mark-To-Market process can also be applied to physical cash grain inventories and open forward contracts to determine potential financial exposures based on current market prices.

Regulatory Oversight

In the U.S., the Commodity Futures Trading Commission (CFTC) enforces reporting requirements and position limits, ensuring that large speculative trades are visible to regulators and do not cause "disproportionate" or hidden volatility.

In essence, it is widely accepted that a dedicated, viable futures contract is a valuable tool for improving the efficiency of price discovery and improving price transparency. Through the same means, it ultimately reduces the price volatility experienced by participants in the underlying physical cash markets.

2. Supporting USDA Government Activities

The USDA's **Agricultural Marketing Service (AMS)**, specifically the Livestock, Poultry, and Grain Market News Division, reports daily cash prices for grain sorghum. These reports include local grain bids, price spreads, and basis calculations for coarse grains, including sorghum, collected from various company websites and industry reports. In addition, the **National Agricultural Statistics Service (NASS):** Reports monthly and annual average prices received by farmers, which can be used for historical analysis.

However, these organizations and reports lack the timeliness of "real-time" information and reporting.

Without timely, transparent, and public price discovery mechanisms, it is increasingly problematic for the market to determine grain sorghum's true market value, particularly when attempting to determine a forward price. The lack of timely and important market activity presents challenges for producers and end users alike when budgeting for their crop production at the time of planting or harvest, future consumption or processing, and making planning more difficult.

C. Access to Information and Market Asymmetry

Timely market information is of fundamental importance, allowing market participants to make informed, rational decisions that ideally lead to a more efficient allocation of resources.

Market Asymmetry occurs when there is an imbalance in information, power, or price transmission between participants, resulting in inefficient, non-linear market behaviors. It frequently manifests as a divergence from theoretical, perfect market models where all traders have identical information and where prices move symmetrically up or down. The impact can result in more volatile price movements, wider margin requirements for supply chain participants and intermediaries, and delays in price adjustments as negative news and information frequently result in more immediate and stronger price shocks than positive news.

1. Market Information

For sorghum, market information flow is limited, less formal, and relegated to regional cash markets, potentially leading to information asymmetry between market participants, including producers, end users, exporters, importers, and other supply chain operators.

In a competitive environment, access to market information (proprietary or otherwise) that competitors do not have can be a source of competitive advantage by lowering costs or improving demand forecasting. The party with more knowledge often holds more market power. Therefore, ensuring widespread information availability promotes a fairer price discovery process.

Timely market information is of fundamental importance, allowing market participants to make informed, rational decisions that ideally lead to a more efficient allocation of resources. The concept of market efficiency hinges on how quickly and completely market prices incorporate available information.

Ensuring that timely and accurate information is available to all participants, including smaller players like farmers or small traders, helps balance power dynamics and promotes a fairer, more competitive market environment. When information is more widely available, anomalies are reduced, and opportunities for abnormal profits through information asymmetry disappear, making the market more efficient.

Universal Access to "Board" Pricing

The centralized price discovery and robust trading volumes provided by futures and derivative markets help to ensure that information is quickly and efficiently incorporated into the price discovery. This helps to level the playing field between large and smaller market participants.

Currently, grain sorghum producers often rely on local elevator bids, which may or may not reflect global supply and demand. A futures contract provides a real-time, public "board price" accessible to both a small farmer in Kansas and a large multinational exporter.

Without a centralized price, local buyers hold the informational advantage. A futures market forces these buyers to align their bids with a transparent, independently determined market value.

2. Information Asymmetry

Asymmetric market information is where one party in a transaction has more or better information than the other. This places the uninformed party at a significant disadvantage.

Thin markets with low trading volume, such as is currently seen for grain sorghum, make it difficult for participants to gather reliable market information and assess true market performance, potentially leading to information advantages for larger participants, with one of the net results being lower farm-gate prices.

The lack of readily available access to information on prices and quantities can increase the risk of making poor business decisions. Readily available and timely market information leads to more effective price discovery and lower overall transaction costs, which encourages trade and competition. This disparity can lead to problems of market inefficiencies or market failures.

Currently, sorghum pricing is often opaque and fragmented, leaving individual producers with limited bargaining power.

The introduction of a new grain sorghum futures contract would address market asymmetry—where one party (typically large buyers or elevators) has better information than another (producers)—by creating a public, centralized platform for price discovery.

3. Current Situation in Grain Sorghum

It should be clearly stated that the current market situation for cash grain sorghum suffers from poor price discovery, lack of price transparency, and low market liquidity, along with severe asymmetry in market information.

Historically, the sorghum market is highly concentrated in the Southern Plains, particularly across Kansas, Oklahoma, and Texas. In the late 80s and 90s, most of the sorghum trade was facilitated among a handful of large companies consisting of a few large exporters and feedlots. More recently, large ethanol producers have also become a major domestic buyer of grain sorghum.

When a physical market is dominated by a few players, they often trade "off-exchange" (forward contracts) rather than using a public futures market. Historically, these sorts of activities further starved the KCBT contracts of volume from its listing in 1989 until its delisting in 1999.

Within the context of the current U.S. grain sorghum market, information is tightly held by a few large exporting commercial traders facilitating international trade, along with a small number of ethanol producers who have the capacity to switch their grind between corn and ethanol.

Within the U.S. grain sorghum market, **market power** is currently defined by a high degree of buyer concentration and grain sorghum’s status as a lower-cost substitute for corn. As such, grain sorghum typically trades at a discount to corn to incentivize domestic use. Ethanol plants in states like Kansas and Texas exercise market power by switching to sorghum only when it becomes a more cost-effective starch source than corn. Industrial usage is concentrated in a small number of ethanol plants in the High Plains (TX, KS, SD), which account for over 80% of the crop's industrial use, giving these localized buyers significant influence over regional prices.

Export Sensitivity

Because the U.S. is a dominant global supplier of grain sorghum, domestic pricing and "power" dynamics are heavily influenced by a single primary export destination and a few key domestic industrial users. Sorghum prices can be extremely sensitive to export demand (historically from Mexico, and more recently from China). Frequently, China can act as the dominant price-setter for U.S. sorghum, frequently accounting for approximately 87% of global sorghum imports. Due to the structure of Chinese import tariffs and the nature of Chinese import licensing, along with the government exerting strong control over the volume and timing of grain sorghum imports, they

are able to exert significant **market power**. As Chinese buying slowed in late 2024, prices dropped significantly.

As international tender interest and trade come to the market in larger quantities or "chunks". These sudden larger orders can cause sharp price movements in a thin market. The resulting volatility, combined with low depth of liquidity, made the contract risky for many small to medium-sized commercial "**flat price**" traders. However, the grain sorghum contract's ability to more clearly define and minimize **basis risk** for hedgers was a noted benefit.

In the arena of international grain sorghum trade, information is very asymmetrical. This challenge is further compounded by the fact that since 2023/24, roughly 80%+/- of global imports are destined to a single country (i.e., China), where imports are tightly regulated by a central government authority.

In the context of market information, the current physical cash grain sorghum market can be said to be asymmetrical in its timely availability of market information and current market pricing. A lack of transparent and timely market information results in information asymmetry, resulting in:

- **Hedge Effectiveness Varies**: The effectiveness of the hedge can be low. The gain or loss on the corn futures position might not fully offset the corresponding loss or gain on the physical grain sorghum position, leading to unexpected financial results and an inability to reliably lock in profit margins.
- **Difficult Pricing Decisions**: Farmers, country elevators, end users, and market participants throughout the supply chain must make uninformed guesses as to whether the appropriate premium or discount sorghum is valuing itself in relation to corn. This presents an added challenge to pricing accuracy, given the many varied and niche uses for sorghum.
- **Negotiation Challenges**: Asymmetry in available market information, when there is not readily available, timely, and verifiable price information, can make price negotiations for grain sorghum more difficult and contentious.

With little capacity to forward price grain sorghum, the majority of trade activity is confined to the nearby "spot" market. The lack of a well-defined forward pricing curve in cash markets makes both production decisions and future usage/demand by end users problematic.

Relying on a related corn market means there is no transparent, exchange-traded price benchmark that reflects the specific, unique fundamentals of grain sorghum.

A recent example of this was seen in the 2024/25 marketing year, which was the periodic lack of a cash grain sorghum bid into country elevators and the lack of a forward cash price bid/offer structure in cash markets. Even as the market approached the 2025 harvest, and no publicly posted prices were readily available, several grain elevator companies adopted the approach that they would be willing to warehouse a farmer's grain sorghum inventories under prevailing storage arrangements until a cash price became available.

The current concern is whether the introduction of a grain sorghum derivative and futures contract will add to, or reduce, the asymmetry in the market, and to which market participants this may benefit.

In addition, an exchange-traded instrument provided by a reputable organization like the CME Group would go a long way to providing improved market oversight and reduced asymmetry.

Reducing Market Information Asymmetry

The potential for the introduction of a new grain sorghum futures market will serve as an additional central exchange for domestic and international supply and demand information, leading to more timely, transparent, and efficient price discovery for the commodity.

- **Centralized and Transparent Price Discovery**: Futures exchanges operate as central marketplaces where all buy and sell orders are exposed to one another in an auction-like process. This ensures that all available information is quickly assimilated into the current price, making the pricing process transparent and accessible to all participants equally, whether a large institution or a small trader.
- **Standardization of Contracts**: Exchange-traded contracts are standardized in terms of quality, quantity, delivery time, and place. The only variable is price, which simplifies the trading process and ensures that all market participants are trading on the same terms, reducing the potential for private, bespoke arrangements (common in over-the-counter or OTC markets) that could create information advantages for some parties.
- **Public Reporting and Data Dissemination**: The CME Group ensures rigorous reporting requirements for Clearing Members, along with public dissemination of trading data, allowing market participants to have a clear view of market activity and fundamentals, further leveling the playing field.

It is suggested here that the introduction of grain sorghum derivatives and futures contracts by the CME will result in improved market information and price transparency, with a notable reduction in the asymmetry

D. Potential Market Liquidity and Activity

1. What is Market Liquidity…?

Market liquidity refers to how easily and quickly an asset or commodity can be bought or sold in the market without significantly impacting its price. High market liquidity would imply a sufficient capacity in the market (i.e., a sufficiently large number of buyers and sellers, along with a depth in bids and offers), allowing for a reasonable volume of the commodity to be quickly transacted without significantly moving the market prices up or down.

Market liquidity for agricultural commodities refers to the ease and efficiency with which commodities (such as corn, soybeans, wheat, or livestock) or their derivative futures contracts can be bought or sold in the market without causing a significant, drastic change in their price. It represents the ability of participants (including producers, processors, and speculators) to quickly enter or exit positions with minimal transaction costs.

This can be particularly a concern for commodities, such as grain sorghum, which have thinner markets and lack significant volume or depth. A “deliverable” derivatives or futures market can significantly help to reduce some of the associated risks.

Key aspects of market liquidity for agricultural commodities include:

- **Key Indicators**: High liquidity is characterized by large trading volumes (number of contracts traded), substantial open interest (number of open contracts), and narrow bid-ask spreads (small difference between buy and sell prices).
- **Active Participation**: Liquidity is driven by a diverse group of participants, including hedgers (farmers, agribusinesses) and financial speculators.
- **Minimal Price Impact**: In a liquid market, large transactions can be executed without forcing a sharp move in the price.
- **Reduced Transaction Costs**: High liquidity allows for tighter bid-ask spreads, reducing the cost for market participants to execute trades.
- **Physical vs. Financial**: While it applies to the physical spot market, liquidity is most often measured in the futures market (e.g., CME Group), which serves as a benchmark for price discovery in the underlying physical markets and risk management.

Sufficient market liquidity is essential for managing risk in volatile agricultural markets. It allows producers and consumers to hedge their risks effectively by ensuring there are always buyers or sellers available, thus reducing the risk that they will be forced to accept a significantly worse price to close a position.

The other key factor affecting volatility is the depth of liquidity a new grain sorghum contract might attract. A sufficient level of liquidity to absorb large trades and price shocks, which helps stabilize prices. If the contract struggles with low volume, it is likely to experience higher volatility.

That said, the current physical cash grain sorghum market does suffer from both liquidity and volume, in addition to lacking a defined **forward price curve**.

The establishment of a centralized, regulated futures market would help to provide a transparent, centralized price discovery mechanism that better reflects national and international supply and demand dynamics, which helps stabilize local cash prices. The architecture of this market should be designed to attract a larger variety and number of market participants in order to provide the opportunity to improve the current situation.

a. Historical Perspective

Historically, the stated reason for the absence of a viable grain sorghum futures market is insufficient trading volume and liquidity, implying the market struggles to attract enough participants to function efficiently.

The uncertainty surrounding future prices and the high basis risk make both producers and elevators more hesitant to engage in forward contracting. However, the cause of this situation may have been more structural than a “lack of need for” or “interest in” participation.

A well-constructed and designed derivative and futures market can provide increased liquidity, allowing for a greater ability to easily buy or sell grain sorghum without significantly impacting the price.

Achieving liquidity in a derivatives or futures market involves both systemic factors that create a liquid environment and individual trader strategies to operate within that environment. Key to this is high trading volume, a large number of diverse participants, and narrow Bid/Ask spreads.

The potential issues with market liquidity arising from the introduction of new grain sorghum derivatives and futures contracts are primarily related to low initial trading volume. This situation makes the market susceptible to erratic price movements and difficulty in executing large orders. This may lead to the potential failure to sustain long-term viability and delisting of the instruments. Historically, this has been the case with previous attempts to list a contract.

b. Importance of Commercial Hedgers

Commercial Hedgers of grain sorghum (country and terminal elevators, exporters, importers, etc.) need a liquid market to effectively manage their large-scale risks.

If a newly listed grain sorghum derivatives and futures market becomes insufficiently liquid, the market may continue to use the well-established and liquid corn futures as a cross-hedge, creating a negative feedback loop that prevents the new sorghum contract from ever becoming liquid.

Farmers and producers may also be hesitant to use an illiquid market due to concerns about price reliability and the ability to exit positions when needed.

Again, for these reasons, it is essential that several large commercial traders embrace using the new contract, facilitating “basis” pricing of physical cash grain sorghum.

c. Importance of Speculative Traders

Speculative traders provide vital liquidity, but they are often drawn to markets with sufficient volatility and volume to profit from. If the new contract is too illiquid, it may not attract enough speculators, further exacerbating the liquidity issue.

If liquidity issues persist and the contract fails to gain traction among commercial and speculative participants, the exchange (CME Group) may ultimately delist the contract due to lack of use, as has happened with previous attempts to trade sorghum futures.

d. Low Initial Trading Volume and Thin Markets

The most significant issue is that, initially, there might not be enough buyers and sellers (market participants) interested in trading the contract at any given time. This creates a "thin market," making it difficult to execute trades quickly without impacting the price.

For comparison, the established corn futures market has massive daily volumes, allowing large orders to be filled efficiently. A new sorghum market would likely lack this depth initially.

A good indication of low liquidity in a market is a widening **“Bid-Ask” spread**. In a liquid market, the difference between the highest price a buyer is willing to pay (bid) and the lowest price a seller is willing to accept (ask) is very narrow.

With low liquidity, this "bid-ask spread" widens significantly, increasing the transaction costs for all participants. Commercial traders (farmers, elevators) would get less favorable prices when they need to hedge their risk.

Low liquidity leads to higher price volatility. Large orders can move the market price significantly because there are not enough counter-orders to absorb them smoothly.

This results in **"slippage,"** where a trader's order is filled at a worse price than expected when the order was placed. This uncertainty is detrimental to commercial hedgers who need price certainty.

Slippage is particularly relevant to agricultural commodities trading (e.g., corn, soybeans, wheat, etc.) as these markets are highly susceptible to fast-moving, news-driven price changes.

Exchange for Related Positions (EFRPs):
Exchange For Physical (EFP), Exchange For Risk (EFR),

To assist in minimizing “slippage” when pricing a “Basis” contract or other underlying physical or risk contract, may be facilitated via a process known as Exchange For Physical (EFP), Exchange For Risk (EFR). This process ensures that a market participant holding a hedge futures position can effectively manage price volatility in a “fast” or “thin” market.

An EFP or EFR allows a hedger to convert a related physical transaction (such as pricing ownership of agricultural commodities like corn, soybeans, or wheat) in a controlled and orderly manner and not experience any “slippage” in pricing between the hedged futures position and the underlying related physical cash contract.

An EFP or EFR in CME agricultural markets is a privately negotiated, off-exchange transaction where two parties simultaneously exchange a CME futures position for a corresponding, equal-quantity, "bona fide" spot (physical) market position. It acts as a way to transfer futures exposure to a physical delivery by passing the standard exchange pit/electronic matching process.

- *Rule 538 Compliance: EFPs must comply with CME Rule 538, which governs Exchange for Related Positions (EFRPs), requiring legitimate, related cash and futures positions.*
- *Reporting: While negotiated privately, they must be reported to the CME Clearing house.*

2. Fundamentals Supporting Forward Cash Prices, Market Liquidity, and Greater Activity

Currently, the physical cash grain sorghum market lacks significant depth and transparency in its pricing of forward cash markets.

In agricultural grain markets, the absence of a forward pricing mechanism or a transparent forward price curve creates a "blind" market environment that clouds everything from seasonal production economics and planting decisions to forward pricing decisions for end-user procurement, undermining long-term financial stability. Without these clear price signals, the market relies solely on “spot” nearby pricing, which presents several critical problems.

Impaired Price Discovery: Without a price discovery of a forward pricing curve, there is no means to incorporate new information (like a weather event or a change in trade policy) into the forward value of grain sorghum.

Lack of Price Transparency: In a "thin" market with low trading volume and lacking forward pricing signals, pricing grain sorghum becomes less impartial and more volatile because there is no centralized market benchmark to influence local grain sorghum bids and offers.

Lack of Storage Signals: A forward pricing curve also results in the more orderly marketing of grain. It sends clear price signals indicating to the market “what to carry” and “what to store”; e.g., when to sell, and where to ship to... A lack of clear "forward spreads" can result in either an unnecessary glut of grain hitting the market all at once or an unnecessary shortage at particular demand points.

Without an efficient pricing signal, the market cannot effectively allocate storage space for abundant harvest-time supplies and carry them forward into later shipment periods when supplies might be needed and have a greater value.

Reduced Risk and Increased Financial Instability: In addition, without clear forward pricing signals, producers, the country elevator/warehouse operator, and end users alike are fully exposed to changes in price. Without clear pricing signals to assist in strategy development, market participants are frequently forced into poor merchandising decisions, resulting in poor and unprofitable margins.

A clear strip of forward pricing signals allows farmers, end users, and other supply chain participants alike the opportunity to "lock in" an operating margin and secure their return on investment months before a crop is even harvested.

All of these factors contribute to producers, end users, and other supply chain participants alike not being able to efficiently adjust to changes in supply and demand, resulting in suboptimal business decisions and leading to poor resource allocation.

[Ref: Section Supplemental Information C. Component Pricing – page 153]

3. Other Possible Efforts Supporting Market Liquidity and Activity

Fundamentals that support this effort are:

- A 10-year high in world grain sorghum production of 63.0 mmts in 2025/26. *(Source USDA December WASDE)*
- A 4-year high in U.S. grain sorghum production of 10.9 mmts in 2025/26. *(Source USDA December WASDE)*
- Increasing demand for grain sorghum from the food and pet food sector, diversifying potential market participants
- Rising environmental and water concerns are likely to continue to drive an increasing trend in sorghum production.

a. Trading Grain Sorghum as an Inter-Commodity Spread to Corn

A currently proposed idea is for grain sorghum futures to be priced (and traded) as a differential to corn futures. The product would be quoted, like corn, in cents per bushel, but the price would represent the sorghum's price difference relative to corn rather than a flat price.

This approach would leverage the deep liquidity of CME corn futures into a grain sorghum futures contract.

Such a contract would allow many commercial market participants to hedge/trade premiums or discounts specific to the sorghum market.

In order to effectively trade flat price sorghum, a trader would take a position in corn futures and sorghum futures (sorghum – corn spread). Or, if they were hedging a cash basis contract and only cared about the relative value of grain sorghum to corn, take a position in only grain sorghum (sorghum – corn spread).

The authors of this white paper agree that this approach of trading a sorghum – corn spread would leverage the liquidity of corn into grain sorghum, and that a robust platform should be designed to deliver this capability, which means to engage the contract platform with other order types is also important to developing sufficient liquidity in a contract.

[Ref: Section IV. Currently Proposed Contract Terms and Delivery: B. Order Placement: 3. Trading as a differential to Corn Futures: on page 46]

b. Other Efforts to Support Liquidity

Other efforts that can help to achieve liquidity activity are:

- Leveraging market makers' presence with consistent "market making",
- Participant presence in the market at key times (like market open/close),
- Using "Limit Orders" close to existing cash price levels,
- Accessing off-exchange (block) trades for large orders.

These efforts, combined with the reintroduction of a new well-constructed and designed derivative and futures contract, have the potential to deliver increased liquidity and activity, resulting in a viable and successful derivative and futures market.

In an effort to enhance and leverage both the volume and liquidity found in the closely related CME Corn Futures, the CME is currently suggesting that the sorghum Futures be traded as a "spread" to the CME Corn Contract.

[Ref: Section IV. Currently Proposed Contract Terms and Delivery: B. Order Placement: 3. Trading as a differential to Corn Futures: on page 46]

This concept is supported. However, it is also suggested that expressing a grain sorghum futures contract in its absolute "flat price" form, just as any of the other agricultural commodities, is important as well. The capacity to easily and actively trade both forms of price is important and preferred.

[Ref: Section IV. Currently Proposed Contract Terms and Delivery: B. Order Placement: 1. Outright Absolute or "Flat" Price Buy / Sell Orders: on page 44]

E. Potential Impact on Market Volatility

1. What is Market Volatility…?

Market volatility refers to the speed and magnitude of price changes for securities or market indices, representing the degree of risk and instability in the market. High volatility indicates rapid, wide, and unpredictable price fluctuations (both up and down), often signaling increased investor fear or uncertainty.

In the context of agricultural grains, market volatility refers to the frequency and intensity of price fluctuations above or below their average level over a specified period. While both the physical (cash) and CME futures markets experience volatility, they define and measure it through different lenses.

a. Physical Cash Market Volatility

In the local "spot" or cash market, volatility is the realized risk of price changes for the immediate exchange of grain at a local elevator or terminal. It is primarily driven by local supply/demand imbalances, such as regional weather events, transportation disruptions (e.g., railcar shortages), or immediate storage constraints.

Volatility in the physical cash markets is usually expressed as "**Historical (Realized) Volatility"**, which calculates the standard deviation of past daily price changes to assess how much the local price has actually moved.

b. Futures Market Volatility

In a derivative or futures market, volatility represents the uncertainty surrounding the value of the underlying asset for delivery against the contract at a specific date in the future. This value is determined by related supply and demand dynamics within the delivery marker, as well as more broadly across both domestic and international markets and trade flows. In addition, value is more generally influenced by domestic and global macroeconomic factors, geopolitical tensions (e.g., the Russia-Ukraine war), and shifts in investor sentiment or fund positioning.

In addition to historical data, the derivatives and futures markets emphasize "**Implied Volatility" (IV)** through tools like the CME Group Volatility Index (CVOL). IV is a forward-looking metric derived from options prices that reflects the market's expectation of how much the price may fluctuate over the next 30 days, or a defined period of time. Drivers of IV can include such things as anticipated market reports, weather forecasts, etc. The magnitude of IV increase before a report is often higher when there is a large dispersion in pre-report estimates within analyst forecasts. Once a report is released, the uncertainty is resolved, often leading to a sharp drop in IV, even if subsequent prices move significantly.

c. Basis Volatility - The Interconnection

The relationship between these two markets (i.e., Physical Cash and Futures Markets) is captured by the "**Basis**" (e.g., the Cash Price minus the Futures Price).

Basis Volatility is generally less than the volatility of either physical cash or the futures market individually, as they tend to move in the opposite direction to each other in response to broader market fundamentals.

For Example: When futures markets rally to higher levels, cash prices will also rally, but generally, to a lesser extent than futures prices. This is a result of the price rally stimulating “Flat Price” selling. As a result, basis values in the physical cash market will tend to weaken.

Conversely, when futures markets move to lower levels, cash prices will also fall, but generally, to a lesser extent than futures prices. This is a result that as the futures price is dropping, “Flat Price” selling will dry up; and as a result, basis values in the physical cash market will tend to strengthen in an effort to encourage selling of hedged stocks.

2. Reduced Market Volatility

Research and empirical data indicate that physical cash markets often exhibit **reduced volatility** when a related futures market exists, primarily due to enhanced price discovery and the availability of “risk-shifting” mechanisms. However, this relationship is non-linear and depends heavily on the "strength" of the coupling between the two markets. [xxviii]

a. How Futures Markets Reduce Cash Volatility

Information and Price Discovery: Futures markets act as a central hub for global information, gathering expectations about future supply and demand. This leads to more "informative" prices in the cash market, reducing erratic movements caused by local information gaps.

Risk Transfer (Hedging): The ability to take offsetting positions (e.g., being long in physical cash and short in futures) allows producers and inventory holders to mitigate the risk of price changes. This encourages more stable inventory management rather than panic selling during gluts.

Inventory Smoothing: In storable commodity markets (like grains), futures prices provide signals for when to store or release supply. This "smoother allocation" of products over time buffers the cash market against sudden supply shocks.

Increased Liquidity: Futures markets attract diverse participants (speculators and hedgers), adding depth to the overall market. This increased liquidity allows the cash market to absorb large trades more easily without drastic price swings. [xxix]

The "U-Shaped" Volatility Curve: Recent experimental research demonstrates that the stabilizing effect of futures markets is not infinite. It typically follows a **U-shaped pattern**: [xxx]

1. **Weak Coupling (Stabilizing):** When a futures market is first introduced or moderately active, it significantly **decreases** spot price volatility by mitigating external shocks.
2. **Strong Coupling (Potential Destabilizing):** If the futures market becomes overwhelmingly dominant—due to excessive speculation or high leverage—volatility can **increase**. In these "very strongly coupled" scenarios, speculative bubbles in the "paper" market can spill over and destabilize the physical cash market.

b. Comparative Empirical Evidence

Market Type	Observed Effect on Volatility	Key Study/Source
Grains (Corn/Wheat)	Often stabilized by futures, though "unexpected" volume can cause short-term spikes.	USDA/University of Wyoming [xxxi]
Stock Indices	Historically lower volatility after the introduction of index futures (e.g., S&P 500).	Chicago Fed [xxxii]
Oil & Metals	Generally stabilizing, though results for metals are mixed depending on speculation intensity.	ScienceDirect [xxxiii]

F. **Efficient Hedging Mechanism** (Decreased Basis Risk)

Currently, without a direct sorghum futures contract, producers and buyers must "cross-hedge" using corn futures, which creates a greater "basis risk" (the difference between the local cash price and the futures price) than would exist with a direct sorghum contract.

Market participants frequently will use corn, wheat, or another commodity futures as a "cross-hedge" for sorghum because the two commodities are used for similar purposes (i.e., primarily a feed grain) and as such their prices are generally correlated. The difference between the local cash sorghum price and the corn futures price (known as the "basis") can be more unpredictable and volatile.

However, cross-hedging in a different commodity is not an optimally preferred or perfect substitute. By definition, the derivative price of a cross-hedge will not converge with the underlying price of the physical commodity in the delivery market. When grain sorghum prices are priced as a premium or discount to corn futures, grain sorghum pricing becomes directly dependent on dynamics within the corn market rather than on its own specific supply and demand fundamentals.

As discussed elsewhere in this paper, market fundamentals and dynamics in the eastern corn belt, centralized in the Illinois Waterway Delivery System (IWDS), can demonstrate great seasonal variability from those in the western corn belt.

Hedging sorghum with a corn contract increases the basis risk, which research has estimated can be 17-34% greater than using a direct sorghum futures hedge. [xxxiv] More recent data would suggest it is likely to be significantly higher than this.

As such, the weaker and more volatile basis negatively impacts the effectiveness of futures- and options-based marketing tools, leading to less optimal forward cash contract pricing.

[Ref: Section Supplemental Information B. The Basics of Basis: on page 152]

1. Benefits of Direct Hedging

A dedicated sorghum futures contract would reduce the "basis risk" currently faced by producers and buyers who rely on cross-hedging with other commodities (e.g., corn). A specific sorghum contract would ensure that the local cash price is more closely linked to the futures price at expiration (convergence), providing a more reliable net price for producers.

With a dedicated futures contract and hedging in a CME Kansas grain sorghum, Basis Risk and Volatility would be significantly reduced. It would more accurately reflect local supply and demand fundamentals in the middle of U.S. grain sorghum production and dynamics of the western corn belt, as well as a more national and international price.

With significant demand from China becoming increasingly uncertain over the past couple of years, the “basis” can shift very quickly with changing trade policy. Additionally, local sorghum basis values would reflect not only export values, but local supply and demand values from feedlots and ethanol plants.

More to the point, the sorghum basis trading range would trade in a much narrower range and be significantly more clearly definable against DVE calculations. A dedicated sorghum futures contract would reduce "basis risk" for producers, as the futures price would more directly reflect specific sorghum market conditions, rather than relying on a substitute commodity. In addition, the basis for grain sorghum vs a deliverable futures contract would more clearly define both the “upside” as well as the “downside” for basis.

[Ref: Section Supplemental Information B. The Basics of Basis: on page 152]

Historical research estimates that hedging risk can be reduced by 17% - 34% through hedging sorghum in the 1988 KCBT Grain Sorghum Futures market compared to cross-hedging sorghum in corn futures. [xxxv] This level of reduction in hedging risk should encourage the use of the KCBT sorghum futures market to hedge sorghum. This level of reduction in hedging risk should significantly encourage the use of a newly introduced CME grain sorghum futures contract to hedge price risk in grain sorghum.

This white paper suggests that the Basis Risk and Volatility would be significantly reduced for grain sorghum directly hedged in a grain sorghum futures contract. More to the point, the sorghum basis trading range would trade in a much narrower range and be significantly more clearly definable against DVE calculations.

2. Why Hedging Grain Sorghum in Corn Can Be Problematic

There are several major challenges in "cross-hedging" agricultural commodities when a direct hedge in the same commodity is not available. Cross-hedging grain sorghum using corn futures (or, on some occasions, wheat) can be problematic primarily because the two commodities, while reasonable substitutes, do not have a perfect price correlation: otherwise known as **Basis Risk**.

In regard to cross-hedging, the core issue is the increased basis risk, along with the lack of convergence through the underlying delivery process. This implies the cross-hedge has definable protection against the specific price movements.

Without a dedicated futures contract, cross-hedging grain sorghum in an alternative commodity, most commonly corn futures, presents several challenges, primarily involving increased basis risk, difficulty in determining an accurate hedge ratio, and other logistical/cost factors.

As such, historical basis values for grain sorghum against corn have been seen to trade in over a 300+ cents per bushel range through a marketing season.

Most commonly, corn makes a suitable cross hedge, but in some situations and locations, wheat may also be easily used.

When cross-hedging grain sorghum in another commodity, the related basis values are going to experience great variability and volatility for a number of reasons.

Additional challenges include imperfect correlation, potential liquidity issues in the hedging instrument, market volatility, and operational complexities. Further details on the challenges in cross-hedging agricultural commodities and why cross-hedging grain sorghum in corn futures can be problematic include, but are not limited to:

a. Convergence and Delivery Economics Do Not Apply

The primary problem in regard to cross-hedging is the increased basis risk, along with the lack of convergence through the underlying delivery process.

As physical grain sorghum cannot be delivered against a corn futures contract, by definition, convergence does not occur. This implies the cross-hedge has no definable protection against the specific price movements.

For Example: A Delivery Value Equivalent (DVE) for grain sorghum cannot be specifically defined via a corn futures contract.

