



How Brazil outfarmed the American farmer

After a half-century of dominance, the U.S. is losing its edge in agriculture to a booming, high-tech Latin American powerhouse. Its secret weapon? Soybeans.

By [Susanna B. Hecht and Charles C. Mann](#)



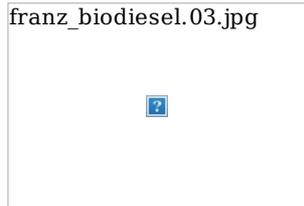
Soy farms in South America are routinely ten times bigger than their North American counterparts.



Longtime Illinois soybean farmer Phil Corzine (right) at his 3,500-acre farm in central Brazil.



Phil Corzine's soy farm in the state of Tocantins.



Lucas do Rio Verde's mayor, Marino Jose Franz, inspects a biodiesel plant being built by his company.



Planned neighborhoods and government housing built by the municipality of Lucas do Rio Verde.

maggi_portrait.03.jpg



Governor of Mato Grosso and president of Maggi, Blairo Maggi



The Maggi Group's new processing plant under construction in Lucas Do Rio Verde.

soy-fed_pigs.03.jpg



Brazilian soy provides feedstock for the country's booming livestock industry.

soy_field.03.jpg



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BR-163, a two-lane, potholed road in Mato Grosso, is one of Brazil's most important highways.

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(Fortune Magazine) -- Phil Corzine is not abandoning Illinois. A longtime soybean farmer in Assumption, a small town east of Springfield, he is firmly loyal to his state - he once ran the Illinois Soybean Checkoff Board, a program in which Illinois farmers promote Illinois soybeans. But the 1,300 acres Corzine planted in 2007 are not in Illinois, or even in the Midwest. They're in central Brazil, in the state of Tocantins, part of a big swath of soy-producing lands that stretch between the Andes and the Atlantic forest and from northern Argentina to the southern flanks of the Amazon basin. Soylandia, as this immense region might be called, is almost entirely unknown to Americans. But it may well be the future of one of the world's most important industries: grain agriculture.

Mainly out of curiosity, Corzine visited Brazil in 1998. Like most U.S. soy producers, he'd noted Brazil's rapid rise in the trade - from amateur to global power in the space of a couple of decades. Its scale of operations, however, stunned him. A big farm in Illinois may cover 3,000 acres; spreads in Soylandia are routinely ten times bigger. Conditions there were primitive, Corzine thought, but Soylandia was going to expand in a way that was no longer possible in the U.S. With three partners he raised \$1.3 million from more than 90 investors, mostly Midwestern farmers. In Illinois, he says, that kind of money "can't even buy the equipment, let alone the land." In Brazil it was enough for Corzine's group to acquire 3,500 acres in 2004. Since then, the land has almost doubled in value as other American investors clamored to get into Brazilian soy. This year Corzine, now 49, raised another \$400,000. "We feel like what's going on is long-term positive," he says with Midwestern understatement.

Twenty years ago it would have seemed absurd for an American farmer to move into South America. U.S. growers still aren't rushing in en masse - Corzine's consortium is one of perhaps 300 U.S. groups invested in the area - but the notion of doing so no longer seems ridiculous. Today Soylandia, with nearly 60% of the world market, dominates the global soy trade. And Brazil - the heart of Soylandia - is an agricultural powerhouse. Not only is it the world's biggest soy exporter, a title it seized from the U.S. in 2006, but it has the world's biggest farm trade surplus, \$27.5 billion last year. (The U.S. surplus was \$4.6 billion.) The leading producer of beef, poultry, pork, ethanol, coffee, orange juice concentrate, sugar, and tobacco, Brazil has seen farm exports grow an average of 20% a year since

2000, according to the USDA.

But of all those products, soy is by far the most important - and demand is exploding. Asia has long produced its own soy foods: tofu, soy milk, miso. Now soy is ever more prominent in the U.S. diet, though it is often hidden by aliases like "hydrolyzed vegetable protein." Meanwhile the use of soy for animal feed is soaring. China wants it for its fast-growing poultry, swine, and fish-farming industries, while Europe increasingly demands it because soy-fed cattle can't develop mad cow disease.

The main boost in demand, however, is industrial. Nontoxic, nonpolluting, and biodegradable, soy is becoming the precursor of choice for manufacturing paints, solvents, textiles, lubricants, plastics of every variety, and countless other products. Soy provides oil for chainsaw motors in Montana, glue for plywood cabinets in Michigan, foam insulation for offices in Massachusetts, and backing for artificial turf in putting greens and stadiums throughout the Midwest. In July, Ford ([F, Fortune 500](#)) announced it would replace the petroleum-based polyurethane foam cushions in its car seats with cushions made from soy foam. The company's first green-seat car: the 2008 Mustang. Muscle-car soy! More important still, the fuel in the tank can also be made from soy biodiesel. With oil stumbling toward \$100 a barrel, Brazil is positioned to become the Saudi Arabia of biofuels. (It could also become a Saudi-like power in conventional fuel: Last year the state oil company, Petrobras ([PZE](#)), found the biggest new petroleum reserve in 30 years 155 miles offshore from Rio de Janeiro.)

Ordinarily the soy boom would represent a huge opportunity for U.S. agriculture. Since World War II, U.S. farmers have led the world in the three most important staple crops: wheat, corn, and soy. Midwestern harvests have steadily increased during that time, in large part due to American prowess at moving laboratory innovations - improved seeds, new fertilizing methods - to the field and to the global market. Along the way, agriculture became the crown jewel of U.S. exports. Even as cars, steel, and other former standouts lost market share to foreign competitors, agriculture reliably put up impressive U.S. balance of trade numbers, partially offsetting America's apparently limitless appetite for Pokémons, Perrier, and Priuses.

