

# Food Security

## The Brazilian Case

Weber Antonio Neves do Amaral  
and Alessandro Peduto

2010

## Abstract

Chronic food insecurity remains one of the main challenges to developing countries' sustainable development and thus to the stability of both nations and global political and economic regimes. Trade plays a vital role in a nation's economic growth and has several links with food security. This report provides the Brazilian context in terms of food security and trade linkages. In less than three decades, Brazil has changed from a net importer of food to a net exporter due to increased production (incorporating new areas of the country) and productivity. Gains of scale achieved by large agricultural enterprises have helped lower production costs and thus increase access to food and to the global commodity trade without affecting the country's internal market. Thus, for Brazil, trade has not affected food security adversely. However, a more detailed analysis is needed to identify the relationship between food security and trade at the local and regional levels; however, this is a complex exercise and beyond the scope of this report.

Copyright © 2010 International Institute for Sustainable Development

Published by the International Institute for Sustainable Development

International Institute for Sustainable Development

161 Portage Avenue East, 6th Floor

Winnipeg, Manitoba

Canada

R3B 0Y4

Tel: (204) 958-7700

Fax: (204) 958-7710

E-mail: [info@iisd.ca](mailto:info@iisd.ca)

Web site: <http://www.iisd.org>

Series on Trade and Food Security – Policy Report

Food Security: The Brazilian Case

Weber Antonio Neves do Amaral and Alessandro Peduto

August 2010

## About the Trade Knowledge Network

<http://www.tradeknowledgenetwork.net>

The Trade Knowledge Network is a global collaboration of research institutions across Africa, Asia, Europe and the Americas working on issues of trade and sustainable development. Coordinated by the International Institute for Sustainable Development (IISD), the TKN links network members, strengthens capacity and generates new research to assess and address the impact of trade and investment policies on sustainable development.

The overarching aim of the TKN is to help ensure that trade and investment contribute to sustainable development, with social development and the environment equitably addressed in trade and investment policies. The TKN furthers this aim by generating compelling research with clear policy recommendations and communicating those effectively to decision makers nationally, regionally and globally.

The TKN is hosted by the International Institute for Sustainable Development, a Canada-based not-for-profit organization promoting change towards sustainable development. As a policy research institute dedicated to the effective communication of its findings, the Institute engages decision-makers in government, business, NGOs and other sectors in the development and implementation of policies that are simultaneously beneficial to the global economy, the global environment and to social well-being.

This study is part of a larger, multi-region TKN project that seeks to understand better the impacts of trade policy on food security. It includes country case studies and regional analyses from Latin America, Southern Africa and Southeast Asia. It was made possible through the generous support of the Swedish Environment Secretariat for Asia (SENSA) and the Norwegian Agency for Development Cooperation (NORAD). The project outputs are available on the TKN website.

## About the International Institute for Sustainable Development (IISD)

<http://www.iisd.org>

The International Institute for Sustainable Development contributes to sustainable development by advancing policy recommendations on international trade and investment, economic policy, climate change, measurement and assessment, and natural resources management. Through the Internet, we report on international negotiations and share knowledge gained through collaborative projects with global partners, resulting in more rigorous research, capacity building in developing countries and better dialogue between North and South.

IISD's vision is better living for all—sustainably; its mission is to champion innovation, enabling societies to live sustainably. IISD is registered as a charitable organization in Canada and has 501(c)(3) status in the United States. IISD receives core operating support from the Government of Canada, provided through the Canadian International Development Agency (CIDA), the International Development Research Centre (IDRC) and Environment Canada; and from the Province of Manitoba. The Institute receives project funding from numerous governments inside and outside Canada, United Nations agencies, foundations and the private sector.