This is one of the primary arguments for establishing a deliverable futures contract for grain sorghum.

[Ref: Section IV. Currently Proposed Contract Terms and Delivery D. Delivery Execution for CME Grain Sorghum (per Kansas HRW Wheat: on page 55]

In summary, while cross-hedging in corn is currently necessary without a dedicated sorghum contract, the practice is problematic because it introduces the risk that the hedge will fail to provide the intended price protection due to the imperfect correlation between the two commodities, the unique market drivers of grain sorghum, as well as the absence of the possibility of "convergence" between grain sorghum and corn.

b. Lack of Independent Price Discovery

While sorghum and corn prices generally follow each other as they are substitutes in feed rations, the price relationship is not always predictable, leading to variability in basis. This variability means the gains or losses in the future's position may not perfectly offset the changes in the cash market, which can result in hedged price risk that is potentially greater than the unhedged price risk.

When grain sorghum basis is priced off corn futures, there is a lack of independent price discovery for grain sorghum. The relationship between the two prices (corn vs. grain sorghum) is not clearly defined. As such, the independent value for grain sorghum is not always as predictable. This can result in greater price risks and can result in unexpected outcomes, more significantly impacting grain sorghum.

The absence of a dedicated futures market for sorghum means that local cash prices are often priced relative to the corn futures price, rather than a specific, transparent sorghum futures price. This can lead to less efficient price discovery and can make it difficult to accurately forecast sorghum basis levels independently.

Imperfect Price Correlation

The prices of grain sorghum and corn do not always move in lockstep. While influenced by similar broad factors (weather, growing conditions, feed, and ethanol demand), their specific supply and demand dynamics can diverge significantly.

- **Operational Complexity:** Cross-hedging is more complex than direct hedging, requiring traders to carefully assess correlations and make informed decisions to ensure the hedge's effectiveness. Accurately assessing correlations and market movements can be inherently uncertain, even with advanced tools.
- **Divergent Demand Drivers**: Grain sorghum has unique demand streams that corn lacks.
- **Substitution and Quality Differences**: Though substitutable in feed rations, quality differentials can impact their relative value. Sorghum is typically valued relative to corn based on its feed value, which can change based on the specific end user's requirements or market conditions.

- The energy complex and the demand for grain sorghum by the ethanol sector also have an impact on grain sorghum demand. Again, the quality difference between grain sorghum and corn in processing results in product yield and value differences.
- **Export Demand and Trade Policy**: With a sudden change in Chinese trade policy or demand for sorghum can cause its price to drop dramatically, but have a minimal effect on the much larger, globally diverse corn market. The corn futures hedge would therefore be insufficient to cover the loss in the sorghum cash price.

For Example: A significant portion of U.S. sorghum is annually exported to China for specific uses (e.g., for stock feed and *baijiu* liquor production). Historically, and prior to 2025, Chinese tariffs on corn imports of 65% compared to grain sorghum of 3%, generally carrying a lower penalty duty than corn. This allowed the world price for grain sorghum to rally to a significant premium vs. corn.

With recent changes to China's tariffs and trade policies in early 2025, and China's noticeable absence from the purchase of grain sorghum from the United States, U.S. domestic prices for grain sorghum have dropped from a premium to a significant discount to corn.

c. Increased Basis Risk and Imperfect Price Correlation with Cross-Hedging

Basis is the difference between the local cash price and the relevant futures price (in this case, corn futures). The goal of hedging is to minimize exposure to changes in the overall price level, leaving only exposure to changes in the basis.

Cross-hedging involves using a futures contract for a related, but different, asset to mitigate price risk. The key challenge is that the imperfect and less definable correlation between the two assets may not be perfect, or it may change over time, which impacts the hedge's effectiveness and introduces increased basis risk.

Unpredictable Basis Movements: When cross-hedging, the basis becomes less predictable because it involves the price relationship between two different commodities, not just different locations or times for the same commodity.

As grain sorghum is not deliverable against a corn contract, by definition, the anticipated convergence between corn and grain sorghum physical cash prices may "not" occur as expected.

Basis Risk: Participants (farmers, elevators, end users) are currently relegated to back-to-back trading of grain sorghum, or cross-hedging sorghum using corn or another commodity futures, which introduces "basis risk". This basis risk can be significantly greater than when a commodity is directly hedged in a futures contract of the same commodity, as the price movements between the two different commodities are less correlated.

A dedicated sorghum futures contract would reduce this risk, as local cash prices would more reliably converge with the futures price at expiration, leading to more stable and predictable local pricing.

One of the primary reasons for this increased volatility is that when cross-hedging grain sorghum in corn, convergence is unable to occur. Due to the difference in underlying commodity types, basis correlations cannot be clearly defined. The hedger is unable to "make" or "take" delivery of corn futures and apply these quantities to related cash purchase or sales of grain sorghum. As such, the underlying DVE basis values for sorghum cannot be clearly defined, e.g., the definable upside or downside to the DVE cannot be determined.

The hedging of agricultural commodities typically does not result in what can be called a "perfect hedge". This is a result of the physical nature of agricultural commodities and the value that can be assessed to the typical (What), temporal (When), and spatial (Where) nature of such physicality. As such, hedging always results in some level of residual "basis risk", which in itself presents another avenue to generate profits through other "merchandising" opportunities.

[Ref: Section Supplemental Information B. The Basics of Basis: on page 152]

For Example: Basis volatility and risk for grain sorghum when hedged in corn futures is much greater than basis volatility in corn. As such, basis volatility and risk for grain sorghum when hedged in grain sorghum futures would be much less.

Relying on the corn market means there is no transparent, exchange-traded price benchmark that reflects the specific fundamentals underlying grain sorghum.

A lack of transparent and timely market information results in information asymmetry, resulting in:

Hedge Effectiveness Varies: The effectiveness of the hedge can be low. The gain or loss on the corn futures position might not fully offset the corresponding loss or gain on the physical grain sorghum position, leading to unexpected financial results and an inability to reliably lock in profit margins.

Difficult Pricing Decisions: Farmers, country elevators, end users, and market participants throughout the supply chain must make uninformed guesses as to whether the appropriate premium or discount sorghum is valuing itself in relation to corn. This presents an added challenge to pricing accuracy, given the many varied and niche uses for sorghum.

Negotiation Challenges: This asymmetry in available market information, when there is no readily available, standardized, publicly verifiable price for the exact commodity being traded, can make price negotiations for grain sorghum more contentious.

In addition, the lack of a forward pricing curve in cash markets makes both future demand and production increasingly difficult and challenging. With the current limited capacity to economically price in future demand, the vast majority of trade activity is relegated to the nearby "spot" market.

d. Hedging Ratios

The "hedging ratio" plays a crucial role in risk management by comparing the value of a protected position to the entire investment. This measure can also apply to futures contracts related to the cash commodity they hedge.

When directly hedging a commodity with its own futures contract, the hedge ratio is typically one-to-one (e.g., one 5,000-bushel corn contract for 5,000 bushels of corn). However, when cross-hedging sorghum with corn or wheat, the optimal futures-to-cash hedge ratio is not necessarily one-to-one and must be estimated, which introduces another layer of risk and complexity.

Because a cross-hedge is imperfect, by definition, it carries more risk than a direct hedge. The effectiveness depends on the strength of the correlation and the accuracy of the hedge ratio.

A “cross hedging” strategy relies on a high degree of price correlation under the assumption that the prices of the two different assets will move in a similar way. Statistical analysis needs to be used to determine the appropriate hedge ratio and estimate the risk involved in a cross-hedge.

For Example: If you have a platinum inventory and a platinum futures contract is not available, you could sell gold futures as they may be highly correlated with platinum.

Or,

For Example: Since grain sorghum does not have a directly related derivative of a futures contract, price risk is often managed by placing an offsetting risk position in corn or wheat futures, since their prices are correlated, but not identical.

A hedge position is then established in the related futures contract of that related asset.

Calculating a Hedge Ratio

A first step is to find a related asset whose price movement is highly correlated with the asset needing to be hedged.

A hedge ratio may then be used to determine the correct amount of the futures contract to use to minimize risk. This is often calculated using the minimum variance hedge ratio, which accounts for the different volatilities and correlations of the two assets.

Hedging ratios can be calculated using both volume (like barrels or gallons) and mass (or weight, like tons), depending on the asset being hedged. The ratio itself is a measure of how much of a position is protected against price movements, calculated by dividing the hedge position by the total position. The specific units of volume or mass depend on the commodity and contract specifications.

- **By Volume**

  For a commodity like crude oil, the contract specifications provide the unit of measurement.

Hedge Ratio = Hedge Volume / Position Volume

For Example: A West Texas Intermediate (WTI) crude oil futures contract specifies a size of 1,000 barrels, which is equal to 42,000 gallons. This volume is used when calculating the number of contracts needed for a hedge.

For grain this would be in bushels, which is a volume measure, not mass.

- **By Mass**

  For other commodities or situations, mass may be the more appropriate unit. The specific hedging ratio would be calculated using the mass of the underlying assets and the mass of the asset being used for the hedge.

Hedge Ratio = Hedge Mass / Position Mass

For Example: One approach to determining a “hedging ratio” for corn to grain sorghum may be determined to be 1:1 (as one bushel of corn: one bushel of grain sorghum, as their bushel weights are both 56 pounds per bushel.); while the elected “hedge ration” of wheat to grain

sorghum may be determined to be .9333 : 1 (as one bushel of wheat = 60 pounds per bushel : one bushel of grain sorghum = 56 pounds per bushel).

- **By Percent of Value**

  The hedge ratio can be determined as a percentage of value. This is a financial metric that measures the financial proportion of an investment or portfolio that is protected against market risk. In this approach, a hedger calculates the hedge ratio to assess financial risk exposure and determine how much of a position is shielded from adverse price movements.

  A simple hedge ratio can be calculated by dividing the value of the hedged portion by the value of the total position. For agricultural commodities, this approach is often taken when hedging foreign exchange risk exposure.

Hedge Ratio = Hedge Value / Position Value

For Example: Foreign Exchange Risk can arise when you are hedging a physical asset in one underlying currency and hedging it in a derivative or futures contract in another currency. Consideration also needs to be considered as to what your underlying "strategic" currency is, as well as your underlying "functional" currency.

- **By Other Adjustments**

  The hedge ratio may also be adjusted for factors like the volatility of the underlying asset and the hedging instrument, as well as the correlation between them.

3. Likely Impact on Inter-Commodity Spreads

The introduction of a new CME Grain Sorghum futures contract would establish an independent price discovery mechanism, likely leading to more efficient inter-commodity spreads and a significant reduction in basis risk in the physical cash markets.

a. Potential Impacts on Inter-Commodity Spreads in Futures

- **Dedicated Sorghum-Corn Spread**: The new contract would enable the creation of a direct, screen-traded sorghum-corn futures spread inter-commodity spreads. This would provide market participants with an efficient and lower-margin way to trade the price relationship between the two commodities, replacing current informal cross-hedging methods using outright corn futures positions.
- **Reduced Cross-Hedging Risk**: Currently, market participants use corn futures to cross-hedge sorghum, which carries inherent basis risk. A direct sorghum futures contract could reduce this hedging risk by an estimated 17-34%. [xxxvi]
- **Arbitrage Opportunities**: The spread market would facilitate automated arbitrage between outright sorghum futures positions and the spread book, potentially increasing liquidity and reducing price slippage.

b. Potential Impacts on Physical Cash Markets

- **Improved Cash-Futures Convergence**: The existence of a deliverable futures contract for sorghum would force local cash prices and futures prices to converge at expiration due to arbitrage activity, which in turn would reduce basis volatility in the cash market.
- **More Transparent Sorghum Basis**: A dedicated futures price would allow for a more accurate and transparent calculation of the local sorghum basis (cash price minus the sorghum futures price). This contrasts with the current method, where sorghum cash prices are often measured against corn futures, leading to less reliable basis expectations.
- **Price Relationship Changes**: The price relationship between sorghum and corn in the cash market is currently variable, with sorghum sometimes trading at a premium due to strong export demand (e.g., from China) and at a discount when used primarily for domestic feed. The new contract would explicitly price in these demand shifts, potentially leading to more dynamic and efficient inter-commodity spread fluctuations relative to the sorghum futures price, better reflecting real-time local supply vs demand dynamics.

  As such, basis volatility for physical cash grain sorghum hedged in a grain sorghum derivative or futures contract would be notably less than a corresponding basis of a cross-hedge.
- **Impact on Other Grains**: While the primary impact will be on corn spreads, as sorghum is a close substitute for corn in feed rations, there could be secondary effects on wheat and oat spreads, especially in regions where these feed grains compete for acreage or in feed rations.

  In particular, there would likely develop an increasing interest in the CME Grain Sorghum - Kansas HRW Wheat spread, as these two commodities would compete for production and planted acres, inclusion in the feed grain complex, as well as capacity and warehousing space at local country elevators.

G. Impact on Warehousing and Storage Rates

The introduction of grain sorghum derivatives and futures contracts is likely to have an impact on the returns to warehousing and storage. The possible impact may be seen within both the tariff storage rates, as well as the commercial returns to storage achieved through merchandising strategies.

The CME Group has an opportunity when re-introducing a new grain sorghum derivatives and futures contract to either apply a “Flat” tariff storage rate, or a Variable Storage Rate (VSR) tariff approach.

Currently, the CME is recommending that the tariff storage rate for grain sorghum be the same as for corn and soybeans on the Illinois Waterway Delivery System (IWDS) are currently at a flat rate of 8 cents per bushel per month.

When interest costs are added to these storage charges, the cost of **Full Financial Carry** is determined.
(Ref: Supplemental Information. C. Defining Full Financial Carry in this white paper, page 160)

Should the CME Group elect to introduce a successful grain sorghum derivatives and futures contract, the situation presents a number of significant merchandising opportunities for country elevators and warehouse operators. These would include, but not be limited to:

- The increased capacity to provide daily cash prices (both spot and forward) to local sorghum growers and end users alike, with significantly reduced risk.
- The improved capacity and reduced risk in accumulating larger parcels of grain sorghum, enabling larger shipments, with reduced freight rates, to higher valued markets.
- Intracommunity “Calendar” Spreads in a Grain Sorghum Futures contract would more accurately reflect regional/western corn belt warehousing capacity and the storage space situation with more regional accuracy than the Illinois Waterway Delivery System (IWDS) for corn.

  This would present different, and more locally relevant, sets of hedging and profit opportunities and scenarios for managing returns to grain warehousing storage space.

1. Likely Impact on the Merchandising of Warehousing Space and Storage

The reintroduction of a CME grain sorghum derivatives and futures contract is likely to have an impact on warehousing and storage rates for physical cash grain sorghum.

Posted commercial tariff rates for physical cash grain sorghum are likely to be unchanged to slightly higher as the CME storage rates are harmonized across commodities and modestly lifted over time.

However, the opportunity to generate improved commercial returns from storage and warehousing of grain sorghum should be notably improved through traditional merchandising and hedge placement strategies.

In the merchandising of grain and other agricultural commodities, the capturing of "returns to storage" is the process of turning a “carry” (contango) market into a risk-free or low-risk profit margin by utilizing the price difference between the cash purchase and a related sale of a forward futures contract.

In regions like the Western Corn Belt (WCB), where storage and warehousing space can be more readily abundant, merchandisers treat "warehouse/bin space" as a tradable asset to be rented to the market. The range of locally grown commodities (wheat, corn, soybeans, grain sorghum, etc.) compete for the same storage space based on the local country elevator's commercial expectations on **returns on investment (ROI)**.

If the forward market structure remains in a strong "carry" (contango), a merchandiser may choose not to sell the physical grain prior to the contract expiration of the futures contract of the initial hedge. This margin can often be further enhanced by managing (rolling) the placement of this hedge further forward in time.

Back-to-Back Trading: If the "carry" is narrow (inverted market), the strategy flips. Merchandisers stop storing and move grain "back-to-back" (buying and selling immediately), as there is no financial reward for holding inventory.

The dynamics of intra-commodity "calendar" spreads, in combination with local physical cash basis values expressed against a related grain sorghum futures price, will more accurately reflect the immediate supply of physical cash grain sorghum and the warehousing space available for its storage.

2. Comparison of Eastern Corn Belt (ECB) vs Western Corn Belt (WCB)

In the physical cash corn market, forward "calendar" spreads (carries) are driven by the relationship between local supply, storage availability, and the "pull" of usage by end-users.

While cash markets in both regions of the **Eastern Corn Belt (ECB)** and the **Western Corn Belt (WCB)** use "carries" to incentivize storage, the primary drivers of these intra-commodity "calendar" spreads differ.

The **Eastern Corn Belt (ECB)** is typically driven by intense processing demand, whereas the **Western Corn Belt (WCB)** is driven by larger storage capacity and logistics to export markets and port terminals.

a. Eastern Corn Belt (ECB): Demand-Driven Spreads

Markets in the ECB have significant annual ethanol demand and a high density of feed users in a diversified livestock sector. In states like eastern Iowa, Illinois, Indiana, and Ohio, the market often functions as a "destination" market due to high concentrations of ethanol plants alongside large domestic livestock feeders.

In order to secure supply from reluctant sellers of warehouse operators carrying hedged stocks, these end-users must often bid up nearby prices, competing with wide cash "carries" that seasonally follow the harvest, narrowing forward carries (or creating inverses) to incentivize holders of hedged stocks to move grain into the market immediately.

Warehouse Storage Deficits: Seasonally, areas experiencing a large harvest face a local situation that is deficits warehousing and storage space. When local harvest storage capacity is full, the market must either build a massive "carry" to justify expensive temporary storage or ground piles or sufficiently narrow the "carries" to cause grain to move toward the processor or export markets.

b. Western Corn Belt (WCB): Storage and Logistics-Driven Spreads

Markets in the WCB are driven by more variability in production (due to greater variability in rainfall) and larger warehousing capacity to store grain and supporting logistics to move grain to port terminals and export markets.

In states like western Iowa, Nebraska, and Kansas, the market is characterized by massive production and a heavier reliance on long-distance logistics predominantly supported by rail.

It is important to note that the large-scale concentration of cattle feeding operations in the WCB (e.g., Hereford, Texas, Western Kansas, and Nebraska) does create a steady baseline demand for feed grains. However, due to the vast scale of production, this usage rarely "shocks" the spreads as severely as the concentrated processing demand of the ECB, or surprise export demand from the CIF NOLA Gulf.

Across the WCB and Northern Plains, there is proportionally more on-farm storage. When storage is abundant, competition among commercial warehouses is less, which typically allows for wider forward carries to compensate producers and farmers for holding grain.

As such, it is typically the case that the WCB carries a disproportionate share of U.S. corn, soybean, and wheat stocks, as the grain inventories must travel a longer and more costly distance to the Gulf or PNW to reach export markets. As such, forward spreads and “basis” are more highly sensitive to barge and rail efficiency. [xxxvii] Higher local freight costs often influence weaker local basis levels and widen “cash carries, as terminal markets are not yet ready to absorb the available supply.

Driver Comparison Table

Driver	Eastern Corn Belt (ECB)	Western Corn Belt (WCB)
Primary Demand	Local Ethanol & Intensive Feed Usage	Seasonally Variable Global Exports, and Large-Scale Cattle Feedlots
Inventory Status	Periodic Tight Holders of Hedged Stocks / Reluctant Sellers	Periodic Burdensome Inventories / Large Carryover Stocks
Storage Impact	When “space” is in deficit, spreads widen	Ample “space” and greater production variability support narrow carries
Typical Market Structure	Narrower “carries” / More prone to cash inverses	Wider “carries” / market structure "Paying" for storage

It is important here to distinguish between “carries” reflected in intra-commodity “calendar” spreads, which reflect the greater macro fundamentals of the delivery market, while underlying “cash” carries reflected in micro fundamentals of local markets may significantly differ and will drive local basis levels versus related futures.[xxxviii] In addition, local “cash carries” reflected between various commodities will approach an equilibrium as these various commodities compete for the same warehousing space or operational capacity. As such, an intra-commodity

"calendar" spreads reflected on a Kansas-based derivative or futures contract could vary significantly from what is reflected on a Chicago, IWDS-based derivative or futures contract.

Regardless of whether the CME Group elects to apply a "Flat" or "Variable" Storage Rate, the pricing dynamics reflected in a Kansas-based grain sorghum derivatives and futures contract will better reflect the underlying fundamentals for the supply of grain sorghum versus available warehousing space, which can seasonally be very different than those reflected in corn derivatives and futures.

H. Challenges in Banking and Securing Financing

Firms that effectively manage their risks using derivatives and futures are typically larger and more profitable, and they tend to make greater use of bank loans and bonds. The use of derivatives essentially expands the financing options available to businesses.

Derivatives and futures markets significantly help in securing financing by allowing companies to manage and mitigate various financial risks, which in turn improves their creditworthiness and the terms of their debt. By providing financial stability and more predictable cash flows, these instruments make businesses more attractive to lenders.

The inability to effectively hedge price risk can make it more difficult for producers and end users, as well as other holders of grain sorghum inventories, to secure credit, as lenders may view the operation as a higher risk due to the unpredictable valuation of these inventories.

1. How Derivatives and Futures Can Help Secure Financing

Futures and derivatives markets help secure financing by allowing companies to manage and transfer various financial risks, which reduces overall riskiness and makes them more attractive to lenders. This risk mitigation can lead to lower borrowing costs and more favorable financing terms.

- **Collateral for Loans**: While the contracts themselves may not be direct collateral for traditional loans, commodities that can be hedged with futures may be more attractive as collateral for financing, as their future price uncertainty is reduced.

  For Example: Financial providers are more likely to provide inventory financing for companies that own grain (along with financing for hedging activities) if the inventory is forward sold to repudiable counterparties or is appropriately hedged.

  In contrast, grain sorghum's pricing relationship to corn reduces the ratio at which banks may be willing to finance grain sorghum inventories when hedged in a viable CME Grain Sorghum Futures contract.

- **Improved Creditworthiness**: Creditworthiness can be improved by reducing the volatility of earnings, stabilizing cash flows through hedging, and presenting a lower risk profile to potential lenders.

This is accomplished by using derivatives to hedge against adverse prices, interest rates, and currency movements, protect operating margins, stabilize earnings, and better manage its anticipated cash flow; all of which improve its credit rating and perceived financial stability.

As such, this can lower the company's "cost of capital", as well as enhance its borrowing capacity. Lenders are often more willing to offer loans, or offer them on better terms (e.g., fewer covenants), to companies that demonstrate robust risk management practices and proper utilization of derivatives and futures, as it reduces the lender's exposure to borrower default risk.

In essence, while futures and derivatives markets do not directly provide loans, they facilitate the financing process by allowing companies to manage the underlying risks that lenders are concerned about, thereby making them more reliable and financeable entities.

The introduction of derivatives and futures markets for grain sorghum will provide additional benefits to the agricultural finance and banking sector. These institutions already engage in agricultural derivatives and futures to manage risk and increase the likelihood of profitable outcomes, ultimately supporting economic growth and stability.

- **Facilitating International Trade and Financing**: A liquid, exchange-traded futures market for grain sorghum will enhance the exporter's ability to operate efficiently in the global marketplace.
- **Collateral and Financing**: Financial institutions are more likely to provide the necessary credit and financing for large commodity transactions when the underlying physical inventory is effectively hedged on a regulated exchange. The futures contracts serve as verifiable collateral against loans.
- **More Competitive Pricing**: The ability to directly hedge grain sorghum using a transparent futures market will allow domestic commercial sellers and exporters to offer both domestic and international foreign buyers more competitive and stable forward prices, as they can more confidently lock in their costs and profit margins.

2. Benefits For Banks & Financial Institutions

- **Risk Mitigation (Hedging)**: Banks use derivatives (like interest rate swaps) to protect their balance sheets from adverse price swings in interest rates, foreign exchange, or credit defaults, ensuring greater stability.
- **Enhanced Profitability**: They can use derivatives to speculate on market movements for higher returns, take advantage of leverage, and even mimic complex asset payoffs.
- **Market Efficiency**: Derivatives reduce transaction costs, making markets more efficient and allowing banks to offer better borrowing rates to clients.
- **Capital Efficiency**: Leverage allows banks to gain significant market exposure with a smaller capital outlay, optimizing resource use.
- **Client Solutions**: Banks tailor derivative products (options, futures, swaps) to meet specific client needs for risk management or investment exposure.

3. For the Broader Financial Sector (Investors, Firms)

- **Price Discovery**: Futures markets provide real-time insights into market expectations, helping to set accurate prices for underlying assets.
- **Access & Diversification**: They offer access to otherwise hard-to-reach markets or assets, allowing for better portfolio diversification.
- **Liquidity & Flexibility**: Highly liquid derivative markets allow quick entry and exit from positions, enabling rapid reaction to market shifts.
- **Transfer of Risk**: They allow risk-averse entities to transfer specific risks to risk-tolerant entities, optimizing risk distribution in the economy.

With the introduction of a futures market of grain sorghum will provide additional infrastructure, allowing financial participants to better manage uncertainty, optimize capital, and discover true asset values for this commodity sector, fostering a more robust and dynamic financial system.

I. Potential Impact on USDA Farm Programs

The introduction of robust derivatives and futures contracts for grain sorghum would potentially impact USDA Farm Programs by enhancing **price discovery** and providing farmers with improved **risk management tools**. This, in turn, has the potential to influence the parameters and payment triggers for programs like Agriculture Risk Coverage (ARC) and Price Loss Coverage (PLC).

Currently, without a specific futures market, the sorghum price for crop insurance purposes has sometimes been linked to corn futures prices as a proxy due to thin markets and poor price discovery and reporting. The successful introduction of a grain sorghum futures contract would provide a more transparent, liquid, and reliable market-based price discovery mechanism. In addition, a viable related options market on grain sorghum futures would also most likely be required to make underwriting of these insurance programs effective.

1. Key Potential Impacts on USDA Farm Programs

- **Improved PLC Payment Accuracy**: The PLC program triggers payments when the Market Year Average (MYA) price falls below a statutory reference price. A dedicated futures market would provide more accurate, real-time price signals, reducing the reliance on potentially incomplete, voluntary NASS reporting, which has historically underestimated sorghum prices.
- **Reduced Revenue Volatility for ARC**: The ARC program protects against revenue declines based on historical averages. A derivative market would allow farmers to hedge price risk more efficiently, potentially reducing the need for government-funded, reactive, and sometimes ad hoc payments (such as the Market Facilitation Program or other emergency aid).
- **Refinement of Crop Insurance (RMA)**: The Risk Management Agency (RMA) sets insurance premiums based on projected prices. A dedicated futures market would likely lead to more tailored Revenue Protection (RP) insurance for sorghum, reducing the need for arbitrary multipliers of corn prices (e.g., 100.2% of corn price) and potentially changing premium costs if risk is better defined.

- **Potential for Changes in Government Payments**: To the extent that farmers effectively use futures markets to mitigate their price risks and secure higher average returns over time, it could theoretically change the frequency or size of government support payments (like ARC/PLC), which are typically triggered by low national average market prices.

  The primary goal of farm programs is to provide a safety net, and the programs' reference prices are often established by the Farm Bill legislation, so direct impacts on the *structure* of the programs would likely be minimal without legislative changes. If this is deemed to be the case, the situation lies outside of the purview of this white paper and squarely in the political area of advocacy.

- **Increased Use of Marketing Contracts**: With more transparent pricing (derivatives/futures), farmers are more likely to utilize marketing contracts with grain buyers (e.g., in the ethanol or feed sectors), which are often tied to these futures markets, allowing them to secure higher returns and lock in prices before harvest.

- **Better Risk Assessment and Capitalization**: Enhanced derivatives would facilitate better financial planning for farmers, potentially improving credit access and reducing reliance on the "wealth effect" of government-insured payments, aligning them more with market-driven income.

Overall Impact Summary

The introduction of grain sorghum derivatives and futures markets serves as complementary risk management tools alongside federal crop insurance and commodity programs. The decision to use private tools like futures is often related to farm size and debt levels.

The introduction of a grain sorghum futures market would allow growers and producers to more effectively hedge against price fluctuations, securing a predictable income stream and reducing financial instability. This may influence how they participate in government programs.

The availability data generated by a successful derivative and futures market would provide better, more specific data for government price reporting and risk assessment tools, benefiting both the USDA's programs and the farmers utilizing them for market information and price risk management.

Overall, the development of these financial tools for grain sorghum would likely shift the industry from a reliance on proxy, corn-based, or ad hoc assistance to a more stable, market-oriented safety net.

However, the above comments are dependent on new derivatives and futures contracts for grain sorghum establishing itself as a viable and robust market and becoming fully embraced and accepted by the industry before it is integrated into USDA Farm Programs. This is not likely to occur immediately with the early establishment of a new contract. It will take time for a set of new derivative instruments to prove themselves as viable, robust, and fully accepted by the industry.

2. Acceptance by USDA and Integration into Farm Programs

Industry acceptance of new derivatives and futures contracts for grain sorghum will take some time to prove itself to be viable and evolve into a sufficiently robust market before becoming fully embraced and accepted by the industry. This should be a precursor before being integrated into any USDA Farm Programs.

The primary challenge the USDA would face in integrating a new, unestablished grain sorghum futures contract into its farm programs' pricing (like ARC and PLC) is the **lack of liquidity and sufficient trading volume**, which impairs accurate price discovery and makes the market susceptible to volatility or manipulation.

Key Challenges for the USDA

- **Regulatory Scrutiny and Validation**: The USDA relies on robust, established markets for its price discovery mechanisms. Adopting a new instrument would require rigorous validation processes to ensure its integrity and reliability. The USDA would need to be confident that the new contract accurately reflects market fundamentals and not speculative distortion, a task complicated by a nascent market.
- **Reference Price Calculations**: The national average market prices (Marketing Year Average or MYA) used to determine PLC and ARC payments are influenced by market dynamics, including futures prices. Currently, this is facilitated for grain sorghum by utilizing CME Corn Futures as a proxy. Improved price discovery from a dedicated sorghum futures market would provide more accurate, real-time data for these crucial price calculations.
- **Thin Markets and Insufficient Data**: A newly established futures contract would likely have low trading volume and liquidity, at least initially. This "thin market" makes it difficult for the USDA to collect sufficient, reliable data to establish fair and consistent national average prices (Marketing Year Average, or MYA) required for program calculations.

  The potential for the introduction of a new grain sorghum futures market will serve as a central exchange for domestic and international supply and demand information, leading to more transparent and efficient price discovery for the commodity.
- **Reduced Basis Risk**: Currently, without a specific futures market, the sorghum price for crop insurance purposes has sometimes been linked to corn prices. A dedicated sorghum futures contract would reduce "basis risk" (the difference between local cash prices and the relevant futures price) for producers, as the futures price would more directly reflect specific sorghum market conditions, rather than relying on a substitute commodity.

  It is important to note that while volatility of basis component of price as expressed against a related sorghum futures contract would significantly reduce basis volatility and better defined, the corn vs. grain sorghum spread (along with the corresponding spatial relationship of “Illinois River” delivery vs. “Kansas” delivery) of the price component would be shown in the relationship of the sorghum futures value vs. the corn futures value.
- **Convergence Issues**: A critical function of futures markets is the convergence of futures prices with local cash prices as the contract expiration date approaches. For new, thin markets, this link may be weak, making it difficult for the USDA to accurately bridge the gap between national futures prices and the diverse, local cash prices experienced by farmers in different regions.
- **Price Volatility and Manipulation Risk**: Low liquidity means that relatively small trading volumes could cause disproportionately large price swings. This volatility introduces a high degree of risk for the USDA, as program payments (which can amount to billions of dollars) would be tied to a less stable and potentially more easily manipulated price benchmark.