Today that is changing. As the rise of Soylandia demonstrates, crops formerly dominated by temperate-zone producers can be transformed into tropical commodities. Latin American soy production is the equal of anything in Iowa or Illinois. Indeed, it's often better: Soybean yields in Brazil have surpassed the U.S. in three of the past six years. Average costs per bushel in the U.S. are about \$6.70, including domestic and ocean freight, while Brazilians weigh in at \$5.05.

In the U.S., soy has little room left to expand. There just isn't much unused good farmland left. Worse, ethanol subsidies have driven the prices for corn so high that many American soy farmers are switching crops. Despite the global rise in soy demand and near-record prices, the USDA reported in July that U.S. soy plantings fell by 15% in 2007, to 64.1 million acres - the lowest level in 12 years. Meanwhile, the United Nations reports that the four main nations of Soylandia - Brazil, Argentina, Paraguay, and Bolivia - were growing almost 100 million acres as of 2005, the most recent year with reliable data. And that number is increasing as much as 5% a year.

Labor and land are cheap in Soylandia, but that's not why it is shaking up the farming world. Instead, its advantages are due to its native climate and home-grown technology. Because Soylandia lies in the tropics, its growing season is nearly year-round. Two - and with irrigation, three - crops a year are the norm. In addition, the region is less vulnerable to climatic extremes than the southern and western zones of the Midwest, which are at constant risk of drought and flooding - a risk that may be exacerbated in temperate zones by global warming. South America "has a clear comparative advantage," says Peter Goldsmith, director of the National Soy Research Center at the University of Illinois. "In the long run, there's no obvious way for American farmers to catch up. I wouldn't bet against these people." South American soy, he says, "is a kind of competition America has never faced before."

Almost nobody in Brazil actually eats soy. In this notoriously carnivorous land, the very idea of tofu is enough to cause a shudder. But as far back as the 1960s, some Brazilians recognized that the Asian bean - Glycine max, to biologists - represented both a major business opportunity and a potential solution to an intractable problem.

The dilemma was what to do with Brazil's vast middle west, centered on the state of Mato Grosso, which is 1 1/2 times the size of Texas. "Less probably is known about the interior of Mato Grosso than any other inhabited place of equal size in the world," wrote the journalist and traveler Peter Fleming (brother of the James Bond creator) in 1933. Even in the 1960s no decent roads or railroads connected it to the rest of the world. Its crumbling capital, Cuiabá, was then little more than a hardscrabble burg that serviced local cowboys and alligator poachers. Today Mato Grosso, with almost 15 million acres planted, leads Brazil in soy production, and Cuiabá (pop. 550,000) is the capital of Soylandia.

The state's current prosperity - and its source - would have startled Fleming. Most of Mato Grosso is covered by cerrado, wooded savanna that sprawls over 700,000 square miles of Brazil, including much of the southern Amazon basin. For decades after Fleming wrote, agricultural researchers believed Glycine max could not prosper there. The plant, imported to Brazil in the 19th century by Japanese laborers, needs long exposure to sunlight; the uniform 12-hour day at the equator is simply too short. (By contrast, Iowa summer days can be more than 15 hours long.) In addition, soy, like other legumes, uses symbiotic rhizobium bacteria in its roots to "fix" nitrogen into the soil, reducing the need for fertilizer. But because nitrogen-fixing bacteria can't survive in the cerrado's highly acidic, aluminum-rich soils, farms would have to be heavily fertilized with lime, a significant cost disadvantage. Even if the poor farmers on the cerrado had somehow managed to eke out a crop, they could not have exported it - Soylandia's potholed dirt roads were impassable much of the year.

In the 1960s the generals who then ruled Brazil looked at their maps and observed to their displeasure that about 60% of the country was empty (actually, it was filled with Indians, the descendants of escaped slaves, peasant farmers, and other forest peoples, but the government dismissed them). To the generals' way of thinking, filling the emptiness was a matter of national security; in any case, like authoritarians everywhere, they wanted to do big projects.

In a program that would later trigger worldwide protests, the generals began linking the brand-new, ultramodernist capital, Brasília (itself an earlier megaproject), to a network of roads across the interior to the port cities of rain forest Amazonia. Much of the road system went through the cerrado rather than the better-known rain forest. Not only was it much easier to clear, but it was then not even in the environmentalists' sights even though the dry forest is almost as biologically diverse as the wet forest.

One of the highways, BR-364, ran from São Paulo through Cuiabá to the west Amazon. In the 1970s and 1980s hundreds of thousands of migrants from central and southern Brazil thronged up BR-364, believing the generals' promises that they could begin new lives in agricultural settlements. Instead, the government lost control of the land rush, setting off violent battles among squatters, speculators, and ranchers over homestead titles. Many small holders abandoned their farms soon after clearing them - few crops would grow in the cerrado's soil. The big ranches didn't do much better, even though many received subsidies from the government. Despite the economic failures, land wars, and ecological havoc, the generals viewed the settlement program as anything but a failure: It opened up the cerrado in Mato Grosso, then moved north through the rain forests and created conduits all the way up to the Amazon River. By the 1990s more than half of the cerrado had been burned and bulldozed into pasture or farmland.

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Bank of America Corp...	30.01-0.08		-0.27%
Twitter Inc	41.211.51		3.80%

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Index	Last	Change	% Change
Dow	25,316.53	75.12	0.30%
Nasdaq	7,645.51	10.44	0.14%
S&P 500	2,779.03	8.66	0.31%
Treasuries	2.94	0.00	0.14%

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