Grain Storage Issues

Roger McEowen (roger.mceowen@washburn.edu) – Washburn University School of Law
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Overview

The U.S. agricultural sector may experience an historic harvest season. The latest projections from the USDA point to a record-setting corn crop. The confluence of this unprecedented yield and already-high grain stock levels from the previous year is poised to create a critical storage bottleneck. This is not merely a logistical inconvenience, it also poses a threat to the economic viability of farmers, the quality of the nation's grain supply, and the stability of global food markets.

USDA's National Agricultural Statistics Service (NASS) has forecasted corn production at a record 16.7 billion bushels for the 2025/26 marketing year, representing a 13 percent increase from the prior year and setting a new record for average yield at 188.8 bushels per acre. Record yields are expected in key agricultural states that form the core of the Corn Belt, including Illinois, Indiana, Iowa, and Minnesota. This production surge arrives at a time when commercial, off-farm corn stocks are already up 12 percent from the previous year, with off-farm soybean and wheat stocks also showing significant increases. This existing inventory creates a strained storage system with limited capacity to absorb the new crop, immediately pushing the pressure back onto on-farm solutions. This situation is further compounded by persistent transportation bottlenecks and labor shortages, which inhibit the timely movement of grain from farms to markets or to permanent storage facilities.

Note: The significant upward revision in the August report, which increased the forecast by over a billion bushels, underscores the inherent volatility of the market and the rapid pace at which projections can change. This rapid shift in outlook demonstrates that waiting for a final, fixed number before acting is a high-risk strategy. Instead, proactive planning based on the most recent and compelling data is paramount for all agricultural stakeholders.

What options exist for farmers to help address the issue? That's the topic of today's post.

Fall 2025 Bumper Crop

The 2025/26 U.S. agricultural season stands as a testament to the nation's immense productive capacity. Favorable weather conditions, advanced farming techniques, and strategic planting decisions have culminated in a projected bumper harvest. This forecast signals an urgent and complex challenge for the agricultural sector. The fundamental question confronting farmers, agribusinesses, and policymakers is not whether the infrastructure can handle the volume, but rather, how will the nation's grain storage and logistics systems absorb the crop without incurring substantial financial losses and compromising the quality of the crop.

While corn commands the most attention due to its scale, other major crops also contribute to the overall storage picture. The soybean yield is expected to average a record high of 53.6 bushels per acre, an increase of 2.9 bushels from 2024, despite an overall 2 percent decrease in production. Total wheat production is forecasted at 1.93 billion bushels, down 2 percent from the prior year. The concentration of record yields in a handful of geographically clustered states means that the pressure on grain storage will be highly acute and localized, placing a targeted stressor on the densest agricultural infrastructure in the country. This challenge is not a uniform national problem but a concentrated logistical test for the Corn Belt.

Storage Capacity System

Current infrastructure. The scale of the harvest, however, is only one half of the equation. The other half is the current state of the nation's storage infrastructure. Analysis of the March 2025 Grain Stocks report reveals a system that is already operating under significant strain, well before the new harvest is in the ground. While total corn stocks were down a modest 2 percent from the previous year, off-farm stocks were up 12 percent, totaling 3.65 billion bushels. This trend is not limited to corn; off-farm soybean stocks were up 13 percent and off-farm wheat stocks were up 14 percent from a year ago.

The commercial, off-farm storage system, which includes grain elevators and terminals, is already holding a high volume of inventory from the previous year's harvest. It is not starting with a clean slate but with a limited buffer to absorb the projected 16.7-billion-bushel corn crop and other grains from the new harvest. The pre-existing high inventory effectively shifts the immediate and immense pressure back to on-farm storage and temporary solutions, leaving producers with little to no buffer in the commercial system.

The number of off-farm storage facilities has also been on a declining trend over the past two decades. While the total off-farm storage capacity in bushels has remained relatively stable, this reduction in the number of facilities suggests a consolidation of the industry, which can further concentrate the pressure on remaining hubs. The current state of high off-farm stocks, combined with a record-breaking harvest, creates a looming logistical challenge that will test the resilience of the entire grain supply chain.

Systemic bottlenecks. The impending storage deficit is not an isolated problem; it is a critical node in a broader network of systemic vulnerabilities within the agricultural supply chain. Even if storage capacity were sufficient, the ability to move the grain to where it is needed would remain a significant obstacle. The transportation and logistics infrastructure that serves the agricultural sector is already strained by a number of factors, including chronic labor shortages, particularly for truck drivers and port staff, as well as aging infrastructure like roads, bridges, and ports.