- **Legislative and Administrative Hurdles**: Changes as to how the USDA determines prices for farm programs often require legislative action through the Farm Bill or formal administrative rulemaking processes, such as publishing proposed changes in the Federal Register. Integrating a new pricing mechanism is not a simple administrative decision and would require substantial time, public comment periods, and potential political negotiation.

3. Addressing policy issues and USDA Farm Programs

The primary goal of farm programs is to provide a safety net, and the programs' reference prices are often established by the Farm Bill legislation, so direct impacts on the *structure* of the programs would likely be minimal without legislative changes.

With more transparent pricing as a result of the reintroduction of a grain sorghum derivatives and futures contract, farmers are more likely to utilize related marketing tools with grain buyers (e.g., in the ethanol or feed sectors), which are often tied to these futures markets, allowing them to secure higher returns and lock in prices before and after harvest.

To the extent that farmers effectively use futures markets to mitigate their price risks and secure higher average returns over time is a commercial decision. However, over time, this could theoretically change the frequency or size of government support payments (like ARC/PLC), which are typically triggered by low national average market prices. In addition, a viable related options market on grain sorghum futures would also most likely be required to make underwriting of these insurance programs effective.

If this is deemed to be the case and a concern, the situation lies outside of the purview of this white paper, and the issue lies squarely in the political arena.

J. Consideration for Natural Resources – Land and Water Use

Grain sorghum benefits land use, soil, and water conservation through its remarkable drought resistance, lower water needs (up to 30% less than corn), and ability to thrive in tough conditions, which conserves water and reduces irrigation reliance. It improves soil health by adding organic matter, breaking up compaction, and reducing erosion, while its deep roots enhance water infiltration; furthermore, it sequesters carbon, supports wildlife, and requires fewer inputs, making it a sustainable choice for challenging climates. [xxxix]

The introduction of derivative and futures markets for grain sorghum will provide an added benefit for land use and conservation by creating financial incentives for sustainable practices, pricing environmental impacts (like carbon), managing climate-related risks for businesses, and funding conservation through mechanisms like carbon credits, which allow landowners to earn revenue for protecting or restoring ecosystems, shifting focus from purely extractive use to valuing natural services.

The introduction of these instruments will further enable markets to adopt "nature-based solutions," attracting investment by making ecological benefits financially quantifiable and tradable, helping to fund long-term stewardship like reforestation and biodiversity protection that otherwise would not be profitable.

Other Key Benefits

- **Incentivizing Conservation**: By creating markets that define prices and value for both the agricultural commodity and the environmental credits (like carbon or biodiversity credits), landowners can earn income for activities like reforestation or soil health, making conservation economically viable.
- **Price Discovery & Risk Management**: By utilizing a combination of derivatives for both grain sorghum and environmental assets (e.g., CO2, water) to help establish prices and value, companies will be able to hedge against climate risk and invest in infrastructure, while farmers manage price volatility for crops.
- **Forward-Looking Incentives**: Improved forward price discovery will allow projects with longer development timelines to secure financing upfront, making large-scale conservation feasible.
- **Valuing Ecosystem Services**: A combination of these types of instruments will help quantify the economic value of natural processes (like water filtration or flood mitigation) that were previously difficult to price.
- **Funding & Investment**: In addition, derivative and futures markets help to facilitate capital flow into “green” projects, with instruments like green bonds and biodiversity credits attracting private sector investment for sustainable land management.

Examples of Practice

In the same way, derivatives and futures for corn, soybeans, and wheat can be utilized to construct sustainability and conservation programs; the introduction of these same instruments for grain sorghum will assist sorghum producers and consumers to develop these same approaches.

- **Carbon Markets**: Companies buy carbon credits from landowners who reduce emissions (e.g., via reforestation), generating revenue for sustainable forestry.

- **Sulfur Dioxide (SO2) Trading**: The success of SO2 trading under the Clean Air Act showed how cap-and-trade systems can drive significant, cost-effective emissions reductions, a model applied to other environmental issues.
- **ESG Investing**: Derivatives help investors assess climate risk, directing capital towards companies and projects with positive environmental impacts.

Challenges

- **Valuation Complexity**: Assigning monetary value to biodiversity loss is difficult.
- **Market Design**: Effective rules, verification, and coordination are needed to avoid double-counting and ensure financial additionality.

K. Measuring Success of a Derivatives and Futures Market

Supported by strong regulatory oversight, a successful futures/derivative market can be gauged through a number of metrics, including:

- **Liquidity and Activity Metrics** (Average Daily Volume (ADV), Open Interest (OI), and tight Bid-Ask Spreads, Trade Size, (as well as possibly tracking the Put/Call Ratio to determine market sentiment).
- **Participation** with a strong diversity of both hedgers and speculators shows deep utility with a diversity of market participants and trader types, combined with initial steady growth in participants, and
- **Robust Price Discovery** demonstrates strong alignment between futures and underlying cash fundamentals, along with effective risk transfer.

Metrics for Activity and Liquidity

A successful futures/derivative market can be gauged through a number of metrics, including: Open Interest (OI), Average Daily Volume (ADV), and a tight Bid-Ask Spread, Trade Size.

Trading activity is a measure of the total number of shares or contracts traded for a specific security within a given timeframe (e.g., hourly, daily, weekly, etc.). High trading activity generally leads to high market liquidity.

Market liquidity refers to the ease with which an asset can be bought or sold without causing a significant change in its price, while trading activity is the volume of buying and selling of a financial instrument over a specific period. These two concepts are closely related.

Market liquidity is a crucial feature of a healthy financial market that impacts transaction speed, costs, and risk management.

- **Average Daily Volume (ADV)**: Average Daily Volume (ADV) is a metric used to measure the total number of contracts traded for a specific commodity on a given day, averaged over a defined period.

ADV (Average Daily Volume) *(in number of contracts)*

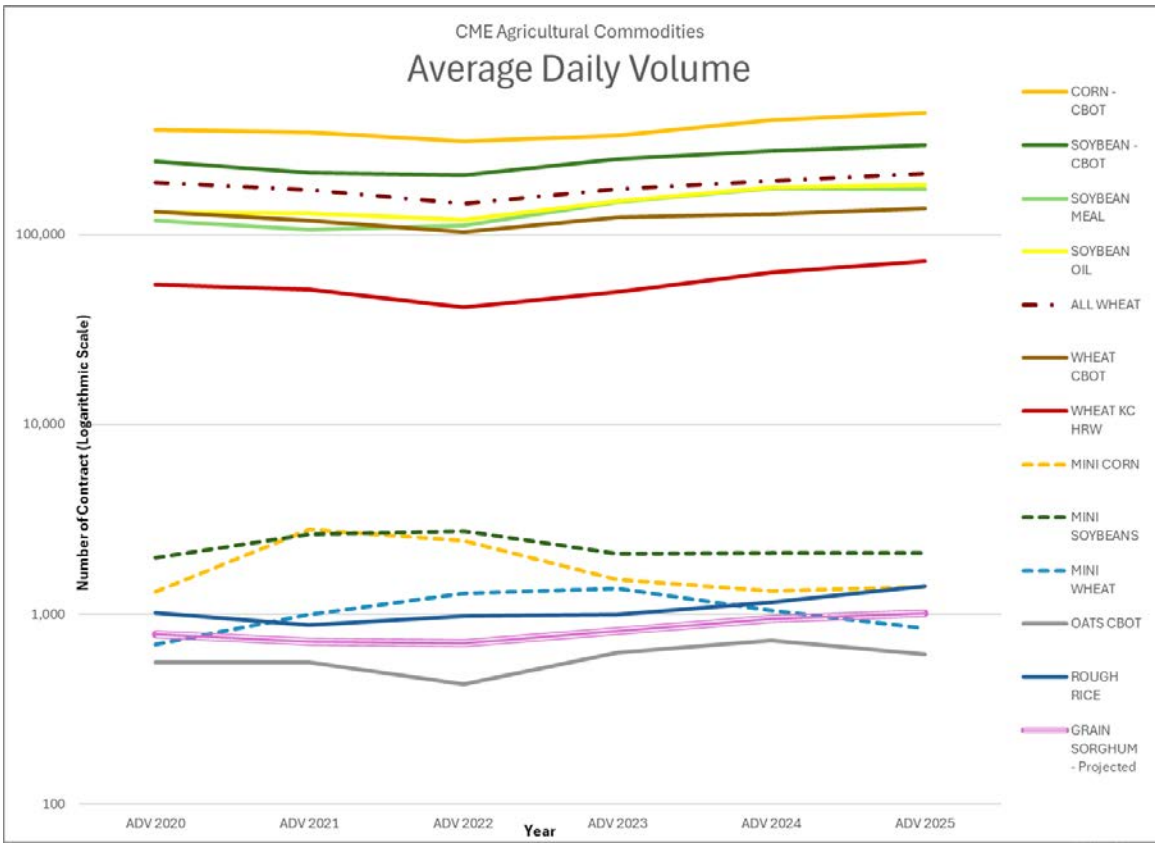
Ag Products Futures	ADV 2020	ADV 2021	ADV 2022	ADV 2023	ADV 2024	ADV 2025	U.S. Production (Six-Year average)			ADV as a % of U.S. Crop
CORN - CBOT	354,755	344,849	310,283	332,379	402,493	437,556	15,170.0	mbus		11.99%
SOYBEAN - CBOT	241,593	211,605	206,059	249,647	276,846	294,921	4,320.0	mbus		28.56%
SOYBEAN MEAL	118,240	106,255	111,919	148,781	175,418	173,426	52.6	mst		
SOYBEAN OIL	130,284	129,664	119,729	150,176	176,494	183,037	11.8	mmts	260 mcwt	
ALL WHEAT	187,485	171,689	144,954	173,599	191,189	209,820	1,840.0	mbus	(ADV = Sum)	48.86%
WHEAT CBOT	131,879	118,956	103,409	123,705	127,802	137,437	345.0	mbus		179.51%
WHEAT KC HRW	54,394	51,497	41,314	49,857	63,356	72,283	804.0	mbus		34.48%
MINI CORN	1,318	2,795	2,427	1,521	1,328	1,392				
MINI SOYBEANS	1,992	2,630	2,750	2,088	2,107	2,113				
MINI WHEAT	692	996	1,292	1,359	1,043	847				
OATS CBOT	556	559	429	630	727	616	69.6	mbus		4.21%
OATS CBOT	556	559	429	630	727	616	275.0	mbus	U.S. + Canada	1.07%
ROUGH RICE	1,017	880	979	996	1,157	1,411	472.2	mbus	212.5 mcwt	1.01%
GRAIN SORGHUM - Projected	787	720	704	813	942	1,014	437.0	mbus		0.95%

Source: CME Group https://www.cmegroup.com/ftp/webmthly/

This metric provides traders, analysts, and investors with an idea of how actively a derivative is traded daily. It is an essential metric that provides valuable insights into the liquidity, volatility, and market sentiment surrounding a particular asset. Investors and traders rely on the ADV to make informed decisions about which securities to buy or sell and to understand how easily they can enter and exit trades.

Higher volumes typically signify greater liquidity, making it easier to enter/exit positions and execute trades at desirable prices without significant price fluctuations.

The Table above shows the historical ADV for a range of CME agricultural commodities. It also shows the "Six-Year Average U.S. Production" of the commodity. (For Oats, it's also showing the combined U.S. and Canadian production, based on the U.S. import trade of Canadian oats and this close trade relationship that is directly related to delivery fundamentals of CME oat futures.

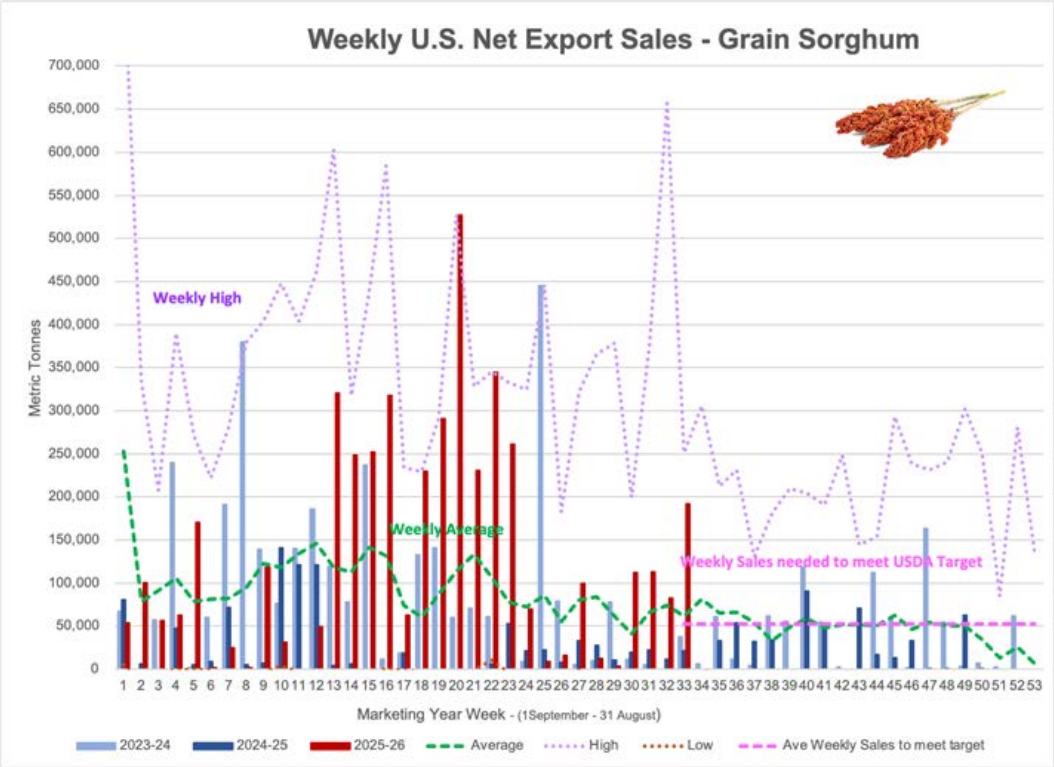


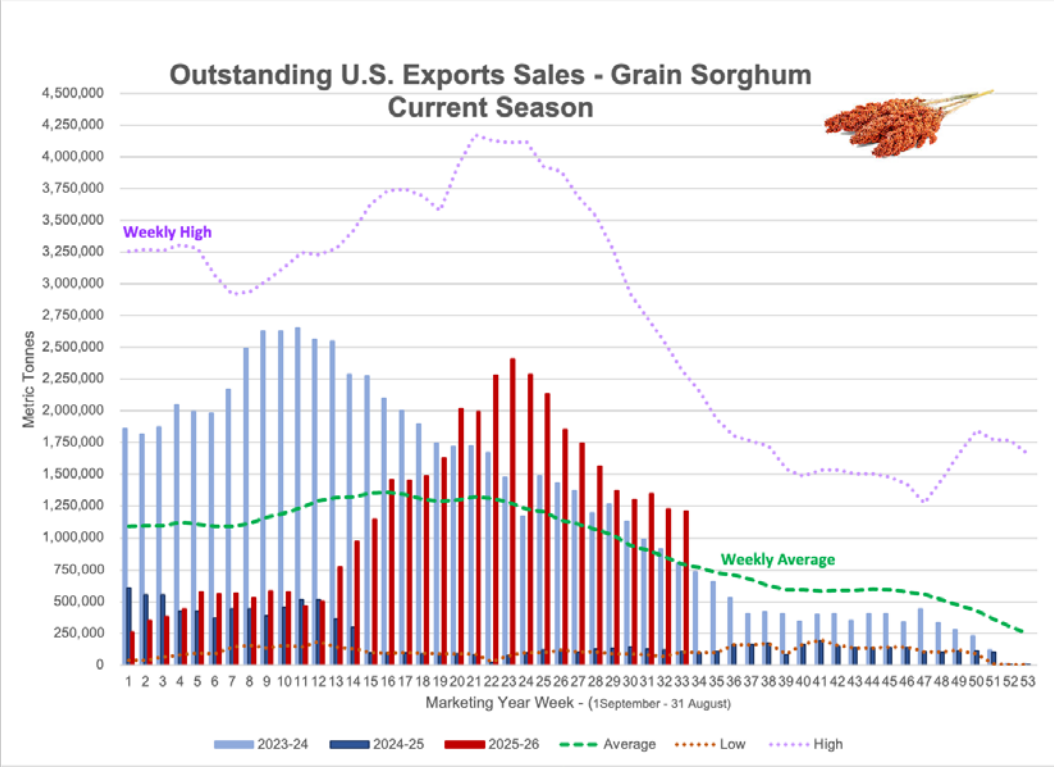
Source: CME Group, *Projected Estimates for Grain Sorghum by GHA**

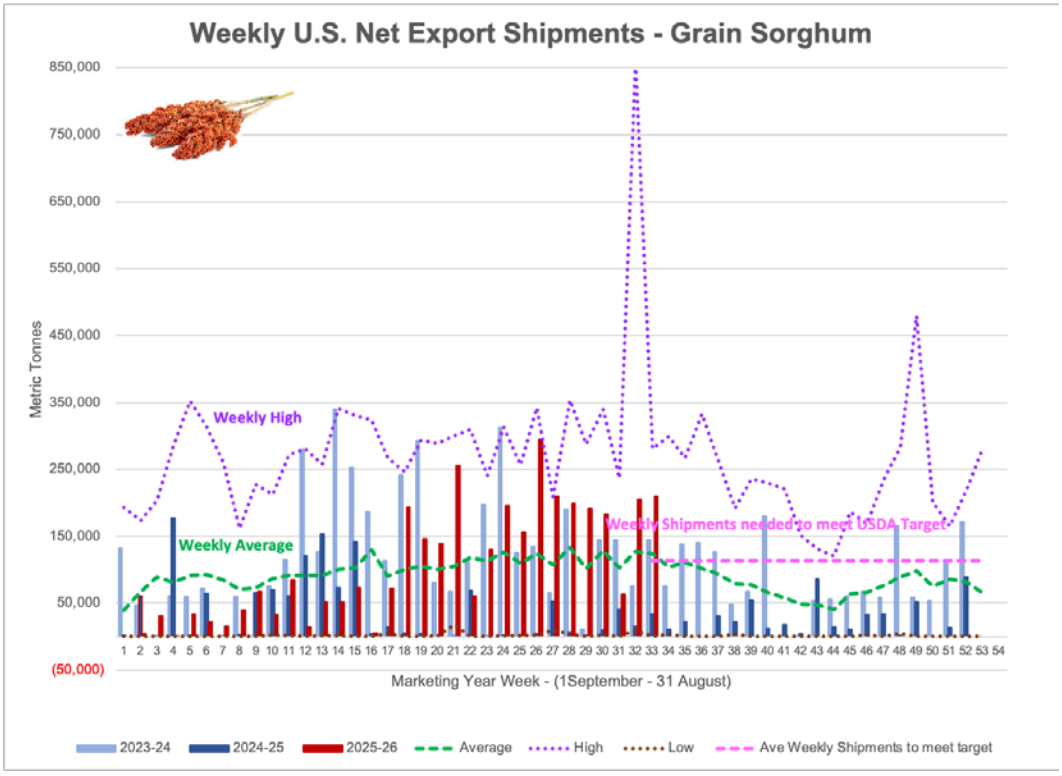
Given the similarities in underlying volumes and cash market fundamentals, it would be suggested that both the CME Oats and Rough Rice futures contracts can be seen as examples of how a CME Grain Sorghum futures contract might perform.

Further consideration of the ADV data, particularly for CME Oats and Rough Rice Futures, in conjunction with the comparative look at the past six-year average crop size for U.S. + Canadian Oats – 275 mbus, U.S. Rough Rice – 472 mbus, and Grain Sorghum

– 437 mbus, ADV would suggest that if a reintroduced grain sorghum derivative and futures contract reached an ADV of between 700 to 1,000 contracts per day, it would be considered a “success”. To put this ADV in other terms, it equates to 3.5 to 5.0 mbus, or 89.0 – 12.7 kmts.







When comparing this to available cash trade data, particularly FAS grain sorghum export sales and shipments data above, this also looks to be reasonable.

- **Trade Size**: Trade size refers to the quantity or monetary value of an asset being bought or sold in a single transaction, crucial for managing risk and potential profit, often measured in units (like shares), lots (in forex), or contract units, and determined by factors like account size, risk tolerance, and market conditions.

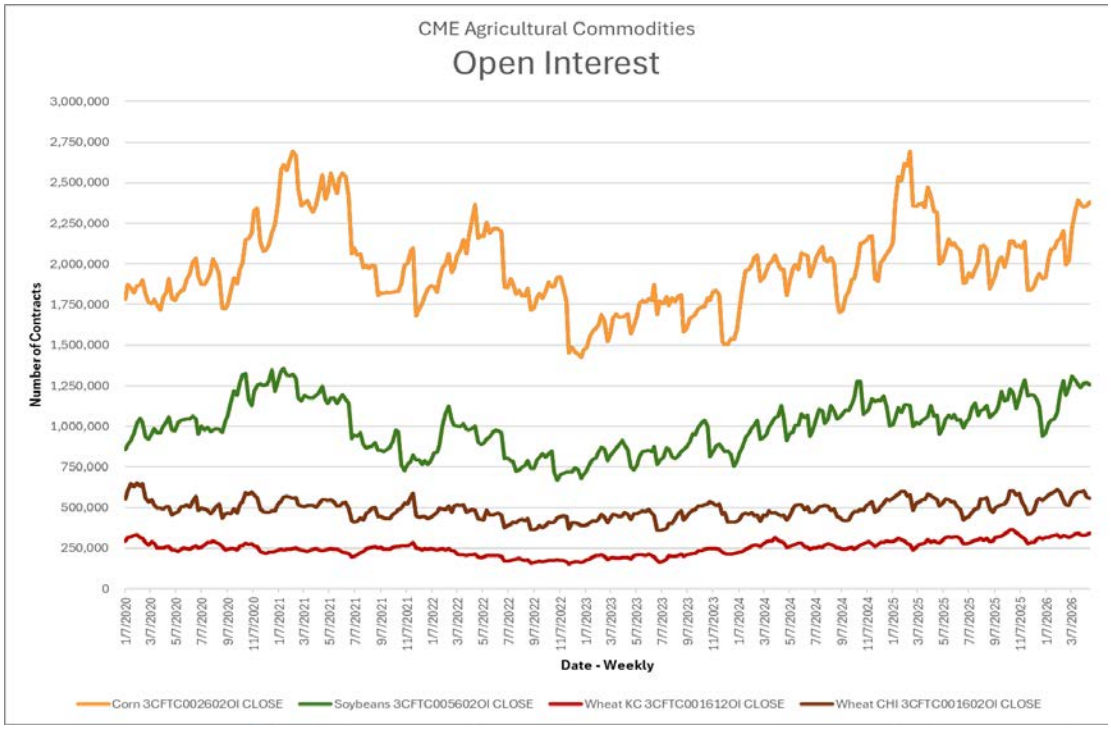
  Large average trade sizes (relative to minimums) suggest institutional participation and market depth.

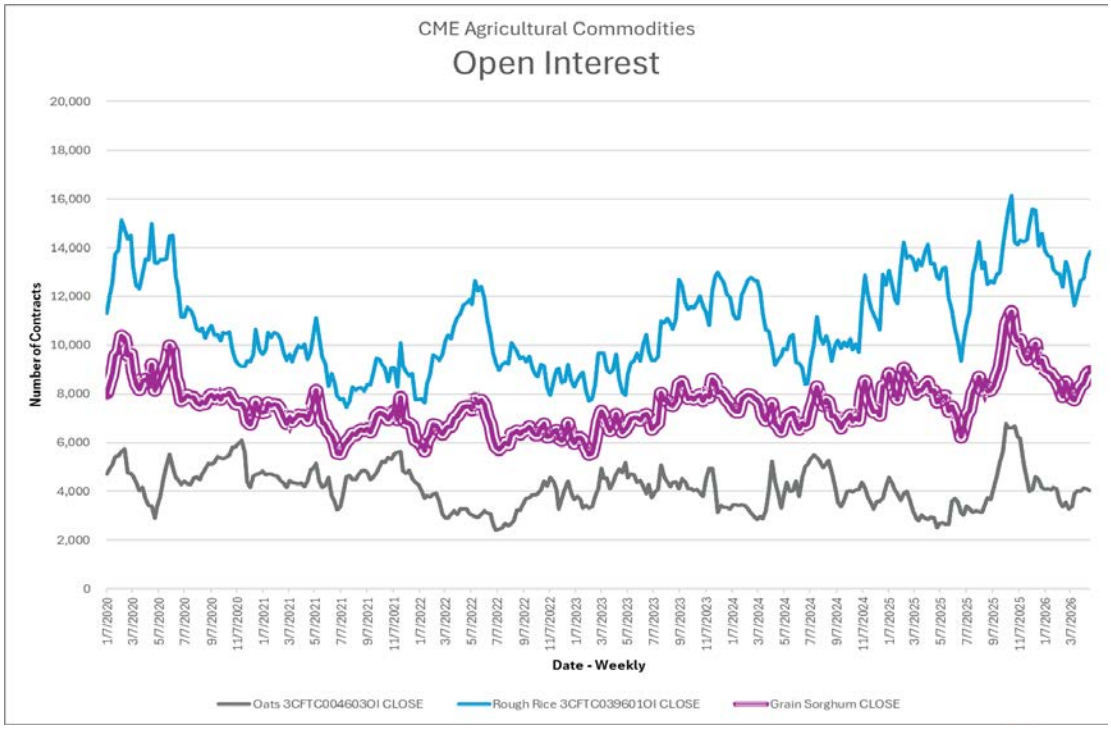
- **Bid/Ask Spread**: The “bid/ask” spread is the difference between the “ask” price and the “bid” price for an asset in the marketplace. It shows the highest price that a buyer is willing to pay for security and the lowest price that a seller is willing to accept.

  The difference between these two, the spread, is the principal transaction cost of trading (outside of commissions). A narrow spread indicates a lower cost of the trade, reflecting higher liquidity, providing for ease of execution.

- **Open Interest (OI)**: Open Interest is the total number of outstanding contracts that have not been settled, exercised, or expired at market close at the end of each trading day. These contracts are outstanding derivatives, specifically unsettled futures and options. They show how many people still have buy and sell positions and have not exited their trades.

Generally, high OI suggests strong commitment and depth. This implies that OI gives an accurate picture of a contract's liquidity and the current level of interest in it.





Source: CME Group, *Projected Estimates for Grain Sorghum by GHA**

Given the similarities in underlying volumes and cash market fundamentals, it would be suggested that both the CME Oats and Rough Rice futures contracts can be seen as examples of how a CME Grain Sorghum futures contract might perform.

Further consideration of the OI data, particularly for CME Oats and Rough Rice Futures, in conjunction with the comparative look at the past six year average crop size for U.S. + Canadian Oats – 275 mbus, U.S. Rough Rice – 472 mbus, and Grain Sorghum – 437 mbus, OI comparisons would suggest that if a reintroduced grain sorghum derivative and futures contract reached an OI of above 6,000 contracts per day, it would be considered a "success". To put this OI in other terms, it equates to 30 mbus, or, 762.3 kmts.

In addition, when comparing this to available cash trade data, particularly FAS grain sorghum export sales and shipments data previously shown above, this also looks to be reasonable.

- **Diversity of Market Participants**

  The weekly Commitment of Traders (COT) Report, published by the CFTC, details the trading positions of market participants in futures markets. This report serves as an indicative breakdown of Open Interest by commercial (hedgers) and non-commercial (speculators) traders and will provide insight into the diversity of current market participants.

  The COT Report in combination with the OI will provide insight into who it holding the open positions in a particular contract. This indicates to traders whether the amount of money flowing into the contract increases or decreases.

- **Market Depth**

  Market Depth refers to a market's capacity to handle a substantial volume of transactions without causing significant changes in the price of an asset. This is typically visualized through an order book, which is a list of outstanding "buy (bid)" and "sell (ask)" orders at various price points.

  Market depth and the diversity of participants are two interconnected characteristics crucial to a liquid, stable, and efficient financial market. A deep market with a wide range of participants can better absorb large trades without significant price fluctuations and provide more reliable transaction execution for all involved.

  Even though a market may not have a high Daily Average Volume, if it has reasonable depth in its Bid/Ask structure and its "Mark-To-Market" (MTM) values are reasonably accurate, it can be said to be viable.

- **Market Efficiency (i.e., Strong Price Discovery via fundamental/technical analysis)**

  Market Efficiency and Strong Price Discovery refer to a marketplace where the real-time interaction of many well-informed buyers and sellers efficiently determines an accurate and fair market price for an asset. This process is central to a healthy, transparent, and liquid market.

  This means a market efficiently finds an asset's true value through transparent information, high liquidity (many buyers/sellers), and competition, leading to confident, quick trades, as seen in liquid stocks or competitive business sales, contrasting with

opaque markets where finding a fair price is difficult and risky. It's crucial for market health, reflecting supply/demand, news, and sentiment, and can be enhanced by open data and processes, like those used in modern electronic exchanges.

In contrast, Weak Price Discovery is demonstrated by opaque markets with wide Bid / Ask spreads, slow price movements, and uncertainty about exiting positions. Additional traits are demonstrated by infrequent trading, leading to stale prices and/or large gaps between trades.

- **Basis Stability**

  Basis Stability is understood to be how well changes in futures prices track the underlying changes in the physical cash market, (demonstrating low basis volatility or risk. This reflects the correlation between futures and the physical cash commodity, and as such, its effective hedging capacity. This correlation can also be used to demonstrate characteristics of hedging viability.

  [Ref: Section Supplemental Information B. The Basics of Basis: on page 152]

- **Reliable Mark-To-Market Valuations**

  Mark-To-Market (MTM) valuations are considered reliable because they reflect the current, real-time market price of an asset or liability, rather than its historical cost.

  This method enhances transparency and provides a more accurate snapshot of a company's financial health, which is crucial for investors and risk management, indicating ease of trading, fair pricing, and effective risk transfer.

  Even though a market may not have volume or much depth of liquidity, if it delivers transparent Mark-To-Market (MTM) values that are reasonably accurate, it can demonstrate effective Price Discovery and is said to be viable.

N.B., Like any financial metric, each of the above measures should be used in conjunction with other indicators and analysis tools to gain greater insight and a more comprehensive understanding of a derivative’s behavior and potential.

Not all commodity markets are as robust as CME Corn and Soybean derivatives and futures, demonstrating the same characteristics of volume and liquidity. However, that does not mean that these smaller commodity derivatives and futures cannot be as effective. This is why it is imperative to use other means of measures to assess a derivative or futures market's viability. These measures, amongst others, should include:

It has also been observed that new agricultural derivatives and futures contracts typically take approximately three years or cropping seasons to determine if they are going to be readily adopted by the industry and become successful.

VI. Initial Comments and Concerns from the Trade

Part of this project will include consultation with grower groups, country elevators, large commercial trade, end users, etc.

There will also be a focus on commercial trade, specifically including potential locations Regular for Delivery, as well as the delivery process for the contract.

A. Farm Gate / Grower Perspective and Issues

1. Potential Impact on Cash Grain Sorghum Prices

How is having an exchange-traded commodity futures instrument by the CME Group for grain sorghum likely to impact cash prices for grain sorghum?

Having an exchange-traded commodity futures instrument for grain sorghum by the CME Group would likely lead to a more **transparent, efficient, and direct pricing mechanism** for the commodity, while also likely reducing price volatility and basis risk.

Futures prices represent direct price discovery of collective expectations in the market regarding future supply and demand conditions, incorporating information like weather patterns, input costs, and global demand.

Without a specific sorghum futures market, the price is often related to, or cross-hedged with, corn or oat futures prices. This can result in an imprecise price that does not fully reflect specific sorghum market fundamentals, such as unique export demand (e.g., from China).

