

## Can the U.S. use low prices and expanded production to blunt Brazil's soybean expansion?

Brazil continues to expand its soybean production. But how can that be? That is not what it was expected to do. The conventional wisdom has been that, if the U.S. used more acreage to produce soybeans and did so at less than premium prices, Brazil would cease and desist, so to speak, from its expansionist tendencies. Or to reverse an oft-repeated slogan: "If we produce additional soybeans, nobody else will."

Maybe the reason Brazil has not reacted as we expected is because we are not viewing Brazil in the right context. Suppose, for a moment, that we think of the Brazilian situation today as similar to that of the U.S. 150 to 200 years ago when the frontier and economic development were being pushed ever westward. And, further suppose that Brazil has a clear vision for the role of agriculture in that process. Viewed in that light, Brazil would be expected to steadily expand agricultural production into its unsettled areas and it is doubtful that any U.S. action would significantly alter that process.

In his fascinating book, The Development and Growth of the Soybean Industry in Brazil, Philip F. Warnken, professor of agricultural economics at the University of Missouri, Columbia, gives credence to these types of suppositions. Early on he lists six key national policy objectives the Brazilians had in the development of their soybean industry. He acknowledges that "Brazil's soybean boom was in response to the growing demand for soybean products, but the industry's response capacity was shaped and determined by public policy."

The six public policy objectives he identifies are "(1) saving foreign exchange, (2) increasing foreign exchange earnings, (3) improving the national diet, (4) stimulating industrial development, (5) holding down food price increases and (6) territorial occupation." With increased soybean production and the further development of a processing industry, all six of these objectives would be achieved.

In a similar vein, based on their behavior, I have previously written that the Brazilians have a long-range-development plan for their agricultural sector in general and their soybean industry in particular. It appears to me that, within a relatively wide range of prices, Brazil will continue to expand its capacity for agricultural production. It would take extremely low prices to slow this down. However, extremely high prices might accelerate the trend.

This view was recently confirmed by Brazilian Agricultural Minister Marcus Vinicius Pratini de Moraes when, following a mid-October meeting with U.S. Secretary of Agriculture Dan Glickman, he said, "We think Brazil will be the world's largest farming country in 10 to 12 years."

As outlandish as that prediction may sound, the vast amounts of undeveloped cerrado savannah type land in the interior of the country provides the land resources

that would be required to achieve such a prediction. The total area of the cerrados is 511 million acres or about the same as the area of the central United States including the Dakotas, Nebraska, Kansas, Oklahoma, Minnesota, Iowa, Missouri, Arkansas, Wisconsin, Illinois and Indiana. Of the 511 million acres, about 336 million acres are suitable to large-scale mechanized agriculture after leaving at least 20% of the land as a natural preserve. At present about 30 million acres are dedicated to crop production and 86 million acres are in pasture.

For comparison, according to the 1997 Census of Agriculture, 431.4 million acres are identified as cropland in the United States. Of this, 255 million acres are planted to the eight major crops. Note that the Brazilian numbers do not include the traditional southern and coastal areas of agricultural production, nor do they include any acreage in the Amazon tropical rain forest.

At first glance, the cerrados appear to be an unlikely region in which to grow soybeans. In its natural state, the cerrados is mostly covered with twisted, stunted trees and its soil has little natural fertility. In addition, the soil is highly acidic, aluminum saturated, deficient in phosphorus, and often deficient in one or more micronutrients. The soils are, however, well drained and have excellent physical characteristics.

There are biological challenges as well. Soybeans is a temperate climate crop, ill-suited to the low latitude areas of central and northern Brazil. The shortened length of day between the Tropic of Cancer and the Tropic of Capricorn causes U.S. and other temperate-zone soybean varieties to flower and mature early, resulting in low yields. As late as 1975, one soybean scientist said, "Growing soybeans for grain in most areas of the tropics is not feasible because of varietal and environmental limitations."

As they expanded agricultural development into the cerrados, how have the Brazilians overcome these obstacles?

Because the cerrados are relatively level, the area is well suited to labor saving large-scale mechanical clearing. Warnken says, "A common method is to knock down standing vegetation by pulling a heavy chain between two large crawler tractors." In addition, the soils are treated with lime, potash, phosphates and micronutrients according to need. Nitrogen fertilizer is not a critical factor in a legume like soybeans.

In some ways, Brazil's land reclamation efforts are similar to those in Iowa and Minnesota in the mid- to late-nineteenth century when, in addition to clearing the land, drainage ditches were dug and field tile was installed turning shallow lakes, potholes and sloughs into fertile cropland. The results of Brazil's land reclamation work was well illustrated in an article in the May 12, 2000 issue of *MidAmerica Farmer Grower*. In that article, National Corn Growers Association Board mem-

ber Tim Burrack told of standing in the middle of a 60,000-acre soybean field. "It was a new experience for me," Burrack said, "because when you stood in that field and looked around 360 degrees—I looked everywhere because I was having trouble comprehending it—it looked the same."

On the biological front, government-funded—and predominately U.S. trained—Brazilian soybean researchers have developed soybean varieties that are well adapted to the low latitudes of the cerrados. By the mid-1980s, yields of Brazilian varieties were equivalent to the yields of temperate-zone varieties. In addition to tolerating acidic soils, the new varieties have deep root systems to better withstand the periodic short dry spells of the cerrados.

In the 1970's when we said, "There are no more lowas," we forgot that before the mid- to late-nineteenth

century there was no agriculturally productive Iowa at all. It was wrestled out of the prairie by the sweat of many a brow. What we see in Brazil at the turn of the millennium is a very similar process. That could mean, and has been the case over the last four years, that it matters not whether the price of soybeans is \$7 or \$4.50 per bushel or whether the U.S. plants 60 or 73 million acres of soybeans, Brazil will steadily expand agricultural production into its unsettled areas.

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