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Producer Alliances and Value-Added Business Ventures

Joan Fulton, Associate Professor; and Kevin Andreson, Elizabeth Beetschen, Brian Jones, Michelle Rice, Erica Rosa, Shylea Wingard all current and former Ag. Econ. Graduate Students

The food industry is undergoing significant structural changes, as the industrialization of agriculture continues and there is increased consolidation and concentration of agribusiness firms. In a drive to increase efficiencies, businesses in the agrifood sector are developing closer connections with firms at adjacent stages along the supply chain to relay information and take redundant costs out of the system. In addition, a drive to achieve economies of scale has resulted in fewer and larger agribusinesses.

These changes have resulted in farmers facing a more competitive business environment and examining ways to improve the returns from their farm operations. One response by farmers is to form producer alliances, often structured as new generation cooperatives. In some cases, the driving force behind the formation of the producer alliance is farmers' desire to move along the value chain and capture profits from other stages.

In other situations, producers find themselves without a marketing or processing plant when agribusiness firms consolidate and close local facilities. Iowa turkey farmers are one example. When Oscar Mayer was closing a processing plant and feed mill, the producers formed Iowa Turkey Growers Cooperative and purchased



the facility (Perkins). These producer alliances have the common objectives of producers working together to achieve/reach common business goals and capture additional value from the commodities they produce. The forms that an alliance can take include: new generation cooperative (NGC), limited liability company (LLC), partnership, corporation, buying or marketing group, joint venture, strategic alliance, as well as unique ownership arrangements with a regional cooperative.

The success of producer alliances often depends upon the answers to three important questions:

1. Is the alliance a good business investment?
2. Will the organizational structure work?
3. Are there other goals for the alliance, and do they compete with or complement the goal of business profitability?

In the following sections of this article, each of these questions is explained in further detail.

Is the Alliance a Good Business Investment?

There are two important questions to consider when evaluating whether an opportunity represents a good business investment or not. First,

what are returns and risks associated with the business venture? Second, what is the potential for the business venture from the perspective of long-term strategic positioning?

Returns and Risks

A series of M.S. theses at Purdue University evaluated the returns and risks associated with producer investment in value-added business activities (Andreson, Jones, Rosa, Van Fleet). Three sub-sectors of agriculture were considered in depth: pork, corn, and beef. In each case, a stochastic simulation model was developed and alternative strategic business decisions for producers were identified and evaluated. Stochastic dominance analysis was used to determine the alternatives that were preferred by risk-averse producers.

Jones evaluated opportunities for hog producers investing in hog packing operations. A stochastic simulation model was developed first and then used to analyze alternative

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business strategies, including investing all equity in the hog farm and investing different percentages of equity in the hog farm, hog packing, and stocks (through the S&P 500) and bonds (through T-bills). Three different sizes of farrow-to-finish hog operations were considered: 300, 600, and 1200 sows.

Andreson examined opportunities for corn producers, including investment in both wet and dry corn milling. A stochastic simulation model was developed to analyze the impact of investment in a dry corn milling (ethanol) operation. An important aspect of this research was the consideration of different government programs for corn producers as well as for ethanol operations.

Van Fleet and Rosa evaluated opportunities for cow-calf producers. The scenarios evaluated reflect decisions that cow-calf producers are currently facing. These include: retaining ownership and custom feeding in a feedlot, incorporation of improved genetics in the beef herd, different pricing grids in a coordinated marketing system, spring versus fall calving, and diversification

into the stock market. The different pricing grids reflect situations that producers are currently considering with cooperative marketing programs that are being established by beef producers, while the spring versus fall calving is an important consideration for these groups as they need a steady supply of beef year round to meet consumer demand.

Three important conclusions can be drawn from the results of the research involving the stochastic simulation analysis and the question of returns and risk:

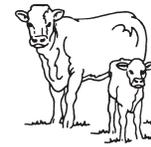
- (1) producers will benefit from a balanced portfolio,
- (2) producers will benefit from leveraging into more profitable areas, and
- (3) government subsidies and programs influence investor behavior.

Producers will benefit from diversifying. Diversification into business activities other than the farm or ranch may result in both an increase in expected return and a decrease in the variability of returns (or a decrease in risk) when compared to a 100% investment in the farm or ranch.

It is important that this diversification result in a balanced portfolio. In particular, diversification into a value-added business related to a farmer's commodity can be a good investment if there is a negative correlation between farm income and processor income. When a product is characterized by volatile commodity prices and relatively stable wholesale/retail prices, there tends to be a high degree of negative correlation between farm income and processor income. This phenomenon exists in the pork industry, and Jones' research revealed that there is the potential for hog producers to diversify beyond the farm into processing and increase expected return and decrease risk. Of course, achieving this potential depends upon finding an appropriate business organizational structure for successful implementation. In

particular, in the case of the processing of livestock, scale economies may make it infeasible for a producer alliance to directly own the entire processing plant because they may not be able to support a large enough operation to achieve economic efficiency.

Producers will benefit from leveraging into more profitable areas. Some sub-sectors of agriculture do not yield as high a rate of return as outside invest-



ments. In these instances, it is often argued that individuals place value on the lifestyle of farming or ranching and thus are willing to accept the lower rate of return on their equity. Historical data on the profitability of cow-calf operations provide a picture of a sector of agriculture that often earns a lower rate of return than other investments. In these situations, with low rates of return, the diversification scenarios are attractive because the other investments yield higher returns.

Government subsidies and programs influence investor behavior. This conclusion is highlighted in Andreson's study of corn producers investing in ethanol production. In particular, the business scenarios involving investment in an ethanol project were preferred only when subsidies for ethanol production were in place. It is therefore vital for producers to evaluate all relevant government programs as part of the evaluation of a new business venture.

