Changing food demand challenges Brazil's farm sector

Constanza Valdes, Ignez Vidigal Lopes, and Mauro de Rezende Lopes

Brazil, an upper-middle-income country, is facing rapid socioeconomic shifts: rural to urban migration, a larger middle class, and a better distribution of income. These shifts present Brazil's farm sector with new challenges, such as shifts in commodity demand and subsequent changes in economic signals. Here we examine the magnitude of the production challenge from increased food demand and evaluate whether the farm sector can meet that challenge.

Brazil, where land, water, and labor are readily available, has achieved impressive agricultural performance. From 1996 to 2008 the GDP of agriculture expanded by an annual average of 12%. This growth, driven by increasing productivity and an increase in the land devoted to agriculture, has allowed Brazil to become a major food supplier to international markets: a quarter of what Brazil produces in grain, oilseeds, and meats is sold beyond its borders.

With a population of 191 million, Brazil is also one of the world's leading consumers of cereals, pulses, oil crops, and meats. Domestic demand is likely to grow as Brazil gains 23 million people by 2018. Income growth, a more balanced income distribution, and increased urbanization are expected to lead to higher demand for all foods, and a shift from staple foods to a diversified diet with higher consumption of animal protein.

Brazil's rising food consumption will require continued increases in food supplies. The question is whether its farm sector can sustain its productivity growth to meet increasing domestic demand and at the same time retain its position as a major supplier of agricultural commodities to other countries. The growth of Brazil's biofuel industry could affect the availability of grains and oilseeds for other domestic uses or exports. Brazil still has much potential to supply more agricultural products if it can address financial constraints for farmers, infrastructure challenges along the food supply chain, and environmental concerns about increased use of land for farming.

Income and food consumption

Brazil is categorized by the World Bank as an "emerging country" based on its large population, large resource base, and large market, and, with per capita gross

Constanza Valdes (cvaldes@ers.usda.gov), is an Agricultural Economist, U.S. Department of Agriculture, and Ignez Vidigal Lopes (Ignez.Lopes@fgv.br) is Head of the Center of Agricultural Economics Studies, and, Mauro de Rezende Lopes (Mauro.Lopes@fgv.br) is Research Project Manager of the Center of Agricultural Economics Studies, Getulio Vargas Foundation. Rio de Janeiro, Brazil. The article is a reprint from CHOICES, 2nd Quarter 2009 • 24(2).

national income of $5,860 in 2008, as an upper-middle-income country. The average masks a disparity between the very rich and the very poor. The richest 10% of the population receive 44% of total income and the poorest 50% receive less than 10%. Living in poverty are 22 percent of the Brazilian population, especially those in rural areas. About 8% of the population consumes less than the minimum level of dietary energy.[1]

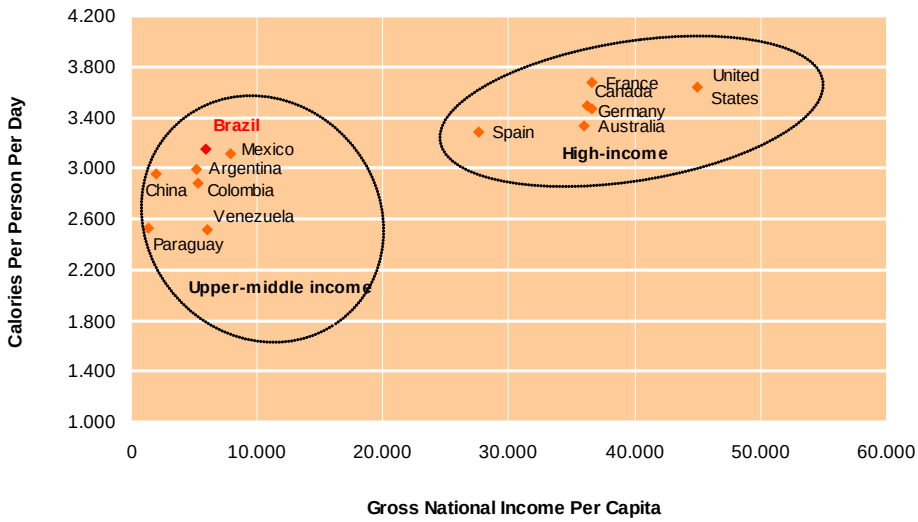
Economic reforms implemented during the 1990s and early 2000s in Brazil restored steady economic growth and reduced annual inflation from over 1,000% to about 5%. The resulting economic stability and "wealth effect" from slower inflation triggered a domestic demand boom. Other reforms implemented since the early 1990s also helped stimulate food demand. Labor reforms kept the real minimum wage above inflation, trade reforms increased imports of foods and other consumer goods, financial reforms increased credit availability, and family farming programs provided credit to low-income producers owning less than 26 hectares of land (small holders).

