

Soy 2020 Scenarios

The following are detailed descriptions of each scenario.

Scenario 1 - Full Speed Ahead!

Scenario Description

Sustainable Soy Technology Advantages; No Sustainable Advantages for Other Crops

Full Speed Ahead is a world in which an integrated and specialized production, processing, marketing, and distribution channel is focused almost exclusively on further development of the soybean industry. Stakeholders throughout the channel benefit from increased private sector investment dollars used primarily for developing new output technologies in fuel, feed and food. Soybeans have been developed to yield higher oil content for conversion to biodiesel, and with increases in oil content and optimization of oil content on a per-acre basis, soybean oil has become the most energy-efficient source of biodiesel. Although soy prices have increased, soy meal has improved, though nutrition innovations have continued to be a preferred source of feed for a global animal agriculture industry. Soy demand in food has also grown as consumers gained understanding of soy's health benefits.

The soy industry has only recently reaped benefits from its preferred position. Fifteen years ago, most expected the ethanol boom to create enhanced long-term profitability for the corn industry. However, technology for other cellulosic options was developed more quickly than expected, limiting corn use as the primary feedstock in ethanol production. Concurrently, soy remained the preferred source of biodiesel production, leaving palm and canola viable alternatives to soy biodiesel primarily in the European Union. Soy biodiesel grew at a more moderate, sustainable pace, and soy research dollars were spent in a variety of ways, including research for new technologies in food and feed. As a result, soybeans benefit from a balanced portfolio of technology innovations that are sustainable, and competition for acres with corn has decreased.

New soybean genetic traits are accepted globally, and marketing and handling systems are differentiated by specific traits and properties. Consumers identify several benefits of soy and demand it in various products. Soy is more commonly used as a food ingredient, and new technologies have allowed soy oil to compete with oils low in *trans* fat. More notably, the mainstream commercialization of nanotechnology has enabled soybeans to provide fat-burning and cancer-beating agents for humans. American producers benefit from an

increased demand for soybeans, keeping prices strong, and compensating for specific traits produced.

Global Competitors

Globally, the scale of soybean production has exploded, and U.S. products hold on to a strong competitive advantage as other countries are adopting technology more slowly than the U.S. The U.S. soy industry is able to capture more of a high-value market, as other countries earn a smaller margin on new technology. Not only are other countries slower to adopt such technology, but other countries are more tentative to protect IP technology developed in their borders, providing a lesser incentive for technology development outside the U.S. This causes soy production in other areas to resemble more of a commodity market, and competitive pressures come from lower labor, production, and transportation costs relative to the potential income of soy. Foreign investment in research and development grows to source more soybeans for desired traits and output sources, and trade barriers have decreased.

U.S. Perspective

The U.S. soy industry holds a strong competitive advantage, capitalizing on continual, rapid investment in innovation from both public and private resources, and rapid deployment of the technology. Technology improves production and processing, and integration in the supply chain has increased in an effort to rationalize production costs and deliver quickly by increasing manufacturing, storage, distribution, and communication efficiencies. U.S. farmland is used to maximize profitability. Imports of commodity soybeans from South America have increased, allowing specific regions in the U.S. to capture added value by specializing in specific traits.

The U.S. soy industry operates under a dual marketing system to maximize efficiency and profitability for all producers. While an increasing share of the industry focuses on differentiated traits and a more integrated system, a majority of soy acres are still produced for traditional commodity uses. Producers who aren't growing "specialized beans" focus on decreasing costs to compete with other low-cost providers. Soy producers benefit from this system because the demand for soybean meal, domestically and globally, remains strong. Despite rising prices, livestock producers have sources of affordable feed because of a channel devoted to efficient soy production.

The Successful Farmer

While there are fewer farmers today than in 2006, the trend of consolidation has slowed, and small to medium-sized farms have carved out a unique position in the market to capitalize on niche markets, and increase profitability potential for the American farmer. Farmers tend to produce under contract, ensuring consistent supply of the traits in highest demand. Although few soybeans were grown for specific specialty purposes in 2006, 20 percent of soy acres in 2020 are devoted to specialty purposes. Farmers are paid premium prices, understanding and embracing the “product innovation” model of continually producing new, novel, high-valued products for a hungry consumer, globally and domestically. Global soy demand has caused producers to shift their acres to soy and take land out of CRP, increasing the number of soy acres in production. Because technology has enabled producers to raise crops resistant to drought and other adverse conditions, soybeans are a more viable option for land previously unfit for production. Demand for specialized traits has shifted producer focus from yield alone. Farmers are less concerned about whether they will be profitable and more concerned about how to be profitable amidst labor, water supply, and storage implications of shifting production trends.