Long-Term Strategic Positioning

A strategic business analysis that carefully and systematically identifies all assumptions and evaluates the potential actions and reactions of competitors is an important step in the evaluation of investment alternatives. A typical framework for this analysis is to examine the five competitive forces set out by Porter: barriers to entry, rivalry among competitors, substitute products, power of buyers, and power of suppliers. One particularly interesting result in Andreson's analysis of the corn milling industries follows from the analysis of the

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Editor

Gerald A. Harrison
E-mail: harrisog@purdue.edu
Phone: 765-494-4216 or
toll free 1-888-398-4636

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“rivalry among competitors” force. In wet corn milling, industry concentration is very high, with the top three firms having almost 80% market share in the corn sweetener market and the top three firms having over 86% market share in the lysine industry. From the perspective of competitive rivalry, the wet corn milling industry is not a good prospect for any firm to enter and certainly not one for farmer-owned cooperatives or other producer alliances. The advantage of hindsight from a real-world example confirms this. Guebert reports an interesting 1994 meeting where Dwayne Andres, then CEO of ADM, urged Joe Famalette, then CEO of American Crystal Sugar, not to build the ProGold high fructose sugar plant. American Crystal Sugar did proceed with the ProGold plant, but it experienced financial difficulties and is now being operated by Cargill.

Will the Organizational Structure Work?

As noted above, producer alliances can be structured under a variety of different business forms, including: new generation cooperative, limited liability company, partnership, corporation, buying or marketing group, joint venture, strategic alliance, as well as unique ownership arrangement with a regional cooperative. There are advantages and disadvantages associated with each of these different business structures, and those advantages and disadvantages often depend upon specific business conditions. It is very important for investors in a producer alliance to get legal and accounting advice and then evaluate their specific business to determine the most appropriate organizational structure.

There is a second set of issues associated with establishing an organizational structure that will work for a producer alliance. Will the members cooperate with each other and work towards a common goal, or will they take on a competitive nature, resulting in the alliance falling apart? The conclusions from Fulton’s research on joint ventures

and strategic alliances are useful here (Fulton et al.).

First, producer alliances are more likely to be successful when the benefits from working together in the alliance are larger. With significant benefits, members are more likely to overcome the challenges associated with working together in an alliance to have a successful business. Next, producer alliances are more likely to be successful when the membership is relatively homogenous and financially stable. It is easier to organize an alliance around common goals the more homogenous the group of individuals. In addition, an alliance made up of producers who are financially stable is more likely to be successful because the ability to withstand difficult financial times will be greater. The stability, and therefore success, of a producer alliance also depends upon there being a mechanism for penalizing any members who defect because it is inevitable that members will attempt to defect or renege on their agreements with the alliance from time to time. Finally, producer alliances involve significant interaction among the members. These businesses are more likely to be stable and successful when the members trust each other, are committed to the alliance, and communicate with each other.

Are there Other Goals for the Alliance, and Do They Compete with or Complement the Goal of Business Profitability?

It is important to identify and evaluate all of the goals that members, or potential members, of a value-added business or producer alliance have for the business. Examples of goals that members may have include: generating new markets for the commodities they produce, increasing member income, generating new jobs in the rural area, and enhancing rural development in the area. It is certainly the case that some value-added producer alliances will generate additional economic activity in the rural area, generate new jobs, enhance the local tax base, and strengthen local demand for retail goods and services. These benefits are described for a series

of cases involving a new generation cooperative in each of Iowa, Missouri, North Dakota, and South Dakota in a USDA report (Rural Business Cooperative Service). However, lenders and investors will judge the success of the value-added business on the profitability of the business. If a producer alliance becomes too focused on some of the secondary objectives, it may not be able to achieve a level of profitability that is needed to sustain the business.

It is therefore important for potential investors in a producer alliance to first explicitly identify all of the goals for the value-added business. Then they can determine whether these goals are complementary or competing. Finally, they can proceed with the project focusing on the goals that are most important for the project.

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Soybean Production: Competitive Positions of the United States, Brazil, and Argentina

Alexandria I. Huerta, Graduate Research Assistant and Marshall A. Martin, Associate Director of Agricultural Research Programs, Purdue University

Soybean production in Argentina and Brazil combined is expected for the first time, this year, to surpass that of the United States (USDA, 2002). Furthermore, the U.S. share of world soybean exports has declined. In recent years, U.S. farmers have been facing some of the lowest soybean prices in decades, due in part to bumper crops, coupled with a weaker world demand. Also, the loan deficiency payments (LDP) incentives associated with the 1996 Farm Bill encouraged American farmers to increase soybean acreage.

Both Brazil and Argentina have not yet fully developed their agricultural resources. Infrastructure improvements, particularly transportation, combined with a more stable political and economic environment, could lead to further gains in South

American soybean production and market share.

Can U.S. soybean producers remain competitive?

Geographical Comparisons

Three countries (United States, Brazil, and Argentina) produce 80% of the world's soybeans. The United States and Argentina share a temperate climate, while the climate in Brazil is more tropical. Because of their location in the Southern Hemisphere, Brazil and Argentina have a crop production season opposite to that of the U.S. with approximately a six-month difference in the time of harvest. This provides some market advantages to Brazilian and Argentine farmers since they harvest their soybeans between February and April when historically soybean prices have been higher. Growing seasons for these three countries also vary in their length. The United States has a shorter growing season (May through October) than its competitors. Argentina's growing season may extend from November through May. In Brazil's frost-free tropics, three crops might be produced each year.