To help reduce income inequality, Brazil established food assistance programs as part of the Zero Hunger (Projeto Fome Zero) government initiative to provide low-income program participants with supplemental food. Bolsa Familia is a targeted conditional cash transfer program that serves nearly 25% of Brazil's population.

Brazil's income and food consumption are rising.

The economic reforms implemented after 2003 led to increases in real per capita income and better income distribution. Real per capita income increased 14% between 2004 and 2007 and inequality in the distribution of income as measured by the Gini coefficient (which ranges from 0, equality, to 1, inequality) diminished from 0.6 in 2000 to 0.5 in 2007. The reforms brought more people into the formal labor force and expanded the middle class (defined as families earning between $600 and $2,600 monthly) to 54% of the total population in 2008, up from less than 42% in 2004.[2]

Figure 1 Food consumption in 2007: Brazil, upper middle income, and high income countries



Sources: World Bank, WDI, 2008. United Nations Food and Agriculture Organization, FAOSTAT database. ERS calculations.

Brazil's food consumption patterns are changing.

As per capita income grew from 1980 to 2007, Brazil's food consumption, measured by calories per person per day, has grown steadily at an annual rate of 0.8% and now exceeds the average for upper-middle-income countries.

Changing food consumption patterns

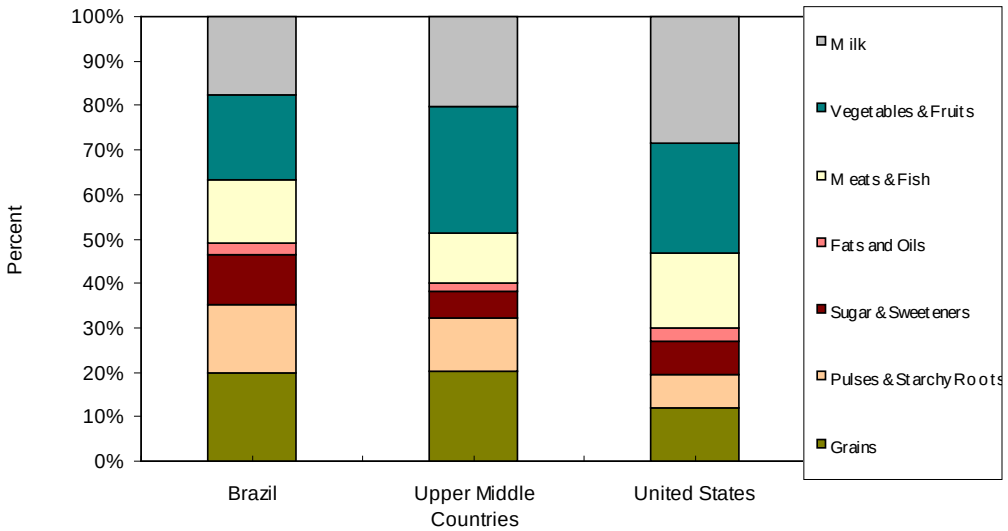
Food consumption in Brazil is shifting toward vegetables, fruits, oils, meats, and milk. Consumption of meat and milk is expanding fastest. By 2008 total red meat and poultry consumption had risen to 89 kilograms per person, 31 kg above the 1993 level.[3] Per capita consumption of milk has risen to 112 kg in 2008, up 20 kg from 1993, aided by milk donations to low-income populations through the food and nutrition security programs (Bolsa Familia and School Meals).