An Integrated Channel

Contracts and joint agreements are prevalent throughout the supply chain, and each player in the supply chain focuses on ensuring a constant supply of novel input and output traits. Vertical and horizontal integration means that stakeholders work to expand and deepen their offer. This integration, combined with new developments in nanotechnology, biotechnology and robotics, allow for quicker, more effective development of traceability capabilities. Processing facilities have been more closely aligned with new food technologies that required a higher level of IP technologies, and suppliers have worked to increase the number and efficiency of such facilities. At the same time, development of the biodiesel industry has posed its fair share of challenges. Feedstock prices have increased, and technology aims to discover new uses for an overstock of soybean meal. Farmers are using varieties that yield more bushels per acre, and new equipment has decreased fuel costs and time required for traditional harvest.

Educated Consumers

New technology faces little resistance, as most consumers worldwide accept food that personally benefits them. Soy-promoting organizations educate the public about the benefits of soy to improve acceptance levels. Food and crop input companies work together to clearly understand emerging consumer trends, and traits and technologies are developed in response to consumer needs, including soy varieties that are sources of Omega 3 fatty acids and have pharmaceutical benefits. Consumers utilize technology to eat foods and intake vitamins specifically designed for their genetic disposition, while food companies design foods that can be customized by consumer preferences and genetic make-up. Reliable news sources regularly commit to publishing information regarding food and nutrition, and digital information is more readily available.

Country of Origin Labeling is in full effect for U.S. livestock production, an industry that also benefits by targeting specific consumer demands. In the grocery store, meat is purchased according to the quality of soybean meal fed to livestock because it is known to enhance the taste and grade of meat products. IP technology has enabled a similar process to begin for soy production traceability. Producers raise soybeans according to specific conditions outlined in contracts for multiple, specialized systems. Real-time, electronic-based testing is in place on the farm, at the point of origination, in handling and in processing. As a result, sustainable value is created and shared up and down the supply chain, and consumers who are most concerned with food safety and nutrition willingly pay a premium for traceability features. Even the share of the population that is complacent about nutrition and food issues readily accepts new technology.

Policy & Logistics

Government tax incentives encourage the development and marketing of beneficial soy technologies for fuel, feed and food use, and domestic policy continues to favor technology that reduces the use of pesticides and other chemicals. As the WTO and other pressures resulted in major changes to farm subsidy programs, producers rely less on government payments, and the Farm Bill has had minimal effect on soy producers. Tax incentives have continued to support production of biofuels, and the development of new production facilities and technologies to improve biodiesel production efficiency has boosted the economy in rural areas.

The need for improved transportation has been addressed with continuing investment and joint governmental lobby between global consumer products companies, food companies, and the agricultural vertical. Concurrently, South America has continued investment in their infrastructure to remain competitive.

Scenario 2 - Shared Success

Scenario Description

Sustainable Technology Advantages for Soy and Other Crops

Shared Success is characterized by a split focus on soybeans, corn and other crops. As technology innovations have enhanced these industries, the distribution channel has become continually more integrated, and the largest share of research dollars aims to improve logistics and infrastructure. Market opportunities continually arise for new technology, and better infrastructure is necessary to handle specialized products and increased volume. Biodiesel and ethanol production have both grown more efficient, yields have increased, efficiencies per acre have continued to improve, and no other competitive technologies have advanced to take the place of bio-based renewable energy.

Advances in soybean technology include higher oil content for conversion to biodiesel, drought-resistant soybeans, and specific health benefits. Concurrently, crops such as corn and other sources of fuel, feed, and food have also sustained technology innovations. They include drought-resistant corn, nitrogen-fixing corn, efficient corn-based ethanol production, designer corn for food products, and new sources for renewable fuel, including switch grass, palm oil, and canola oil.

Increased commodity prices and the expansion of ethanol and biodiesel production have boosted the rural economy, further increasing the standard of living for most Americans. Demand for high-protein feed has also increased with more meat consumption, met largely by higher protein DDGs and soybean meal. Higher energy corn products have become more mainstream and are grown in heavily populated livestock states, competing for additional soybean acres on another front. Trade-off between soy and corn acres varies by season, depending on popular opinion and where the most current technology is available.

Land grant universities and the private sector regularly develop new products and technologies, and invest in specific patents and promotion. Consumers pay slightly more for food than they did 15 years ago, and their choices extend beyond type and brand name to include detailed point of origin information. Consumers are bombarded with information, as continuous innovation has allowed for discovery of multiple health benefits. New technologies have enhanced the benefits of soybean oil in food, allowing it to compete with oils low in *trans* fat, and consumers are more aware of health benefits specific to their genetics of various food products.