In the United States, the deep rich soils of the Corn Belt have made that region the world's most productive soybean-growing area. Argentina's soybean production region, known as the "Pampas", has soils that are equally fertile (See figure 1).

In Brazil, soybean production historically was concentrated in the south, but in recent years has expanded into the "Cerrado", which is a savannah-like flatland in the central west. The Cerrado soils, which are high in aluminum, highly acidic, and deficient in phosphorus and nitrogen, are naturally less fertile. But, public and private researchers in Brazil have adapted soybean varieties to these soil conditions. The addition of lime and

phosphorus minimizes aluminum toxicity. Brazil has large supplies of lime. The soils in the Cerrado are very fragile, and high rainfall levels create significant soil erosion problems. Producers in Brazil have adopted no-till production practices and terracing to minimize erosion.

Between 1991 and 2001, U.S. soybean production increased about 50% from 52.9 to 79.1 million metric tons (million ts). In 1991, the United States exported 23.6 million ts, 39% world market share. In 2001, U.S. exports had increased to 35.1 million ts, but the export share had fallen to 32% (Schnepf, et. al, 2001).

Brazilian soybean production more than doubled over the past decade, from 18.5 million ts in 1991 to 41.5 million ts in 2001 (Schnepf, et. al, 2001). Brazilian production has expanded faster than domestic consumption, resulting in increased exports. Argentina too has experienced an increase in soybean production. In 1991, Argentine soybean production was 11.1 million ts, and by 2001 had also more than doubled to 27 million ts (Schnepf, et. al, 2001).

Soybean yields are comparable among the three producers; in the U.S. Heartland Region soybeans average 45.0 bushels per acre compared to U.S. average yields of 41.0 bushels per acre (Table 1). Soybean yields in Brazil and Argentina are 44.5 and 40.0 bushels per acre, respectively.

Total U.S. agricultural land area is 418.3 million hectares (one hectare equals 2.47 acres), with 239.3 million hectares in permanent pasture, 177 million hectares in cropland, and 2.1 million hectares in permanent crops. Soybean expansion in the United States primarily must come from a reduction in the area planted to another crop (Table 2). Brazil and Argentina combined have approximately the same amount of agricultural land as the United States: 419.4

Figure 1. Soybean Production Regions for Latin America



million hectares. The difference lies in the potential for expansion. For example, Brazil currently has 50% as much land under cultivation as the United States, but it has the potential to increase crop area by 56% more than the United States has under production (Leibold, et al.). Both Argentina and Brazil have vast expanses of land in permanent pasture which could be converted to soybean production with appropriate market incentives and technologies.

Infrastructure

The United States possesses a well developed marketing structure. U.S. soybean producers are able to move their product to international markets more efficiently and at a cheaper cost. Paved highways are more prevalent in the United States than in Argentina and Brazil, where only 10 percent and 30 percent, respectively, of the highways are paved. The availability of rail lines and a common single gauge allows for larger load densities in the United States that further reduce transportation costs for commodities.

In contrast, Argentina's and Brazil's waterways and overland transportation infrastructure are underdeveloped and generally sub-standard. The governments in these countries have not invested much capital or implemented policies to modernize and improve existing transportation infrastructure. Inefficient barge and railroad transportation systems have led to a dependence on slower, and more expensive, overland trucking. However, recent initiatives to deregulate and privatize railways

* *Macroeconomic policies affect exchange rates, investment incentives, energy costs, etc.*

** *Sector specific policies include credit subsidies and import and export taxes.*

*** *Supporting institutions include regulatory agencies, credit, and news and information services.*

**** *This reflects land that has not yet been cleared or prepared for planting.*

and ports in both countries could lead to infrastructure improvements.

Another major problem in Argentina and Brazil is the underdeveloped on- and off-farm storage. Increasing storage capacity would reduce the need for harvest-time sales, and shipment, which tends to depress harvest-time prices and create congestion at terminal elevators and port facilities.

Competitive Positions

Competitiveness in international commodity markets reflects the ability to deliver a product at the lowest cost. Competitiveness is influenced by many factors: relative resource endowments, agro-climate conditions, macroeconomic policies*, agricultural policies**, infrastructure and supporting institutions*** (Schnepf et. al, 2001). The combination of farm-level production, transportation, and marketing costs will determine a farmer's competitiveness on the international stage.

As noted previously, there are clear differences in agro-climate conditions among the three soybean production regions. Soil types and climate conditions dictate yields and when the product reaches the market. However, there are other equally important differences: types and availability of technology, land costs, labor costs, access to capital (cost of capital), transportation costs and marketing costs.

A major production cost difference is the cost of land. The relatively high soybean production costs in the United States are partially attributed to higher fixed costs, especially land. A recent study by the USDA's Economic Research Service (ERS) shows estimated land rental rates for Brazil at \$6 per acre (in Mato Grosso)

Table 1. Soybean Yields, Major Production Regions

Region	Soybean Yields (Bushel/acre)
United States ¹	41.0
Heartland ¹	45.0
Brazil ²	44.5
Argentina ³	40.0

Source:

1 *USDA National Agricultural Statistics Service.*

2 *Companhia Nacional de Abastecimento.*

3 *Consorcio Regional de Experimentacion Agricola*

to \$14 per acre (in Parana). Average per acre rental rates in the United States and Argentina were much higher: \$88 and \$63, respectively. U.S. data represent the Heartland region in the Midwestern United States, while those for Argentina represent prime land in northern Buenos Aires Province. The lower land rental rates in Brazil are a reflection of the abundance of land available in the Cerrado for agricultural development. High yielding land in Mato Grosso can be purchased for as low as \$200**** per acre compared to the \$2000 or more per acre costs in the U.S. Corn Belt (Schnepf et. al, 2001).