A dedicated commodity-specific derivative and futures market for grain sorghum would allow for a price specific to grain sorghum, capturing its unique supply and demand dynamics, along with its primary locational difference to corn, to more accurately reflect the true value for grain sorghum.

This improvement will most likely be reflected in the grain sorghum futures price in relationship to world price, i.e., FOB Texas Gulf values, where it is roughly estimated that a 15 to 25 cent per bushel improvement could be expected.[xl]

Price Liquidity

Derivative and futures markets are designed to facilitate **price discovery**, **price transparency**, and the transfer of risk, which is believed to alleviate some erratic price movements in the spot market.

An exchange-traded instrument provides a centralized market attracting a larger number of buyers and sellers. This would suggest an increase in market liquidity. Currently, the physical cash markets for grain sorghum lack significant depth in liquidity. The introduction of a derivative and futures market for grain sorghum is not likely to make the situation in the physical cash market any worse, but it will add significant potential to improve the situation.

In addition, supporting the argument, the addition of an exchange-traded instrument for grain sorghum would provide a centralized facility where information can be rapidly disseminated, leading to more efficient and transparent pricing, assisting in improving price transparency and potentially adding to market liquidity.

Price Volatility

Market volatility in agricultural commodities and grain markets is driven by a complex interplay of unique supply and demand factors, as well as broader external influences.

The question that must be asked here is: **What impact might the introduction of a new grain sorghum derivative and futures contract have on the volatility of grain sorghum prices?**

The impact on price volatility due to the introduction of grain sorghum derivatives and futures market is difficult to find in academic literature, but general market theory would suggest the potential for stabilization of prices.

However, it is important to note that the price volatility observed in a new grain sorghum derivative and futures market would be different from that observed in the corn market (currently used as a cross-hedge). This is a result of each commodity, grain sorghum and corn, having a different and unique set of drivers and underlying fundamentals; though it must be admitted they both share a good number of similar themes as they are highly substitutable in a number of end-use processes (i.e., feed and ethanol). The ultimate effect (stabilizing or destabilizing) can depend on the nature of underlying fundamental events (e.g., production vs. consumption shocks, etc.) and how each commodity is affected.

In addition, a newly introduced set of exchange-traded instruments for grain sorghum, with an unestablished market and the likelihood of significantly lower liquidity than corn, is likely to experience higher volatility until sufficient trading volume is achieved.

The one thing that can be said for sure is: Volatility will be different…

This difference may also be one of the drivers to encourage the market to participate directly in a grain sorghum derivative or futures market.

2. Potential Impact on Cash Grain Sorghum Basis

Basis Risk and Volatility for grain sorghum traded against a grain sorghum futures contract would be significantly reduced, trading in a narrower and more clearly definable range.

A dedicated sorghum futures contract would reduce the "basis risk" currently faced by producers and buyers who rely on cross-hedging with other commodities (e.g., corn). A specific sorghum contract would ensure that the local cash price is more closely linked to the futures price at expiration (convergence), providing a more reliable net price for producers.

Currently, without a specific futures market, the sorghum price for crop insurance purposes has sometimes been linked to corn futures prices. As grain sorghum is not deliverable against a corn contract, by definition, the anticipated convergence between corn and grain sorghum may occur as expected.

As such, historical basis values for grain sorghum against corn have been seen to trade in over a 300+ cents per bushel range.

A dedicated sorghum futures contract would reduce "basis risk" (the difference between local cash prices and the relevant futures price) for producers, as the futures price would more directly reflect specific sorghum market conditions, rather than relying on a substitute commodity.

In addition, the basis for grain sorghum vs a deliverable futures contract would more clearly define both the “upside” as well as the downside for basis.

[Ref: Section IV. Currently Proposed Contract Terms and Delivery D. Delivery Execution for CME Grain Sorghum (per Kansas HRW Wheat: on page 55]

How basis can affect producer profitability.

The more definable, stronger, and less volatile grain sorghum basis is likely to result in a higher cash price relative to a grain sorghum futures contract, as well as an improved reflection of the international world price of grain sorghum back into the U.S. domestic market, i.e., the spread between Delivered or FOB Texas Gulf vs. Country Elevator posted price.

[Ref: Section Supplemental Information B. The Basics of Basis: on page 152]

For Example: If a farmer can pick up an additional $0.30/bu of basis value, this additional value will be reflected in his final cash price.

There are many farmers who sell grain this way, on a Basis Contract, pricing it later against an agreed corresponding futures month and contract.

For Example: because of on-farm storage and a farmer's ability to manage basis, their decision to sell is often driven by how strong the basis is. When the "basis" is strong, the local market is telling the farmer it needs grain, and it is bidding the local cash/basis price up to procure it.

3. Potential Impact on Growers' Planting and Acreage Decisions

Without a forward curve for different crops (e.g., corn, soybeans, wheat, etc.) farmers cannot compare expected profitability. This can lead to an unnecessary surplus of one crop and a shortage of another, further destabilizing commodity prices.

With a more clearly defined forward price curve for both futures and related cash prices, the production economics of sorghum versus corn, soybeans, wheat, or other commodities become clearer. With a more transparent and manageable price signal, farmers are more likely to adjust their production and planting decisions more responsively to the expected profitability.

In addition, a viable futures market would allow these forward prices, driving production decisions to be hedged and locked in, increasing the confidence in profitable marketing outcomes for grain sorghum.

This would not only result in the capacity to lock in future demand, but would also be likely to lead to increased sorghum acreage and production in suitable regions, which would impact the overall supply of grain sorghum.

4. Potential Impact on USDA Government Programs

The primary goal of farm programs is to provide a safety net, and the programs' reference prices are often established by the Farm Bill legislation, so direct impacts on the *structure* of the programs would likely be minimal without legislative changes.

Legislative and Administrative Hurdles

Changes to how the USDA determines prices for farm programs often require legislative action through the Farm Bill or formal administrative rulemaking processes, such as publishing proposed

changes in the Federal Register. Integrating a new pricing mechanism is not a simple administrative decision and would require substantial time, public comment periods, and potential political negotiation.

If this is deemed to be the case, the situation lies outside of the purview of this white paper and squarely in the area of political advocacy by growers.

See related previous discussion on Potential impact on USDA Farm Programs
[Ref: Section V. Potential Impacts and Concerns: I. Potential Impact on USDA Farm Programs on page 101]

5. Market Information Asymmetry

The futures market reflects all available information about the supply and demand for grain sorghum. A decline in information asymmetry will particularly assist smaller market participants, such as growers, producers, country elevators, consumers, and end users in making better-informed decisions and developing and executing their marketing strategies.

Enhanced Market Information and Sourcing

An exchange-traded futures market provides a centralized hub not only for price discovery but also for the accumulation of market information. This will increase information transparency throughout the market and across the supply chain, significantly reducing the asymmetry in market information.

Better market information allows for improved supply chain planning and management. By observing the price differences between pricing locations, as well as across the forward pricing curve (contract expiration months, market participants are able to interpret the market price signals as to locations of high valued markets, as well as the cost and availability of storing a commodity. This information helps them decide when to secure supply, whether to use on-site storage, or explore forward contracting opportunities with producers.

Having an exchange-traded commodity futures instrument by the CME Group helps to reduce market information asymmetry and minimize market manipulation through several mechanisms, primarily centered around **transparency, standardization, and robust regulation**.

[Ref: Section V. Potential Impacts and Concerns: C. Access to Information and Market Asymmetry: 1. Market Information on page 76]

6. Risk of Market Price Manipulation

Grain farmers and growers often believe markets are manipulated due to increased corporate consolidation across the supply chain, speculative participation in the market, algorithmic trading by non-agricultural entities, and a perceived lack of understanding and transparency of how prices are set.

Information Asymmetry: Farmers often feel like "price takers" with little influence over the market. Traders and large processors often have access to real-time global data that individual farmers lack. This "asymmetry" leads to the belief that the market is tilted in favor of "informed" insiders who can front-run the moves of actual producers.

The previous section's discussion on **Market Information Asymmetry** should go some way to explaining this perception and addressing the perception of market price manipulation.

The introduction of related grain sorghum derivatives and futures contracts should actually go a long way to reducing this asymmetry. Further discussion on this issue would be welcome.

Perceived inaccuracies in USDA and government reporting, which at times have seen significant upward revisions, stoke beliefs that the data used to set prices is unreliable or influenced by outside interests.

Algorithmic and Speculative Trading: Farmers often point to "managed money", hedge funds, and large institutional investors that use computer algorithms that can trigger large buy or sell orders. These algorithms can trigger significant market moves based on news rumors or technical indicators rather than actual grain supply and demand, leading to extreme price volatility that farmers find artificial and increases suspicion of market manipulation.

However, it must be acknowledged that algorithmic and speculative trading can move the market higher, as well as lower, and bring much-needed liquidity, depth, volume, and capital into a market as they are willing to assume great volumes of risk.

-

More to the point at hand, a commodity that is traded on a long-recognized and well-regulated exchange, such as the CME, is more likely to identify any untoward attempt to manipulate prices and is less likely to see an occurrence of such attempted activity.

- **Robust Market Surveillance**: The CME Group Market Regulation department operates a sophisticated surveillance program to actively monitor trading in real-time, detecting and deterring market manipulation, such as wash trades, spoofing, and illegal noncompetitive trades. They monitor large trader positions, physical market prices, and news to ensure orderly trading and expiration of contracts.
- **Regulatory Framework**: As a designated contract market, the CME Group operates under the oversight of the Commodity Futures Trading Commission (CFTC) and has rigorous rules and an enforcement process to ensure compliance and hold violators accountable, further protecting all market participants.
- **Position Limits and Accountability**: The exchange imposes position limits for speculators and position accountability levels to prevent market congestion or manipulation, especially during the delivery month of a contract.
- **Centralized Clearing and Counterparty Guarantee**: The CME Clearing House becomes the neutral counterparty to every trade, guaranteeing the financial performance of both the buyer and the seller. This virtually eliminates counterparty risk and ensures market integrity by preventing the accumulation of losses or debt and allowing for twice-daily mark-to-market settlements, which limits the potential for one party to exploit another's financial weakness.

7. Conclusion from the Farm Gate Perspective

The grain sorghum producer would be a significant beneficiary from the reintroduction of a grain sorghum futures contract. Even though the vast majority of grain sorghum producers would not directly engage the CME derivatives and futures market, they would significantly benefit from more efficient, accurate, and transparent **price discovery,** as well as the reduced string of supply chain costs it would provide.

They would also benefit from the increased forward pricing opportunities that provide improved forward pricing signals, along with the variety of risk management tools and contract types that are likely to be made available through their local country elevator or marketing advisor. This would support a more predictable income stream to cover production and input costs.

As the ability to appropriately manage risks and secure profitable production margins improves, more grain producers should be willing to increase acres and grow sorghum

B. Terminal and Country Elevator Perspective

A U.S. country elevator, terminal, or warehouse operator would utilize a new grain sorghum futures contract for **inventory risk management** (hedging their physical stock) and to **facilitate grain merchandising** and pricing services for farmers.

Most of these companies already utilize derivatives and futures markets (such as corn, soybeans, and wheat) to manage their existing price risks. As such, utilizing newly introduced grain sorghum derivatives and futures contracts is an easy addition to their suite of tools to better manage price risks.

The introduction of a viable and successful Grain Sorghum Future contract would present several significant opportunities for country elevators and warehouse operators. These would include, but not be limited to, the following.

It is important to note that for terminal and country elevators to be successful in hedging physical grain sorghum inventories, the large commercials, exporters, and end users will need to initially adopt the practice of pricing their merchandising activities based on grain sorghum futures contracts. (This will most likely take the form of a Basis trade that can be priced with futures Exchange For Physical (EFP) or Exchange For Risk (EFR).)

1. Inventory Risk Management (Hedging) and Merchandising

Elevator operators hold physical inventories of grain sorghum purchased from farmers, which are stored and eventually sold to domestic end users or exporters. This stock is subject to price fluctuations, creating significant financial risk.

- **Hedging and Merchandising**: The primary use of the futures contract would be to hedge their long physical position. By selling a corresponding amount of futures contracts, the elevator operator locks in a profit margin when they buy the grain from the farmer. If the market price for sorghum falls before they can sell their physical stock, they make a profit on their short futures position, which offsets the loss on their physical inventory.
- **Managing Basis Risk**: Elevators use futures to manage "basis risk" (the local cash price minus the futures price). By selling futures, they shift the price exposure from changes in overall market price levels to changes in the basis. They profit from anticipating changes in the local basis value.
  A re-established grain sorghum derivative and futures market would provide a more clearly definable means to calculate a “basis” value for locally produced and stored grain sorghum, with significantly less volatility.
- **Managing Returns to Storage and Warehousing Space**: Intra-Commodity “Calendar” Spreads in a Grain Sorghum Futures contract would more accurately reflect

regional/western corn belt warehousing capacity and the storage space situation with more regional accuracy than the Illinois Waterway Delivery System (IWDS) for corn. This would present a different and more locally relevant set of hedging and profit opportunities and scenarios by actively managing returns to grain warehousing storage space.

2. Improved Merchandising and Pricing Services

The existence of a liquid futures market allows elevator operators to offer more flexible and sophisticated pricing and contracting alternatives to the sorghum producers and farmers, and they source from.

A re-established grain sorghum derivative and futures market would provide the means to independently determine daily cash prices (both spot and forward), to local sorghum growers and end users alike, with significantly reduced risk.

- **Offering Forward Cash Contracts**: Elevators can use the futures market to manage the risk associated with offering farmers forward contracts, allowing the farmer to lock in a price for their grain before it is even harvested. The elevator hedges this commitment by taking a position in the futures market.
- **Basis Contracts**: Elevators can offer contracts where the farmer delivers the grain immediately (locking in the basis) but sets the final price later based on a specified futures contract month. The elevator holds the grain and manages the price exposure through the futures market.
- **"Deferred Pricing" (DP) Contracts**: These contracts allow farmers to lock in the futures price component of their sale price while the local basis is determined later. The elevator manages this transaction efficiently using the futures market.
- **"Hedge-to-Arrive" (HTA) Contracts**: These contracts allow farmers to lock in the future's price component of their sale price while the local basis is determined later. The elevator manages this transaction efficiently using the futures market.

3. Improved Market Information

Grain elevators and terminals are vital hubs of local market information, but the futures market provides a national and international pricing benchmark.

- **Enhanced Market Information Improves Sourcing**

  An exchange-traded futures market provides a centralized hub not only for price discovery but also for the accumulation of market information. This will increase information transparency throughout the market and across the supply chain, significantly reducing the asymmetry in market information.

- **Benchmarking and Price Transparency**

  The futures price offers a clear, transparent benchmark that helps elevator operators negotiate cash prices with both farmers and end buyers (domestic and export), reducing information asymmetry in local transactions.

- **Enhanced Market Information Improves Supply Chain Management**

Better market information allows for improved supply chain planning and management. By observing the price differences between pricing locations, as well as across the forward pricing curve (contract expiration months), market participants are able to interpret the market price signals as to locations of high-value markets, as well as the cost and availability of storing a commodity.

This information helps them decide when to secure supply, whether to use on-site storage, or explore forward contracting opportunities with producers. By observing the price differences between various contract expiration months (the "term spread" or "carry"), end users can interpret the market's signal about the cost and availability of storing the commodity. This information helps them decide when to secure supply, whether to use on-site storage, or explore forward contracting opportunities with producers.

Having an exchange-traded commodity futures instrument by the CME Group helps to reduce market information asymmetry and minimize market manipulation through several mechanisms, primarily centered around **transparency, standardization, and robust regulation**.

C. Domestic End User Perspective

International and domestic end users alike face the risk of rising input costs and protecting their anticipated margin. A futures contract allows the possibility to mitigate this risk.

U.S. domestic end users, such as **livestock feeders**, **ethanol producers**, and **food processors**, would see an advantage in utilizing a new grain sorghum futures contract primarily for **price risk management** (hedging) and to gain greater **price transparency** and supply chain certainty.

Most of these companies already utilize derivatives and futures markets (such as corn, soybeans, and wheat) to manage their existing price risks. As such, utilizing newly introduced grain sorghum derivatives and futures contracts is an easy addition to their suite of tools to better manage price risks.

The reintroduction of grain sorghum derivatives and futures contracts will reinforce the value of grain sorghum and its potential inclusion by both international and U.S. domestic end users alike.

In addition, an exchange-traded futures contract provides a centralized hub for market information, which helps end users in developing their procurement strategies:

- **Establishing Price Certainty**: End users can purchase futures contracts to lock in a purchase price for grain sorghum several months in advance of their actual physical need. This allows them to budget and plan their operational costs with greater certainty, protecting them from unexpected price increases.
- **Transparent Price Discovery**: The futures market reflects all available information about the supply and demand for grain sorghum, allowing end users to make better-informed procurement decisions. This reduces information asymmetry that might exist in a less centralized cash market.

  The futures price offers a clear, transparent benchmark that helps elevator operators negotiate cash prices with both farmers and end buyers (domestic and export), reducing information asymmetry in local transactions.
- **Alternative to Cross-Hedging**: Currently, end users often have to cross-hedge using corn or oat futures, which may not perfectly align with specific sorghum market dynamics (e.g., strong export demand from China). A dedicated sorghum contract would provide a

more direct and effective hedging tool, reducing "basis risk" (the difference between local cash prices and the futures price).

- **Enhanced Market Information Improves Sourcing**: An exchange-traded futures market provides a centralized hub not only for price discovery, but also a focus for the accumulation of market information. This will increase information transparency throughout the market and across the supply chain, significantly reducing the asymmetry in market information.
- **Establishing Supply Certainty**: When appropriately attractive sorghum prices sufficiently encourage an end user to change their feed ration or feed stock, it usually comes with a cost in the changeover to implement the manufacturing process. As such, these changes are only implemented when a sufficient supply of the physical product can be procured. With the introduction of a grain sorghum futures contract, these changes can be initiated by purchasing/hedging a sufficient volume of futures to lock in a purchase price for grain sorghum, rather than relying on the procurement of the physical supply of grain sorghum. This allows for greater flexibility in budgeting and planning changes in operational costs, combined with greater certainty in the results.
- **Improved Supply Chain Planning**: By observing the price differences between various contract expiration months (the "term spread" or "carry"), end users can interpret the market's signal about the cost and availability of storing the commodity. This information helps them decide when to secure supply, whether to use on-site storage, or explore forward contracting opportunities with producers.

  A liquid futures market provides a reliable mechanism for end users to enter and exit positions quickly and at a fair market price, offering flexibility that may not be available in localized cash markets or bespoke forward markets.
- **Protection and Flexibility in Operational Margins**: With greater flexibility in the ability to procure and change inputs of feedstock between corn and grain sorghum, an opportunity is presented to improve related operational margins each time a switch is implemented. This increased flexibility in procurement across the forward curve of the pricing structure has the potential to increase the aggregated demand for physical grain sorghum.
- **Increased Market Liquidity**: Increased engagement in the futures market by the end user will increase liquidity in both the futures and the underlying physical cash market.

  A liquid futures market will be needed to provide a reliable mechanism for end users to enter and exit positions quickly and at a fair market price, offering flexibility that may not be available in localized cash markets or bespoke forward contracts.

Ultimately, the lack of a dedicated futures contract leaves sorghum producers and the wider supply chain with fewer formal tools to use to manage risk, relying instead on less efficient methods such as cross-hedging with corn futures, forward contracts with buyers also based on corn futures contracts, or crop insurance.

D. Large Commercial Trade Perspective

It is acknowledged that in our effort to author this white paper, there were only limited direct discussions with large commercial traders. In this area, the author relied heavily on his own professional experience. *[Ref:* Positionality Statement *on page 76]* *The greatest part of these discussions was left to the CME Group.*

Participation in the market by large commercial traders is key to establishing success for a newly listed contract. Their activities need to include the willingness to purchase/sell physical cash grain sorghum on a basis relative to a related grain sorghum futures contract. This will allow the smaller cash trade participant (i.e., grower, country elevator, end user, exporter/importer, etc. to more effectively execute a hedge position in futures against their physical cash market activities.

The vast majority of firms already engage in these types of activities (for commodities such as corn, soybeans, and wheat). As such, utilizing newly introduced grain sorghum derivatives and futures contracts is an easy addition to their suite of tools to better manage price risks.

1. Why do U.S. and International Entities Use CME Grain Futures...?

The U.S. domestic and international trade alike rely on CME Group grain futures for global price discovery and risk management. Even though the contracts are based in the U.S., market participants around the world use these futures markets for efficient indications of price discovery, to hedge against price risk fluctuations, speculate on price movements, and gain insights into the world's most vital agricultural commodities.

The vast majority of these companies already utilize derivatives and futures markets (such as corn, soybeans, and wheat) to manage their existing price risks. As such, utilizing newly introduced grain sorghum derivatives and futures contracts is an easy addition to their suite of tools to better manage price risks.

It is expected that a re-established CME Grain Sorghum Futures Contract with a viable underlying delivery mechanism to ensure convergence of grain sorghum cash and futures price interrelationships at delivery will attract both domestic and international trade participation in the marketplace.

- **Price Discovery**: The CME Group's grain futures, particularly Corn, Soybeans, and Wheat, are global benchmarks that provide a central, transparent reference point for world market prices.

  International and domestic traders and investors alike look to the CME grain products for a vehicle to capitalize on market opportunities arising from changing global supply and demand dynamics, which are influenced by weather, crop cycles, and geopolitical events.

- **Expands the Product Suite**: The addition of a grain sorghum futures contract would be a welcome addition to the suite of internationally traded commodities, accommodating a wider range of commodities traded by international participants.

- **Risk Management and Hedging**: A wide range of international participants, including producers, merchandisers, food processors, importers, and exporters, use CME futures and options to hedge against adverse price movements for grains they buy or sell. The

addition of a grain sorghum futures contract would create more effective hedging opportunities for this internationally traded commodity.

- **Speculative Traders**: Speculators are crucial in futures markets because they provide liquidity and contribute to price discovery. Their active participation in buying and selling contracts creates a trading environment where other participants, like hedgers, can easily enter and exit positions without significantly impacting prices. Additionally, speculators absorb risk, helping to balance the market and enabling hedgers to manage their own price risks more effectively.

  International and domestic traders alike use CME grain futures to speculate on price changes.

  For Example: News of a potential purchase by a country like China or a geopolitical event like the Russia-Ukraine war can cause significant swings in futures prices that traders seek to profit.

- **Access and Liquidity**: Due to high daily trading volumes and deep liquidity, the markets allow international traders to enter or exit positions efficiently, which is crucial for capturing opportunities or managing risk quickly.

  CME Group operates the CME Globex platform, which offers electronic trading nearly 24 hours a day, six days a week, making the markets accessible to participants around the world.

- **Additional Considerations**: U.S. grain producers and merchants, large and small, are currently participants in the CME futures markets. They use the contracts to manage price risk associated with merchandising a range of agricultural commodities. The addition of grain sorghum derivatives and futures would provide the marketing system, including sorghum producers, warehouse operators, country elevators, exporters, and importers, as well as domestic and international end users, with more well-defined price signals and a forward curve. In addition, a well-constructed and deliverable futures contract will significantly reduce basis volatility and increase certainty in outcomes of related basis values.

  These improved, and more well-defined pricing signals allow marketing system participants more economical procurement, hedging, merchandising, and risk management decisions.

  In addition, the export supply chain, from the country elevator to the exporter/importer, has a long depth of experience in effectively utilizing derivative and futures markets help to facilitate their merchandising strategies.

2. Potential Impacts on the U.S. Domestic Trade, and Other Considerations

It is expected that a re-established CME Grain Sorghum Futures Contract with a viable underlying delivery mechanism to ensure convergence of grain sorghum cash and futures price interrelationships at delivery will attract domestic participation in the marketplace.

The introduction of new CME Grain Sorghum futures contracts would primarily improve price discovery and risk management tools for the U.S. domestic trade, potentially reducing hedging

risk compared to using corn futures. Active participation would be expected from domestic producers, country elevators, processors, exporters, importers, end users, and consumers.

However, the new market's success would most likely hinge on achieving **sufficient liquidity**, establishing **sufficient price discover**y relative to underlying physical cash markets, and successfully navigating existing trade policies and geopolitical factors.

It is also important to be under no delusion that the volume traded in a CME Grain Sorghum Futures Contract would reach the levels of corn, soybeans, or wheat.

With this noted, it is suggested that this white paper that well designed derivative and futures market that will serve a much-needed price discovery and risk transfer function and contract spread opportunity in the grain futures market and should reach sufficient volumes to be economically viable for the Chicago Mercantile Exchange.

Trading activity in a new derivatives and futures market would be supported by the U.S. position in the world grain sorghum market as the largest producer, exporter, and consumer. The following is noted:

- The U.S. is the largest global producer of grain sorghum, making up 14% of world production.
- In addition, the U.S. is the largest exporter of grain sorghum, making up 57% of global trade, followed by Australia – #2 / 20%, then Argentina – #3 / 17%, with the three of these countries making up over 90% of world sorghum exports.

B. *Ref: Also see comments in Section – Supplemental A. Fundament Supply & Demand of Grain Sorghum 2. U.S. Fundamentals of Grain Sorghum, on page 148.*

Potential Impacts on U.S. Domestic Trade

- **Improved Risk Management**: Farmers, feedlots, and elevators currently use corn futures to cross-hedge grain sorghum, which carries basis risk. A dedicated sorghum contract would allow for more precise hedging, potentially reducing basis risk by 17-34% compared to cross-hedging in corn futures, [xli] thus offering better price protection for U.S. producers and buyers.
- **Enhanced Price Discovery**: A dedicated futures market would establish a transparent, nationally and internationally recognized price for sorghum, which could improve local cash prices and overall market efficiency.
- **Potential for Increased Acreage**: With better risk management tools and potentially higher local cash prices due to improved market access, farmers might be encouraged to plant more sorghum, especially given its advantages as a lower-input, hardy crop. This could impact domestic supply chains and logistics by increasing the volume of sorghum handled by elevators and transport systems.
- **Dependence on Exports**: The U.S. sorghum market is heavily reliant on foreign demand, particularly from China. Trade tensions and variable export demand can cause price volatility and impact domestic market conditions, which the futures market would need to effectively price and manage.
- **Alternative Markets**: If the new futures market provides stable pricing and better risk management, it might help producers and exporters seek new opportunities in other growth regions like Southeast Asia, potentially diversifying the U.S. export base beyond the primary Chinese market.

Other Considerations

- **Liquidity Challenge**: A significant hurdle to a successful sorghum futures contract has historically been a lack of sufficient trading volume, leading to liquidity issues. The new contracts would need to attract enough participation (volume) from commercial hedgers and speculators to ensure they are liquid and efficient.
- **Sustainability and Transparency**: The U.S. domestic trade increasingly expects transparency regarding the environmental impact and sustainability of grain production. The industry would need to meet these evolving expectations to maintain and grow international market share.
- **Market Education**: Broader adoption of the new contracts would require educating market participants on their effective use, as many have a long history of managing risk solely through the corn futures market.

3. Potential Impacts on International Trade, and Other Considerations

The introduction of new CME Grain Sorghum futures contracts would provide international buyers with a transparent, globally recognized price benchmark.

The international trade, as well as domestic consumers outside of the U.S., rely on CME Group grain futures for global price discovery and risk management.

Even though the contracts are based in the U.S., market participants around the world use these futures markets for efficient indications of price discovery, to hedge against price risk fluctuations, speculate on price movements, and gain insights into the world's most vital agricultural commodities.

International participants include:

- commercial firms that would be hedging price exposure,
- international importers and end users,
- institutional investors like hedge funds, and
- speculative traders.

However, the new market's success would likely hinge on achieving high liquidity and navigating existing trade policies and geopolitical factors.

However, i***t is important to be under no delusion that the volume traded in a CME Grain Sorghum Futures Contract would reach the levels of corn, soybeans, or wheat.*** It is suggested by this white paper that it will serve a much-needed price discovery and risk transfer function and contract spread opportunity in the grain futures market and should reach sufficient volumes to be economically viable for the Chicago Mercantile Exchange.

With this said, activity in a new derivatives and futures market would be supported by the U.S. position in the world grain sorghum market as the largest producer and exporter. This is likely to impact contract open interest and trading volume. The following is noted:

- The U.S. is the largest global producer of grain sorghum, making up 14% or world production. In addition, the U.S. is the largest exporter of grain sorghum, making up 57% of global trade, followed by Australia – #2 / 20%, then Argentina – #3 / 17%, with the three of these countries making up over 90% of world sorghum exports.

- The major importer of sorghum is currently **China**, making up over 85% of the world's imports, followed by **Japan**, Sudan, **Mexico**, and **South Africa**.
- The **Johannesburg Stock Exchange** currently lists a successful Sorghum futures contract. This would offer cross-exchange spread trading opportunities between these two futures contracts.

Given the position of U.S. grain sorghum in global trade, a newly designed and effective CME Grain Sorghum Futures Contract would have direct relevance to international grain market participants.

Ref: Also see comments in Section – Supplemental A. Fundament Supply & Demand of Grain Sorghum 1. International Fundamentals of Grain Sorghum, on page 143.

Potential Impacts on International Trade

- **Global Price Benchmark**: A dedicated CME futures market would establish a transparent international price for U.S. sorghum, making it easier for global buyers to price their purchases and manage their own risk.
- **Improved Hedging for International Buyers**: International grain traders and end-users, such as those in the livestock industry in Asia or feedlots in Mexico, could use these contracts to hedge their physical purchases more effectively, managing the price volatility of U.S. sorghum imports.
- **Logistical Advantages**: For some international customers, U.S. sorghum's shorter transit times and reliable inspection standards could add logistical and quality advantages, which the futures market could help formalize and make more accessible.
- **Market Diversification and Access**: Enhanced price stability and risk management tools might encourage U.S. producers and exporters to seek new growth regions like Southeast Asia, while potentially attracting interest from other importers (e.g., Japan, Saudi Arabia, Spain) to diversify their supply sources.

Other Considerations

- **Sustainability and Transparency**: International buyers increasingly expect transparency regarding the environmental impact and sustainability of grain production. The industry would need to meet these evolving expectations to maintain and grow international market share.
- **Geopolitical Factors and Tariffs**: U.S. sorghum trade is heavily influenced by international trade policies and geopolitical tensions, especially with China, its main buyer. Tariffs or trade disputes can cause significant price volatility and disrupt trade flows, which the futures market would reflect but not necessarily mitigate.
- **China's Role**: China's demand has historically been the primary driver of U.S. sorghum exports. The market's success remains heavily tied to China's purchasing commitments and domestic grain policies (e.g., corn import tariffs), which can rapidly change and impact global dynamics.
- **Liquidity and Volume**: The primary challenge for any new futures contract is achieving sufficient trading volume and liquidity. Without enough commercial participation (hedgers, end-users), the market may fail, as seen with past sorghum contracts.

- **Market Education**: Broader adoption of the new contracts would require educating market participants on their effective use, as many have a long history of managing risk solely through the corn futures, as well as other CME agricultural derivatives and futures markets.

[Ref: Supplemental Information - A. U.S. Fundamentals of Grain Sorghum, on page 143]

E. Exporter / Importer Perspective

International exporters/importers would utilize a new grain sorghum futures contract for similar reasons as U.S. domestic participants, this being primarily for **managing price risk** on large cargo shipments, or smaller container shipments alike, ensuring competitive pricing, and facilitating trade with international buyers who require stable prices.

The ability to directly hedge grain sorghum using a transparent futures market will allow commercial traders to be more competitive as they can more confidently lock in their costs and profit margins with a greater degree of confidence.

1. Exporters

Exporters deal in large volumes and face substantial exposure to price volatility between the time they commit to a sale to an international buyer and when they physically acquire and ship the grain.

