



# SOY TRANSPORTATION COALITION

## *FARM TO MARKET: A SOYBEAN'S JOURNEY*

### Summary

The U.S. transportation infrastructure system is rapidly deteriorating. The interstate highway system is more than a half century old, the lock and dam system more than seven decades, the rail network dating to the late 1800s, while ports and terminals form the bedrock of the trade infrastructure. This infrastructure fostered the economic vitality of the United States, but its functional design has been eclipsed, desperately needing rebuilding and modernizing. Attention has been focused on the impact to the U.S. economy, but little on how the infrastructure system impacts agriculture.

The movement of agricultural commodities and products flow through a number of logistics options from farm to market. The logistics options often require the use of multiple modes across various geographies. The transportation of soybeans and soybean products and other grains and products were analyzed in this report. The goal of this project was to develop a more precise understanding of how U.S. soybeans and other leading agricultural products are transported to its customers.

In order to achieve these answers, the following tasks were performed:

- Baseline crop and livestock production outlook
- State level crop surplus and deficit outlook
- U.S. transportation system accommodating agricultural products
- Infrastructure enhancements among international competitors

This report was originally prepared by Informa Economics, Inc. (Informa) in 2011 and updated in 2015. For this report nine additional states were included as compared to the 2011 report. Summary information characterizing Informa is available in the appendix.

### **Report Highlights**

- Crop Outlook
  - Production increasing on higher yields, stable cropping area; soybean area expanding, corn shrinking, but overall total production rising.
  - Corn ethanol will reach its Renewable Fuel Standard mandate cap of 15 billion gallons in 2015.
    - During the ethanol build out phase, surplus corn supplies diminished across the Corn Belt, especially along the geographic reaches of the upper Mississippi and Illinois Rivers.
    - Surplus corn supplies are increasing, which increases the exportable supply of corn in a barge draw area, which increases Center Gulf exports versus PNW.
  - China will continue to import larger volumes of soybeans. China's annual soybean net imports have increased by 24 million MT from 2006 through 2010. From 2010 through 2023, soybean annual net imports are expected to increase an additional 74 million MT to 126 million MT in 2023.
    - China's consumption of soybeans is shifting world acreage away from grains to oilseeds.



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- Cropping of soybeans and corn has been and will continue to expand into the north and to the west, and into the Delta at the expense of wheat, cotton, and other feed crops, such as sorghum and oats.
- Livestock Outlook
  - U.S. meat production is expected to increase on the strength of foreign demand.
    - Chinese beef consumption is expected to grow by 1.5 million metric tons over the next decade, with Chinese imports fostering growth.
    - The increase in beef consumption is a result of China's strengthening economy, rising incomes, and continued urbanization.
  - The U.S. livestock outlook is projected to be mixed with growth driven by export demand and not domestic consumption.
  - Free Trade Agreement rules are being finalized for implementation between the U.S. and South Korea, Panama and Colombia, to the benefit of U.S. meat exports.
  - Poultry production will increase through 2016/17, and then shrink slightly during 2017/18 and expand to 57.5 billion pounds or 26.0 million metric tons in 2022/23.
  - Hogs are projected to increase about 7.3 million head from the 2014/15 low point to 72.3 million in 2022/23 and remain steady from there.
    - Hog production will expand more rapidly within the Corn Belt, while essentially shrinking in other areas.
    - Even though head count will flatten out, hog productivity gains will expand total pork production.
  - Cattle head counts are forecast to increase to 2019/20 before declining through 2022/23, with no significant shift in geographic distribution.
    - South Korea experienced a severe outbreak of foot-and-mouth disease, which has reduced the size of its herd, and increases the prospect of increased imports from the U.S., especially with the newly established Free Trade Agreement.
  - Dairy cattle head count will remain relatively stable, but annual productivity gains of 1.6% will increase total milk production.
    - The size of the U.S. dairy herd is dependent on exports of milk and associated products, especially to Asia and more specifically to China.
- Transportation of Soybeans and Products
  - Long haul transport of soybeans and soybean products, grains and grain products move from areas of surplus into deficit areas of the United States for domestic feeding and processing purposes, and to export position.
  - After years of losing market share to the PNW, the Center Gulf is maintaining its market share.
  - Unit or shuttle train elevators exceed 500 efficient, rapid operational locations across the Corn Belt. These facilities allow fast loading of unit or shuttle trains of 90 to 110 cars per train in less than 12 hours.