In terms of competitive advantages from infrastructure, the United States still holds the advantage. U.S. transportation systems are superior to those in South America. The U.S. infrastructure is better for moving soybeans from the field to a domestic port, and on to a foreign port. Since the mid-1980's, the average U.S. producer to free-on-board (f.o.b.) port price spread has shown little variability at about \$16 to \$18 per ton. Lower transportation and marketing costs for U.S. soybean producers reflect in

Table 2. U.S. Crop Acreage

Crop	U.S. Crop Acreage Per Marketing Year		
	1997/1998 Crop Year --millions of acres--	2000/2001 Crop Year --millions of acres--	Change --millions of acres--
Corn	97.5	95.8	(1.7)
Wheat	70.4	59.6	(10.8)
Soybeans	70.0	74.1	4.0

Source: *Agricultural Outlook USDA/ERS April 2002*

part the efficient barge transportation system. With the barge system, soybeans can travel long distances at relatively low costs. However, on the Mississippi River, barges loaded with Heartland grown soybeans often wait in line for hours to pass through a series of 80-year-old locks that lower the barges down to sea level at New Orleans. From there the soybeans are loaded onto freighters. Farmers have been lobbying for upgrades in the lock system, a project that will cost more than \$1 billion (Rich, 2001). This long awaited upgrade has been slowed by doubts raised about cost-benefit analysis and environmental impact studies by the Army Corps of Engineers. Such transportation improvements will be essential if U.S. soybean producers are to remain competitive in the international market.

“It is not likely that U.S. soybean producers will be able to regain the dominant export position they once enjoyed.”

This transportation advantage is under constant threat from U.S. competitors. There have been some reductions in internal transportation costs in Argentina and Brazil, which has boosted their soybean export competitiveness. However, despite construction of some new rail lines and ports, roadways are still the primary means of moving commodities throughout Brazil. In the last few years, the Brazilian government has leased roads for private maintenance. To fund road maintenance, private companies charge high tolls, thereby increasing the transportation costs for Brazilian soybean producers.

The trucking distance in Brazil is greater than that faced by U.S. farmers. Approximately 80% of Brazil's soybeans are trucked to market (McVey, et. al, 2000). Unlike U.S. production regions, soybean production in Brazil is not conveniently located near a main source of water navigation, thus its reliance on overland travel. The quality of these

roads is poor and a substantial portion of Brazil's main highways that serve much of the soybean producing regions are dirt surfaced. On average, Brazilian soybeans travel 900 miles by truck before being transferred to railroad cars or waterways (Spangler and Wilson, 2002). These soybeans must then travel approximately an additional 900 miles to reach an east coast seaport, as is the case for soybeans produced in Mato Grosso. The producer f.o.b. price spread is estimated at \$47 per ton.

The Brazilian government has been promising upgrades in paved roads and navigable waterways, but chronic economic instability and large budget deficits have held up this work. Private companies are stepping in and partially filling the gap. Using loans from a government

development bank, private companies are building new railroads. One example of private initiative is Blairo Maggi, one of Brazil's largest soybean producers. When promises of infrastructure improvements from the government went unfulfilled, Maggi provided \$20 million plus \$40 million from the state of Amazonas to build a port on the Amazon-feeding Madeira River. Once the port was opened, soy shipments on the Madeira River quadrupled, and Maggi's shipping costs fell 20 percent (Rich, 2001).

Another competitive advantage for Brazilian soybean producers comes from the government breaking up the long-standing petroleum monopoly. New laws have allowed new petroleum companies access to the country, resulting in increased imports. In January 2002, Brazilians saw a 20% drop in fuel prices, which translates into decreased fuel costs for soybean producers.

One area that has concerned government and soybean producers

alike is the state of navigation on Brazilian rivers. Producers want the government to invest in the development of a system of locks and dams to raise water levels on the rivers, especially the Parana-Paraguay River system. These projects would keep the waters deep enough to float barges capable of carrying larger soybean loads to ports. Such a project would require huge investments and has significant environmental implications. Draining this watershed could have an adverse impact on wildlife.

Argentina's soybean producers also face the problem of shallow rivers. The Parana River which connects the Port of Rosario, one of the largest in Argentina, to the Atlantic Ocean requires dredging to maintain a deeper channel. Without dredging, barges cannot carry big shipments. This results in higher transportation costs for Argentine soybean producers.

The United States has a fairly efficient water-based system of transportation using barges. Trucking distances in the United States are shorter, especially since the majority of soybean production occurs in the regions surrounding the Ohio, Illinois, Mississippi, and Missouri Rivers. U.S. soybeans are hauled to the nearest river, and loaded onto barges. The majority of the soybeans exported flow down the Mississippi River.

There is the potential for substantial gains in South America, but these gains will require overcoming economic, political, and environmental hurdles and issues. The current gap in production costs will narrow with improvements in South America, but the United States can maintain a comparative advantage in transportation costs, with improvements in the existing U.S. locks and dams.

Cost of Production: Analysis

Different countries and institutions within a country use different concepts, definitions, terminologies, and measurement methods to estimate production costs. This study summarizes production cost data from several sources. Data for U.S.

soybean production costs are from USDA-ERS. Data for Argentina and Brazil were gathered from various government agency websites, e-mail contacts with key industry personnel in South America, individual company websites, and the USDA-ERS.