- **Hedging Export Commitments**: When an exporter sells a large volume of sorghum to a foreign buyer for future delivery, they commit to a price. To manage the risk that the price of the physical grain might rise before they purchase it from country elevators or producers, they buy futures contracts (go "long") to offset the risk of prices increasing. As such, a profit on the future's position would then offset the increased cost of the physical commodity.
- **Managing Physical Inventory**: In the same manner, if an exporter buys a large amount of physical grain in anticipation of a sale, they will sell futures (go "short") to protect against a potential adverse price move (drop in the market price) before the sale is finalized.
- **Offering Firm, Competitive Pricing**: The ability to hedge using a transparent futures market allows exporters to offer foreign buyers more stable and competitive forward prices, as they can confidently lock in their costs and profit margins.
- **Basis Trading**: By trading the "basis", exporters can focus on negotiating the "basis" (the difference between the local price at origin/destination and the futures price) rather than the overall "flat" price level, allowing them to better manage specific logistical and quality differentials.

  As such, export suppliers are encouraging their importing customers to initially secure supplies on an initial "Basis Contract"; and then waiting to determine the final price on their purchase contract with a "Pricing Order" for futures with execution to be completed through their physical supplier.

  (This point is important as it highlights another reason that the grain sorghum contract needs to be expressed in a "Flat" Price format.)

As such, utilizing newly introduced grain sorghum derivatives and futures contracts is an easy addition to their suite of tools to better manage price risks.

- **Price Discovery and Transparency**: By determining the price of the commodity to a buyer via a publicly traded futures price, the exporter is providing the buyer with a universally accepted, transparent benchmark for global trade negotiations. This helps to ensure all parties are negotiating with the same information base, leading to a more efficient and trusted global supply chain for grain sorghum.
- **Dependence on Exports**: The U.S. sorghum market is heavily reliant on foreign demand, particularly from China. Trade tensions and variable export demand can cause price volatility and impact domestic market conditions, which the futures market would need to effectively price and manage.
- **Facilitating International Trade and Financing**: A liquid, exchange-traded futures market enhances the exporter's ability to operate efficiently in the global marketplace. Financial institutions are more likely to provide the necessary credit and financing for large commodity transactions when the underlying physical inventory is effectively hedged on a regulated exchange. The futures contracts serve as verifiable collateral against loans.

Most of these exporting companies already utilize derivatives and futures markets (such as corn, soybeans, and wheat) to manage their existing price risks. As such, utilizing newly introduced grain sorghum derivatives and futures contracts is an easy addition to their suite of tools to better manage price risks.

2. Importers

Importers face the risk of unexpected price increases between the time they plan their purchase and when they secure the physical cargo.

- **Hedging Against Rising Prices**: By purchasing futures contracts (going "long"), importers can lock in an approximate purchase price for their needs several months in advance. If the price of physical sorghum in the cash market rises, the profit made on the futures position offsets the increased cost of acquiring the physical grain. This provides budget certainty and protects profit margins.
- **Protection for Forward Sales**: If the importer is a processor who has already committed to selling their processed product (e.g., feed, alcohol) at a set price, the futures contract protects their input costs and guarantees a stable margin regardless of market fluctuations.
- **Enhanced Market Information and Procurement**: A dedicated futures market provides valuable tools for international procurement and purchasing strategies. Observing the futures market provides insights into global supply and demand dynamics, allowing importers to anticipate shortages or surpluses, plan their procurement schedules more effectively, and ensure a stable supply for their operations.
- **Basis Trading**: By trading the “basis”, " importers can focus on negotiating the "basis" (the difference between the local price at origin/destination and the futures price) rather than the overall price level, allowing them to better manage specific logistical and quality differentials.

  In addition, importers are encouraging their exporting suppliers to initially secure supplies on an initial “Basis Contract” and then waiting to determine the final price on their

purchase contract with a “Pricing Order” for futures with execution to be completed through their physical supplier.

(This point is important as it highlights another reason that the grain sorghum contract needs to be expressed in a “Flat” Price format.)

- **Price Discovery and Transparency**: By determining the price of the commodity to from a supplier via a publicly traded futures price, the importer can be confident they are receiving a universally accepted and transparent fair price benchmarked to global trade negotiations. This helps to ensure all parties are negotiating with the same information base, leading to a more efficient and trusted global supply chain for grain sorghum.
- **Alternative Markets**: If the new futures market provides stable pricing and better risk management, it might help producers and exporters seek new opportunities in other growth regions like Southeast Asia, potentially diversifying the U.S. export base beyond the primary Chinese market.
- **Facilitating International Trade and Financing**: A liquid, exchange-traded futures market enhances the importer's ability to operate efficiently in the global marketplace. Financial institutions are more likely to provide the necessary credit and financing for large commodity transactions when the underlying physical inventory is effectively hedged on a regulated exchange. The futures contracts serve as verifiable collateral against loans.

As such, utilizing newly introduced grain sorghum derivatives and futures contracts is an easy addition to their suite of tools to better manage price risks.

3. Other Considerations

- **Sustainability and Transparency**: Exporters and Importers increasingly expect transparency regarding the environmental impact and sustainability of grain production. The industry would need to meet these evolving expectations to maintain and grow international market share.
- **Geopolitical Factors and Tariffs**: U.S. sorghum trade is heavily influenced by international trade policies and geopolitical tensions, especially with China, its main buyer. Tariffs or trade disputes can cause significant price volatility and disrupt trade flows, which the futures market would reflect but not necessarily mitigate.
- **China's Role**: China's demand has historically been the primary driver of U.S. sorghum exports. The market's success remains heavily tied to China's purchasing commitments and domestic grain policies (e.g., corn import tariffs), which can rapidly change and impact global dynamics.
- **Liquidity and Volume**: The primary challenge for any new futures contract is achieving sufficient trading volume and liquidity. Without enough commercial participation (hedgers, end-users), the market may fail, as seen with past sorghum contracts.
- **Market Education**: Broader adoption of the new contracts would require educating market participants on their effective use, as many have a long history of managing risk solely through the corn futures market.

[Ref: Supplemental Information - A. U.S. Fundamentals of Grain Sorghum, on page 143]

F. Proprietary Trade Perspective

Proprietary traders (or "prop traders") are people who trade financial instruments — like stocks, bonds, currencies, or commodity futures — using a firm's own money rather than clients' money. They trade for profit utilizing a new grain sorghum futures contract for many of the same reasons as speculative traders, primarily focusing on profit generation through short-term market inefficiencies, risk arbitrage, and providing liquidity.

Their participation in a newly introduced contract is important as it is uniquely diverse due to their sophisticated infrastructure, capital size, and focus on high-speed, data-driven strategies:

- **Exploiting Short-Term Volatility and Inefficiencies**: Prop traders often use algorithmic and high-frequency trading strategies to capitalize on small, temporary price discrepancies that arise in a new or developing futures market. They thrive on the volatility often associated with nascent contracts that have lower initial liquidity.
- **Arbitrage and Spreading Strategies**: Prop traders frequently focus heavily on arbitrage opportunities that will keep the price relationship in line. These include market activities such as:
    - **Basis Trading**: Exploiting the convergence (or lack thereof) between the futures price and the physical cash market price.
    - **Intra-Commodity “Calendar” Spreads**: Trading the price difference between different delivery months of the sorghum contract.
    - **Inter-Commodity Spreads**: Trading the price relationship between grain sorghum and related commodities like corn or oats, capitalizing on temporary misalignment in prices between markets; (typical, temporal, spatial).
- **Leveraged Exposure**: Like other speculators, prop traders utilize the leverage inherent in futures contracts to maximize their return on capital invested, taking significant positions based on their analytical edge.
- **Providing Liquidity (Market Making)**: Prop trading firms often act as de facto market makers, providing continuous bids and offers to the market. Their presence improves liquidity, allowing commercial participants (hedgers) to execute large trades more efficiently.
- **Rapid Data Integration**: Prop traders can quickly integrate new data sources relevant to the grain sorghum market (e.g., satellite imagery data for crop yields, export data from ports) into their models faster than the broader market, giving them an informational edge to profit from anticipated price movements.

[Ref: Supplemental Information - A. U.S. Fundamentals of Grain Sorghum, on page 143]

[Ref: Supplemental Information - B. International Fundamentals of Grain Sorghum, on page 143]

Participation in the market by proprietary traders is key to establishing success for a newly listed contract. The vast majority of firms already engage in these types of activities (for commodities such as corn, soybeans, and wheat). As such, utilizing newly introduced grain sorghum derivatives and futures contracts is an easy addition to their suite of tools to better manage price risks.

G. Speculative Trade Perspective

A **speculative trader** (or "speculator") is someone who buys or sells assets, including financial instruments like stocks, bonds, currencies, or commodity futures, with the primary goal of profiting from price changes.

Unlike a **hedger** (such as a producer, feedlot operator, or exporter, etc.) who trades to manage the risk of prices moving against them, a speculator has no intention of actually owning or using the physical grain. They intentionally take on risk in exchange for the chance to make a profit.

Speculative traders would utilize a new grain sorghum futures contract to **profit from anticipated price movements** in the market without the need to physically own or handle the actual commodity. They help provide essential liquidity and risk capital to the market.

With a new set of grain sorghum instruments being listed by the CME Group and adjacent to existing agricultural commodities (such as corn, wheat, soybeans, cattle, ethanol, etc.), it has greater potential to attract speculative trading.

Providing Market Liquidity and Risk Transfer

While primarily seeking profit, speculative traders perform a vital economic function within the market system:

- **Providing Liquidity**: Speculators ensure there are always buyers and sellers available in the marketplace, making it easier for commercial participants (farmers, end users, exporters) to enter and exit positions quickly at a fair price.
- **Assuming Risk**: Speculators are willing to take on the price risk that commercial participants (hedgers) want to offload. They essentially serve as the counterparties to the hedgers' transactions, allowing the commercial firms to lock in stable prices and profit margins. Without speculators, hedgers would find it much harder to find a willing counterparty for their risk management needs.

Profit Opportunities from Price Movements

- **Anticipating Market Fundamentals**: Speculators will use their expertise to analyze domestic and global supply and demand fundamentals —such as weather patterns in key growing regions, export demand (e.g., from China), biofuel policies, and changes in input costs—to forecast future price direction and take corresponding long (buy) or short (sell) positions.

  In addition, speculators are also likely to use their technical analysis and expertise that they apply to other agricultural commodities to grain sorghum derivatives and futures as well.

[Ref: Supplemental Information - A. U.S. Fundamentals of Grain Sorghum, on page 143]

[Ref: Supplemental Information - B. International Fundamentals of Grain Sorghum, on page 143]

For this reason, it would be suggested that it is important and preferable that the absolute "flat price" component for grain sorghum be expressed and available to trade, just as any of the other agricultural commodities; (as opposed to just traded sorghum as a spread to con); the capacity to trade both is important and preferred.

- **Arbitrage Opportunities**: Speculators might engage in arbitrage, profiting from price discrepancies between different markets or contract months. Examples include:
    - **Inter-commodity spreads**: Trading the price difference between grain sorghum futures and corn or oat futures.
    - **Intra-Commodity ("Calendar") Spreads**: Trading the price difference between a near-month sorghum contract and a far-month sorghum contract.
- **Leveraged Exposure**: Futures trading allows traders to take large positions with a relatively small amount of capital (margin), providing significant leverage. This magnifies potential profits from even small price changes in the grain sorghum market.

Participation in the market by speculative prop traders is key to establishing success for a newly listed contract. A good number of these firms already engage in these types of activities (for agricultural commodities such as corn, soybeans, and wheat). As such, utilizing newly introduced grain sorghum derivatives and futures contracts is an easy addition to their suite of tools to better manage price risks.

VII. Initial Conclusions, Findings, and Recommendations

A. Conclusions and Findings

1. Findings on Underlying Delivery Process

The architecture of the underlying delivery process is the cornerstone for any derivative or futures contract. It alone can determine the success or failure of a contract.

It has been assumed here that recent changes in the Kansas HRW Contract have successively addressed the underlying delivery issues involving loadout, transportation, and other related issues, and it would be suggested that the industry has moved a good way toward eliminating several of the underlying issues with the previous delivery process that plagued the Sorghum Futures Contract in the past.

“Mirroring” the longtime and well-established Kansas HRW Wheat Contract will provide confidence and notably increase the initial familiarity and understanding of a newly introduced CME grain sorghum derivative and futures contract, significantly increasing its acceptance and likelihood of success. In addition, the approach of “mirroring” the existing template of the CME Kansas HRW Wheat Futures contract in re-designing a CME Sorghum Futures contract would more readily allow for easier regulatory approval.

As such, it is suggested that this effort should be quickly adopted by the trade, leading to success.

2. Findings on Price Risk - Futures

The lack of a dedicated derivatives or futures contract for grain sorghum results in several problems for farmers, end users, and the market, which are primarily centered on increased price risk and reduced risk management efficiency.

With a directly related derivative and sorghum futures market, participants would be able to lock in futures prices for a future date, thereby enabling hedging and managing price risks.

[Ref: Section V. Potential Impacts and Concerns: A. Price Risk 1. Impacts on Futures on page 71]

3. Findings on Price Risk - Basis

Currently, grain sorghum is frequently priced off corn futures. This creates a "basis risk" that many market participants cannot hedge effectively. With a dedicated derivatives and futures market for grain sorghum, commercial hedgers would be able to establish a more effective hedged position with more well-defined basis parameters, with reduced cross-commodity risk exposure, and reduced basis volatility and risks. This would enable significantly better risk management practices for all participants across the supply chain.

[Ref: Section V. Potential Impacts and Concerns: A. Price Risk 1. Impacts on Futures on page 72]

4. Findings on Price Discovery and Price Transparency

Without question, the reintroduction of a derivatives and futures contract for grain sorghum would provide the opportunity for more **efficient price discovery** and significantly improve **price transparency**.

[Ref: Section V. Potential Impacts and Concerns: B. Efficient Price Discovery and Transparency on page 73]

5. Findings on Market Information and Asymmetry

For grain sorghum, market information flow is limited, less formal, and relegated to regional cash markets, potentially leading to information asymmetry between market participants, including producers, end users, exporters, importers, and other supply chain operators.

An established derivatives and futures market for grain sorghum would create a platform for the timely collection and distribution of relevant market information.

[Ref: Section V. Potential Impacts and Concerns: C. Access to Information and Market Asymmetry: 1. Market Information on page 76]

Currently, sorghum pricing is often opaque and fragmented, leaving individual producers with limited bargaining power.

The introduction of a new grain sorghum futures contract would address market asymmetry—where one party (typically large buyers or elevators) has better information than another (producers)—by creating a public, centralized platform for price discovery.

[Ref: Section V. Potential Impacts and Concerns: C. Access to Information and Market Asymmetry: 2. Information Asymmetry on page 76]

6. Generating Sufficient Market Liquidity

This is a key strategic point for reintroducing grain sorghum derivatives and futures contracts.

A new market's success will hinge on achieving sufficient liquidity, establishing sufficient price discovery relative to underlying physical cash markets, and successfully navigating existing trade policies and geopolitical factors.

[Ref: Section V. Potential Impacts and Concerns: D. Potential Market Liquidity and Activity: on page 80]

Key to help establish sufficient liquidity is the unique approach of trading a “sorghum – corn” spread, leveraging the liquidity of corn into grain sorghum.

[Ref: Section V. Potential Impacts and Concerns: D. Potential Market Liquidity and Activity: 3. Other Possible Efforts Supporting Market Liquidity and Activity on page 84]

Note that this unique approach is likely to require significant changes to many cash trading companies' back office and accounting systems.

In addition, this change will require some additional educational efforts and training by the CME or the private sector to sufficiently evolve the industry to adopt this unique approach.

To help in developing liquidity and encourage broad participation across the trade, the developed trading platform should have the capacity to easily execute and trade all three types of trade orders:

i. “Inter-Commodity Spreads” to Corn, (possibly HRW Wheat) Orders

ii. “Intra-Commodity Calendar Spreads” Orders

iii. “Absolute” or “Flat Price” Buy / Sell Orders

[Ref: Section IV. Currently Proposed Contract Terms and Delivery: B. Order Placement – page 44]

It is important to be under no delusion that the volume traded in a CME Grain Sorghum Futures Contract would reach the levels of corn, soybeans, or wheat. As such, what will be the measure of success for reintroducing grain sorghum derivatives and futures contracts?

[Ref: Section V. Potential Impacts and Concerns: K. Measuring Success of a Derivatives and Futures Market on page 107]

7. Findings on Volatility

In essence, while general market volatility factors like weather and global supply/demand will persist, it is widely accepted in agricultural economics that a dedicated, viable futures contract would be a valuable tool for managing risk and would ultimately reduce the price volatility experienced by participants in the physical cash market.

Research and empirical data indicate that physical cash markets often exhibit reduced volatility when a related futures market exists, primarily due to enhanced price discovery and the availability of “risk-shifting” mechanisms. However, this relationship is non-linear and depends heavily on the "strength" of the coupling between the two markets.

Also of significance would be the separation of volatility in the drivers of grain sorghum prices, versus the drivers of corn volatility arising from a less correlated cross-hedge.

Basis Risk and Volatility for grain sorghum traded against a grain sorghum futures contract would be significantly reduced and trade in a narrower and more clearly definable range.

[Ref: Section V. Potential Impacts and Concerns: E. Potential Impact on Market Volatility: 2. Reduced Market Volatility on page 86]

8. Findings on Hedging

This white paper suggests that the Basis Risk and Volatility would be significantly reduced for grain sorghum directly hedged in a grain sorghum futures contract. More to the point, the sorghum basis trading range would trade in a much narrower range and be significantly more clearly definable against DVE calculations.

Currently, without a direct sorghum futures contract, producers and buyers must "cross-hedge" using corn futures, which creates a greater "basis risk" (the difference between the local cash price and the futures price) than would exist with a direct sorghum contract.

Without a dedicated futures contract, cross-hedging grain sorghum in an alternative commodity, most commonly corn futures, presents several challenges, primarily involving increased basis risk, difficulty in determining an accurate hedge ratio, and other logistical/cost factors.

[Ref: Section V. Potential Impacts and Concerns: F. Efficient Hedging Mechanism on page 88]

9. Findings on Alternative to Cross-Hedging

While cross-hedging in corn is currently necessary without a dedicated sorghum contract, the practice is problematic because it introduces the risk that the hedge will fail to provide the intended price protection due to the imperfect correlation between the two commodities, the unique market drivers of grain sorghum, as well as the absence of the possibility of "convergence" between grain sorghum and corn.
There are several major challenges in "cross-hedging" agricultural commodities when a direct hedge in the same commodity is not available. Cross-hedging grain sorghum using corn futures (or, on some occasions, wheat) can be problematic primarily because the two commodities, while reasonable substitutes, do not have a perfect price correlation.

In regard to cross-hedging, the core issue is the increased basis risk, along with the lack of convergence through the underlying delivery process. This implies the cross-hedge has definable protection against the specific price movements.

[Ref: Section V. Potential Impacts and Concerns: F. Efficient Hedging Mechanism: 2. Why Hedging Grain Sorghum in Corn Can Be Problematic on page 89]

10. Findings on Convergence

The primary problem in regard to cross-hedging is the increased basis risk, along with the lack of convergence through the underlying delivery process.

In summary, while cross-hedging in corn is currently necessary without a dedicated sorghum contract, the practice is problematic because it introduces the risk that the hedge will fail to provide the intended price protection due to the imperfect correlation between the two commodities, the unique market drivers of grain sorghum, as well as the absence of the possibility of "convergence" between grain sorghum and corn.

[Ref: Section V. Potential Impacts and Concerns: F. Efficient Hedging Mechanism: 2. Why Hedging Grain Sorghum in Corn Can Be Problematic: a. Convergence and Delivery Economics Do Not Apply on page 89]

11. Findings on Warehousing and Storage

It would be likely that spreads and carries reflected in a CME "Kansas-based" Grain Sorghum derivatives and futures contract could seasonally be significantly different from spreads and carries reflected in the CME IWDS Corn derivative and futures contracts.

Regardless of whether the CME Group elects to apply a "Flat" or "Variable" Storage Rate, the pricing dynamics reflected in a Kansas-based grain sorghum derivatives and futures contract will better reflect the underlying fundamentals for the supply of grain sorghum versus available warehousing space, which can seasonally be very different than those reflected in corn derivatives and futures.

[Ref: Section V. Potential Impacts and Concerns: G. Likely Impacts on the Merchandising of Warehousing and Storage on page 96]

12. Findings on Banking and Securing Finance

In essence, while futures and derivatives markets do not directly provide loans, they facilitate the financing process by allowing companies to manage the underlying risks that lenders are concerned about, thereby making them more reliable and financeable entities.

[Ref: Section V. Potential Impacts and Concerns: H. Challenges in Banking and Securing Finance on page 99]

13. Findings on the Terminal and Country Elevator

The introduction of a new grain sorghum futures contract would offer U.S. country elevators significantly better tools for risk management, operational efficiency, and customer service. It is through these services that are provided through their origination efforts that grain sorghum producers will access the benefits of reestablished grain sorghum derivatives and futures contracts.

Currently, elevators manage sorghum using corn futures (cross-hedging), which often leads to inaccurate pricing and greater financial risks. More efficient and reliable hedging opportunities created by a new grain sorghum futures contract will allow country elevators to more effectively protect their profit margins and manage returns to storage on physical inventories.

[Ref: Section VI. Initial Comments and Concerns: B. Terminal and Country Elevators Perspective on page 119]

14. Findings on the Large Commercial Traders

Participation in the market by large commercial traders is key to establishing success.

Their activities need to include the willingness to purchase/sell physical cash grain sorghum on a basis relative to a related grain sorghum futures contract. This will allow the smaller cash trade participant (i.e., grower, country elevator, end user, exporter/importer, etc. to more effectively execute a hedge position in futures against their physical cash market activities.

Most firms already engage in these types of activities (for commodities such as corn, soybeans, and wheat). As such, utilizing newly introduced grain sorghum derivatives and futures contracts is an easy addition to their suite of tools to better manage price risks.

[Ref: Section VI. Initial Comments and Concerns: D. Large Commercial Trade Perspective on page 123]

15. Findings on the Domestic End User Perspective

International and domestic end users alike face the risk of rising input costs and protecting their anticipated margin. A futures contract allows the possibility to mitigate this risk.

U.S. domestic end users, such as livestock feeders, ethanol producers, and food processors, would see an advantage in utilizing a new grain sorghum futures contract primarily for price risk management (hedging) and to gain greater price transparency and supply chain certainty.

Most of these companies already utilize derivatives and futures markets (such as corn, soybeans, and wheat) to manage their existing price risks. As such, utilizing newly introduced grain sorghum derivatives and futures contracts is an easy addition to their suite of tools to better manage price risks and improve their operating margins.

The reintroduction of grain sorghum derivatives and futures contracts will reinforce the value of grain sorghum and its potential inclusion by both international and U.S. domestic end users alike.

[Ref: Section VI. Initial Comments and Concerns: C. Domestic End User Perspective on page 114121]

The lack of a dedicated futures contract leaves sorghum producers and the wider supply chain with fewer formal tools to manage risk, relying instead on less efficient methods such as cross-hedging with corn futures, forward contracts with buyers based on corn futures, or crop insurance. – Guy H. Allen

16. Findings on Grower and Farm Gate Perspective

The current conclusion of this white paper is that the U.S. grain sorghum producer would be a significant beneficiary from the reintroduction of a grain sorghum futures contract. Even though the vast majority of grain sorghum producers would not directly engage the CME derivatives and futures market, they would significantly benefit from more efficient, accurate, and transparent price discovery, as well as the reduced string of supply chain costs it would provide.

They would also benefit from the increased forward pricing opportunities that provide improved forward pricing signals, along with the variety of risk management tools and contract types that are likely to be made available through their local country elevator or marketing advisor. This would support a more predictable income stream to cover production and input costs.

As the ability to appropriately manage risks and secure profitable production margins improves, more grain producers should be willing to increase acres and grow sorghum.

[Ref: Section VI. Initial Comments and Concerns: A. Farm Gate / Grower Perspective and Issues on page 114]

17. Findings on USDA Farm Programs

Changes to how the USDA determines prices for farm programs often require legislative action through the Farm Bill or formal administrative rulemaking processes, such as publishing proposed changes in the Federal Register. Integrating a new pricing mechanism is not a simple administrative decision and would require substantial time, public comment periods, and potential political negotiation.

If this is deemed to be the case, the situation lies outside of the purview of this white paper and squarely in the area of political advocacy by growers.

[Ref: Section V. Potential Impacts and Concerns: I. Potential Impact on USDA Farm Programs on page 101]

[Ref: Section VI. Initial Comments and Concerns: A. Farm Gate / Grower Perspective and Issues: 4. Potential Impact on USDA Government Programs on page 116]

18. Findings on Natural Resources – Land and Water Use

The introduction of derivative and futures markets for grain sorghum will provide an added benefit for land use and conservation by creating financial incentives for sustainable practices, pricing environmental impacts (like carbon), managing climate-related risks for businesses, and funding

conservation through mechanisms like carbon credits, which allow landowners to earn revenue for protecting or restoring ecosystems, shifting focus from purely extractive use to valuing natural services.

The introduction of these instruments will further enable markets to adopt "nature-based solutions," attracting investment by making ecological benefits financially quantifiable and tradable, helping to fund long-term stewardship like reforestation and biodiversity protection that otherwise would not be profitable.

[Ref: Section V. Potential Impacts and Concerns: J. Considerations for Natural Resources – Land and Water Use on page 105]

19. Findings on what success might look like…?

Based on comparative crop size, if a re-introduced CME Grain Sorghum derivatives and futures contract reached a similar volume and open interest to CME Oats or CME Rough Rice, it would be deemed as successful.

[Ref: Section V. Potential Impacts and Concerns: K. Measuring Success of a Derivatives and Futures Market on page 107]

It would be said: The introduction of new derivatives and futures contracts for grain sorghum has the potential to deliver significant opportunities to address many of the current challenges and problems facing the marketing of grain sorghum, with minimal possibilities of making the situation any worse. – Guy H. Allen

B. Initial Recommendations

1. Kanas-Based Delivery

[Ref: Section VI.A.2. Kansas-Based Delivery System: on page 36]

The authors of this white paper agree with the CME Group that a Kansas-based delivery location that mirrors the current CME Kansas HRW Wheat Contract is preferable.

(The authors are making the assumption here that recent changes in the Kansas HRW Contract have successively addressed the underlying delivery issues involving loadout, transportation, and other related issues.)

2. Order Placement Types

[Ref: Section VI.B. Order Placement – page 44]

The capacity to easily execute and trade all three types of trade orders is preferred and important to the success of the grain sorghum contract.

iv. "Inter-Commodity Spreads" to Corn, (possibly HRW Wheat) Orders

v. "Intra-Commodity Calendar Spreads" Orders

vi. "Absolute" or "Flat Price" Buy / Sell Orders

The authors of this white paper agree with the CME Group's effort to enhance and leverage the volume and liquidity found in the closely related CME Corn Futures.

However, while the authors of this white paper agree with this approach of trading a sorghum – corn spread, which would leverage the liquidity of corn into grain sorghum, a more robustly designed platform should be established with the means to accept other order types so as to create maximum liquidity in a contract.

The CME is currently suggesting that the sorghum futures be traded and expressed as an "inter-commodity spread" to the CME Corn Contract. This concept is strongly supported in an effort to leverage liquidity.

However, it is also suggested that the sorghum futures contract has the capacity to efficiently trade "Intra-Commodity Calendar Spreads" to facilitate the needs of commercial hedgers to effectively manage hedge placements in appropriate delivery months.

It is also suggested that expressing a grain sorghum futures contract in its absolute or "flat price" form, just as any of the other agricultural commodities, is important as well. This would be to the benefit of traders (such as producers, end users, processors, consumers, etc.), as well as traders relying on technical analysis to develop strategies that are based on "flat" price directional movements.

The capacity to easily execute and trade all three of these order types is preferred and important to the success of the grain sorghum contract.

3. Road Truck Load Out Option

[Ref: Section V.A.3.b. Possible CME Road Load Out Procedures – page 42]

The authors of this white paper would support the implementation of a "Road Truck Load Out" option for deliveries against the Grain Sorghum Futures Contract.

4. Grain Quality Specifications

[Ref: Section IV.C.1. Grain Quality Specifications – page 50]

It would be recommended that the minimum acceptable grade for delivery against a new CME Grain Sorghum Future contract be USDA No. 2 Sorghum, or better, with a maximum 13.5% moisture.

It would be recommended NOT to allow delivery of USDA No. 3 Sorghum, as this is likely to cause underlying quality issues with deliverable stocks.

5. Variable Storage Rate (VSR) vs Flat Storage Rate…?

[Ref: Section V.F. Likely Impact on Warehousing and Storage Rates 2. Comparison of ECB vs WCB – on page 98]

Regardless of whether the CME Group elects to apply a "Flat" or "Variable" Storage Rate, the pricing dynamics reflected in a Kansas-based grain sorghum derivatives and futures contract will better reflect the underlying fundamentals for the supply of grain sorghum versus available warehousing space, which can seasonally be very different than those reflected in corn derivatives and futures.

C. Invitation for Further Comment

The authors of this paper would welcome further comments, opinions, and perspectives arising on this matter and from review of the information presented in this White Paper.

