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The Shifting Nexus of Global Agriculture: A Summary of the 2013 Agricultural Symposium

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Record high farm profits have triggered a new wave of agricultural investments. Agriculture has traditionally responded to rising profits by expanding investments in farm productivity. Today, these expansions are strikingly global. In addition, as the transportation infrastructure in the U.S. ages, it is becoming clearer that global investments in infrastructure could also affect the competitive balance in agricultural markets. As competition in these markets intensifies, agricultural policies could be critical to the future of U.S. agriculture.

On July 16-17, 2013, approximately 200 agricultural finance and business leaders met at the Federal Reserve Bank of Kansas City's symposium, "The Shifting Nexus of Global Agriculture." The symposium explored how worldwide investments could redraw the landscape of agricultural production and the implications for competitiveness, trade, and farm prosperity. Participants concluded that the boom in U.S. agriculture is likely to eventually fade as other nations expand their agricultural sectors and become more competitive. Although the timing of the slowdown may be uncertain and the

structure may be unknown, agriculture certainly will be more global and will include new competitors.

Investing in Productivity and Expansion

Global investments in farm productivity enhancements and expansion could contribute to the shifting nexus in agriculture. Responding to strong demand in recent years, worldwide investments have led to a dramatic increase in the global supply of crops. Much of this increase in supply has occurred outside the United States and prospects of further external growth raise questions about the future for U.S. agriculture.

Burgeoning demand for agricultural products has been a key driver of higher prices and farm sector profitability in recent years. Underlying this surge in demand has been the rapid expansion of the Chinese economy and increases in U.S. ethanol production. Furthermore, world population is expected to continue growing to a peak of around 9 billion by 2050. A larger population is expected to require increasing quantities of food, particularly if incomes rise at the same time, generating a long-run increase in the demand for agricultural products.



Growth in global corn and soybean consumption has far outpaced that of other major crops. Patrick Westhoff, director of the Food and Agricultural Policy Research Institute at the University of Missouri, showed that per capita corn and soybean consumption has grown significantly since 1990 while wheat and rice consumption has been relatively flat. Since 1990, per capita corn consumption has increased by an average of 1.3 percent each year, primarily due to increases in feed use and ethanol production. Soybean consumption has expanded by an annual average of 2.3 percent due to increased use of soybean oil for food and industrial purposes, as well as increased use of soybean meal in livestock rations.

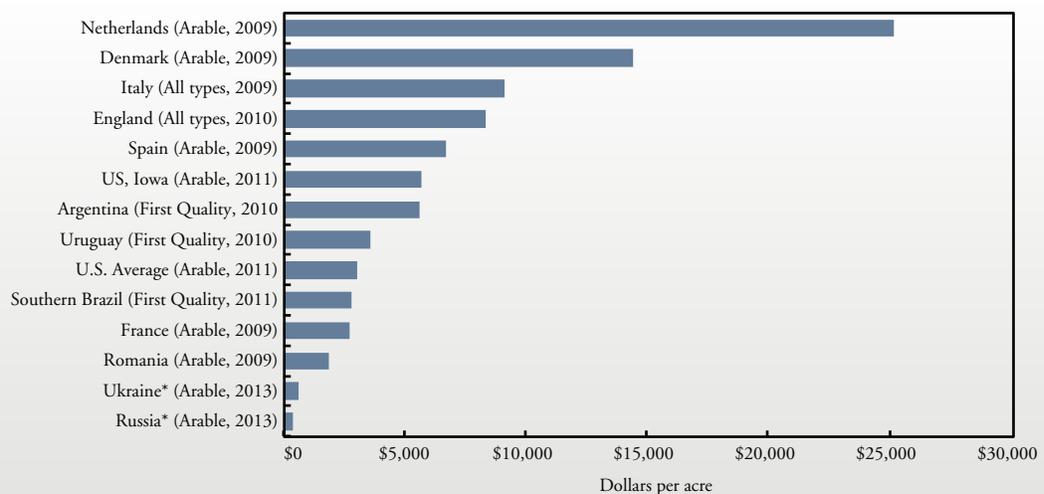
Sparked by growing demand, investors have recognized the profit potential of crop production on a global scale. William Mott, president and founder of Agland Investment Services Inc., pointed out that historically, there has been little institutional interest in farmland overseas, but this has

recently changed. Today, institutional money is following attractive returns in agriculture worldwide, particularly in Ukraine, Brazil, Australia, and even Africa. Joseph Bond, managing director of NCH Capital Inc., identified three primary factors underlying his firm's decision to invest in farming operations in the Black Sea region of Southeast Europe: a shortage of long-term capital, low production costs, and significant growth potential. Other symposium speakers offered similar perspectives about South America and Africa.