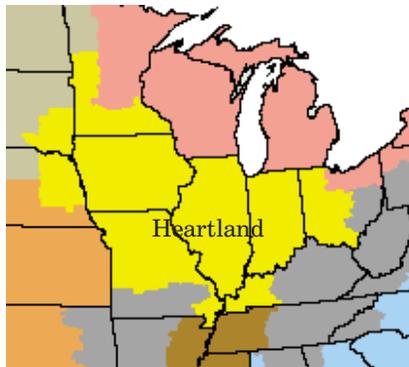
Methods used to calculate costs vary from country to country, with certain variables included in the costs by one country, but omitted by another. Another difficulty lies in the adoption of different production practices. These would include single versus double cropping, conventional till versus no-till, transgenic versus conventional varieties, etc.

Exchange rates further complicate cost estimates. Fluctuations in the Brazilian currency make accurate dollar-valued cost estimates somewhat difficult. Between 1995 and 1999, apparent declines in Brazilian soybean production costs were largely a reflection of a weakening Brazilian currency (the Real). After the Real was allowed to free float in international exchange markets, Brazilian total production costs actually increased in local currency terms (ERS, 2001). If exchange rates adjustments are ignored and nothing changed in terms of the Real, devaluation alone makes it appear as if Brazilian producers possess a cost advantage in soybean production. However, the devaluation increased the cost of imported goods—machinery, petroleum, and agro-chemicals. Non-tradable goods, which are minimally impacted by currency devaluation, include land and labor, two key production costs. Currency devaluation drives up the cost of imported inputs, while making soybean exports more competitive in international markets.

Comparisons of costs of production are complicated by interest rates and inflation. For example, in the recent past, Brazilian inflation has exceeded 30% per month (AAEA, 1998), and from 1997 to 2002 the Real depreciated by 132%. In 1997, the Real was 1.0 to \$1.00, and by 2002 it had devalued to 2.32 to \$1.00. Increased government spending, due to domestic support programs such as subsidies, increases inflation. This

increase in inflation normally leads to currency devaluation.

In the last 6 years, soybean producers in Argentina have adopted Round-Up Ready soybeans in about 95% of the area. This has resulted in higher yields and lower overall production costs allowing Argentine producers to be more competitive in international markets. Weak patent protection resulted in Argentine farmers not paying a technology fee for soybean seed. Cheaper glyphosate became available when Monsanto's Round-Up product patent expired in Argentina.



In the 1990s, the Argentine government privatized the economy to drive out excess labor and increase labor productivity. The result was an increase in unemployment to almost 20%. Such structural readjustment takes a long time to take effect, so social unrest can develop, and investors can lose confidence in the economy. After nearly a decade of parity of the Argentine Peso to the U.S. dollar, the exchange rate fell from 1 to 1 to 3.22 to 1 in a period of three months (January to March 2002). While this made Argentine exports more competitive, import prices increased dramatically. The cost of most inputs, including capital and imported inputs, increased by as much as 100% (USDA/ERS, 2002). That has resulted in higher production costs for soybean farmers who use imported inputs such as agro-chemicals and machinery. Agricultural credit is essentially non-existent. Argentina currently finds itself in the midst of a serious economic crisis.

“Underlying the current economic crisis in Argentina are three interrelated factors: the policy of pegging the domestic currency to the U.S. dollar throughout most of the 1990s, the Argentine government’s failure to reduce budget and trade deficits, and the default on government debt” (USDA/ERS, 2002). In the short-run, supply-side effects of capital controls have made it difficult to obtain dollars to buy imports. In April 2002, the Argentine government imposed even more export taxes on many agricultural products and other primary products, with soybeans experiencing an export tax of 23.5%. Nitrogen-based fertilizer and fuel, which are produced domestically, are expected to at least double in cost. Also, percentage markups for transportation and export marketing expenses will likely rise due to increased market and policy uncertainty.

One way for Argentine farmers to off-set the higher costs of inputs is to change cropping patterns. Should this happen, farmers are most likely to plant more soybeans and less corn, since corn requires greater amounts of fertilizer, diesel fuel, agro-chemicals, and high-cost seed than soybeans. Prospects for Argentine farm exports will depend on that sector’s ability to adopt innovative solutions to the higher production costs.

Cost of Production: Empirical Results

Total soybean production costs are higher for U.S. producers (Table 3). While per acre variable costs for soybean production are lower in the United States, fixed costs are higher, mainly due to the higher cost of land. Higher cost of land is due to limited availability of land, government payments, urban development demand, and stronger export demand in the early to mid 1990s.

The Iowa State University Extension Service conducted a survey of soybean production costs for different tillage systems (Table 4 and Table 5). They found cost advantages for using GMO soybeans in a no-till system. The variable costs per acre in this Iowa study are \$106.48, and fixed

Table 3. Production Costs, Major Competitors

Soybean Production Costs			
Cost of Production	Heartland⁴ -\$ per acre-	Brazil⁵ -\$ per acre-	Argentina⁶ -\$ per acre-
Variable Costs	76.95	132.39	76.0
Fixed Costs	153.0	46.72	80.8
Total Production Costs	230.0	179.11	157.2

Source:
⁴ USDA National Agricultural Statistics Service,
⁵ Companhia Nacional de Abastecimento,
⁶ Consorcio Regional de Experimentacion Agricola

costs per acre were estimated at \$157.48. Although the variable costs for Iowa soybean farmers are considerably higher than those for the Heartland Region, these variable costs are still lower than those of soybean farmers in Brazil. The Iowa State University Extension Service survey reported production costs for Iowa and Mato Grosso, a state in Brazil. Results of this survey indicate Mato Grosso's competitive advantage lies in its lower land cost—estimated at \$2.38 per bushel higher for Iowa farmers. Since farmland values are the major cause of Brazil's cost advantage in soybean production, Iowa and other U.S. soybean producers must find a way to reduce or offset high land values (Baumel, et. al, 2000). This will not be easy for a number of reasons: it is politically difficult to reduce farm program payments which tenants use to maintain or bid up rents (land costs) and pressure from banks to maintain land values for mortgages.