Global Competitors

America imports many commodity grains and biodiesel feedstocks to offset the increased demand for renewable energy inputs, and to allow the U.S. to focus on specialty crops and uses. Large-scale production and the necessary focus on specific practices have helped the U.S. compete against lower labor, production, and transportation costs elsewhere. Off-shore investment has grown rapidly to fill the gap left by reduced U.S. exports of corn and soy, causing the infrastructure gap between the U.S. and other countries to quickly narrow. The increased demand for corn and soybeans domestically has decreased U.S. exports, and allowed Argentina and Brazil to supply several markets that were filled by U.S. production 15 years ago. While China's soy production has increased, it accounts for a smaller percentage of global supply than it did 15 years ago.

U.S. Perspective

The U.S. soy industry competes by pursuing continuous product innovation and technology advancement. Other countries also invest in technology, but the U.S. is able to maintain a competitive advantage because of continual domestic development of new technologies, adopted at least one or two years before others incorporate similar innovations. Specifically, investment in agronomic qualities aims to maximize the efficiency of each acre, by developing drought-tolerant or temperature-resistant plants. Additionally, the U.S. is able to capitalize on an efficient and effective integration of IP systems and traceability. Not only are other countries slower to adopt such technology, but other countries are more tentative to protect IP technology developed in their borders, providing a lesser incentive for technology development outside the U.S.

Competition for acres and markets is strong because of numerous benefits with a variety of crops. Stakeholders are forced to choose a specific direction in the marketplace, whether that be a niche market, type of product, or specific technology. For example, producers who contract with a local biodiesel plant do not also produce soy for human health benefits. Other producers find a niche market in soy tailored for the preferences of Japanese consumers, or for the domestic needs of those working to prevent obesity in the U.S. Those who thrive efficiently deliver a niche product or service. Organizations have formed joint ventures to consolidate processes between the farmer and elevator, or between the processor and consumer systems to offset increased technology investment.

The Cooperative Producer

Yield has increased because of improved technology, and continuous competition from other crops and increasing urbanization mandates soy producers to focus on the optimization of each acre. While producers traditionally counted on yield to increase revenue

by maximizing production, farmers in 2020 seek the most advanced technology to maximize revenue. Premier pricing opportunities in multiple crops drive balanced crop rotation systems and a reduction in the number of domestic livestock producers, as domestic feed prices increase. Producers are unable to beat the prices of soy grown in South America, but specific traits allow U.S. soy producers to optimize profitability with varieties best suited for their region. Domestic land prices have increased moderately over the last several years, and even though U.S. labor costs are more expensive, U.S. technology advances offset part of the difference.

Many producers now specialize and build “focused expertise,” requiring greater cooperation with other producers and processors. As producers develop specific skill sets, they share or trade those with other producers who have a complementary area of expertise. These producers are well educated, many having earned graduate degrees and operating efficient businesses. Maximizing profit potential of their land, more wind turbines line farm fields than ever. Some producers even hire consultants specific to their energy needs and production capacity.

A Booked Channel

Technology improvements have caused a highly integrated channel seeking to maximize efficiency. Because soy technology is equitable with other crops’ technology, every point along the soy channel works to reduce costs to remain competitive. In a world where success is shared, channel members lean toward risk management through forward-looking contracts. Technology improving protein content of corn DDGs, a byproduct of ethanol production, has resulted in a surplus of soybean meal. Premiums offered for farmers for specialty production have been modest due to many alternatives for downstream uses.

The Consumer with Choices

The U.S. consumer continues to expect higher quality and value, providing a market for specialty grains. While consumers accept new technology, the rate of growth for soy is slower than if success were not shared with other crops. Some consumers have so many choices to improve their health that they may feel overwhelmed or become complacent to the choices around them. Others have embraced new technology to take advantage of specific products designed for their genetic disposition, which is commonly displayed on labels of most consumer products. Food prices have increased because of competing outputs and food sources. Soy is a common food source, but only the clear food of choice when price also wins, which will likely not happen for long if the soy industry would collectively choose to focus on industrial uses of soy. Consumers are forced to choose among a variety of traits and benefits.