These limitations create a logistical cascade. A bumper crop creates a surge in demand for transportation, a demand that an already-constrained system cannot meet. This leads to delays and increased freight costs. The most significant effect of this cascade is that grain cannot be moved from farms to commercial storage facilities or from commercial facilities to final markets in a timely manner. This forces farmers to hold their grain for longer periods, adding immense pressure to on-farm capacity and exacerbating the existing bottlenecks. The situation is vividly illustrated by the fact that

over 70 percent of containers are leaving West Coast ports empty, a record-high figure, as vessels rush back to China to meet consumer demand.

The consequences of this cascade are far-reaching. When agricultural products cannot be moved, producers risk being viewed as unreliable trading partners in the global market. The inability to deliver products in a timely fashion can lead to lost sales and decreased value.

Economics. A fundamental economic principle dictates that a significant increase in supply, particularly at harvest time, depresses prices. A bumper crop without adequate storage capacity forces a flood of supply onto the market, creating a worst-case scenario where producers are compelled to sell their grain at a time when prices are at their lowest to avoid spoilage. This can result in a significant reduction in profit margins, or even negative returns, for the season's work. Historical analysis demonstrates that holding grain off the market until the following spring can result in average prices that are 5 percent to 10 percent higher than those available during harvest months.

The decision to store or sell is not a simple calculation for many producers. It is a complex financial determination that is heavily influenced by capital constraints, debt obligations, and the specific costs of storage. Research indicates that younger and smaller farms are often in a more financially precarious position and, as a result, are more vulnerable to price shocks and less likely to store their grain. While storing grain offers the advantage of waiting for better prices and lower off-season freight rates, it also carries a significant but often-unseen cost: foregone revenue. This is the revenue a farmer cannot use for new investments or to cover immediate expenses because the crop is sitting in storage. This financial reality highlights the importance of liquidity and makes a strong argument for policy interventions that help producers overcome these capital constraints.

Spoilage. Inadequate or improper storage can lead to a complete loss of a harvested crop. The primary driver of spoilage is excessive moisture content, specifically at levels above 14 percent 15 percent. This is especially true during warm, humid weather. This creates an ideal environment for the proliferation of mold, fungi, and insects, which degrade both the weight and the quality of the grain. This physical degradation can manifest in several dangerous ways, including the formation of a solid, crusted surface on top of a grain pile, or unstable vertical columns of moldy, non-flowable grain. These formations can pose a serious safety hazard, as they are prone to collapsing and causing grain engulfment, which is a leading cause of fatalities in agricultural confined spaces.

Potential Solutions

Temporary storage alternatives. When commercial storage is unavailable or uneconomical, producers can turn to several temporary solutions to manage the harvest overflow.

- **Outdoor Ground Piles:** This is often the most accessible short-term solution for large volumes of grain. To be successful, the grain must be sufficiently dry (at 15 percent moisture or less) and cool (ideally 50°F to 60°F) before being piled. Proper site preparation is critical, including selecting a well-drained location and creating a crowned pad with a 1 percent to 2 percent slope. The use of materials like lime, fly ash, or cement, compacted to a high density, can reduce water permeability,

and a 6-mil plastic sheet on the surface can prevent ground moisture from wetting the grain. For extended exposure, plastic tarps are recommended to protect against rain, as just one inch of rainfall can re-wet the top foot of a pile to near 9 percent moisture. Despite these measures, ground piles are a short-term solution with a higher risk of crop loss compared to bins and should be monitored frequently.

- **Grain Bags:** A more contained and reusable option, grain bags provide a fast and cost-effective way to increase storage capacity. A 10-foot-diameter bag can store approximately 60 bushels per foot of length. The per-bushel cost for a single-use bag is around 5¢ to 7¢, but this requires a significant upfront investment in loading and unloading equipment, which can cost between $50,000 and $165,000. Grains stored in bags should also be cool and dry to minimize spoilage.

- **Temporary Indoor Spaces:** Before resorting to outdoor piling, producers can utilize existing farmstead buildings for temporary storage. This is a low-cost, short-term option, especially for grain that is not piled against outside walls.