For the U.S. Heartland Region, variable costs are comparable to those in Argentina, while Brazil's variable costs are almost double that amount. In Brazil, it is illegal to plant Round-Up Ready soybeans, hence herbicide costs for non-GMO soybeans are higher. The majority of

Brazilian soybean producers custom hire harvesting, further increasing their variable costs. Finally, production inputs (fuel, chemicals, lime, etc.) have to travel longer distances to the soybean production region in the interior of Brazil, which also results in higher variable costs.

The fixed costs for U.S. producers are nearly triple that of their Brazilian counterparts. Much of this is attributable to higher land costs in the United States. Fixed costs for Argentine producers falls between the U.S. and Brazil. Argentine land costs are higher than in Brazil.

Using data from a USDA-ERS study, costs for transportation and marketing indicate the United States holds the competitive edge in international freight costs (Table 6). Internal transport and marketing costs for Brazil are nearly three times more expensive, due in large part to the inefficient infrastructure and the longer distances the soybeans must travel before reaching a waterway. U.S. producers have a slight cost advantage when shipping to European markets. Internal transportation costs are much lower in the United States, affording U.S. producers a competitive advantage.

Recent U.S. government policy developments will impact future

soybean production costs. On May 13th President Bush signed a new farm bill. Once variable production costs have been met, remaining market revenues received by farmers are used to pay the costs of land, and provide a return to labor and management. New payments to soybean producers will be used to offset input costs, and provide residual income that will be capitalized into land values, resulting in higher land costs and higher production costs for U.S. soybean producers.

Implications

How can U.S. producers become more competitive? If the United States wants to expand soybean exports, there are two methods to increase competitiveness: (1) reduce costs or increase yields, and/or (2) increase demand. Supply side changes can be affected by boosting production through improved genetics. Demand can be expanded by adding value to soybean products. However, increasing the demand for soybeans without concurrently increasing the supply side could alter the competitiveness of U.S. farmers.

While most soybeans in the United States are already produced under a no-till system, encouraging more U.S. farmers to switch to no-till practices, could further reduce labor, machinery, and fuel costs. More than half the farmers in Brazil and Argentina have adopted no-till practices. No-till practices are of vital importance in controlling soil erosion, and maintaining long-term production efficiency.

Another supply side change would be to improve soybean yields and/or quality. In the United States, a large percentage of soybean producers already use Round-Up Ready seed. This allows farmers to reduce herbicide costs, improve weed control, and make fewer trips across the field. Potential for further adoption of this technology in the United States and Argentina is limited. Currently, 74% of all soybean acres in the United States are planted to biotech varieties (NASS, 2002). In Argentina, about 95% of the soybeans are biotech varieties (Round-Up Ready). Even though it is illegal to grow biotech varieties in Brazil, approximately

Table 4. Production Costs in Various Tillage Systems

	GMO Soybeans Till	GMO Soybeans No-Till
Total Cost per acre	\$269.40	\$263.96
Total Cost per bushel	\$5.99	\$5.87
Yield per acre	45	45

Source: Iowa State University Extension

10% – 20% of soybeans produced in Brazil are estimated to be Round-Up Ready. The potential growth in biotech soybeans in Brazil will be much greater if a court injunction against biotech varieties is rescinded.

Another way to reduce production costs is through varieties with enhanced traits. Currently, research is being conducted on ways to improve pest resistant soybean varieties. Several insects and diseases attack the soybean plant. Sudden death syndrome (SDS) and the soybean aphid can reduce yields by 20% or more. Also, nematodes that attack soybean roots can reduce yields. Purdue University scientists have developed CystX, a soybean variety that is resistant to nematodes. Efforts are underway to cross this variety with existing varieties.

U.S. producers can increase demand by enhancing the quality of their product and searching for alternative markets. For example, there is growing demand for soybean oil blended with diesel fuel (bio-diesel). Bio-diesel (ranging from 5% to 20% soy oil) can be used in diesel motors, for both on- or off-road vehicles (trucks, school buses, tractors, combines, etc.). This new fuel blend is environmentally friendly and reduces sulfur emissions. Research is underway to blend soybean oil with jet fuel. The goal is to find a cleaner, more efficient jet fuel. This would reduce dependence on foreign oil also.

Increases in demand also can be achieved through value-added components in food. For example, work is underway to develop soy iso-flavones (a food additive). Soy derivatives can be used as a hormone replacement for women to help reduce the incidence of osteoporosis. Researchers are looking for ways to blend soybeans with petroleum for plastic polymers. This would make polymers more biodegradable, which could have significant impacts in food packaging and landfills.

Latin American producers also can consider various methods to increase their competitiveness. First, they can increase the adoption of no-till methods to reduce production costs. Second, they can seek higher yields

Table 5. Farm-Level Production Costs, Iowa and Mato Grosso

Non-land costs	Cost (\$) per acre		Cost (\$) per bushel	
	Iowa	Mato Grosso	Iowa	Mato Grosso
Seed	21.00	11.00	0.42	0.20
Fertilizer & Lime	25.00	70.00	0.50	1.27
Herbicides & Insecticides	30.00	36.00	0.60	0.65
Labor	14.00	5.00	0.28	0.09
Machinery	34.00	29.00	0.68	0.53
Other	15.00	16.00	0.30	0.29
Total Non-land costs	139.00	167.00	2.78	3.03
Land Cost	140.00	23.00	2.80	0.42
Total Cost	279.00	190.00	5.58	3.45

Source: Iowa State University Extension (Baumel et. al, 2000).

through research and development. With the high costs of agro-chemicals for Latin American producers and the greater amount of applications required, new herbicide and insect resistant varieties could reduce production costs. For example, in Brazil the warm weather often makes insect problems more severe than in the United States (Leibold et. al.). Many producers spray several times during the growing season to control insects and diseases. Brazilian producers also are plagued by the nematode problem. If Brazilian producers were to adopt genetically enhanced pest resistant varieties, they would be able to improve yields as well as reduce production costs, and they could reduce their transportation and handling costs through improvements in infrastructure and port facilities all of which would increase their export competitiveness.