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Supplemental Information

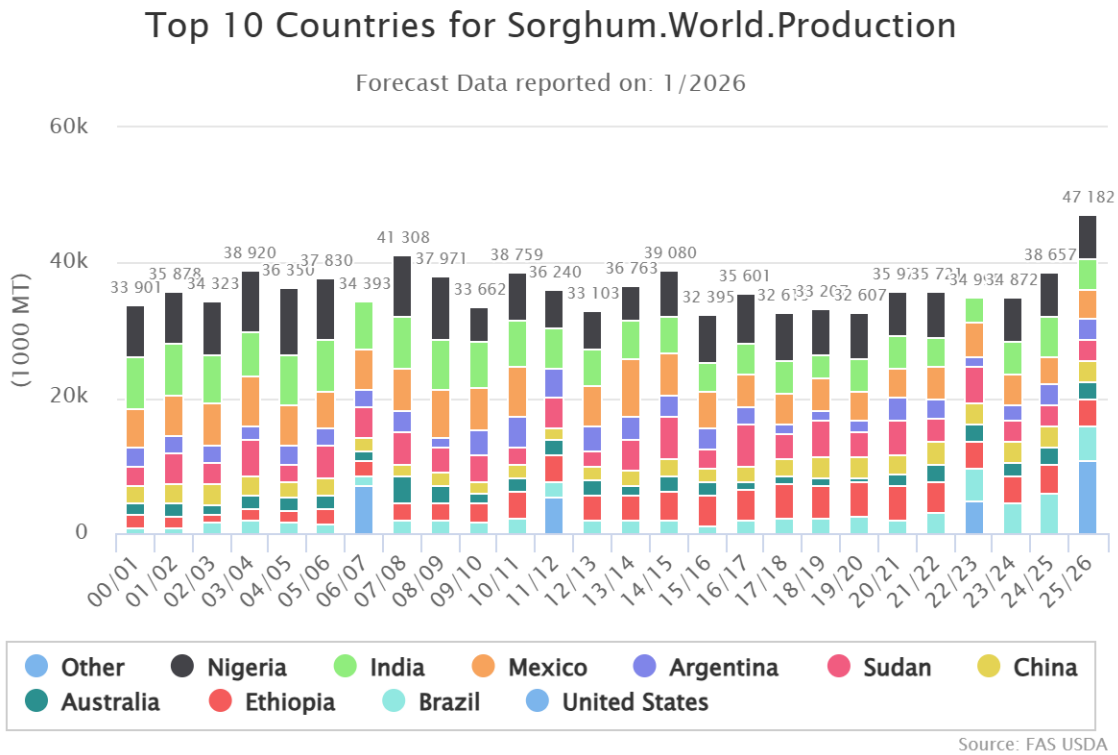
A. Fundamentals: Supply & Demand of Grain Sorghum

1. International Fundamentals of Grain Sorghum [xlii]

USDA World Supply & Demand Balance Sheet for Grain Sorghum

Sorghum World as of January 2026							
Attribute	25/26 Jan'26	Change	25/26 Dec'25	24/25	23/24	22/23	21/22
Area Harvested (1000 HA)	40,053	+114(+.29%)	39,939	40,416	39,440	40,419	40,850
Beginning Stocks (1000 MT)	4,707	+111(+2.42%)	4,596	3,993	4,008	4,280	3,976
Production (1000 MT)	63,196	+214(+.34%)	62,982	63,058	58,807	57,414	61,198
MY Imports (1000 MT)	9,433	+80(+.86%)	9,353	7,449	9,393	6,138	12,552
TY Imports (1000 MT)	9,383	+80(+.86%)	9,303	7,629	9,381	6,088	12,530
TY Imp. from U.S. (1000 MT)	0	-	0	2,278	5,887	2,891	7,330
Total Supply (1000 MT)	77,336	+405(+.53%)	76,931	74,500	72,208	67,832	77,726
MY Exports (1000 MT)	10,012	+40(+.4%)	9,972	6,720	9,768	6,221	11,764
TY Exports (1000 MT)	9,837	+80(+.82%)	9,757	6,585	9,485	6,795	11,818
Feed and Residual (1000 MT)	26,500	+212(+.81%)	26,288	26,046	24,096	20,620	26,329
FSI Consumption (1000 MT)	36,762	+102(+.28%)	36,660	37,027	34,351	36,983	35,353
Total Consumption (1000 MT)	63,262	+314(+.5%)	62,948	63,073	58,447	57,603	61,682
Ending Stocks (1000 MT)	4,062	+51(+1.27%)	4,011	4,707	3,993	4,008	4,280
Total Distribution (1000 MT)	77,336	+405(+.53%)	76,931	74,500	72,208	67,832	77,726
Yield (MT/HA)	1.58	-	1.58	1.56	1.49	1.42	1.50

Major Producers of Grain Sorghum

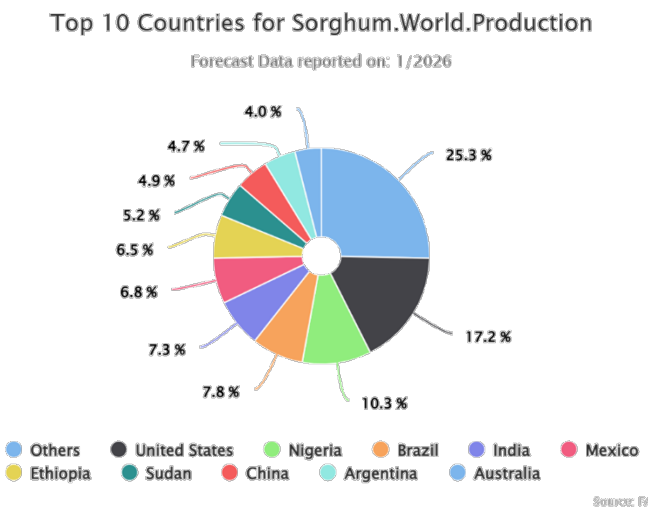


Global production of grain sorghum is estimated by USDA FAS to be 63.196 mmts / 2,487 mbus in January for 2025/26 MY. World production has remained fairly steady over the past 20 years.

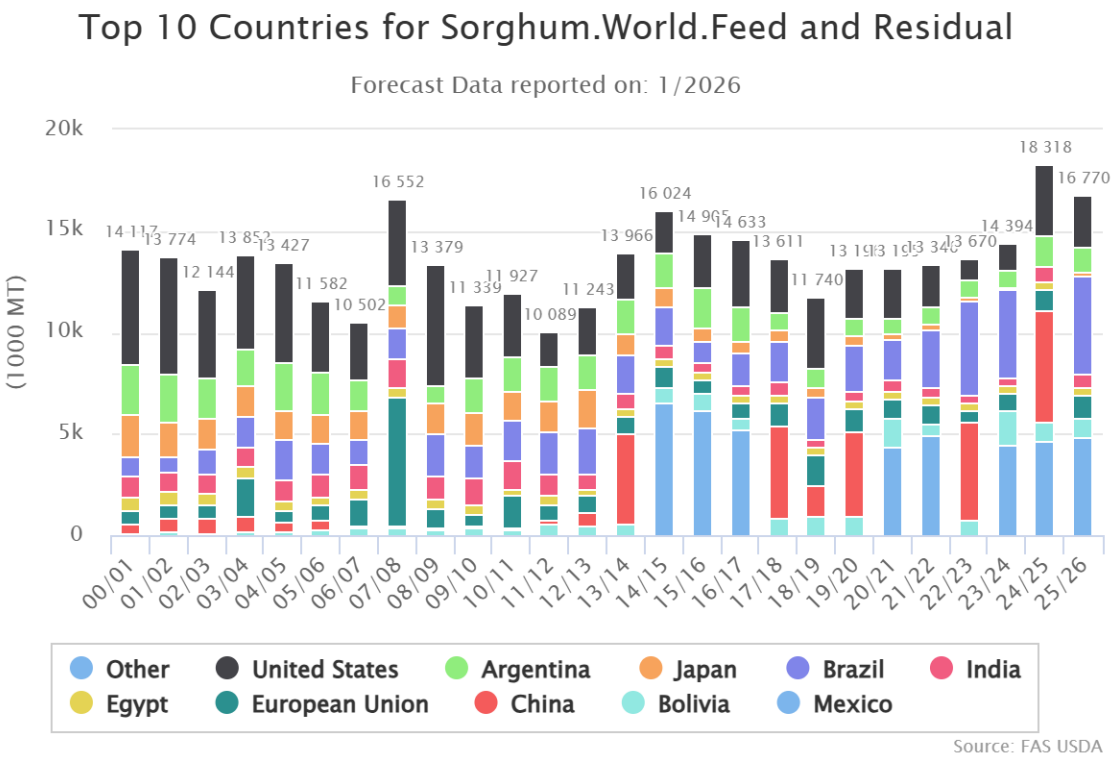
Top 10 major producers of grain sorghum in order of 2025/26 USDA January estimated volumes include:

1. United States (10.882 mmts / 428 mbus),
2. Nigeria (6.500 mmts / 255.8 mbus),
3. Brazil (4.900 mmts / 192.9 mbus),
4. India (4.600 mmts / 181.0 mbus),
5. Mexico (4.300 mmts / 169.2 mbus),
6. Ethiopia (4.100 mmts / 161.4 mbus),
7. Sudan (3.300 mmts / 129.9 mbus),
8. China (3.100 mmts / 122.0 mbus),
9. Argentina (3.000 mmts / 118.1 mbus),
10. Australia (2.500 mmts / 98.4 mbus),

ROW (16.014 mmts / 630.265 mbus).



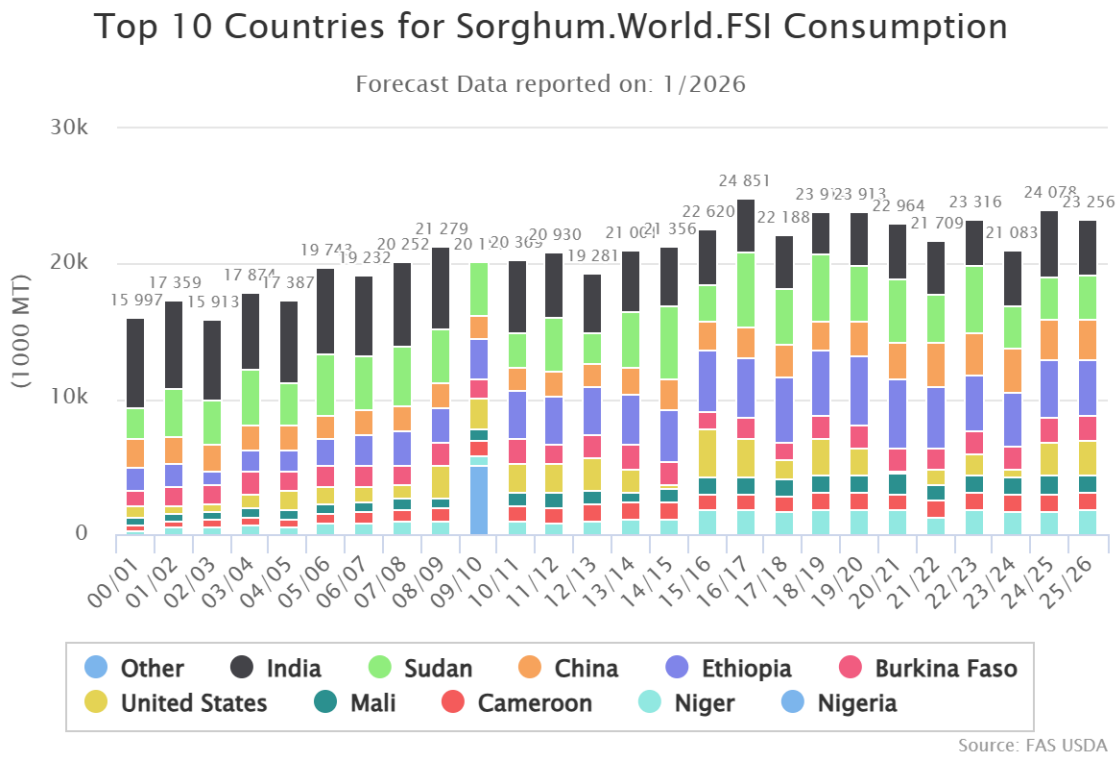
Global Grain Sorghum Feed Usage



Global feed usage of grain sorghum is estimated by USDA FAS to be 26.500 mmts / 1,043 mbus in January for the 2025/26 MY.

Major countries for feed usage of grain sorghum in order of 2025/26 USDA January estimated volumes include: China (7.800 mmts / 307 mbus), Brazil (4.900 mmts / 192.9 mbus), Mexico (4.800 mmts / 188.9 mbus), United States (2.540 mmts / 100 mbus), Argentina (1.200 mmts / 47.2 mbus), EU (1.150 mmts / 42.3 mbus), Bolivia (0.950 mmts / 37.4 mbus), India (0.650 mmts / 25.6 mbus), Egypt (0.380 mmts / 15.0 mbus), Japan (0.200 mts / 7.9 mbus)

Global Food, Seed, and Industrial Usage



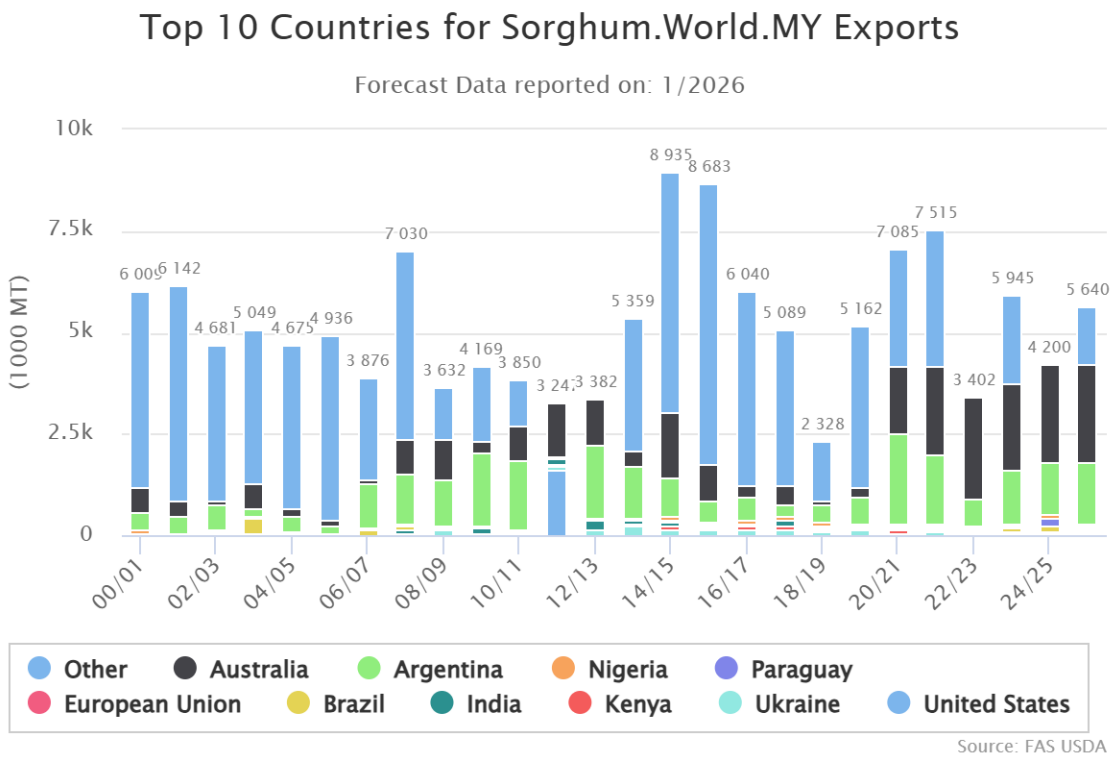
Global food, seed, and industrial usage of grain sorghum is estimated by USDA FAS to be 36.762 mmts / 1,447 mbus in January for the 2025/26 MY.

Major countries for food, seed and industrial usage of grain sorghum in order of 2025/26 USDA January estimated volumes include: Ethiopia (4.200 mmts / 165.3 mbus), India (4.100 mmts / 161.4 mbus), Sudan (3.200 mmts / 125.9 mbus), China (3.000 mmts / 118.1 mbus), United States (2.668 mmts / 105.0 mbus), Niger (1.850 mmts / 72.8 mmts), Nigeria (1.850 mmts / 72.8 mmts), Burkina Faso (1.750 mmts / 68.9 mbus), Mali (1.400 mmts / 55.1 mbus), Cameroon (1.215 mmts / 47.8 mbus) ROW (7.003 mmts / 275.6 mmts)

Major food companies and processors: Large, multinational food companies and processors use CME futures to lock in the cost of future purchases of corn, wheat, and soybeans to manage their supply chain costs and provide more stable pricing for their products. Grain sorghum futures would be a welcome addition to the suite of products offered by the CME.

Major Exporters of Grain Sorghum

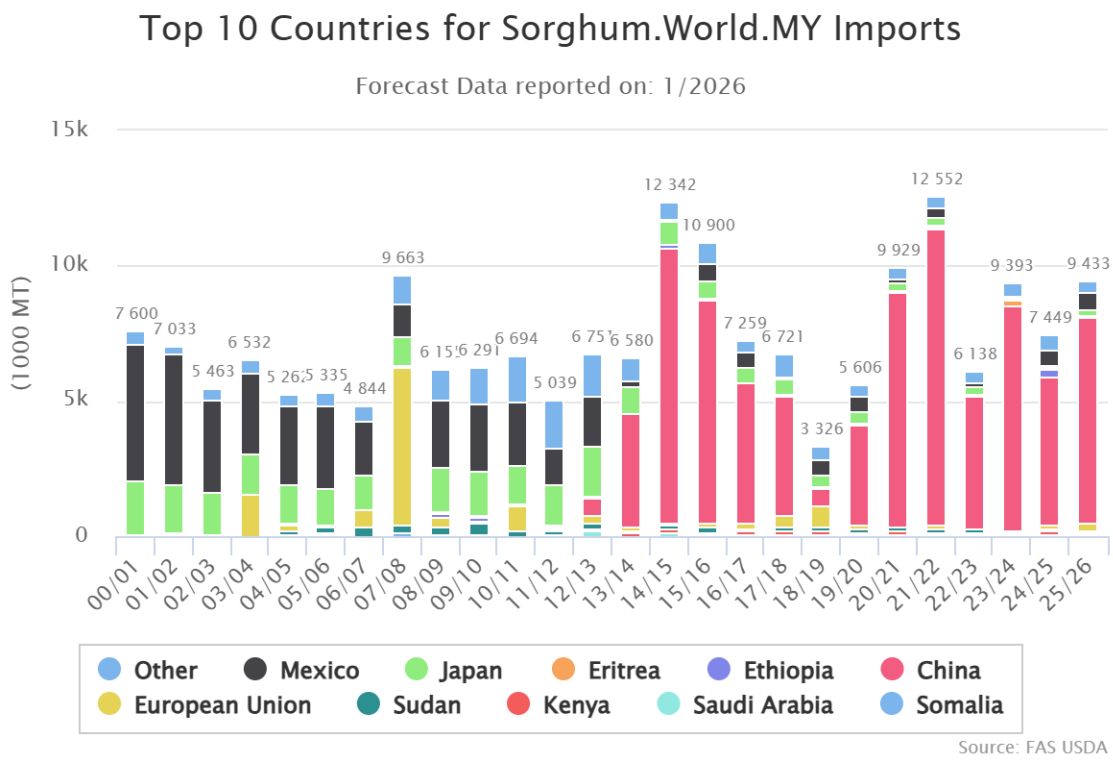
International Grain Traders: Large global and regional grain merchants are currently major participants in the CME futures markets. They use the contracts to manage price risk associated with merchandising a range of agricultural commodities.



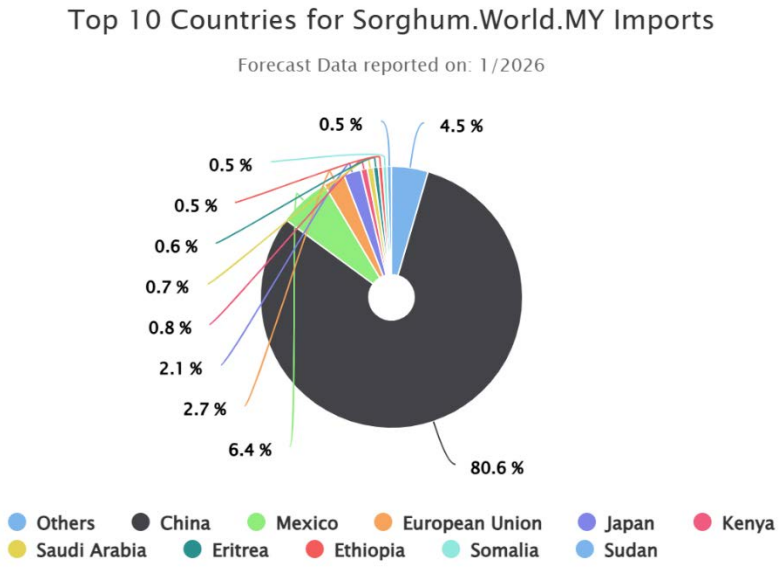
Global exports of grain sorghum are estimated by USDA FAS to be 10.012 mmts / 394 mbus in January for the 2025/26 MY.

Major exporters of grain sorghum in order of 2025/26 USDA September estimated volumes include: United States (5.715 mmts / 224.9 mbus), Australia (2.400 mmts / 94.5 mbus), Argentina (1.500 mmts / 59 mbus).

Major Importers of Grain Sorghum



Global imports of grain sorghum are estimated by USDA FAS to be 9.433 mmts / 371 mbus in January for the 2025/26 MY.



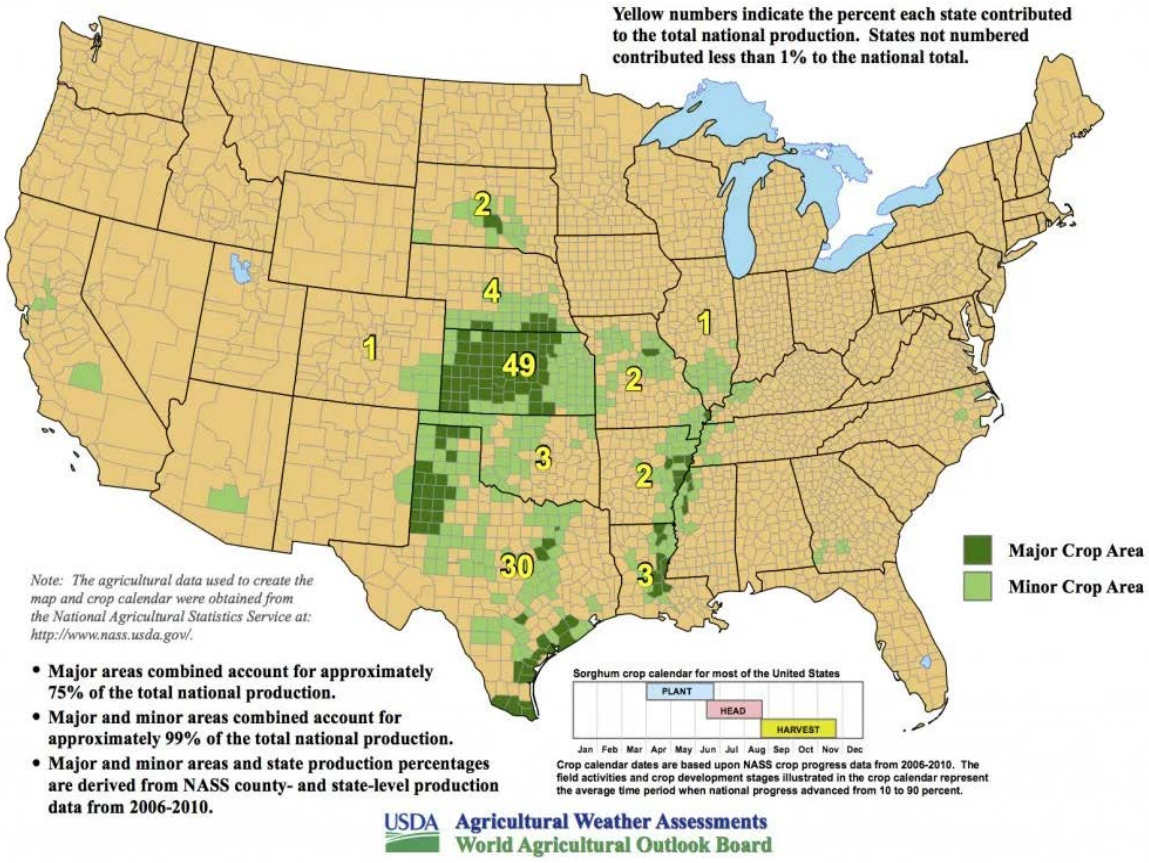
Major importers of grain sorghum in order of 2025/26 USDA January estimated volumes include: China (7.600 mmts / 299.1 mbus), Mexico (0.600 mmts / 23.6 mbus), EU (0.250 mmts / 9.8 mbus), Japan (0.200 mmts / 7.9 mbus).

2. U.S. Fundamentals of Grain Sorghum [xliii]

USDA United States Supply & Demand Balance Sheet for Grain Sorghum

Sorghum United States as of January 2026							
Attribute	25/26 Jan'26	Change	25/26 Dec'25	24/25	23/24	22/23	21/22
Area Harvested (1000 HA)	2,436	+123(+5.32%)	2,313	2,268	2,475	1,849	2,626
Beginning Stocks (1000 MT)	1,020	+3(+.29%)	1,017	831	616	1,201	516
Production (1000 MT)	11,096	+214(+1.97%)	10,882	8,734	8,071	4,770	11,375
MY Imports (1000 MT)	0	-	0	1	1	0	0
TY Imports (1000 MT)	0	-	0	1	1	0	0
TY Imp. from U.S. (1000 MT)	0	-	0	0	0	0	0
Total Supply (1000 MT)	12,116	+217(+1.82%)	11,899	9,566	8,688	5,971	11,891
MY Exports (1000 MT)	5,715	-	5,715	2,480	5,945	2,770	7,515
TY Exports (1000 MT)	5,400	-	5,400	2,295	5,964	2,965	7,387
Feed and Residual (1000 MT)	2,667	+127(+5%)	2,540	3,568	1,294	1,079	2,031
FSI Consumption (1000 MT)	2,668	+127(+5%)	2,541	2,498	618	1,506	1,144
Total Consumption (1000 MT)	5,335	+254(+5%)	5,081	6,066	1,912	2,585	3,175
Ending Stocks (1000 MT)	1,066	-37(-3.35%)	1,103	1,020	831	616	1,201
Total Distribution (1000 MT)	12,116	+217(+1.82%)	11,899	9,566	8,688	5,971	11,891
Yield (MT/HA)	4.56	(-2.98%)	4.70	3.85	3.26	2.58	4.33

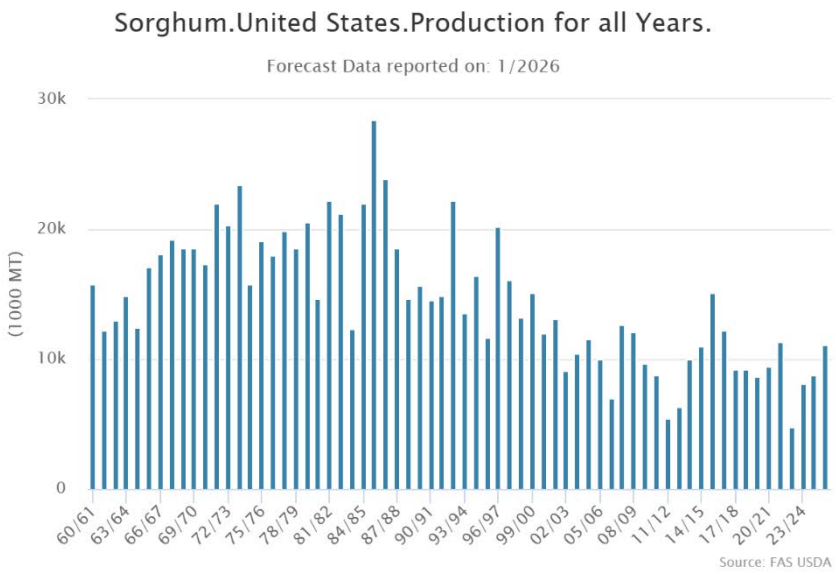
U.S. Production



The U.S. is the largest annual producer of grain sorghum.

Over the past 12 years, the U.S. has produced an average of 9.823 mmts / 386.6 mbus of grain sorghum annually.

2022/23 was a major drought year, significantly impacting U.S. grain sorghum production. Since then, sorghum production has been steadily increasing.



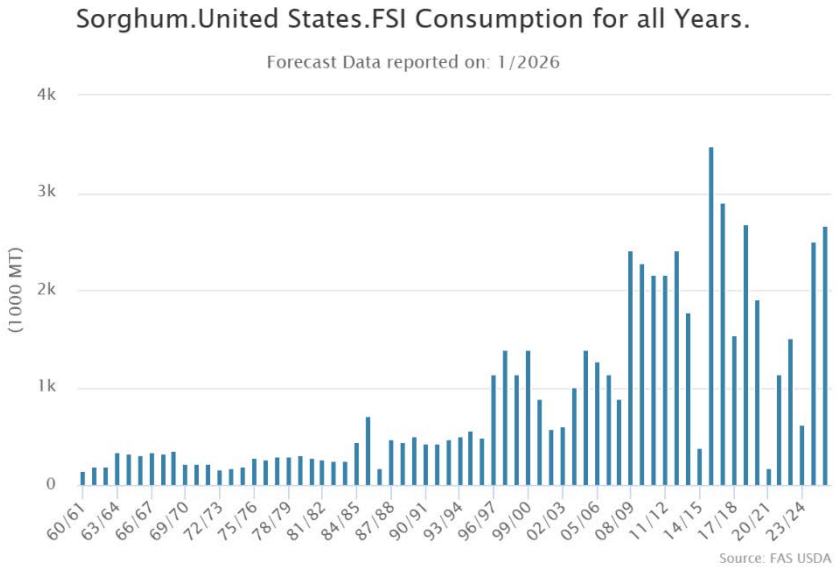
Given that grain sorghum is primarily produced in the western corn belt, where the availability of water is a growing concern, and given the drought tolerance of the crop, planted area and production of grain sorghum are expected to increase.

It is important to note here that a more well-defined forward curve in a futures market and/or underlying physical cash markets will provide better forward pricing signals, allowing a grain sorghum producer an opportunity to make better and more economical production decisions. In addition, a well-constructed and deliverable futures contract will significantly reduce basis volatility and increase certainty in outcomes of related basis values.

U.S. Domestic Usage

FSI – Ethanol

FSI usage of grain sorghum is primarily driven by its inclusion into the U.S. ethanol grind and has varied between 0.175 to a record 3.500 (2015/16) mmts / 6.9 to 137.8 mbus over the past twelve years. It is estimated by USDA FAS to be 2.540 mmts / 100.0 mbus in September of 2025/26.



Grain sorghum's competitive price with corn and its relative value in the export markets have driven the volatility of usage into the ethanol grind. Many ethanol plants can receive grain by both road and rail.

This demand sector has an excellent understanding of how to utilize derivatives and futures in well-developed merchandising strategies. In addition, a well-constructed and deliverable futures contract will significantly reduce basis volatility and increase certainty in outcomes of related basis values.

It is important to note that when the ethanol sector elects to include grain sorghum in the grind, they prefer to do so over a defined period, and by procuring and pricing in larger volume lots. An effective futures market will help to facilitate these strategies.

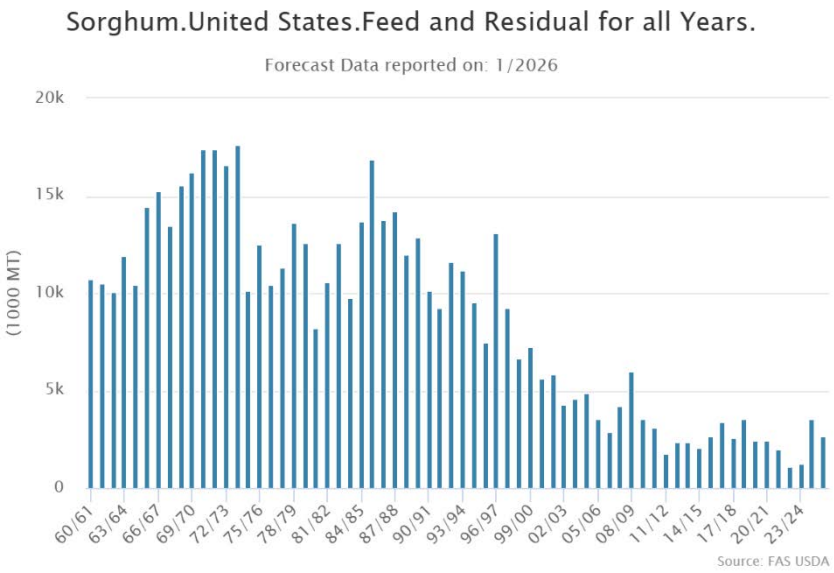
Feed & Residual

While feed usage of grain sorghum has varied between 1.0 to 3.7 mmts / 39.4 to 145.6 mbus over the past five years, it is estimated by USDA FAS to be 2.667 mmts / 105.0 mbus in January for the 2025/26 MY.

Grain sorghum's price competitiveness with corn and its relative value in the export markets have driven the volatility of usage in the feed sector.

It is important to note that a more well-defined forward curve in a futures market and/or underlying physical cash markets will provide better defined pricing signals, allowing a livestock producer to make more economical feed formulation decisions. When a poultry or beef producer elects to include grain sorghum in their feed ration, they prefer to do so over a defined period, and by procuring and pricing in larger volume lots. An effective futures market will help to facilitate these strategies.