The recent run-up in U.S. farmland prices is also a major driver of institutional investors' interest in overseas farmland markets. According to the U.S. Department of

Agriculture, average farm real estate prices have surged more than 75 percent since 2009 in the Corn Belt (Illinois, Indiana, Iowa, Missouri, and Ohio). Prices have more than doubled in the Northern Plains (Kansas, Nebraska, South Dakota, and North Dakota). Conversely, Bond suggested farmland prices are substantially lower in Ukraine and Russia (Chart 1). Although investment opportunities may still exist in the U.S., Michael Swanson, senior vice president and consultant at Wells Fargo, cautioned that simply purchasing high-priced farmland should be carefully considered against alternatives, such as investing in land improvements that could lead to greater productivity at a lower cost.

Chart 1
Global Farmland Prices

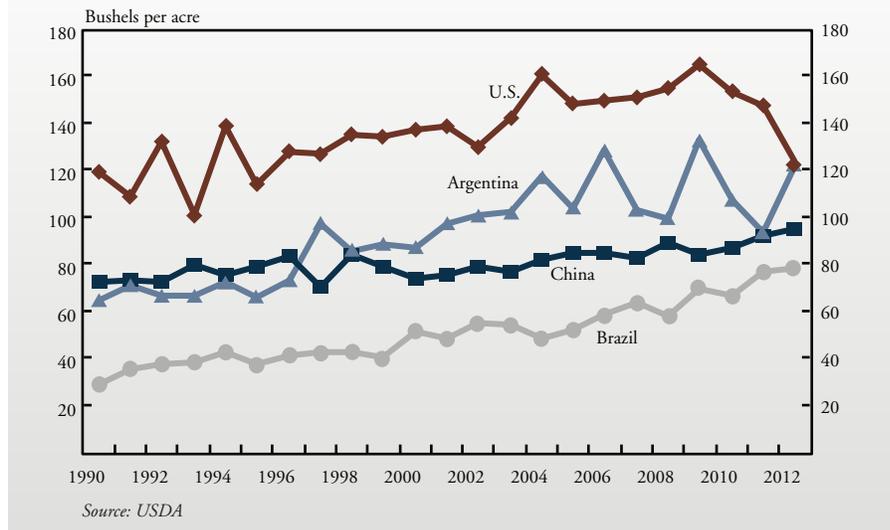


Sources: Credit Suisse, Savills, USDA, NCH. Latest available data shown for each market.
* Figures for Russia and Ukraine represent NCH estimates of average price during the Fund's investment period, which in the case of Ukraine is subject to future lifting of the agricultural land sale moratorium.



Investments in global crop production have boosted productivity and harvested acreage. Global corn yields have increased an average of 1.4 percent annually since 1990 and wheat, soybean, and rice yields have improved by approximately 0.9 percent per year. In Brazil, corn yields have increased an average of more than 7 percent annually (Chart 2). In addition, the number of acres harvested globally has jumped by 193 million from 2002 to 2012, an increase that exceeds combined U.S. corn and soybean acreage. Westhoff noted that India, Brazil, and China have accounted for the vast majority of the expansion and more than 80 percent has been for corn and soybeans. In some areas, double-cropping, and even triple-cropping

Chart 2
Corn Yields



in India, has contributed to the surge. Ray Wyse, senior director of trading and research at Gavilon Group LLC, noted that if genetically modified organism (GMO) technology is adopted globally, productivity could be dramatically improved, especially since the majority of GMO penetration is currently in the Americas.

In summary, Westhoff said the future profitability of U.S. agriculture will depend on the balance of local and global productivity gains relative to the strength of global demand. Westhoff showed that U.S. spending on agricultural R&D has slowed considerably, from 3.8 percent annually from 1950 to 1970, to 1.2 percent annually from 1990 to 2009. However, there is some potential

for private companies, which now account for the majority of R&D spending in the U.S., to generate further productivity gains in the U.S. But if the trend of declining R&D spending leads to slower productivity growth in the U.S. relative to other parts of the world, the prospects of future income growth in the U.S. could dim considerably.

Investing in Infrastructure

Investment in infrastructure could alter the relative competitiveness among nations in a 21st century agricultural production system. Historically, infrastructure has been an essential driver of competitiveness and profitability in agricultural markets due to the geographic mismatch between global population



Ray Wyse, senior director of trading and research at Gavilon Group LLC, speaks to the Symposium attendees.



centers and agricultural production. Recently, swelling trade flows have strained agriculture’s supply chain. Although the U.S. has an extensive infrastructure network, a significant share of agriculture’s transportation system is ageing. While much of the infrastructure overseas is still underdeveloped, investments are being planned or are under way.