## Table of contents

Abstract	i
About the authors	iv
Abbreviations and acronyms	iv
Executive summary	v
1. Introduction	1
1.1 Definition of food security	1
1.2 The state of global food insecurity	2
2. The state of food insecurity and agriculture in Brazil	3
2.1 Brazil's major crops: Cultivated areas and productivity	4
2.2 Brazil's trade market share of major food commodities	5
2.3 Trends in the Brazilian population's food consumption patterns	7
2.4 Government policies and food security	9
2.4.1 Agricultural programs and policies on food security: The Guaranteed Price Policy	9
2.4.2 Additional food policies	9
3. Additional food security drivers	11
3.1 Biofuels demand and land use changes	11
3.2 Competition for land use	11
3.3 Fertilizers and inputs	13
4. Conclusion	15
References	17
Annex: Major Brazilian government food and agricultural programs, 1994–2010	18
<b>Figures and tables</b>	
Figure 1: FAO Food Price Index variation, 1990–2010	3
Figure 2: Evolution of daily calories consumption by individuals in Brazil, 1980–96 (calories/day)	8
Figure 3: Participation of family/subsistence farming in Brazilian food production, 2006	10
Figure 4: Evolution of areas of staple crops under cultivation, 1976/77–2006/07 (1,000 ha)	12
Figure 5: Percentage of the Brazilian population living below the poverty line, 1991–2007	16
Figure 6: Variations in Brazilian food prices, 1996–2010 (%)	16
Table 1: Brazil's major crops, 2000/01–2008/09 harvests (production in millions of tons; area under cultivation in millions of ha; productivity in tons/ha)	4
Table 2: Brazil's production (million tons) per major agricultural state and harvested area (million ha), 2001 & 2008 harvests	5

Table 3: Major Brazilian crop imports, 1998–2007 (imports in kilotons; global market share in %)	6
Table 4: Major Brazilian crop exports, 1998–2007 (imports in kilotons; global market share in %)	7
Table 5: Brazil’s land area and its uses	11
Table 6: Variations in the harvested area of staple crops in Brazil and some centre-south states between the 2007 and 2008 seasons	13
Table 7: The proportion of raw materials imported for Brazilian fertilizer production, 1990–2010 (%)	13
Table 8: Brazil’s share of global demand for nitrogen, phosphorus and potassium, 2008 (%)	14
Table 9: Brazil’s share of global imports of nitrogen, phosphorus and potassium, 2008 (%)	14

## About the authors

Weber A. Neves do Amaral has an MA and PhD from Harvard University. He also holds a Master of Sciences and Engineering from the University of São Paulo. He was the founder and formerly the CEO of the Brazilian Centre for Biofuels and a senior scientist at Bioversity International, based in Rome. He is currently a professor at the University of São Paulo and a partner in a venture capital firm.

Alessandro Peduto has a BA in Business Management from the University of São Paulo and later studied at Bocconi University in Milan. In 2009 he was an intern at Wal-Mart Brazil as part of the e-commerce new business development team and was an intern at Venture Partners do Brazil (VPB) in 2007–08. In 2010 he became an investment analyst at VPB, where he has worked on strategic consulting projects.

## Abbreviations and acronyms

BRL	Brazilian real
FAO	Food and Agriculture Organization of the United Nations
ha	hectare(s)
kg	kilogram(s)
MDA	Ministry of Agrarian Development
MERCOSUR	Southern Common Market
TEC	Common External Tariff
USD	U.S. dollar

## Executive summary

Chronic food insecurity remains one of the main challenges to developing countries' sustainable development and thus to the stability of global political and economic regimes. Trade plays an important role in a nation's economic growth and has several links with food security. Therefore, a proper understanding of the direct and indirect links between trade and food security is highly important. Addressing these linkages is particularly challenging, however, since food insecurity is the result of the interplay of a series of factors operating at different levels, only one of which is trade.

Brazil plays an important role in both food production and trade. The expansion of its agricultural sector over the last few decades has guaranteed an increase in food supplies to its national market and, significantly, to the global commodities trade. Trade (internally and externally) is considered to affect at least three of the pillars of food security: availability, access and, thus, stability. When appropriate stimuli are given to agricultural producers, trade might have a positive impact on food availability and access, as food production increases and prices decrease. However, when trade is not supported by the right combination of agricultural policies, food availability might decrease and prices increase. The past few years have been characterized by unprecedented challenges for both developed and developing countries, spurred by the increases in food and fuel prices in the period 2006–08—as measured by the Food and Agriculture Organization's Food Price Index, which shows a compound growth rate of 25 percent in this period—and by the financial crisis and the resultant 2008–10 global economic slowdown. These challenges were exacerbated by the planet's growing human population (although the rate of growth has slowed significantly since the 1960s) and by the various effects of climate change (variations in rainfall patterns and droughts, new crop and livestock diseases, heat waves, etc.), which have serious repercussions on the capacity of most vulnerable countries, households and individuals to address food insecurity.