Rising incomes have led to an increase of consumption of some grain products to 131 kg per person in 2008, up 6% from 1993. Rice (41 kg per person) and wheat (52 kg) were the most popular cereals in 2008. Consumption of staples (beans and starchy roots) has reached 97 kg per person, and there has been a 12% gain in vegetable and fruit consumption since 1993. Sugar consumption — currently double the world average — reflects abundant domestic supply and low prices.[4]

As Brazil becomes more urbanized and Brazilian consumers grow wealthier, the composition of food demand will move toward that of higher-income countries (Figure 2). To match average shares in high-income countries, consumption of meat, vegetables, fruit, and milk would grow the fastest. Consumption of pulses will be relatively unaffected by urbanization, since urban and rural consumption levels are similar.

USDA agricultural projections to 2018 indicate that 2.9% annual growth in Brazilian incomes will lead to consumers spending more on food. Per capita consumption of red meats and poultry will increase from 89 kg per person in 2008 to 92 kg in 2018.

Figure 2 Food consumption shares by selected countries in 2005



Note: Based on per capita consumption measured in kilograms per year.
Source: United Nations Food and Agriculture Organization, FAOSTAT database.

Poultry will be the fastest-growing component of meat consumption, with its share of meat consumption increasing from 45% in 2008 to 47% in 2018. While per capita beef consumption is projected to decrease 0.2% annually through 2018, annual per capita poultry and pork consumption will rise steadily as incomes increase (by 0.8% and 0.2%, respectively).

Overall food use of grains is projected to decrease, probably by a shifting of coarse grains to feed use, but wheat and rice consumption will rise to the levels observed in high-income countries. Brazil's per capita demand for wheat is projected to rise to 56 kg per person by 2018, 7% above the 2008 level. Consumption of rice, a major staple in the diet of more than half of Brazilians, is projected to grow to 43 kg per person by 2018, a 5% increase from 2008.

Sugar consumption is expected to decline to levels similar to those of higher-income countries, leaving more sugarcane available for biofuel production. About 53% of Brazil's sugarcane is already being distilled into ethanol. Domestic demand for ethanol has increased 3% annually since the late 1990s as sales of "flex-fuel" cars powered by gasoline and ethanol in any proportion in a single tank of fuel have boomed as Brazilian incomes increased. Ethanol represents 41% of the gasoline used in Brazil, compared to 7% in the United States. Brazil's ethanol consumption is projected to rise to 14 billion gallons by 2018, from 4.3 billion gallons in 2008.[5]

Rising demand

USDA projections indicate that Brazil will need to produce 7% more grain and 43% more oilseeds than in 2008 to meet projected domestic and foreign demand in 2018 as demand increases from major soybean importers, such as China, and soybean exports from the United States fall. More than 57 million tons of feed grains would be needed to supply Brazil's livestock, 6% more than in 2008.

To meet domestic and foreign demand, ethanol production is projected to rise to 16 billion gallons by 2018, from 7 billion in 2008. Brazil's ethanol exports are expected to increase an additional 1 billion gallons, to 2.3 billion by 2018.[6] This increase could help the U.S. meet ambitious biofuel demand targets under the 2007 Energy Independence and Security Act (EISA). The law allocates 3 billion gallons out of 26 billion in 2018 for renewable fuel other than ethanol derived from corn starch, a category that could include sugarcane-based ethanol.

Brazil will need to increase agricultural output to meet rising demand.

Brazil will need to import commodities it does not produce competitively, including wheat and rice, two commodities that Brazilian consumers are expected to demand more often over the next decade as incomes grow. Wheat imports, which for the past decade have accounted for over two-thirds of supply, are projected to increase to 7.4 million tons in 2018, a 376,000 ton increase over 2008. The main suppliers of wheat to Brazil in recent years have been Argentina, the United States, and Canada. Brazil is usually a net importer of rice, and its imports are projected to increase 26% to reach 43 kg per capita in 2018.