Major Livestock Feeders, Ethanol Processors, Food Companies, and First-Stage Processors



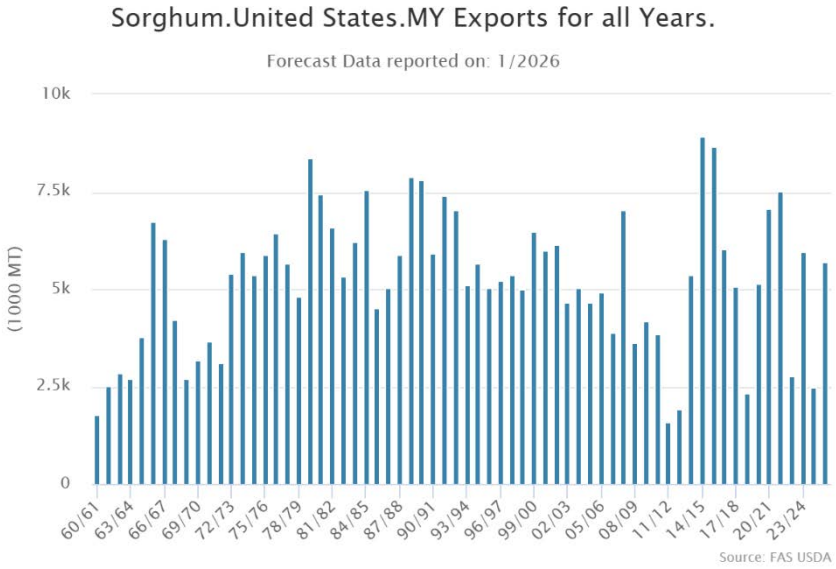
Large livestock feeders, ethanol processors, multinational food companies, and first-stage processors use CME futures to lock in the cost of future purchases of corn, wheat, and soybeans to manage their supply chain costs and provide more stable pricing for their products. Grain sorghum futures would be a welcome addition to the suite of products offered by the CME Group.

U.S. Exports

Over the past 15 years, U.S. exports of grain sorghum have varied between a record low of 1.611 (2011/12) to a record high of 8.935 (2014/15) mmts / 63.4 to 351.7 mbus.

The U.S. annual make up over half of the world trade in grain sorghum.

China and Mexico are perennially the top two export buyers of U.S. grain sorghum. China has historically been a premium buyer of grain sorghum due to a normal import duty of around 65% import tariff in corn and only charging a normal import duty of around 2% on grain sorghum.



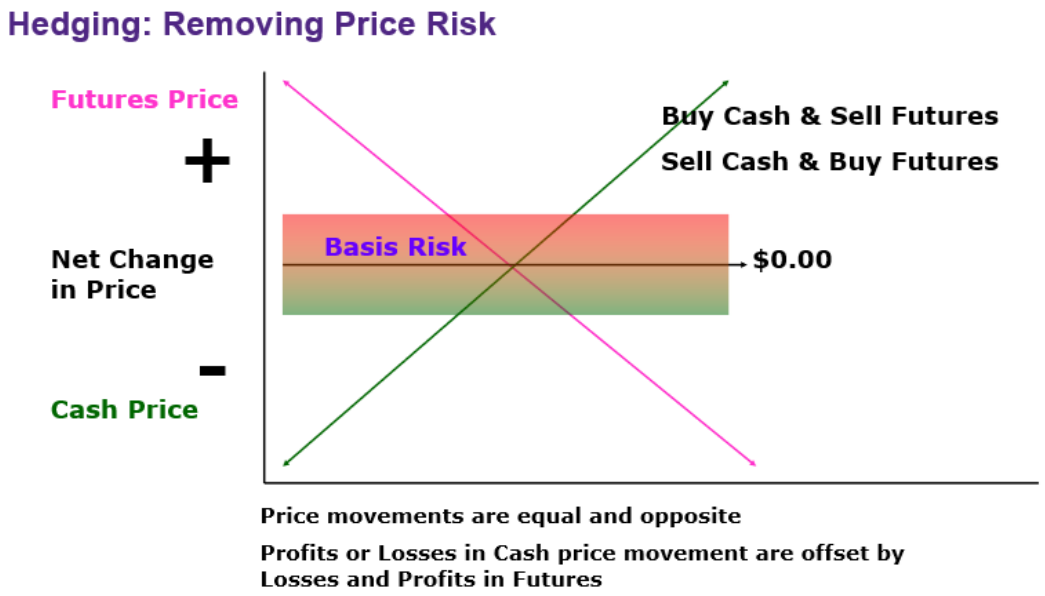
It is important to note that a more well-defined forward curve in a futures market and/or underlying physical cash markets will provide better defined pricing signals, allowing exporters, importers, and international end users to make more economic procurement and merchandizing decisions.

In addition, the export supply chain, from the country elevator to the exporter/importer, has a long depth of experience in effectively utilizing derivative and futures markets help to facilitate their merchandising strategies.

In addition, a well-constructed and deliverable futures contract will significantly reduce basis volatility and increase certainty in outcomes of related basis values.

B. The Basics of Basis

Commodity futures markets are based on an underlying cash or physical market, which serves to keep the futures market price fairly valued and actively traded. To fully understand the relationship between physical cash markets and futures markets, a comprehensive understanding of basis relationships is especially important.



While a hedge eliminates the larger **Flat Price Risk** (absolute market movement), it leaves the participant exposed to residual fluctuations in the **Basis.**

In agricultural commodity markets, Basis Risk is the residual price risk that results when hedging a physical commodity in a corresponding futures market, and when the hedge does not move in perfect tandem.

In its simplest definition, Basis is the difference between the local physical cash price and the corresponding futures price in which the physical commodity is to be hedged:

Basis = Cash Price less a related Futures Price

Basis can be positive or negative, depending on the factors that determine basis. Basis is always expressed in the same units and currency as the Futures Contract in which it is being related.

Three Dimensions of Basis

Since Basis is directly related to the underlying physical cash value of the commodity, it has dimensions of value that can be defined as:

i.	What	(Typical)	Considerations and issues related to commodity Type and Quality consideration
ii.	When	(Temporal)	Considerations and issues related to time and period of delivery/shipment
iii.	Where	(Distal / Spatial)	Considerations and issues related to Pricing Location considerations

These factors include local supply and demand for the raw commodity, supply and demand for transportation, variations in the commodity's quality and the futures contract specifications, and the availability of substitutes for the commodity. Generally, spatial relationships and transportation costs make up the largest portion of the cash basis.

Planning is key, and hedgers must maintain historical basis records in order to make realistic basis expectations for the time they plan to buy or sell. Changes in basis tend to follow seasonal patterns. At harvest, grain supplies are generally more plentiful, resulting in a higher demand for transportation services and an increased cost to move grain (weaker basis). Post-harvest improvement in basis often occurs because of increased availability of transportation services at a better price, and improvements in local supply and demand conditions.

By hedging with futures, buyers and sellers are essentially reducing their price risk by assuming basis risk. Basis risk is typically much lower than price risk, so the tradeoff is worth it. The behavior and proper management of the basis risks in grains and other agricultural markets can have a significant impact on the performance of a hedge.

Changes in cash basis levels are closely watched by grain futures traders, as that can be one clue to future price direction of the market. Changes in cash basis levels signal changes in demand coming from the end-users and changes in supply coming from the producers of the raw commodity. Commercial entities go to great lengths to keep history and study various cash-based levels for the markets in which they are involved. It is a laborious process.

C. Component Pricing

In agricultural grain markets, CME derivatives and futures markets act as the global benchmark for "Price Discovery," providing the necessary data for local elevators to calculate and offer forward cash prices to producers.

The forward cash prices seen at a local grain elevator or C&F destination are not an independent number; it is mathematically derived from the futures market using a simple formula:

Forward Cash Price = Futures Price + Local Basis

Stated another way, a singular physical cash price can be broken down into its two **components of price**: **Future** and **Basis**.

Forward Cash Price = (Futures Price + Local Basis) X Foreign Exchange Rate

If you are trading into an international destination market with a singular physical cash price in a differing currency, the cash price can be broken down into its three **components of price**: Future, Basis, and Foreign Exchange Rate.

The **Futures Price:** Represents the benchmark "world price" for the value of a specific delivery month (e.g., December corn). It will generally account for approximately 80% to 95% of the final flat price.

The **Basis Price:** The difference between the CME price and the local cash price. It accounts for regional factors like transportation costs to export hubs, local supply and demand for storage space, and handling fees.

How Futures help to establish a Forward Cash Price

Futures markets facilitate forward pricing through several key mechanisms:

Transparent Price Discovery: Because CME futures are traded globally in a regulated exchange, they incorporate all known information (weather, geopolitics, USDA reports, and other underlying fundamental concerns) into a single, transparent price updated in real-time. Buyers and Seller with then utilize this benchmark price as a starting point for determining a more location-specific value or price for grain.

Risk Transfer for Buyers and Sellers: When a local elevator offers a farmer a "Forward Price Contract" for harvest, the elevator takes on the risk that prices might fall before they can resell the grain. To protect themselves, the elevator immediately sells an equivalent amount of CME futures. This hedge allows them to offer the farmer a guaranteed price months in advance.

Similarly, when a commercial trader offers a domestic end user or international importer a "Forward Price Contract" for future delivery, the commercial trader takes on the risk that prices might rise before they can originate and procure grain to deliver against this sale. To protect themselves, the commercial trader immediately buys an equivalent amount of CME futures. This hedge allows them to offer the end user or importer a guaranteed price months in advance.

Components of Forward Pricing Tools

The merchandising of physical cash grain with a related derivative or futures market, the decision can be separated into two components:

i. Determining the major component of “price” of the transaction, i.e. Futures
ii. Determining physical “what”, “when”, and “where” of the transaction, i.e., Basis

Tool	**Price Component, It “Locks In”;**	**Relationship to CME**
Forward Price Contract	Entire Cash Price (Futures + Basis)	Locks in both the current CME price and the current Basis. *(Both secure supply and determine price)*
Basis Contract	Only the Basis Value	Locks in the local delivery premium/discount but lets the CME price fluctuate until the customer chooses to "set" it. *(Secures supply, but a major component of the final price remains undetermined)*
Hedge-to-Arrive (HTA)	Only the Futures Value	Locks in the CME price component but leaves the local basis to be determined later. *(Determines the major component of price, but supply has not been secured)*

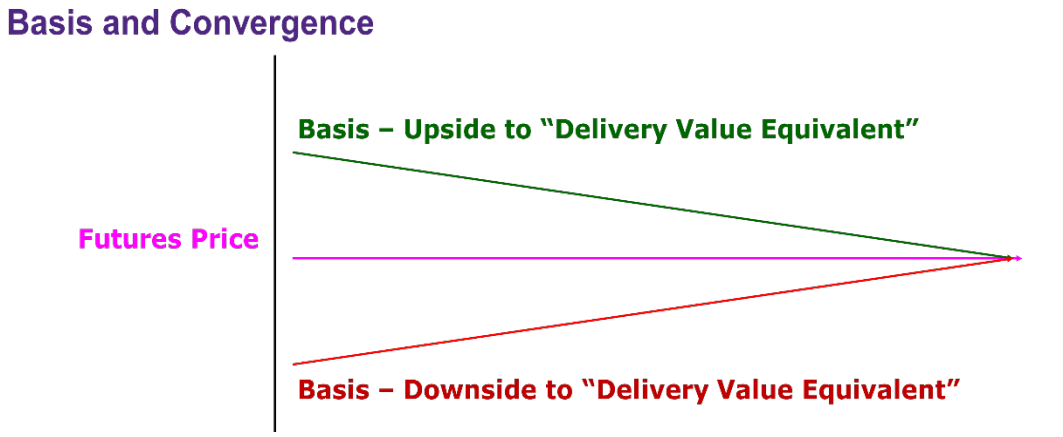
D. Convergence and Delivery Execution

The physical delivery process ensures convergence by creating an actionable link between the "paper" futures market and the physical (cash) market. Convergence in agricultural grain futures markets means the futures price and the cash market price for the same commodity come together as the futures contract nears expiration, driven by arbitrage opportunities, allowing hedgers to manage risk effectively.

As the delivery period approaches and the threat of physical delivery against a futures contract becomes imminent, the futures price and the cash price at the delivery location must be approximately equal.

If a significant price difference existed, market participants could exploit a risk-free arbitrage opportunity: i.e., buying the grain where it is cheaper (cash or futures market) and selling it where it is more expensive. This buying and selling activity forces the two prices to align.

This event is known as “convergence” and typically occurs as the market approaches the delivery period and expiration date of the related futures contract. As a futures contract approaches the delivery period and expiration, the futures price and the cash price are expected to be equivalent or nearly identical.



“In a delivery period, in the delivery market; Cash = Futures”

The threat of the delivery process is what forces “convergence” and provides underlying confidence that the price of futures and derivatives will be predictably related to the final price in the underlying physical cash market.

- For many CME grain contracts, such as corn, soybeans, and wheat, particularly those with “river” delivery, convergence can be seen happening with the secondary cash markets at the US Gulf, CIF NOLA.
- For CME Kansas HRW Wheat futures, convergence can be seen happening with the secondary cash rail markets for delivery to the Texas Gulf.
- **For the proposed CME Kansas Sorghum Futures, convergence is expected to be most easily observed with the secondary cash rail markets for Delivery or FOB the Texas Gulf.**

1. Core Concepts of Convergence

- **Basis**: The difference between the cash price and the futures price is known as the "basis". Convergence means that as the delivery month approaches, the basis narrows toward zero (or a predictable regional difference); i.e., convergence means that the basis approaches zero in the delivery month, at the delivery point.
- **Why It Happens (Arbitrage)**: In a market that has efficient price discovery and transparency, arbitrageurs would act to align the cash and futures prices if they diverge too significantly from underlying economic relationships. This is facilitated by simultaneously buying in the “cheaper” undervalued market and selling in the more “expensive” overvalued one, ensuring price anomalies and discrepancies are minimized.
  - **If Futures > Cash**: A trader can buy cheap physical grain, sell high-priced futures, and deliver the grain, securing a risk-free profit.
  - **If Cash > Futures**: A trader can buy futures, take delivery of the cheap grain, and sell it in the cash market.
- **Significance for Hedging**: Convergence makes hedging effective. It ensures that the gains/losses in the futures market closely offset the losses/gains in the cash market, allowing farmers and grain elevators to manage price risk.

  Hedging is the practice of taking an opposite position in the futures market from one's position in the physical cash market to reduce price risk.

  Convergence ensures that a loss in one market is predictably offset by a gain in the other, allowing hedgers (like farmers, grain elevators, and processors) to manage price fluctuations effectively.

2. Convergence and Arbitrage Opportunities

The phenomenon of convergence is a fundamental concept for hedging and speculation, and is primarily driven by arbitrage in the underlying cash market versus derivatives and futures.

In addition, as the market approaches the time to expiration, the influence of carry costs diminishes. As such, the factors that cause a difference between the futures and cash prices become less significant, forcing the two prices to align.

While convergence is the rule, divergence - when the futures and cash prices move apart - provides opportunities for speculators to profit by betting on a return to the long-term equilibrium.

If the futures price is significantly different from the underlying cash price as expiration nears, it creates a risk-free arbitrage opportunity.

Mechanics of Arbitrage

As a futures contract approaches expiration, market participants (arbitrageurs) can profit from any significant price difference between the cash price at an approved delivery location and the expiring futures price.

- **If the futures price is greater than the cash price**: Arbitrageurs buy cheap grain in the cash market and sell expensive futures contracts, then make delivery. This activity increases cash demand and futures supply, forcing prices together.

- **If the cash price is greater than the futures price**: Arbitrageurs buy cheap futures contracts, stand for delivery, take the physical grain, and sell it in the expensive cash market. This increases futures demand and cash supply, again forcing prices to align.

Even though actual delivery against CME futures contracts occurs in only a very few cases, it is the mere threat of physical delivery that keeps prices in line. It is the underlying efficiency of the delivery process that is essential for making futures markets effective hedging tools.

For Example:

- **If the CIF NOLA basis is higher** than the DVE, it would suggest a potential arbitrage opportunity, as the trader could theoretically buy the futures contract at the DVE, take delivery, and sell it at the higher CIF NOLA physical market price, or buy the futures and sell the physical CIF NOLA basis at a higher price.

  This action increases supply for the physical cash asset (driving its price down) and increases the demand for futures contracts (driving the price up), forcing the two prices to converge.

- **If the CIF NOLA basis is lower** than the DVE, it would suggest a potential arbitrage opportunity, as the trader could theoretically buy the physical CIF NOLA at the lower DVE value, and sell a futures contract.

  (Rather than sell the open future position, the hedger may apply his existing bought/long futures position to a CIF NOLA basis purchase in a process known as an “EFP” (Exchange for Physical))

  This action increases demand for the physical cash asset (driving its price up) and increases the supply of futures contracts (driving the price down), forcing the two prices to converge.

With a CME Kansas-based futures contract for HRE Wheat or Grain Sorghum, convergence would work much the same with grain sorghum futures converging with Texas Gulf grain sorghum markets via shuttle car rail delivery.

This is exactly the same as convergence works for the CME Kansas HRW Wheat contract.

3. Convergence - Impact of Intra-Commodity “Calendar” Spreads

The physical delivery process against CME agricultural derivatives and futures is a critical mechanism that not only enforces **convergence** between the futures price and the physical cash price of grain, but it also heavily influences the pricing and behavior of **intra-commodity “calendar” spreads**.

Impact on Intra-Commodity “Calendar” Spreads

“Calendar” spreads are the price differences between different delivery months of the same commodity. The delivery process determines whether the market is in "carry" (deferred months are more expensive) or "inversion" (nearby months are more expensive).

- **Market Carry**: If spreads are wide (a large carry), it signals that there is ample supply and the market is paying a sufficient premium for storage. This encourages storage.
- **Market Inversion**: If spreads are narrow or inverted (nearby price higher than deferred), it signals tight supplies and discourages storage, encouraging immediate sale and movement of grain to market.

The **Intra-Commodity "Calendar" Spreads** transmit crucial storage signals through the price relationship between nearby and forward delivery months. These inter-month price relationships signal the physical market's need (or demand) for warehousing and storage space and available supply. Through the hedging and merchandising activities of warehouse operators, the market uses the potential for delivery against nearby futures contracts to indicate how much revenue the warehouse operator is willing to accept to store grain from one month to the next.

The delivery process, or even the threat of delivery itself, can drive the spread. If supplies become extremely tight late in the crop year, the nearby bid gets pushed up relative to deferred contracts to pull the grain out of storage, causing inversion and influencing the spreads. The prompt availability or registration of delivery instruments (shipping certificates) can also influence the nearby "calendar" spreads.

4. Importance of Convergence in Thinly Traded Markets

For new and thinly traded markets, it is this physical threat of delivery that makes the pricing mechanism effective. Though this link may appear to be weak, making it difficult to accurately bridge the gap between futures prices and the diverse range of domestic and international cash prices observed by the trade in various locations, it is this effective delivery process that makes the market work.

This is why understanding the details and mechanics of the delivery process is so important. In these situations, it becomes imperative to fully understand the dynamics of price relationships and "Delivery Value Equivalents" (DVE's).

As such, a thinly traded futures market can still provide efficient price discovery and an effective hedging and risk management tool.

"For smaller volume markets that can suffer from a lack of liquidity, this physical delivery process is of greater importance and significance."

5. Non-Convergence

Non-convergence can happen when cash and futures prices fail to align at expiration.

Unexplained divergence and lack of convergence can signal market inefficiencies, delivery problems, or imbalances that warrant further investigation. When prices fail to converge, this can be a sign of flaws in the market's structure or market failure.

Issues that may contribute to the lack of convergence are:

- **Delivery Logistics**: For physically settled contracts, the practicalities of delivery – including warehouse availability, or lack of sufficient capacity in storage or transportation, market congestion, significantly inflated execution costs, unanticipated transaction costs, or issues caused by a force majeure event – can create friction that prevents a perfect and smooth convergence.

- **Liquidity**: Low trading volume in either the futures or spot market can lead to significant price discrepancies and a failure to converge.
  (An underlying physical delivery process can help to overcome this issue.)
- **Market Disruptions**: Major supply or demand shocks or issues caused by a force majeure event can cause temporary dislocations between futures and cash markets.
- **Market Structural Issues** (e.g., contract specifications or delivery processes and requirements), imperfect market information, which can hinder effective arbitrage, and prevent a more perfect and smooth convergence.

Convergence Failure

Unpredictable convergence compromises the market's reliability as a risk management tool and can send misleading storage signals.

Failures in convergence are often linked to issues with market design. This highlights the prerequisite for proper consideration to be given to new contract specifications, delivery locations, and the underlying delivery process.

In addition, overtime delivery terms and processes can become outdated as markets evolve and change.

While vital in theory, convergence occasionally fails in practice, as seen in the **CBOT Wheat market from 2005 to 2010**. [xliv] Historically, issues like inflexible, exchange-set storage rates on delivery instruments have occasionally caused convergence failures, particularly in wheat markets. In this case, there was a mismatch between the exchange-set storage rates for delivery instruments and the actual market price of physically storing grain. The CME addressed this by implementing Variable Storage Rates (VSR) to better reflect the true market cost of storage, thus improving convergence performance.

A more recent example of non-convergence as a result of structural changes in supply chain and rail transportation is discussed in this white paper. This resulted in changes by CME Group to the Kansas HRW Wheat contract. In this case, large **"shuttle trains"** became the predominant mode of transportation, replacing the antiquated mode of "single" railcar transit movements, with the prevailing CME Delivery Rules (still based on a "single car" rate), becoming unlined with current commercial practice.

The consequences of non-convergence are:

- it weakens the effectiveness of risk management,
- it sends misleading price signals for storage, and returns to carrying inventories,
- it can be a threat to the derivatives and futures market's viability.

Although market failure is an economic concept, it does have implications beyond theoretical economics.

E. Defining Full Financial Carry

In the context of CME commodity futures, "**Full Financial Carry**" refers to the situation where the difference in price between the current (spot) price of a physical commodity and the price of its futures contract perfectly reflects all the costs associated with owning and holding that physical commodity until the future delivery date.

In simpler terms, it's the total expense of physically carrying a grain over time, including:

- **Storage Costs**: The fees for warehousing the physical commodity. For grain in a deliverable position for CME futures, which is at the CME Daily Storage Rate.
- **Financing costs (Interest)**: The interest expense incurred on the funds borrowed to purchase and hold the commodity.
- **Risk of Quality or Loss**: The cost of the insurance premiums to protect against risks like theft, damage, or deterioration.
- **Opportunity cost**: The potential profit is foregone by choosing to store the commodity rather than selling it immediately and investing the funds elsewhere.

Theoretical Concept: **"Full Financial Carry"** is an idealized theoretical model. In derivative and futures trading, this refers to the complete cost of maintaining a commodity in a deliverable position until the expiration of the next derivative or futures contract. It encompasses all expenses associated with holding the commodity, including storage costs, financing expenses, and insurance premiums against quality and loss.

Essentially, it represents the difference between the spot price and the futures price, reflecting the cost of holding the asset over time.

In the real-world, changing market conditions can experience sudden changes in local and macro supply/demand relationships, interest rates, or storage capacities, that can cause deviations from the full temporal or time spreads, which vary from the "full carry" model.

- **Carries or Contango**: When a market is in a carry or contango pricing structure, the forward price is higher than the nearby "spot" price. This is because the local nearby supply is in excess of nearby demand, and as such, the forward or futures price needs to compensate the holder of a commodity for the cost of carrying the commodity over time.
- **Inverted or Backwardation**: When a market is in an inverted or in backwardation pricing structure, the forward price is lower than the nearby "spot" price. This is because the nearby local supply is in deficit of nearby demand, and as such, the nearby cash or futures price needs to incentivize the holder of a commodity to bring that inventory to market.
- The CME utilizes the concept of "**Full Financial Carry**" in its **Variable Storage Rate (VSR)** mechanism for wheat futures, aiming to improve cash-futures convergence at contract expiration. If the value of storage in the physical cash markets exceeds the tariff rate in the related derivative or futures market, convergence may not occur.

  The VSR mechanism adjusts the maximum allowable storage charges based on how nearby time spreads relate to **Full Financial Carry**.

Key aspects of Full Financial Carry

- **“Full Financial Carry”** is particularly relevant for commodities that require physical storage, like grains, metals, and energy products. It is less applicable to financial futures, as there is no physical storage or warehousing involved.
- When the market “carry” is below the cost of interest, there is no residual return to storage; therefore, there is little incentive for a warehouse operator to hedge the commodity.
- **Arbitrage**: If the futures price deviates significantly from the full carry cost, it creates opportunities for arbitrage (risk-free profit).

  If the futures price is *above* “full carry”, one could buy the commodity in the spot market, store it, and sell futures contracts for a profit.

  If the futures price is *below* “full carry”, one could sell the physical commodity, invest the proceeds, and buy the cheaper futures contracts.

Example: Imagine the December Corn futures contract on the CME is priced at $5.00 per bushel. If the monthly cost of carry (storage + interest + insurance) is calculated to be $0.08 per bushel, then a March corn futures contract trading at $5.24 per bushel would be considered to be in “full carry” ($5.00 + ($0.08 X 3 months)).

If it traded higher, it would imply the market anticipates higher demand or other factors driving the price up beyond the “cost of carry”.

F. Complexity & Systemic Risk and Fragility

In the context of CME Agricultural Futures and grain markets, **systemic risk and fragility** refer to a market state where the internal structural integrity (rather than just supply-and-demand fundamentals) is highly susceptible to abrupt failure or instability.

For Example: Complex derivative positions can hide risks (as seen in the 2008 Global Financial Crisis, (GFC)), and the failure of large players can freeze credit markets. However, at the time being, agricultural commodity markets are not seen to contain this same level of complexity.

1. Symptoms of a Fragile System

System fragility is characterized by a "predictable collapse" scenario in which vulnerabilities are embedded within the market's high level of “interconnectedness” and lack of diversity. It is often measured by the "tail risk dependencies" between different commodities (i.e. grain sorghum’s reliance on corn pricing), or diversity of demand.

For example: when energy and agricultural markets become overly synchronized, a single shock in one can lead to a cascading failure across the entire global commodities network.

As of early 2026, this fragility is increasingly driven by the gap between increasing instrument complexity and shrinking accessible liquidity.

System fragility is often characterized by an **asymmetry in market information**, which manifests itself as "asymmetric" price movements, where grain sorghum and corn futures can react differently to market shocks.

A primary indication of systemic failure in agricultural commodities with a related futures market is the **non-convergence** of futures prices and the underlying physical cash prices as the contract approaches the delivery period and contract expiration. This persistent gap makes hedging and risk management ineffective and sends misleading signals to the broader agricultural economy. Without a related futures market for grain sorghum, convergence prices by cross-hedging grain sorghum with corn is not possible, and by definition a not event, further confounding the asymmetry observed in the sorghum market.

2. Core Drivers of Systemic Fragility

- **Execution and "Hidden" Illiquidity**: Market structures may appear deep and liquid during calm periods but can abruptly become illiquid under pressure as participants (such as high-frequency traders) withdraw to manage their own risk. A primary risk for a thin market, such as grain sorghum, is that markets appear liquid on the surface but behave as if illiquid when order pressure arises. Fragmented order books and complex derivatives mean that while liquidity may be visible, it may not be reachable in times of stress, turning a localized shock into a systemic one.
- **Geopolitical Interconnectedness**: Agricultural futures are highly sensitive to geopolitical shocks. This is currently highlighted by stressed trade relations with China, the largest global importer of grain sorghum. These events trigger contagion across linked financial and physical markets, heightening systemic stress.
- **Geopolitical, Logistical and Operational "Friction"**: Current systemic risks are driven less by a scarcity of physical commodities and more by "friction costs", including geopolitical sanctions, logistical bottlenecks, and currency wars, which disrupt the flow from surplus regions to consumers.

  Current stability is described as "fragile" as it relies on a precarious equilibrium where ample global supply is offset by intensifying logistical risks. Systemic fragility increases when prices are dictated more by the ability to move grain safely through high-risk zones (like the Black Sea, Straits of Hormuz, etc.) than by actual crop yields.
- **Financialization Spillover**: Volatility is increasingly transmitted through financial instruments like index funds and ETFs. This "financialization" of agricultural commodities (e.g., corn, wheat, soybeans) amplifies price fluctuations, reducing the market's ability to act as a stable hedge during times of stress. Increased trading by financial entities not directly involved in agriculture (index funds and ETFs) can transmit shocks from other asset classes into grain markets. This "financialization" can increase the volatility of futures prices, harming the informational efficiency required for farmers to manage risk.
- **Tight Producer Margins and Leverage**: As of 2026, grain producers are facing a "bearish stability" with thin margins due to high input costs and subdued prices. When producers are financially overextended, the system becomes fragile as even small price dips can trigger widespread margin calls or forced liquidations.

G. Mississippi Waterway System

1. Navigation Note for the Mississippi Waterway System

The major secondary physical cash market for grain and oilseeds delivered against CME derivative and futures contracts is the **CIF NOLA** barge market *(Delivered on barges "Costs, Insurance and Freight" - New Orleans, Louisiana, LA)*.

Delivery throughout the marketing year to this pricing point can originate from any number of barge loading facilities located on the Mississippi Waterway System.

For reference, it is important to note the following seasonal operational limitations throughout the Mississippi River System:

Illinois River: The Illinois River is typically operationally open year-round for barge freight and loading, but at times is susceptible to ice-induced "soft closures". It can experience weather-related disruptions and scheduled maintenance closures during the winter and early spring months. Extreme cold can cause the river to freeze, particularly from Havana, Illinois, to the north, which can effectively shut down barge loading operations.

As the IWDS is the primary pricing point and area for physical delivery against many CME grain and oilseed futures contracts, the river must remain operational year-round.

Mississippi River: While the Lower Mississippi River remains open year-round, the northern stretch officially "hibernates" for several months.

- **Upper Mississippi River:** The Upper Mississippi River closes to barge freight every winter. The Upper Mississippi officially closes for the season (typically early Dec to late March).
- **Mid-Mississippi River:** The Middle Mississippi River (sometimes called the "Mid-Mississippi") is the 190-mile stretch of the river that flows from the confluence with the Missouri River at St. Louis, Missouri, to the confluence with the Ohio River at Cairo, Illinois. This section serves as a transition zone between the highly regulated Upper Mississippi and the massive, free-flowing Lower Mississippi.

  Unlike the Upper Mississippi, which uses 29 locks and dams to maintain depth, the Middle Mississippi is relatively free-flowing and un-impounded. It is the first section of the river where vessels no longer must pass through locks (after leaving the Chain of Rocks Lock near St. Louis). This allows for barge tows and year-round navigation.
- **Lower Mississippi River:** The Lower Mississippi River is the segment of the river that flows from the confluence with the Ohio River at Cairo, Illinois, to its mouth at the Gulf of Mexico.

  Unlike the Upper Mississippi, which is a series of controlled pools, the Lower Mississippi is a free-flowing river with no locks or dams. This allows for significantly larger barge tows and year-round navigation.

Missouri River: The Missouri River has a formal winter closure for commercial barge freight. Unlike the Upper Mississippi, which closes due to ice, the Missouri River shuts down primarily because the U.S. Army Corps of Engineers (USACE) reduces water releases from upstream dams, making the channel too shallow for heavy barges.

The Missouri River navigation season typically runs from late March or April 1st through early December. Outside of these dates, the river is effectively closed to commercial traffic.

Ohio River: Unlike the Upper Mississippi, the Ohio River does not have a scheduled winter closure and is intended for year-round navigation. However, extreme weather can cause temporary, unscheduled closures and significant operational restrictions during the winter months. Severe cold can freeze lock gates, making them impossible to operate. To ensure safety, the U.S. Army Corps of Engineers (USACE) and U.S. Coast Guard often impose size limits on barge tows during icy periods.

Arkansas River: Specifically, the McClellan-Kerr Arkansas River Navigation System (MKARNS) — does not have a scheduled winter closure and is designed for year-round navigation.

While there is no official "hibernation," barge freight is frequently disrupted during the winter months by unscheduled closures and severe weather restrictions.