Long-term on-farm investment. While temporary solutions are essential for immediate needs, long-term on-farm investments in permanent bins offer significant financial and logistical advantages. These benefits include greater control over harvest timing, a reduction in transportation costs, and increased market leverage. By having on-site storage, farmers can avoid the long lines and limited receiving hours at grain elevators during harvest, allowing them to continue harvesting and capitalize on favorable weather windows. This control also allows producers to wait for more favorable market prices, taking advantage of futures market price carry and basis improvement after the harvest glut has subsided.

For many producers, the primary barrier to investing in long-term storage is the high upfront capital cost. The U.S. government has a critical role in mitigating this barrier through targeted financial programs. The USDA's Farm Storage Facility Loan (FSFL) program is an excellent example of a policy designed to address this systemic risk. The program provides low-interest financing for producers to build or upgrade permanent and portable storage facilities and equipment.

The FSFL program offers flexible loan terms ranging from three to 12 years, with a maximum loan amount of $500,000 for storage facilities and $100,000 for trucks. A standard loan requires a 15 percent down payment, but the program also offers a critical "microloan" option. This microloan, for amounts up to $50,000, reduces the down payment requirement to just five percent and waives the standard three-year production history requirement. The microloan option is particularly important for small and mid-sized farms and new farmers who are often more financially constrained and lack the extensive production history needed for a traditional loan.

USDA Farm Storage Facility Loan (FSFL) Program Details

Feature	Standard Loan	Microloan Option
Maximum Amount	$500,000 - facilities $100,000 - trucks	Up to $50,000
Down Payment	15%	5%
Loan Terms	3, 5, 7, 10, or 12 years	Shorter terms available
2025 Interest Rates	3-year: 3.750% 5-year: 3.875% 7-year: 4.125% 10-year: 4.375% 12-year: 4.500%	Interest rates vary with term
Production History	3 Years is Required	Waived
Application Fee	$100	$100

Technological Innovations

The future of grain storage management lies in the adoption of smart technologies that move beyond static physical structures to dynamic, data-driven systems. These innovations fundamentally shift the approach to grain management from a reactive model—dealing with spoilage after it has begun—to a proactive one of prevention.

- **Real-time monitoring:** Modern grain monitoring systems utilize wireless IoT sensors and probes to track critical environmental data points in real-time. For example, the AgroLog TMS6000 and Digital Matter's SensorNode LoRaWAN® systems use sensors to continuously monitor grain temperature, moisture, and CO2 levels. This continuous stream of data allows producers to detect "hot spots" or moisture spikes that indicate the beginning of spoilage, providing alerts via a smartphone or cloud dashboard.

- **Automation and predictive analytics:** These monitoring systems can be integrated with automated controls to optimize storage conditions. For instance, a system can use real-time temperature and moisture data, combined with ambient weather conditions, to automatically turn aeration fans on or off. This not only prevents spoilage but also optimizes energy use, preventing fans from reintroducing moisture during high-humidity periods. Advanced systems can use artificial intelligence to analyze historical and real-time data to predict potential risks, allowing for

interventions before problems become a crisis. The integration of these technologies into even temporary storage solutions, such as those with optional ventilation systems, makes them accessible and scalable for producers of all sizes.

Conclusion

The 2025/26 U.S. harvest presents a unique and pressing challenge defined by the convergence of record production and an already-strained storage and transportation infrastructure. The data confirms that a massive volume of corn, in particular, will be coming to market at a time when the commercial storage system is already holding a high level of inventory. This will inevitably shift the burden of storage back onto producers, who will be forced to choose between selling at potentially depressed prices or facing the risks of spoilage and financial illiquidity.

For producers, the path forward involves a proactive combination of on-farm operational strategies. This includes the careful implementation of temporary solutions like outdoor ground piles and grain bags, which must be executed with strict attention to best practices to minimize losses. At the same time, producers should be encouraged to make long-term investments in permanent on-farm bins, which provide greater market leverage and harvest autonomy.

For policymakers, the continued support and expansion of programs like the Farm Storage Facility Loan are vital. The microloan option, in particular, is a critical tool for democratizing access to capital and reducing the barriers to entry for smaller and financially constrained farms.

For industry, the widespread adoption of modern technologies is no longer a luxury but a necessity. The integration of IoT sensors, automation, and predictive analytics allows for a fundamental shift from a reactive to a proactive model of grain management, safeguarding crop quality and minimizing waste.

By embracing this strategic and holistic approach, the U.S. agricultural sector can successfully navigate the challenge of the 2025/26 harvest.