Factors affecting farm sector expansion

Brazil produces most of the foods it consumes. It has quadrupled output since the 1970s through technological improvements, expansion of cultivated area,

and shifting production from smallholders to large-scale farming to achieve economies of scale. Large-scale agriculture now accounts for over three-quarters of total grain, oilseed, and meat production.

Increasing government investment in agricultural research since the 1970s, carried out through the Brazilian Corporation for Agricultural Research (Empresa Brasileira de Pesquisa Agropecuária, EMBRAPA), a public company linked to the Ministry of Agriculture and Food Supply, is credited with stimulating the rapid expansion of the land base and increasing agricultural productivity, with the greatest gains for soybeans, cotton, and rice. Yields of beef, pork, and poultry also increased significantly. Recent gains in area and yields for soybeans and corn reflect Brazil's response to growing export demand and expansion of Brazil's hog and poultry industries (Table 1).

This agricultural productivity growth has helped Brazil meet domestic demand while increasing exports. Brazilian farm exports performed well between 2003 and 2008, increasing at an annual rate of 22% in US dollar terms. Brazil is the world's largest exporter (global market shares in parentheses) of sugar (48%), ethanol (40%), beef (18%), coffee (30%), and orange juice (39%); and the second largest exporter of soybeans (32%) and poultry (27%), after the United States These gains are also reflected in the US loss of market share.

Despite its successes in expanding production, growth in agriculture could slow unless Brazil can address financial constraints for farmers, infrastructure constraints along the food supply chain, and environmental concerns about land expansion. Also, the growth of Brazil's biofuels industry could reduce the availability of Brazil's exportable surpluses of some commodities. Demand for soybeans as a raw material for biodiesel will likely increase use of Brazil's excess crushing capacity and dampen the recent boom in soybean exports. Planned increases to Brazil's biodiesel mandate from the current 3% of transportation fuel would also likely reduce soybean oil exports.

Lack of credit is a constraint on farm investment and output growth, and prospects for farmers to access more credit for production and marketing of crops and livestock are poor because the sector is currently highly indebted. In Brazil the cost of credit is high and its availability is limited. Total credit granted by the financial system is less than 30% of GDP, one of the lowest levels of credit availability anywhere in the world.

Table 1
Brazil's land use and yields

Commodity	2000-02		2003-05		2006-08	
	Area	Yields	Area	Yields	Area	Yields
	Ha 000	Tons/ha	Ha 000	Tons/ha	Ha 000	Tons/ha
Soybeans	14,628	2.7	20,962	2.5	21,410	2.8
Corn	12,459	2.9	12,319	3.3	13,867	3.6
Cotton	784	1,018.7	1,002	1,146.3	1,007	1361.7
Wheat	1,482	1.6	2,421	2.0	1,979	1.8
Rice	3,315	2.2	3,613	2.3	2,946	2.7
Sugarcane Ethanol	5,036	68.5	5,609	73.4	6,739	76.1

Source: Foreign Agricultural Service (FAS), U.S. Dept. of Agriculture.

Over the past 10 years, to alleviate the unavailability of official credit, input supply and trade companies provided the bulk of production financing for farmers — a critical factor in the expansion of the agricultural sector. However, with the current global financial crisis these companies are less able to finance farmers in the near term. Many Brazilian farmers are now struggling to pay debts. Brazil's agriculture-related debt arrears in 2008 reached 7% of agricultural GDP.[7]

Infrastructure bottlenecks are the main obstacle to Brazilian agriculture's capacity to supply domestic and world markets. Poor roads impose high costs on farmers in the Center-West region, where crops have the highest yields in the country. Large investments in maintenance and expansion of transport infrastructure are needed to keep up with the expected growth in demand, reduce delivery times and costs, and maintain product quality. In recent years, private investment in infrastructure has exceeded federal investments, and new public-private partnerships (PPPs) have been improving roads and port facilities. The Brazilian government estimates that it needs to invest $200 billion in infrastructure over the next decade.