Policy & Logistics

Soy lobbyists and promotion groups have tremendous competition, for technology innovations have caused legislators and consumers to split their focus and attention among a variety of inputs. Public funding has increased for research in soy, corn and other crops, and the government offers incentives of two main types: tax incentives for high value crops, and program payments for commodity producers who help supply a cheap source of feed. Overall declines in program payments for soybean producers have been parallel with other commodities. Trade barriers have been reduced, as sourcing commodity crops has become a more global effort. Land and water usage are under close scrutiny, and testing requirements for new technologies and techniques have become more stringent. The government has kept up with new IP technology, enforcing labeling policy that assures accountability and contributes to consumer education, which is one of the industry's greatest challenges in a market with endless choices.

The volume resulting from global production has placed significant pressure on domestic infrastructure, while increased expenses in other areas result in slow adoption of improvements. The competitive advantage the U.S. traditionally held in transportation has decreased as other countries have also concentrated investment on their infrastructure. While sometimes slow to change, the U.S. has shown some improvement through regular investment in logistics from the farm to the consumer. Combines are wired to grain facilities, providing real-time information on contracted crops for attributes such as test weight, oil content, and foreign material. Additionally, some organizations have devoted their business to specialize in logistics. Large barges are often used for shipments, but the industry also increases efficiency by filling empty ships from China and developing countries that import to the U.S.

Scenario 3 - The Off-Shore Migration

Scenario Description

No Sustainable Technology/Innovation Advantages for Soy; Sustainable Advantages for Other Crops

In The Off-Shore Migration, soybeans are produced in and for traditional commodity markets, with production and distribution shifting to lowest total cost sites in North America and off-shore. Additionally, soybean research and capital investment levels are growing rapidly outside the U.S. Countries like China and India saw greater profit and innovation potential in building the infrastructure in South America, for example. The ethanol industry has posted significant sustainable growth over the last 20 years, and an increase in demand increased the price of commodity corn, encouraging farmers to shift acres to corn. Product and genetic development has supported corn production, as drought-resistant and nitrogen-fixing corn have allowed for corn-corn-soy or corn-wheat rotations.

Unfortunately for soy, investment dollars formerly committed to soy germplasm or technology improvement have shifted to other crops and uses. The Off-Shore Migration poses a challenging scenario for the U.S. soy industry, as no innovations have created a sustainable advantage to grow the market. Biodiesel production once heavily relied upon soy oil, but other crops such as canola and palm have surpassed soy oil as a feedstock for biodiesel. Food companies switched to other sources of oil during the biodiesel boom, and they have been slow to convert back to soy. Technology to enhance yield and quality of the soybean has been introduced, but they hit the market after producers had already begun reaping benefits from corn innovations. Unable to provide a profitable alternative to other enhanced crops, soy production has continued to migrate off shore.

Consumers understand and communicate the health benefits of alternative crops, including whole grains and oil from crops such as canola. Technology advancements have increased the protein and energy content of corn, increasing its use for protein sources in food, and securing a strong market share of animal feed and renewable energy sources. Oil surpluses have grown beyond levels at the turn of the century, as investors have forced biodiesel companies to find cheaper sources of feedstock. Because corn stalks, switchgrass, kenaf and other fibrous crops can be used for ethanol production, technology has made even marginal lands profitable.

Global Competitors

The global soy environment has shifted to favor South American producers. Competitors in South America, aided by foreign technology investment from China and the Pacific Rim, and the availability of low cost inputs and labor, dominate the soy industry. Dramatic

improvements in South America transportation infrastructure further improved their ability to compete, and Asia has become a stronger competitive force. Global investment in cost-effective soy production has grown significantly, resulting in dramatic increases in U.S. soy imports.

U.S. Perspective

Production efficiency is the key to success in the U.S. soy industry, primarily in sourcing animal feed and selected food products. Soy producers in the U.S. focus primarily on regional customers, driven in part by logistics and transportation efficiency advantages. Much of the soy human food market has shifted to canola and other oils.

The Surviving Producer

Soy producers face an unstable market and remain focused on that which they can control most, yield per acre. Soy is primarily grown minimally in a rotation with corn and other specialty crops, and soy acres have decreased as larger scale producers disproportionately shifted to producing other, more lucrative crops. Even though producers are taking land out of CRP, it is used for corn, switchgrass, and other fibrous crops now used for ethanol production.

An Off-Shore Channel

Local grain origination and processing operations are cost disadvantaged as these processes are generally more cost-effective off-shore. Global demand for soy oil as a biodiesel feedstock has largely been fulfilled by production off-shore, including South America and South Africa. Even when soy is produced domestically, most processing occurs elsewhere, as domestic processors have focused their investment efforts in new renewable fuels technologies. Many integrated U.S. livestock producers align with South American soy producers and crushers for cheap feed from soybean meal. Food companies have shifted focus to alternative sources of oil, such as canola.