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- The relative movement of soybeans and grains by barge had shifted away from the upper Mississippi and Illinois River origins toward the lower Mississippi and lower Ohio Rivers. With the ethanol mandate maxing out, surplus corn supplies are increasing, which expands the exportable supply of corn in the upper Mississippi and Illinois River surplus regions. That being stated, the unreliability of the locks and the ability to load heavier on the lower Mississippi River is encouraging loading below St. Louis, MO.
- The fleet of covered barges has transitioned from older equipment with less carrying capacity and shallower draft to equipment that is 15% to 20% larger that has deeper hulls, which requires deeper draft capabilities when fully loaded. The ability to load heavier and avoid lock issues enables barge companies to charge 40 cents per bushel less on the lower Mississippi River as compared to locking areas of the navigation system.
- Export capacity has increased 30% in the PNW, 10% across the U.S. The PNW capacity accommodates the westerly expansion of crops and increased soybean and grain trade with Asia.
- Rail carloadings of soybeans will increase 20% to almost 240 thousand and barge loadings will increase 32% to over 21 thousand. The 26 states in this study currently represent 97% of the soybean carloadings in the U.S., while in 2022/23 it is expected they will represent 98%.
- For barge movements of soybeans, the 26 states represent 100% of the soybeans moving on the navigable waterways of the Mississippi River System.
- Key Transportation and Infrastructure Issues
  - The locks and dams on the inland navigation system have exceeded the design life of the structures and have not been fully and efficiently maintained, and many are not adequate to accommodate modern tow configurations.
  - Dredging navigation channels to project depths, that is, the specified navigable waterway targeted by the U.S. Army Corps of Engineers at key ports and navigation channels is not being efficiently funded for reliable service to maintain adequate navigational draft. This limits the volume of soybeans and grains that can be loaded on a vessel or barge, leading to higher freight costs.
  - The Panama Canal expansion effort to add a new set of locks to accommodate increased traffic and larger vessels to transit the isthmus between the Atlantic and Pacific Oceans is almost complete. The expansion project first started in 2007 and was targeted to be complete by October 2014. Through a series of delays with dredging, concrete and labor, the project is expected to be completed by April 2016. The expansion will allow vessels to be loaded to a 50 foot draft from the current draft of 39.5 feet, as well as longer and wider vessels to utilize the passage. This will allow dry bulk vessels loaded with grain to take on an additional 11,000 to 28,000 metric tons of cargo depending on the vessel class. Conceivably the heavier loadings to the deeper draft will lower the overall ocean freight rate transporting bulk grains and soybeans from the U.S. Center Gulf to Asia for vessels transiting the Panama Canal.
- South America Infrastructure Influence
  - Soybean production in Brazil is expected to exceed 129 million metric tons by 2023, up from 87 in 2013.



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- Exports of soybeans will expand commensurately with Brazil's exports to exceed 74 million metric tons in 2023 from 45 million in 2013.
- Transportation in Brazil is key to remain competitive
  - Heavily oriented toward truck movement over long-haul distances, however efforts are underway to shift increasingly to rail and waterway modes to mitigate costs.
  - Since 2005, Brazil's modal shares have been realigning with the more efficient modes of rail and barge gaining notable shares.
- Inland transportation expensive
  - The transportation cost to export position is expensive in South America, especially in Brazil where truck costs run upwards of U.S. \$104 per metric ton (or U.S. \$2.83 per bushel) during harvest on some routes. The movement of soybeans in Brazil is over long distances while in the United States the truck move is much shorter, to the next logistics option. In the United States, truck costs moving soybeans to the next market position are considerably lower, between \$10 and \$15 per metric ton.
    - The lower fuel costs are increasing the competitiveness of Brazil.
- Proposed soybean corridors
  - Several infrastructure projects have been proposed to accommodate the reliable and efficient movement of soybeans in Brazil. Many have yet to be realized or lack resources to be fully completed.
  - Based on information in Brazil, improvements to the infrastructure, including the addition of multi-modal options (e.g., truck-rail or truck-barge to export position), have been estimated by Informa Economics to reduce freight costs \$40 per metric ton or between 20% and 30% depending on the origin. Based on information compiled and taking into account wait times between transportation events and eventual vessel loading for export movement, the more optimistic Department of Agriculture estimated cost savings could exceed 50% or U.S. \$55 per metric ton to more than U.S. \$60 per metric ton.
    - Such potential improvements will bring Brazil nearly on par with the United States in terms of inland transport costs, which effectively bolsters its farm industry.
- For South America, and especially Brazil, projects have been discussed for many years with little fulfillment. Some portions of some proposed projects have been started, but due to poor construction and or the lack of on-going maintenance resources, the infrastructure quickly crumbles.

*"Farm to Market: A Soybean's Journey" can be accessed at [www.unitedsoybean.org](http://www.unitedsoybean.org) or [www.soytransportation.org](http://www.soytransportation.org)*

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