H. Efficient Market Hypothesis (EMH)

Efficient Market Hypothesis (EMH) was popularized by Eugene Fama in the 1970s, and states that financial asset prices reflect all available information, making it impossible to consistently "beat the market" on a risk-adjusted basis. EMH implies that market prices are always fair, and only new information causes prices to move.

While EMH is a cornerstone of modern financial theory, it is often viewed today as a useful model or assumption rather than a perfect reflection of real-world market behavior.

Core Forms of EMH

- **Weak Form:** Suggests that past prices and trading volumes are already reflected in current prices, rendering technical analysis ineffective.
- **Semi-Strong Form:** Argues that all public information (earnings, news) is already incorporated into prices, making fundamental analysis useless.
- **Strong Form:** Asserts that even insider information is already priced in.

Key Implications & Assumptions

- **Rational Actors:** Assumes investors are rational, processing information optimally.
- **No Arbitrage:** Opportunities to profit from inefficiency are rapidly eliminated by competition.
- **Passive Investing:** Because you cannot consistently outperform the market, a passive strategy (e.g., index funds) is considered best.

Limitations

- **Market Anomalies:** Research has focused on deviations where markets do not seem fully efficient.
- **Behavioral Finance:** Challenges EMH by arguing that human psychology causes irrationality, bubbles, and crashes (e.g., the 2008 financial crisis).
- **Outperformance:** Some investors have historically outperformed the market, challenging the assertion that it is impossible.

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References

Acronyms

Basis	Cash Price less a related Futures Price = Basis
CIF NOLA	(Delivered on Barge) Costs, Insurance and Freight - New Orleans, Louisiana (LA)
CBOT	Chicago Board of Trade
CFTC	Commodity Futures Trading Commission
CME	Chicago Mercantile Exchange
DVE	Delivery Value Equivalent
ECB	Eastern Corn Belt
EFP	Exchange For Physical
EFR	Exchange For Risk
FOB	Free On Board
FOB NOLA	Free On Board - New Orleans, Louisiana (LA)
KCBT	Kansas City Board of Trade
KCBT	Kansas City Board of Trade
IWDS	Illinois Waterway Delivery System
MKARNS	McClellan-Kerr Arkansas River Navigation System
MTM	Mark-To-Market
NOLA	New Orleans, Louisiana (LA)
PNW	Pacific Northwest
ROI	Return On Investment
SIT Rates	Storage-In-Transit Rates
Tx FOB Vessel	Texas Gulf Free On Board Vessel
VSR	Variable Storage Rate
WCB	Western Corn Belt

Definitions

Average Daily Volume (ADV) – Average Daily Volume (ADV) is a metric used to measure the total number of shares or contracts traded for a specific security, such as a stock, on a given day, averaged over a defined period.

Back-To-Back Trading – A simultaneous buy-and-sell transaction where an intermediary agribusiness purchases a specific quantity of grain from one party and immediately sells it to another, often without taking physical possession or inventory risk. It acts like “drop-shipping,” locking in a margin spread while bypassing logistical costs.” In grain markets, grain companies often “back-to-back” their purchases from farmers by immediately contracting those same bushels to end users (processors, exporters) to offset risk. For hedging, “back-to-back” transactions are used to lock in margins and manage price volatility. These deals require precise, linked contracts to ensure transparency in the supply chain.”

Baijiu (白酒, báijiǔ) – Often referred to as Chinese "white liquor," is a clear, high-alcohol (35–60% ABV) distilled spirit. Produced primarily from sorghum, it is known for its distinct, pungent aroma and is commonly enjoyed during meals. Key types include sauce aroma (pungent), strong aroma (fruity), light aroma (sweet), and rice aroma.

Basis Cash Price less a related Futures Price = **Basis**

Basis Risk – In agricultural commodity markets, Basis Risk is the financial risk that the price of a physical commodity and the futures contract used to hedge it do not move in perfect tandem.

While a hedge eliminates the larger **Flat Price Risk** (absolute market movement), it leaves the participant exposed to fluctuations in the **Basis**—the difference between the local cash price and the futures price.

Bid / Ask Spread – The bid ask spread is the gap between the highest price a buyer is willing to pay for an asset and the lowest price a seller is willing to accept.

Calendar Spread – Commonly referred to as an **intra-market spread**) in agricultural commodity and grain markets. Also see “**Intra-Commodity Spread**”.

Carry Markets (or Contango Markets) – A situation where the forward or futures curve is upward sloping.

For physical commodities such as grains and metals, the cost of storage space, insurance, and finance charges incurred by holding a physical commodity. In interest rate futures markets, it refers to the differential between the yield on a cash instrument and the cost of funds necessary to buy the instrument.

Carry or Contango situations can be costly to investors holding net long Futures positions as they roll those positions forward in time.

Carrying Charge – (1) Those costs incurred in warehousing the physical commodities, such as grains and metals; the cost of storage space, insurance, and finance charges incurred by holding a physical commodity.

(2) In interest rate futures markets, it refers to the differential between the yield on a cash instrument and the cost of funds necessary to buy the instrument. Also referred to as the cost of carry or carry.

Center Gulf (Mississippi River Gulf) – Primarily encompasses export terminals located along the Mississippi River in Louisiana, typically including the lower Mississippi River region from Baton Rouge down to New Orleans.

It is the largest region for U.S. grain exports and often serves as the "par" or standard delivery point for grain contracts.

Class I Railroad – In the United States, a Class I Railroad is a line-haul freight carrier that exceeds a specific annual operating revenue threshold set by the Surface Transportation Board (STB). These primary rail lines form the backbone of the North American rail network, handling long-haul, high-density intercity traffic.

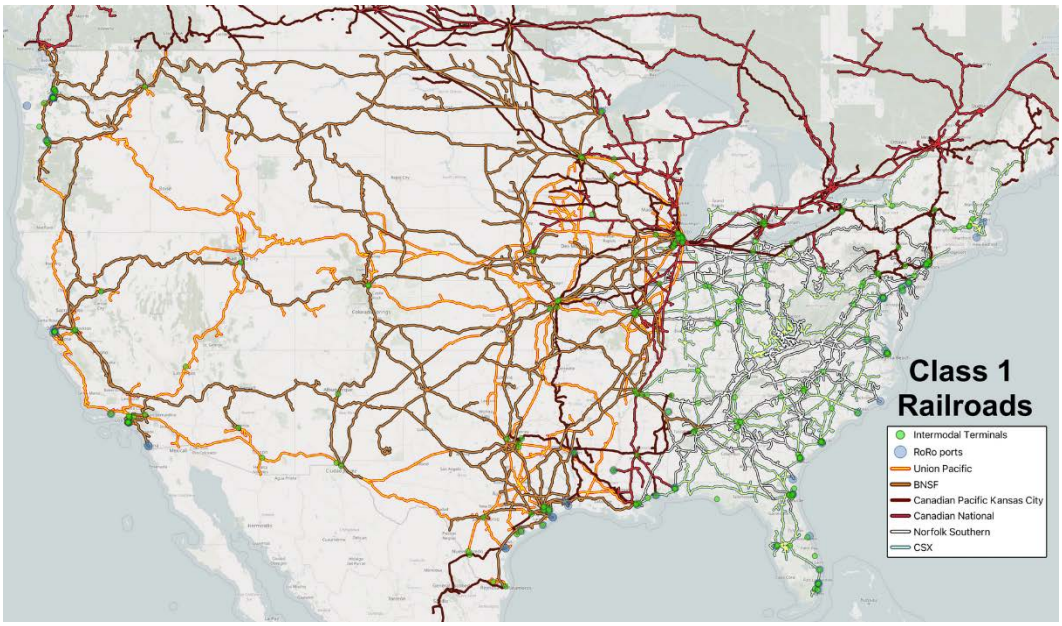
Class I Railroad Revenue Threshold:

As of 2024, the revenue threshold for a Class I Railroad was $1,074,600,816. The STB adjusts the revenue threshold annually for inflation. While the specific figure for 2026 will be released in mid-2027 based on 2026 data, carriers are currently operating under the expectation of continued inflation-based increases to this billion-dollar benchmark.

Class I railroads account for the vast majority of the rail industry's economic footprint:

- 94% of total U.S. rail freight revenue.
- 90% of all rail-related employees.
- 68% of total U.S. track mileage.

Six Class I Railroads



Following significant industry consolidation, including the 2023 merger of Canadian Pacific and Kansas City Southern, there are only **six** major freight companies that hold this designation in the U.S.

- **BNSF Railway**: Operates primarily in the Western U.S. and is wholly owned by Berkshire Hathaway.
- **Union Pacific (UP)**: The largest Class I by revenue, covering the Western two-thirds of the U.S.
- **CSX Transportation**: A dominant carrier in the Eastern U.S.
- **Norfolk Southern (NS)**: The other primary Eastern U.S. carrier.
- **Canadian National (CN)**: A Canadian-owned carrier with extensive trackage in the U.S. Midwest and South.
- **CPKC**: Formed by the CP-KCS merger, it is the only single-line railroad connecting Canada, the U.S., and Mexico.

Commercial Trader – A commercial trader, in the context of agricultural derivatives and futures, is an individual or entity that uses the futures markets primarily to **hedge or manage the price risk** associated with their actual physical business operations involving the agricultural commodity. They have a tangible, commercial interest in the underlying physical product.

Key characteristics and roles of a commercial trader in this context include:

- **Physical Business Involvement**: They are directly involved in the production, processing, handling, storage, exporting, or importing of the physical agricultural commodity (e.g., a farmer, a grain elevator operator, an ethanol producer, or an exporter).
- **Hedging and Price Risk Management as Primary Goal**: Their main objective is not to profit from market speculation, but to protect the profit margins and stability of their core commercial business by locking in future prices for inputs or outputs.

- **Opposite of Speculator**: They typically transfer their price risk to speculative traders in the market.
- **Large Trader Reporting**: The Commodity Futures Trading Commission (CFTC) formally classifies these entities in its reports (such as the Commitment of Traders report) as "commercial" participants, who are often subject to different position limits than "non-commercial" (speculative) traders.

In essence, a commercial trader is a participant with a "bona fide" physical need for the hedging market, using it as an essential tool for sound business management and risk mitigation.

Commitment of Traders (COT) Report – The Commitment of Traders (COT) report is a weekly publication by the CFTC, released every Friday at 3:30 p.m. EST, detailing the trading positions of market participants in futures markets as of the previous Tuesday. It serves as a sentiment indicator, breaking down open interest for commercial (hedgers) and non-commercial (speculators) traders.

Cross Hedging – Cross-hedging is a risk management strategy where a position in one asset is used to offset risk in a related but different asset. It is typically used when a perfect hedging instrument for the asset needed to hedge is unavailable.

Cross hedging results in an “imperfect hedge”. Unlike a direct hedge where the same asset is utilized, a cross hedge is imperfect by definition. The goal is to minimize the potential for losses from price changes in the underlying asset, which is known as “basis” risk.

Because the cross hedge is imperfect by definition. It carries more risk than a direct hedge. The effectiveness depends on the strength of the correlation and the accuracy of the hedge ratio.

A “cross hedging” strategy relies on a high degree of price correlation under the assumption that the prices of the two different assets will move in a similar way. Statistical analysis needs to be used to determine the appropriate hedge ratio and estimate the risk involved in a cross-hedge.

For Example: If you have a platinum inventory and a platinum futures contract is not available, you could sell gold futures as they may be highly correlated with platinum.

Or,

For Example: Since grain sorghum does not have a directly related derivative of a futures contract, price risk is often managed by placing an offsetting risk position in corn or wheat futures, since their prices are correlated, but not identical.

A hedge position is then established in the related futures contract of that related asset.

Calculating a Hedge Ratio: A first step is to find a related asset whose price movement is highly correlated with the asset you want to hedge.

A hedge ratio may then be used to determine the correct amount of the futures contract to use to minimize risk. This is often calculated using the minimum variance hedge ratio, which accounts for the different volatilities and correlations of the two assets.

For Example: One approach to determining a "hedge ration" for corn to grain sorghum may be determined to be 1:1 (as one bushel of corn : one bushel of grain sorghum, as their bushel weight is both 56 lbs); while the elected "hedge ration" of wheat to grain sorghum may be determined to be .9333:1 (as one bushel of wheat – 60 lbs/bu : one bushel of grain sorghum – 56 lbs.

Delivery Value Equivalent (DVE) – DVE is a concept used in commodity futures markets, particularly for grains, which represents the value of a futures contract that has the potential to be settled with physical delivery. It is a benchmark used by traders to determine whether they should make or take physical delivery of the commodity instead of settling the contract with cash. By comparing the DVE to the physical market price (like the New Orleans CIF basis), traders can identify arbitrage opportunities.

Exchange for Physical (EFP) – An EFP, or Exchange for Physical, is a private, negotiated transaction where two parties swap an exchange-traded futures position for an equivalent physical (or "spot") market position in the same commodity or asset.

EFPs are frequently used in the trade to "price" a physical Basis Contracts. In this situation, a party holding, or wishing to hold, an offsetting futures position could use an EFP in exchange for "pricing" a physical basis contract for purchase or sale of the physical asset.

EFPs allow traders to move between futures and physical markets without the price risk of a normal spot transaction, helping them manage risk, hedge exposure, or take advantage of price changes (or slippage in pricing).

This type of trade is arranged privately but must be reported to the relevant exchange for clearing.

Exchange for Risk (EFR) – An EFR, or Exchange for Risk, is a private, negotiated transaction where two parties swap an exchange-traded futures position for an equivalent physical (or "spot") market position in the same commodity or asset.

Flat Price Risk – In agricultural Commodity markets, Flat Price Risk (also known as absolute price risk or outright price risk) is the exposure to financial loss resulting from changes in the overall market price level of a commodity. Flat price risk focuses on the total value of the commodity.

Forward Price Curve – A forward price curve in agricultural markets represents a snapshot of market sentiment for a specific day, reflecting current bids and offers for future delivery.
It can be graphically represented by plotting the current forward or futures prices of a commodity (e.g., corn, soybeans, wheat, etc.) for various future delivery dates, illustrating market expectations over time. This maps out the "term structure" of prices, showing whether the market is in a **carry** (contango) structure (i.e., future prices higher than the

spot price) or **inverse (**backwardation) structure (i.e., future prices lower than the spot price).

Forward Market – In agricultural commodities and grain markets, the term “forward” market is used to distinguish the cash or physical market from the exchange-traded “derivatives” or “futures” market.

A “forward” market (also a cash market or physical market) is an informal, over-the-counter (OTC) facility where the commercial trade negotiates customized, non-standardized contracts to buy or sell specific quantities of agricultural commodities (e.g., corn, soybeans, wheat, etc.) at a negotiated price for a “forward” or future transfer of ownership, payment, and delivery. It represents the “forward” or future price of a physical commodity.

Also see Futures Market

Futures Market – In agricultural commodities and grain markets, the term “futures” market is used to distinguish an organized and regulated exchange-traded “derivatives” or “futures” market from the cash or physical market.

These are highly standardized contracts (e.g., 5,000 bushels for corn or wheat) traded on organized exchanges like the CME Group or Intercontinental Exchange (ICE). Terms such as quality, quantity, and delivery location are fixed by the exchange.

Also see Forward Market

Hedged Stocks – In the context of grain and agricultural commodities markets, "hedged stocks" specifically refers to **physical inventories** of commodities (such as corn, wheat, or soybeans) that are protected against price fluctuations by taking an offsetting position in the futures market. As such, they are exposed to Basis Risk but protected from adverse “Flat” Price movements.

Inter-Commodity Spread – An **Inter-Commodity Spread** in agricultural and grain markets is a trading strategy involving the simultaneous purchase (long) of one futures contract and the sale (short) of a different, but related, commodity futures contract. Unlike an intra-commodity spread (which trades the same commodity across different months), an inter-commodity spread focuses on the price relationship—or relative value—between two distinct assets, such as corn and wheat or soybeans and soybean oil.

Traders use this strategy to profit from a widening or narrowing price difference (differential) between the two commodities, often driven by shifts in demand, supply, or seasonality, rather than betting on the outright direction of the market.

Intra-Commodity Spread – An **Intra-Commodity Spread** (commonly referred to as a **“calendar” spread** or **intra-market spread**) in agricultural commodity and grain markets is a futures trading strategy that involves simultaneously buying (long) and selling (short) futures contracts of the **same underlying commodity** on the **same exchange**, but with **different delivery or expiration months**.

The goal of this strategy is not to bet on the overall direction of the market, but rather to profit from the changing price relationship—the "spread"—between two different timeframes, such as buying July wheat and selling December wheat.

Inverse Markets (or Backwardation Markets) – A situation where the forward or futures curve is downward sloping.

A futures market in which the nearby months are selling at premiums over the more distant months; characteristically, a market in which supplies are currently in shortage.

For physical commodities such as grains and metals, the nearby price is higher than the deferred or forward price, and as such, there in not incentive to store the commodity.

Market Asymmetry – Refers to situations where there is an imbalance in information, power, or price transmission between participants, resulting in inefficient, non-linear market behaviors. It frequently manifests as a divergence from theoretical, perfect market models where all traders have identical information and where prices move symmetrically up or down.

Market Failure – Market failure is a situation where the free market fails to allocate resources efficiently, resulting in an inefficient distribution of goods and services. This occurs when the supply and demand for a good or service are not in equilibrium, leading to either too much or too little being produced from a societal perspective.

Market Liquidity – Market liquidity for agricultural commodities refers to the ease and efficiency with which commodities (such as corn, soybeans, wheat, or livestock) or their derivative futures contracts can be bought or sold in the market without causing a significant, drastic change in their price. It represents the ability of participants (including producers, processors, and speculators) to quickly enter or exit positions with minimal transaction costs.

Market Maker – A market maker in derivatives and futures is a financial firm or individual that continuously provides liquidity by quoting both buy (bid) and sell (ask) prices for contracts, profiting from the spread, and ensuring smooth trading, even during volatility, by absorbing imbalances and bridging buyer/seller gaps. They hold inventory of contracts (like swaps, options, futures) and are essential for price discovery and market efficiency, often using sophisticated algorithms for rapid, high-volume transactions.

Market Power – Market power is the ability of a company or entity to influence prices and control terms within its market, often reducing competition by creating barriers to entry.

Mark-To-Market – In the agricultural commodity market, Mark-to-Market (MTM) is the daily regulatory process where the value of a futures contract is adjusted to reflect the current market price at the end of each trading session.

In regulated futures exchanges, because derivative and futures prices fluctuate daily, the MTM process ensures that gains and losses are settled in cash every day rather than waiting until the contract expires or the grain is delivered.

The MTM process may also be applied to physical cash inventories and open forward contracts (purchases and sales) to determine the current financial exposures based on current market prices.

Open Interest – Open interest is the total number of derivative contracts, including futures and options, which remain outstanding in the market and have yet to be settled.

Price Discovery – Price discovery in grain futures is the continuous process of determining the market price for crops (e.g., corn, wheat, soybeans) through the interaction of buyers and sellers on an exchange. It efficiently incorporates global supply/demand data, weather reports, and trader sentiment into real-time, transparent prices.

Key aspects of price discovery in grain markets include:

- **Fundamental Drivers**: Prices are set based on anticipated supply and demand, with factors like crop production, storage, and consumption being instantly incorporated into the price.
- **Information Incorporation**: Rapidly updating prices to reflect changing fundamentals (e.g., USDA reports, crop progress).
- **Functionality**: It assists producers and consumers in managing risk through hedging and guides decisions regarding storage vs. immediate sales.
- **Reduced Friction**: Minimal transaction costs and high liquidity allow for immediate price updates.

Price Risk Management – Price risk management in agricultural commodity and grain markets is the strategic process of using financial instruments and marketing contracts to offset the danger of adverse price movements, ensuring a predictable, profitable, or minimum acceptable price for crops. It involves shifting price uncertainty—the risk that selling prices will drop below production costs—by locking in prices, setting floors, or hedging with futures and options.

Price risk management is not price prediction but rather protecting against adverse price movement (up or down), while potentially allowing for other related gains (basis, logistics, transportation, arbitrage, etc.).

Price Transparency – With grain futures, this refers to the accessibility of real-time, public information regarding bid prices, ask prices, trading volumes, and historical data for exchange-traded contracts (such as those on the CME/CBOT). It ensures that all market participants—from farmers to multinational traders—have equal, instant access to accurate data, which facilitates fair, competitive pricing and efficient price discovery.
Providing all participants with instant access to the same bid/ask quotes, ensuring fairness. It occurs when, for example, a trader in Europe and one in Australia view identical, constantly updating prices for a soybean contract.

Proprietary Trader – A proprietary trader (prop trader), in the context of agricultural derivatives and futures, is an individual or firm that trades exclusively with its **own capital** (the firm's capital) to make a profit, rather than trading on behalf of external clients or managing someone else's money.

Key characteristics that distinguish proprietary traders in the agricultural context include:

- **Focus on Firm Profit**: Their sole objective is to maximize the firm's returns from market movements and inefficiencies.
- **Trading Firm's Capital**: They use the firm's capital and balance sheet for all trades, meaning all profits and losses accrue directly to the firm.
- **Speed and Infrastructure**: They typically invest heavily in technology and infrastructure to execute trades rapidly and gain a slight edge in speed or information processing over other market participants.
- **Sophisticated Strategies**: Prop traders often employ complex, data-driven, and algorithmic trading strategies, including high-frequency trading, arbitrage between related commodities (e.g., corn vs. sorghum spreads), and statistical analysis of market data.
- **Market Making/Liquidity Provision**: Many prop trading firms act as continuous market makers, providing essential liquidity by always offering to buy and sell contracts.

While they share the speculative goal of profiting from price changes with other speculators, their organizational structure (trading for the firm vs. personal account or client accounts) is often more sophisticated, as their systematic approaches are what define them in the derivatives and futures market landscape.

Price Volatility - Price volatility measures how rapidly and dramatically the price of an asset, such as a stock or commodity, fluctuates over a given period. High volatility indicates large, frequent, and often unpredictable price swings, signifying higher risk, while low volatility suggests more stable, consistent price behavior.

Price Volatility (Historical) – Historical Price Volatility, or "realized" price volatility, measures the magnitude of an asset's past price fluctuations relative to its average price over a specific period. Calculated using standard deviation of returns, it indicates how quickly and widely prices have swung, helping investors gauge risk—higher volatility signifies greater price fluctuation and risk.

Price Volatility (Implied) – Implied Price Volatility measures the market's forecast of a security's potential price movement magnitude, derived from option prices rather than historical data. High implied volatility signals expected large moves (expensive options), while low implied volatility suggests smaller expected moves (cheaper options). It is calculated using models like Black-Scholes to reverse-engineer volatility from current premiums.

Regular - In the context of CME Group futures, the term “Regular” or "Regular for Delivery" (often referred to as a "Regular Firm," "Regular Facility," or "Regular Warehouse") refers to storage facilities, warehouses, or shipping stations approved by the exchange to deliver commodities in satisfaction of a physically delivered futures contract.

Only these exchange-approved entities can initiate the delivery process by issuing registered warehouse receipts or shipping certificates.

Shipping Certificate – In the context of CME agricultural grain futures, a **shipping certificate** is a negotiable instrument issued by an Exchange-approved delivery facility. It represents the facility's commitment to deliver a specific quantity and quality of the underlying commodity to the holder when requested.

Key Characteristics

- **Delivery Instrument**: Shipping certificates are used alongside warehouse receipts for the physical delivery of grain against futures contracts during the expiration month.
- **Commitment to deliver**: Unlike a warehouse receipt, which represents ownership of grain in storage, a shipping certificate is a promise to deliver, functioning as a "call on production rather than inventory".
- **Transferable**: The certificate is transferable. A holder can retain it (subject to storage fees), sell it, or present it to the issuing facility to arrange for the physical grain to be loaded into a conveyance.
- **Collateralized**: The Exchange's clearing house requires issuing facilities to collateralize outstanding shipping certificates using cash, letters of credit, U.S. Treasuries, or USDA warehouse receipts to guarantee delivery.
- **Role in Convergence**: The potential to receive a shipping certificate that guarantees physical delivery helps link the physical and paper markets, encouraging the convergence of cash and futures prices as the contract expiration approaches.

Shuttle Train – In the context of grain markets, a shuttle train is a specialized, high-efficiency rail unit consisting of a dedicated set of typically 75 to 120+ covered hopper cars that travel continuously between a single origin (loading facility) and a single destination (unloading facility). These trains are designed to maximize logistics efficiency by never having their locomotives detached from the cars while in transit, bypassing intermediate rail yards to provide fast, consistent turnaround times.

Key Characteristics of Grain Shuttle Trains

- **Size**: Usually 75 to 120 cars (110 is standard for many, such as BNSF and Union Pacific).
- **Operation**: The same set of cars and locomotives moves back and forth, often under a one-year contract, resulting in 2.5 to 3 times more trips than non-shuttle railcars.
- **Speed & Efficiency**: Shuttle-loading facilities can load these trains in 15 hours or less.

- **Infrastructure**: Requires specialized, high-capacity loop track facilities (shuttle loaders) capable of handling the entire train at once.
- **Incentives**: Railroads offer lower freight rates (tariffs) to shippers who guarantee to meet strict loading/unloading time requirements.

Benefits in the Grain Market

- **Lower Costs**: Shippers and producers benefit from lower transportation costs compared to smaller, conventional, or "unit" trains.
- **Improved Market Access**: The high-volume capacity allows producers to access distant markets, including export, more efficiently.
- **Quality Preservation**: Because cars are loaded at a single point and often sealed until reaching their final destination, they are handled fewer times, preserving grain quality.
- **Increased Storage Capacity**: The high-speed requirement has driven the consolidation of smaller country elevators into larger "shuttle-loader" facilities.

Shuttle trains are considered a superior, modern alternative to traditional "unit trains" due to their higher, faster turnover of equipment.

Slippage – In agricultural commodity and grain markets, slippage refers to the difference between the expected price of a trade (the price a trader sees or sets) and the actual price at which the trade is executed. It is a form of transaction cost that often occurs during periods of high market volatility or low liquidity, common in futures trading.

Slippage is particularly relevant to agricultural commodities trading (e.g., corn, soybeans, wheat, etc.) as these markets are highly susceptible to fast-moving, news-driven price changes.

Speculative Trader – A speculative trader, in the context of agricultural derivatives and futures, is an individual or entity that enters the market to **profit from anticipated changes in the price** of a commodity (like grain sorghum, corn, or wheat) without having any intention of physically producing, delivering, or taking possession of the actual agricultural product.

Key characteristics and roles of a speculative trader in this context include:

- **Risk Assumption**: They willingly take on the price risk that commercial participants (such as farmers, elevator operators, and end users) want to transfer or hedge against.
- **Leverage**: They utilize the inherent leverage of futures contracts, putting up a relatively small amount of margin compared to the total value of the contract to control a large position, magnifying potential gains and losses.
- **Providing Capital and Liquidity**: By being willing to take part in either side of a trade, speculators provide crucial liquidity to the market. This ensures that hedgers can easily buy or sell contracts when needed, making the market function smoothly.
- **Market Analysis**: Speculators base their trading decisions on analysis of market fundamentals (weather, crop reports, global demand, government policies) and

technical factors (chart patterns, volume trends) to forecast future price movements.

In essence, while commercial participants (hedgers with an underlying physical position) use futures to manage their business risks and stabilize cash flows, speculators use the same instruments purely to capitalize on market volatility and price direction, acting as necessary counterparties in the transfer of risk.

Spot Market – In agricultural commodity and grain markets, the spot market (also known as the cash market or physical market) is a facility where the actual, physical commodity—such as wheat, corn, or soybeans—is bought and sold for immediate transfer of ownership, payment, and delivery. It represents the "right now" price of a commodity, rather than a price agreed upon for “forward” or future delivery.

Also see “Forward Market” …

Staggers Rail Act of 1980 - The Staggers Rail Act of 1980 is a landmark federal law that significantly deregulated the United States freight railroad industry, reversing nearly a century of heavy government oversight (dating back to 1887) that had left the industry on the verge of financial collapse. The Act, signed by President Jimmy Carter, allowed railroads to set their own rates, negotiate confidential contracts, streamline operations through mergers, and abandon unprofitable lines.

Its impact on agricultural grain transportation was transformative, shifting the industry from a rigid, high-cost, and slow-moving system to a more efficient, high-volume, and market-driven, albeit more concentrated, system.

Stopper – or “**Taker**” of delivery, is a crucial participant in the physical delivery process of an agricultural commodities futures market.

A stopper is a trader who holds a **long** position (an agreement to buy) in a futures contract that they retain until the contract enters its delivery period and a delivery notice is issued against them by a short-position holder (seller).

In essence, a stopper is the buyer who accepts the physical commodity (e.g., grain, corn, sorghum) from the seller through the clearing house mechanism. The stopper is obligated to accept the physical commodity that the seller tenders, pay the full cash value, and make all necessary logistical arrangements to receive the delivery at a designated, futures exchange-approved delivery location (e.g., an approved warehouse or silo).

While speculators usually close their positions before delivery begins, stoppers are typically commercial entities, such as grain elevators, processors, or exporters, who actually need the physical commodity for their business operations.

Storage-In-Transit - "Storage-In-Transit" (SIT) or "Transit" billing in through Kansas City was a specialized freight arrangement that allowed commodities (most notably grain and livestock) to be stopped, processed, and then reshipped while maintaining a single, continuous "through rate" from the original source to the final destination.

Tenderer – or **“Maker”** of delivery, is a crucial participant in the physical delivery process of an agricultural commodities futures market.

A "maker of deliveries" is a participant in the physical delivery process of an agricultural commodities futures market who holds a **short position** (an agreement to sell) and chooses to satisfy that obligation by delivering the actual physical commodity rather than offsetting the futures position before expiration.

In simple terms, a maker is the seller who initiates the delivery process by tendering the physical commodity (e.g., grain, corn) to the buyer (the "taker" or "stopper") via the futures exchange's clearing house mechanism.

They must deliver the specified quantity and quality of the commodity to an exchange-approved delivery location (e.g., an approved warehouse or elevator) within the delivery period, adhering strictly to the contract specifications, including any premiums or discounts for grade, location, or other factors.

Makers are typically commercial entities, such as grain elevators or merchandisers, who have the physical commodity on hand and find it economically advantageous to deliver it against their short futures position, often when the futures price is higher than the local cash price.

Texas Gulf – Refers to the export facilities located along the Gulf Coast of Texas, including ports like Houston, Galveston, and Corpus Christi.

Handles large volumes of wheat, sorghum, and corn for export. It is critical for moving grain to Mexico and acts as a primary hub for grain that is "removed from the inland water system" (i.e., not using the Mississippi River).

Trade Size – Trade Size refers to the quantity or monetary value of an asset being bought or sold in a single transaction, crucial for managing risk and potential profit, often measured in units (like shares), lots (in forex), or contract units, and determined by factors like account size, risk tolerance, and market conditions.

Positionality Statement

“This white paper specifically examines the reintroduction of a Grain Sorghum Futures Contract by the CME Group, evaluating its potential to address the unique market liquidity and basis challenges inherent in U.S. domestic and international trade. This effort requires an intimate understanding of the intricate logistics and commercial pressures unique to the U.S. and international sorghum industry and trade.”

“The content in the information within this white paper is written with the underlying perspective of over 35 years of commercial experience within the U.S. domestic and international agricultural commodities and grain trade. Drawing upon senior-level experience in agricultural commodity markets, the author provides a nuanced look at the domestic trade environment that traditional data alone cannot capture. With this professional background, spanning both domestic origination and international trade, the author can provide a practitioner’s perspective on the structural necessity for robust risk management tools in the sorghum sector. This serves as the primary lens for assessing whether the proposed contract specifications meet the real-world needs of today’s commercial grain participants. By bridging decades of frontline commercial expertise with current market data, this work aims to provide a definitive roadmap for the contract’s role in modern agricultural hedging and risk management."

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End Notes

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