Controlling Consumers

New technology faces little consumer resistance, and most traits and technologies are developed in response to consumer demands. However, the U.S. soy industry has not capitalized on such consumer acceptance. Most technology innovation favored by consumers has occurred in crops and industry sectors other than soy.

Policy & Logistics

Domestic policy supports technology development, but success has been limited. Domestic soy production and processing have grown too inefficient in comparison to global suppliers for the U.S. government to bridge the gap for U.S. soy production without infringing on free trade agreements. Overall, program and CRP payments have declined.

The need for improved transportation has been addressed with continuing investment and joint lobbying efforts between global consumer products companies, food companies, and the agriculture sector. The traditional lock and dam system has undergone minor improvements, allowing for efficient transportation of a commodity product. However, IP technology investments relative to storage and handling have focused on corn and other crops, where more profit potential lies.

Scenario 4 - Forward to the Past

Scenario Description

No Sustainable Technology/Innovation Advantages for Soy or Other Crops

Although the year is 2020, Forward to the Past is a year in which the soybean market looks much like 2006. Production and distribution systems support traditional commodity markets, where soybeans, corn, and other crops are produced domestically for efficiency. The domestic need for cheap feed and the slight adoption of soy for human food favor a market of commodity soy. Consolidation along each step of the distribution channel has continued, particularly reducing the number of producers and agricultural retailers. This has led to significant cost reduction throughout the entire value chain, and the livelihood of small farms and cooperatives are threatened by consolidated growers, often called the “Wal-Mart” of farming as they compete in the market with lower prices.

Investment dollars focus primarily on agronomic traits and production efficiencies, and other countries outpace U.S. technology developments. With few sustainable technological advancements, the industry struggles to attract innovative workers. Ambitious members of the workforce who pursue advanced degrees thrive in other industries, leaving agriculture in a steady-state cycle. Concurrently, urban areas continue to expand, causing additional pressure for producers.

Americans enjoy food as affordable as it was 15 years ago. Consumers are often fearful of food safety, as an absence of technologies for soy production for food has resulted in less education about the source of food in general. Livestock production remains a viable business with affordable feed, and commodity markets grow through new uses by volume as opposed to relying on sustainable technology innovations. Production technology advancements have allowed the average farm size to triple, influencing the way the whole channel conducts business.

Global Competitors

South America’s ability to produce soy cheaply has enabled their share in the global market to significantly exceed the U.S. share. Further enhancing efficiency, foreign investment has focused on other countries’ infrastructure, reducing the American competitive advantage. Although other countries are out-producing U.S. soy producers, a growing world population and increasing demand for feed allows the U.S. a continuing market for exports.

U.S. Perspective

Production methods, innovations, and inputs center on the need to produce more bushels more efficiently. Seed genetics have improved yield, and genetics to resist drought and disease have been mildly successful. Wireless technologies have influenced equipment innovation, allowing for more control from even remote locations, reducing costs for improving communication tools, and enhancing quality through advanced technology that provides a truer indication of soy attributes at harvest. However, new technologies are slow to be accepted outside of innovations in production methods, and successful innovations do not provide sustainable advantage. Exports have increased with a growing world population, which results in more mouths to feed around the world. As a commodity industry, soy continues to be a viable source for biodiesel production and animal feed.

The Mega Farmer

Forward to the Past farmers are bigger than ever. The number of soy acres has changed little in 15 years, but the number of producers has dramatically decreased as the rate of consolidation and migration to urban centers have increased. While farms of all sizes remain active, mega farmers have significantly increased their share of production.

A Commodity-Focused Channel

Low-cost providers win in a world without sustainable technologies, and soy is used primarily for biodiesel and animal feed. Generic chemicals have increased their presence in the marketplace, and supply chains have become more integrated in the search for greater efficiency. Additionally, most soy processing has shifted to South America, driven in part by food companies' need for lower cost oils.

Multiplying Consumers

Consumers benefit from low-cost commodity production by taking advantage of cheap food sources. Urban expansion continues as increasing numbers of consumers pursue a "ruralpolitan" lifestyle, possible in part from the money saved on affordable food. As domestic and global population increases, so does demand for soybeans and other food.

Policy and Logistics

Domestic regulatory efforts focus on production issues, such as water restrictions, pesticide use, and land rights. Commodity prices have remained low, and producers still receive and heavily rely on subsidies. Despite foreign improvements, the U.S. has made only modest public investments to improve transportation and infrastructure.