Conclusion

It is not likely that U.S. soybean producers will be able to regain the dominant export position they once enjoyed. To remain competitive U.S. producers will need to reduce costs, enhance quality, and increase yields.

A growing concern among U.S. producers is that Latin American competitors will gain more market share due to lower production costs, mostly associated with lower land values in Brazil and Argentina, but these countries face other challenges that reduce their competitive edge. They include: economic instability, inadequate transportation infrastructure, and insect and disease pressures associated with warmer climates.

In summary, there is nothing in the foreseeable future that points to Brazil and Argentina leaping over their U.S. competitors in the export market. But there will be on-going competition among these three major soybean producing countries.

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Table 6. Transportation Costs, Major Production Regions

Cost	Heartland -\$ per bushel-	Brazil -\$ per bushel-	Argentina -\$ per bushel-
Internal transport and marketing	0.43	1.34	0.81
Border Price	5.54	5.23	4.74
Freight Costs To Rotterdam	0.38	0.57	0.49
Price at Rotterdam	5.92	5.80	5.23

Source: USDA/ERS

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Weather and Taxes

George Patrick, Professor

Many Indiana producers have been adversely affected by weather conditions in 2002 and most of the state has been declared a disaster area. However, because of cash accounting methods, these losses may not be reflected in their taxable income until 2003. For example, because of reduced feed supplies some livestock producers have reduced herd size through larger than normal sales of livestock thereby increasing taxable income for 2002. Some crop producers who normally sell their crops in the year following the year of production may receive crop insurance indemnities or government disaster assistance payments this year. In both cases, these producers would be likely to have lower than normal taxable incomes in 2003. Income tax law allows farmers to defer reporting of this income to even out their income and avoid potentially higher taxes. Farm income averaging was enacted after the weather-related provisions and is an alternative which may result in lower taxes for producers in some situations. Good tax management involves consideration of several tax years rather than minimizing this year's tax bill.

Weather-related Sales of Livestock

There are two provisions in tax law which attempt to cushion producers from the consequences of the

weather-related sales of livestock. Livestock held for draft, breeding or dairy purposes and sold because of weather-related conditions are provided a two-year reinvestment period under the first provision. The second provision, which applies to all livestock (other than poultry), allows cash basis taxpayers whose primary trade or business is farming a deferral of receipts from sales in excess of normal business practice because of weather-related conditions resulting in a disaster area declaration. Both provisions apply only to those sales which are in excess of normal business practice of the producer.

Sale with Replacement

The gain on the weather-forced sale of livestock held for draft, breeding or dairy (not sporting) purposes does not need to be reported as income if the proceeds will be used to buy replacement livestock within two years after the end of the tax year of the year of sale. Although declaration of a disaster area is not necessary, a producer must be able to show that weather-related conditions forced the sale of more livestock than would normally be sold. For example, a beef producer who normally sells five cows per year may sell 20 cows in 2002 because of limited feed supplies. Gains from the sale of the extra 15 cows would not be reported as income if the producer purchased at least 15

replacement animals before the end of 2004. The new livestock must be used for the same purpose as the livestock which was sold. Beef cows must be replaced with beef cows.

A producer's tax basis in the replacement livestock equal to the basis in the livestock sold plus any additional amount invested in the replacement livestock that exceeds the proceeds from the sale. For example, a producer sells 20 raised beef cows (with a \$0 tax basis) for \$500 each. The gain of \$7,500 (15 cows sold in excess of normal business practice X \$500) is deferred. If the producer purchased 15 cows in 2004 for \$600 each, the tax basis in the replacement animals would be \$100 (the \$600 cost minus the \$500 proceeds from sale).

To make the election under Section 1033(e) to defer recognition of gain, a producer does not report the gain and attaches a statement to the current year's tax return. The statement shows the following:

- (1) Evidence of weather-related conditions which forced the sale of the livestock.
- (2) Computation of the amount of gain realized on the sale.
- (3) The number and kind of livestock sold.

- (4) The number and kind of livestock that would have been sold as normal business practice without the weather-related sales.

If a producer spends \$7,500 and buys 15 cows before the end of 2004, the basis of the replacement animals will be \$0, the same as the raised cows sold. If the producer spends less than \$7,500 on the 15 replacement animals, the difference between what was spent and \$7,500 must be reported as 2002 income. If less than 15 replacement cows are purchased, the gain from the animals not replaced must be reported as 2002 income regardless of the cost of the replacement animals. When filing an amended 2002 return, the producer will be subject to additional tax and interest on the tax.

Sale without Replacement

Producers who are forced to sell livestock because of weather-related conditions may be eligible for an exception to the rule the livestock-sale proceeds must be reported as income in the year they are received. This exception allows postponement of reporting income for one year. To qualify, an area which affects the livestock must have been declared a disaster area. The animals do not need to have been located in the disaster area and can have been sold before or after the disaster area declaration. However, only the livestock sales in excess of normal business practice qualify for deferral.