Potential for output growth from bringing more land under cultivation is limited. Although there is still land available for crop and livestock expansion, continued expansion in the Cerrados (savannah areas) and Amazon region is likely to be constrained by environmental concerns about land clearing. Based on yield projections, production projections through 2018 assume that an additional 10 million hectares of cropland will be brought into production. The expected rate of expansion is one of the world's highest at 2.1% annually for the next 10 years. This expansion in cropland is likely to come from new land brought into production and from converted pasture land. Pasture land is expected to decline as cattle growers adopt new technologies and feeding practices.

Brazil's current agricultural area totals 76 million hectares, with 58 million hectares of annual crops and 18 million of perennial crops. Pasture now stands at 172 million hectares. The scope for cropland expansion in Brazil is estimated at 119 million hectares, with 69 million hectares in the Cerrados and 50 million from pastureland conversion.

Biofuel production in Brazil is facing increasing pressure to respond to environmental sustainability concerns about land use of cropping systems (sugarcane, soybean, and palm oil plantations) to produce biofuels and land use change impacts. Frequently cited are the environmental risks from intensified competition for land currently planted to other crops and the conversion of forest or grassland to crop production, which may result in habitat loss. Sugarcane area is projected to increase 2.2% annually through 2018, from 8 million hectares in 2008 to over 10 million in 2018, driven by biofuel demand.[8]

Farm sector up to the challenges

Over the past two decades Brazil's rapid economic growth has been driven by stabilization and structural reforms that have led to high rates of investment and gains in productivity throughout the economy. Reforms led to growth in employment and income, better income distribution, poverty alleviation, and more demand for food. More consumers are participating in formal markets, expanding the quantity and quality of food products demanded by Brazilian consumers. As household incomes rise, the structure of Brazilian food expenditures is changing, with demand shifting toward fruits, vegetables, and meats.

At this point it appears that Brazil will be able to meet these challenges and that the agricultural

sector will produce enough food to meet domestic demand and — depending on future changes to Brazil's biofuels mandate — exports as well. Brazil's impressive agricultural performance of the past few years is likely to continue, despite the pressures on the farm sector. On the positive side, productivity advances for crops and animal products seem almost guaranteed given the anticipated supply of improved seeds, soil correction techniques, and other technologies generated by EMBRAPA.

In addition, the PPP (public-private partnership initiatives) will enable accelerated investment in much-needed transport, ports, and storage infrastructure. The large investments needed for infrastructure development and budgetary constraints make PPPs the most viable option. These positive factors will minimize pressures from the lack of credit availability and the rapid growth of the biofuel sector, allowing Brazil to meet the new challenges from changes in dietary consumption patterns.

For more information:

Ministério do Desenvolvimento Social e Combate à Fome,
http://www.mds.gov.br.

World Trade Atlas, Global Trade Information Services.
Available online:
http://www.gtis.com/english/GTIS_WTA.html.

[1] World Bank, World Development Indicators 2008. WDI Online: http://publications.worldbank.org/WDI/; accessed April 14, 2009.

[2] Neri, Marcelo. Crônica de uma crise anunciada. FGV, Revista Conjuntura Econômica, March 2009. http://www.fgv.br/cps/crise/; accessed on April 17, 2009.

[3] USDA, Agricultural Projections to 2018, OCE-2009-1, Office of the Chief Economist, World Agricultural Outlook Board, February 2009. www.ers.usda.gov/publications/oce091; accessed on April 24, 2009.

[4] Food and Agriculture Organization of the United Nations, FAOSTAT, http://faostat.fao.org/default.aspx; Accessed March 29, 2007.

[5] MAPA: Ministério da Agricultura, Pecuária e Abastecimento, http://www.agricultura.gov.br/pls/portal.

[6] Ibid.

[7] Banco Central do Brasil, 2008. www.bcb.gov.br.

8 MAPA, op. cit.



CONJUNTURA ECONÔMICA

Address

Rua Barão de Itambi, 60 – 5º andar
Botafogo – CEP 22231-000
Rio de Janeiro – RJ – Brazil
Tel.: (55-21) 3799-6840 – Fax: (55-21) 3799-6855
conjunturaredacao@fgv.br
www.conjunturaeconomica.com.br