At the national level, food availability in Brazil is more than sufficient for its entire population. Domestic production of food, plus imports and minus exports, results in food availability per capita (in grain equivalent) of more than 340 kg per capita per year, about one third more than per capita nutritional requirements. The market share values of Brazilian imports for the period 1998–2007 decreased for dry beans (from 10.82 to 3.25 percent), maize (from 2.38 to 1.02 percent), rice (from 6.1 to 2.39 percent), soybeans (from 2.15 to 0.13 percent), refined sugar (from 0.0003 to 0.0002 percent) and wheat (from 6.03 to 5.57 percent). In the same period, exports increased for dry beans (from 1.85 to 30.85 kilotons), maize (from 7.17 to 10,933.46 kilotons), rice (from 6.61 to 201.48 kilotons), soybeans (from 9,274.75 to 23,733.78 kilotons), refined sugar (from 3,575.27 to 6,915.80 kilotons) and wheat (from 4.19 to 104.48 kilotons). As can be seen from the figures for the period from the late 1990s to the late 2000s, Brazil played a significant role in the world commodities trade; for example, in 2007 exporting maize (10,933.46 kilotons and 9.97 percent of market share), refined sugar (6,915.80 kilotons and 29.95 percent of market share) and soybeans (23,733.78 kilotons and 31.90 percent of market share), while importing maize (1,095.54 kilotons and 1.02 percent of market share) and wheat (6,638.02 kilotons and 5.57 percent of market share).

The Guaranteed Price Policy is the main agricultural policy used in Brazil to ensure food security and is aimed at small and medium-sized holders. The primary aim of this policy is to ensure that purchase prices are compatible with production costs, plus reasonable levels of profits. The growing productivity per acre for the main staple foods in Brazil more than compensates for the reduced area under cultivation (specifically for rice and beans). This increased production is also associated with higher fertilizer usage. Perhaps the most important factor responsible for the rise of food prices over the period 2006–08, besides the increase in demand for food due to population growth and, more importantly, rising

incomes, was the price of the fertilizers, especially in Brazil. As Brazil is one of the largest producers of agricultural commodities, the use of fertilizers is significant and is an important part of the costs of production. Brazilian demand for the raw materials needed to make fertilizers grew by about 6.6 percent per year between 2000 and 2008, and currently the country is applying self-sufficiency policies for these inputs in order to reduce the quantity of imports, reduce spending on agricultural commodities and boost farmers' competitiveness. Fertilizer prices also showed a direct correlation with oil prices, which is the raw material for the production of the nitrogen used in fertilizers. Increases in the price of oil, therefore, increase the production costs of nitrogen, and thus of the fertilizers used by farmers. Besides the logistics issues, the fertilizer trade also faces several protectionist barriers set up by producers. For example, China, a major producer of fertilizers, in April 2008 raised the export tax on the raw materials used to make fertilizers by up to 135 percent in order to avoid a possible shortage in its internal market.

## 1. Introduction

Chronic food insecurity remains one of the main challenges to developing countries' sustainable development and thus to the stability of global political and economic regimes. Trade plays an important role in a nation's economic growth and has several links with food security. Therefore a proper understanding of the direct and indirect links between trade and food security is highly important. Addressing these linkages is particularly challenging, however, since food insecurity is the result of the interplay of a series of factors operating at different levels, one of which is trade. The root causes of food insecurity include poverty, war and civil conflicts; environmental degradation; national policies that do not contribute to and promote agricultural development; inequitable access to food; market protection and subsidies; and limited access to markets for trading purposes (since free market access would contribute to income generation and eventually to lower food prices).