A declaration must be attached to the tax return for the year in which the weather-related sale occurred. To make the election the statement should include the following:

- (1) A declaration that the election is being made under Section 451(e).
- (2) Evidence of the weather conditions which forced the early sale on the livestock and when the area was declared a disaster area.

- (3) A statement explaining the relationship between the disaster area and early sale.
- (4) The total number of animals sold in each of the three preceding years.
- (5) The number of animals that would have been sold as normal business practice if the weather-related condition had not occurred.
- (6) Total number of animals sold and the number sold because of the weather-related event during the tax year.
- (7) Computation of the amount of income (see calculation below) to be deferred for each classification of livestock.

For example, a producer normally farrows and feeds 2,000 pigs per year. However, because of drought which caused the area in which the farm is located to be declared a disaster area, the farmer sells 1,000 pigs as feeder pigs in 2002 rather than feeding them and selling them as market hogs in 2003. Under normal practice, no feeder pigs would be sold, so the proceeds from the sale of the 1,000 head can be deferred ($\$35$ per head \times 1,000 feeder pigs = $\$35,000$) can be deferred until 2003.

Crop Insurance and Disaster Assistance Payments

For farmers who use cash accounting, there is an exception to the general rule that payments must be reported in the year in which they are received. This exception applies to crop insurance indemnity payments received when crops cannot be planted (prevented planting) or are damaged or destroyed by a natural disaster such as drought or a flood. This exception does not apply where the insurance indemnity is due to a low price, such as could occur with the Crop Revenue Coverage (CRC) or Revenue Assurance (RA) programs. Government disaster assistance payments are treated the same as insurance indemnity payments.

The exception allows farmers to postpone reporting such payments by one year. To qualify for the exception, a farmer must be able to show that the income from a substantial portion of the crop (generally considered as 50% or more) for which payment has been received would normally have been reported in a year following the receipt of payment.

If a farmer qualifies for this exception, the producer has the option of reporting the income in the year in which it is received. Alternatively, the producer can elect to defer reporting the payment as income until the following year. The election to postpone the reporting of the payment as income when received covers all crops from a farm business. For example, a producer cannot postpone the reporting the payment received for corn unless reporting of the payment for soybeans is also postponed if both payments are received in the same year. However, separate elections can be made for each separate farming business.

To make the election under Section 451(d), a statement is attached to the tax return which includes:

- (1) The name and address of the producer.
- (2) A declaration that an election is being made under Section 451(d).
- (3) Identification of the crop or crops damaged or destroyed.
- (4) A declaration that under normal business practice the income from the crops that were destroyed or damaged would have been included in gross income in a year following the year of damage or destruction.
- (5) The cause of destruction or damage of the crops and dates when the destruction or damage occurred.
- (6) The total amount of payments received, itemized with respect to each crop and each date when payment was received.



- (7) The names(s) of the insurance companies or federal agencies from which payments were received.

Farm Income Averaging

In contrast to the methods of deferring the reporting of income discussed above, farm income averaging uses prior years to generate potential tax savings. Farm income averaging allows farmers to elect part or all of their farm income and have it treated as if it had been earned equally over

the three preceding years. The portion of elected farm income is added to the taxable incomes in the base years and is taxed at the tax rates for those years.

If taxable income in 2003 is likely to be low relative to 2002, then the deferral methods discussed above are likely to reduce taxes. However, if taxable income in 2003 is likely to be similar to 2002 or higher, farm income averaging may provide a tax savings alternative. This could occur because of increased off-farm

employment or the sale of some farm assets other than land. This is especially true for producers whose taxable incomes in the 1999 to 2001 tax years have been low.

Further Information

For additional information on these tax provisions and details of the elections, see IRS Publication 225, *The Farmer's Tax Guide*. This is available on the web at www.irs.gov under Publication 225 in the search menu.

Farmland Lease Law Update*

*Gerry Harrison, Extension Economist
and member of the Indiana Bar*

Title 32 of the Indiana statutes dealing with farmland and other leases was revised by the 2002 Legislature. What was in article 7 of title 32 was moved to Article 31. The "three month rule" for advance notice is now at IC 32-31-1-3 and has not changed. The statutory form for a notice to terminate a tenancy is now at IC 32-31-1-5 and has been "modernized."

* For questions on these and other related matters, contact Gerry Harrison, Extension Economist and member of the Indiana Bar at 765-494-4216 toll free 1-888-EXT-INFO or E-mail: harrisog@purdue.edu.

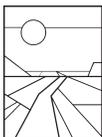
A reminder for leases longer than three years, IC 32-31-2-1 states: *Not more than forty-five (45) days after its execution, a lease of real estate for a period longer than three (3) years shall be recorded in the Miscellaneous Record in the recorder's office of the county in which the real estate is located. And IC 32-31-2 Sec. 2 states: If a lease for a period longer than three (3) years is not recorded within forty-five (45) days after its execution, the lease is void against any subsequent purchaser, lessee, or mortgagee who acquires the real estate in good faith and for valuable consideration.*

You may find the Indiana Code on the Internet at www.ai.org/

legislative/ic/code. Contact your lawyer for assistance in dealing with the legal aspects of leases, rental agreements and other contracts dealing with farmland.

On another note, a federal tax regulation at Reg Sec. 1.1301-1 *Averaging of farm income* **requires** a landowner who otherwise qualifies to use income averaging as a share-lease landlord to have a **written lease** starting January 1, 2003. Further, this regulation says there is a bar to income averaging without a written agreement even if the landowner is materially participating. One more reason to have an up-to-date written lease.

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Gerald A. Harrison
Department of Agricultural Economics
Krannert Building
403 W State Street
West Lafayette, IN 47907-2056

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