Over the years, the U.S. transportation infrastructure has quietly sustained a thriving agricultural sector. This infrastructure, including ports, railroads, waterways, and highways, has moved a massive amount of commodities within the U.S., and as exports to overseas destinations. According to Ken Eriksen, senior vice president at Informa Economics, agricultural commodity transportation also accounts for about 1.5 million jobs and \$352 billion in U.S. output.

The overall size of the U.S. transportation network is impressive. According to Paul Hammes, vice president and general manager of agricultural products at Union Pacific, this network consists of about 138,000 miles of railroad, 12,000 miles of waterways, and 165,000 miles of major highways. Measured in ton-miles, Hammes indicated that rail accounts for 22 percent, waterways 44 percent, and highways 28 percent of agricultural transportation.

Infrastructure has provided U.S. agriculture with a competitive edge

by keeping the cost of production low relative to other nations. Timothy Gallagher, executive vice president of Bunge North America, illustrated this cost difference between the U.S. and Brazil. Transporting one ton of grain by rail from Mato Grosso (a prominent agricultural state in Brazil) to Santos (a prominent port location in Brazil) can cost up to \$100. Transporting a ton of grain from central North Dakota to Portland, Oregon, costs about \$53 per ton. Even after accounting for differences in distance, U.S. rail transportation is still about 30 percent cheaper.

The U.S. inland waterway system, however, needs substantial updates to maintain its competitiveness. According to Hammes, more than half of the locks on U.S. inland waterways are more than 50 years

old. Construction expense to improve the Olmsted Lock and Dam on the Ohio River, authorized by Congress in 1988, has recently surpassed \$2 billion. As Eriksen noted, this is for just one lock, and it is not expected to be completed until 2020. Other lock and dam projects, in addition to channel dredging, have also presented considerable costs (Table 1). Moreover, some lock construction projects are not scheduled to be completed until 2080 or later. It is also noteworthy that while rail is primarily a privately funded industry, U.S. inland waterway system projects receive public funding from Congress. Facing a steep government budget deficit, it may be a challenge to fund future inland waterway projects.

Meanwhile, developing countries are investing heavily in infrastructure improvements. Chris Erickson,

Table 1
Key Infrastructure Issues

Infrastructure	Project Description	Cumulative Outlays (\$ millions)
Inland Navigation Lock and Dams	Mississippi River Lock 20: 1,200 foot Lock Addition + Lock & Dam Rehabilitation	\$311.1
	Mississippi River Lock 25: 1,200 foot Lock Addition + Scour Repairs & Rehabilitation	\$429.9
	Ohio River Olmsted Lock & Dam Construction and Lock 52 and Lock 53 Removal	\$2,044.0
	Ohio River Markland Lock Major Rehabilitation	\$35.8
	Illinois River LaGrange Lock Addition	\$320.9
	Illinois River LaGrange Lock Rehabilitation	\$78.8
Channel Dredging by Army Corps of Engineers District	Galveston	\$1,230.8
	Mobile	\$677.8
	New Orleans	\$2,322.5
	Portland	\$288.0

Source: Informa Economics



managing director at HighQuest Partners, commented that the Brazilian government has a goal to increase grain storage capacity by 65 million tons in the next five years. Eriksen echoed this development, noting that China, South America, and Russia are also actively pursuing port projects. Christopher Delgado, strategy and policy adviser at the World Bank, pointed out that China is investing massively in moving surplus water in the south to areas of deficit in the north where most crops are grown.

Throughout the symposium, however, there was recognition that the current infrastructure overseas is still underdeveloped. For example, Eriksen noted that Brazil currently consumes about twice as much fuel and emits four times as much carbon dioxide to transport 20 percent less soybeans to market when compared with the U.S. In addition, Erickson noted that postharvest losses in Mato Grosso can be as high as 10 percent.

The Policy Framework

Although investments typically respond to market conditions, the policy environment sets the stage. Over the past century, U.S. trade, energy, and farm policy have shaped the agricultural sector and farm profitability. With competition in global agricultural markets intensifying, these key policy areas could affect the competitiveness and

future growth potential of U.S. agriculture.

Trade Policy

Agricultural trade is a key component of farm sector profitability. In the U.S., exports account for approximately 31 percent of total gross farm receipts (Aldonas).

During the last three years, real U.S. agricultural exports have averaged \$114 billion annually, compared with \$71.2 billion during the previous 10 years. Record exports, in turn, have helped boost farm income to near-record highs each of the past three years.

Increased competition, however, has gradually been changing the nature of agricultural trade. Grant Aldonas, principal managing director of Split Rock International, described how globalization has led to a rise in contract farming and vertical integration of supply chains. Increasing numbers of multinational retailers have been organizing supply chains for their products by contracting with individual suppliers. These suppliers must be capable of adapting to the standards of the retailer, which may also differ from individual government standards. Aldonas noted that trade is no longer simply about price; it is increasingly about the capacity of firms to integrate themselves into the supply chain.