Other factors operate at the household and community levels (low productivity of crop and livestock systems; limited or insufficient access to food because of poverty, physical barriers and gender inequalities, etc.) and the individual level (low levels of education, poor health status, inequitable intra-household distribution, etc.) (EC, 2010: 3). These factors will not be addressed in this report, but should be considered when examining the relationship between trade and food security.

Brazil has played an important role in global food production and trade. The expansion of its agricultural sector during the last two decades has guaranteed an increase in food supplies to its national market and, significantly, to the global commodities trade.

### 1.1 Definition of food security

The Food and Agriculture Organization of the United Nations (FAO) defines food security as 'a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life' (FAO, 2003).

In addition to this concept, several other definitions are important when considering the issue of food security (FAO, 2006):

- **Food availability:** This refers to the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).
- **Food access:** This refers to access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. *Entitlements* are defined as the set of commodity bundles over which an individual has control, given the legal, political, economic and social arrangements of the community in which he/she lives (including traditional rights such as access to common resources);
- **Utilization:** This refers to the utilization of food through adequate diet, clean water, and sanitation and health care facilities to reach a state of nutritional well-being where all human physiological needs are met. This brings out the importance of non-food inputs to food security.
- **Stability:** To be food secure, a population, household or individual must have sustained (i.e. stable) access to adequate food at all times and should not be in danger of losing access to food



as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security.

Trade (both internally and externally) is considered to affect at least three of these pillars of food security: availability, access and, thus, stability. When appropriate stimuli are given to agricultural producers, trade can have a positive impact on food availability and access, as food production increases and prices decrease. When trade is not supported by the right combination of agricultural policies, food availability might decrease and prices increase. In this policy report, we provide aggregated information on food production in Brazil and the food trade, and discuss the role of government policies in securing food stability, especially for lower-income families. We conclude that despite its increasing participation in the global food trade, Brazil's food security is not being affected negatively.

## 1.2 The state of global food insecurity

According to FAO, the number people suffering from hunger grew between 1995–97 and 2004–06 in all regions except Latin America and the Caribbean, despite the progress made in the 1980s and in the first half of the 1990s.

In the first quarter of 2009 the number of chronically hungry people in the world was estimated to be about 1 billion: around 642 million in Asia and the Pacific, 265 million in sub-Saharan Africa, 53 million in Latin America and the Caribbean, and 42 million in the Middle East and North Africa.

Despite these trends, food security and agriculture have been generally neglected in recent decades by both developing country governments and parts of the international donor community. As a result, the relative share of funding for food security and agriculture has decreased (EC, 2010: 3).

In addition, recent years have been characterized by unprecedented challenges for both developed and developing countries, spurred by the increases in food and fuel prices in the period 2006–08 (Figure 1)—as measured by the Food Price Index<sup>1</sup>, which shows a compound growth rate of 25 percent over the period—and by the 2008–10 financial crisis and the resultant global economic slowdown (FAO, n.d.).

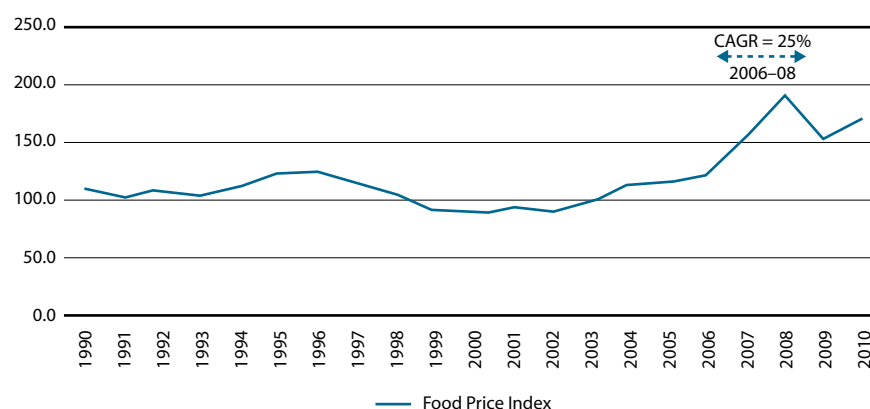
These increases marked the reversal of a decades-long trend of declining (real) prices for food on the global market and are likely to lead to a period of greater price volatility for food. These events have also created uncertainty about the ability of global markets to correct price distortions and triggered both speculation in food commodities and the new phenomenon of the large-scale acquisition of farmlands by richer food-deficit countries in poorer developing countries in Africa, Latin America, and Central and Southeast Asia (EC, 2010: 3).