The shift toward vertical



integration has also changed the type of agricultural products being traded. Today, nearly 60 percent of U.S. agricultural trade involves intermediate, or high-value, products (U.S. Department of Agriculture). With greater vertical integration, Aldonas recommended that policy should focus on liberalizing trade along the entire value chain to improve producers' access to end-user markets, which are increasingly defined as multinational retail firms. Moreover, Aldonas noted that potential bilateral agreements, such as the Trans-Pacific Partnership and the Transatlantic Trade and Investment Partnership, could present a more promising attempt to liberalize trade between the U.S. and key trading partners with multilateral agreements proving more difficult to achieve.

Energy Policy

With respect to energy policy, the federal Renewable Fuel Standard (RFS) is perhaps the most relevant for agricultural commodities. At its core, the RFS mandates an annual minimum volume of renewable fuel in the U.S. be



blended into transportation fuel. The majority of this mandate is satisfied by blending ethanol derived from corn starch with gasoline.

Recently, the RFS has been extremely controversial. Some critics say the RFS has created new demand for corn, causing a surge in corn prices leading to higher prices for food and animal feed. Following the nationwide drought in 2012, which cut corn production and pushed prices higher, livestock producers and consumer advocacy groups issued calls to reduce or eliminate the ethanol mandates established in the RFS.

Despite the controversy, Bruce Babcock, professor of economics at Iowa State University, argued that repealing the RFS would likely have a limited effect on corn prices. According to Babcock, oil refineries have a financial incentive to use ethanol independent of the RFS. Refineries can blend low-cost 84-octane gasoline with higher-octane ethanol to achieve minimum octane requirements. Babcock noted that relative market prices of gasoline and ethanol are driving refineries' use of ethanol.

Babcock described potential scenarios, however, in which the RFS may have a larger effect on corn prices. If corn prices are low, any reduction in the RFS would have little effect because ethanol production becomes more profitable when corn prices are low. Babcock noted that if corn prices

fall toward \$4 per bushel, ethanol production may become profitable enough to warrant greater use of higher blends or intensify exports. If, however, market conditions lead to higher corn prices, the RFS would have a more significant effect by mandating ethanol production even if doing so would not otherwise have been profitable.

Farm Policy

U.S. farm policy, also a contentious issue, has been undergoing a steady transition. Historically, Farm Bills have provided agricultural producers a safety net through a combination of supply controls, price supports, or direct transfers. The recent prosperity of U.S. agriculture, however, has led to debates about the necessity of a safety net. Although passage of a long-term Farm Bill has been unsuccessful thus far, there appears to be growing momentum for support focused more on risk management than other traditional means of support.

Price support subsidies have been largely irrelevant during the recent boom in U.S. agriculture. Historically, price supports have provided farmers a safety net, with payments made when prices for various commodities fall below a defined target price. This target price in recent years, however, has been substantially below market prices. Joe Outlaw, professor of

economics at Texas A&M University, noted that these policies have recently resulted in annual payments of only about \$1 billion.

Direct payments have provided a slightly larger boost to farm incomes. Totaling about \$5 billion annually, direct payments are made to farmers regardless of current production plans; they are made based on historical production. However, there currently appears to be very little political support for direct payments, given the recent extraordinary profitability of agricultural production. It is widely believed that a future long-term Farm Bill would not include direct payments.

Meanwhile, crop insurance has expanded significantly. Most farmers throughout the Corn Belt purchase crop insurance to protect investments in production. Following the 2012 drought, crop insurance paid farmers a record of more than \$17 billion, providing some compensation for extremely poor yields.

There is, however, disagreement on the structure of a future safety net for the farm sector. Babcock argued that farmers are responding to market conditions, claiming that price supports based on a defined target could distort markets and lead to disruptions. Outlaw noted, however, that price supports are designed to protect farmers during the bad times and that crop insurance might not be



a perfect substitute.

Conclusion

The current wave of farm and infrastructure investments could transform the competitive balance in global agricultural markets. In addition to investments in productivity and expansion, investments in infrastructure could alter the competitiveness of U.S. agriculture and influence farm sector profitability. The global pace of these investments has the potential to accelerate the trend of

reduced U.S. dominance in export markets. Agricultural policies, both domestically and internationally, will also be important components to this competitiveness in the global marketplace.

The future for agriculture still remains bright, despite significant uncertainty about the underlying structure. As Michael Boehlje, professor of agricultural economics at Purdue University noted, there is uncertainty in supply and demand, policy, regulations, and even climate change. For the future to remain

bright for agricultural producers and businesses they will need to plan for this uncertainty and recognize that markets have become more global, and more competitive. Then they will need to adapt to this structure as it evolves, whether it evolves in Kansas, Kazakhstan, or even Congo.

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