Even though food prices, oil prices and financial crises affected developed, emerging and developing economies alike, their impacts varied significantly across regions, countries and population groups. In many countries the spike in food prices fuelled political instability and social unrest, which reignited the significance of food insecurity as a 'non-traditional' human security challenge.

---

1 FAO's Food Price Index consists of the average of six commodity group price indices weighted with the average export shares of each of the groups for 2002–04. In total, 55 commodity quotations are considered by FAO commodity specialists as representing the international prices of the food commodities in question and are included in the overall index.

Figure 1: FAO Food Price Index variation, 1990–2010



CAGR = compound annual growth rate

Source: FAO (n.d.)

The 2006–08 food crisis also had a direct impact on malnutrition figures. According to a World Bank estimate, the number of children suffering from irreversible after-effects of malnutrition increased by more than 40 million in 2008. For the poorest and most vulnerable countries, the effects of the crisis not only compounded the development challenges they face, but also put at risk the gains they had achieved in relation to the Millennium Development Goals, as growth stagnated, transfers of food were reduced and poverty increased (EC, 2010: 3). The main regions of hunger are located in less-developed areas of the world, i.e. Latin America (excluding Mexico), sub-Saharan Africa (excluding South Africa), South and East Asia (excluding Japan and South Korea), although several regions within developed countries also suffer from poverty and hunger.

These challenges are being exacerbated by the growing global population (although the rate of growth has slowed significantly since the 1960s) and by the various effects of climate change (variations in rainfall patterns and droughts, new crop and livestock diseases, heat waves, etc.), which have serious repercussions for the capacity of the most vulnerable countries, households and individuals to attain food insecurity (EC, 2010: 3).

## 2. The state of food insecurity and agriculture in Brazil

Brazil is the world's fourth-largest food exporter. Its agricultural sector is strong enough to meet all domestic needs and still generate foreign currency through exports. Even so, access to food is still a problem for millions of Brazilians.

Today, nearly a third of the Brazilian population is in a situation of food insecurity, meaning that they do not eat enough or well enough, with regularity or dignity, regardless of food trade policies.

The issue of food security has had a prominent place in Brazil's policy agenda for decades. On the national level, food availability in Brazil is in theory more than sufficient for its entire population. Domestic production of food, plus imports and minus exports, results in food availability (in grain equivalent) of more than 340 kg per capita per year, about one third more than the country's per capita nutritional requirements.

Brazil's average per capita calorie availability grew steadily over the last three decades at an annual rate of 0.7 percent, reaching 2,985 kilocalories in 2000 (FAO, 2009). However, due to the country's highly skewed income distribution, the lowest-income population segments are consuming less than their basic nutritional requirements (Meade *et al.*, 2004: 25).

Regarding international trade, Brazil's main agricultural export products are soybeans and soybean products, coffee, meat and meat products, frozen concentrated orange juice, sugar and sugar products, and tobacco. Agricultural exports totaled USD 24.8 billion in 2002 and have grown by 6 percent per year over the last two decades (AgraFNP, 2010b). Export earnings are used in part to finance grain imports such as wheat and corn, which are mainly used for feed in the rapidly expanding poultry sector (Meade *et al.*, 2004: 26).

The dramatic conclusion is that in Brazil, hunger and food insecurity are not due to any shortage of food because of the international food trade, but because people simply cannot afford to eat.

## 2.1 Brazil's major crops: Cultivated areas and productivity

During the last two decades the area of land under cultivation and the level of productivity have changed significantly in Brazil. In 2008 the total area under cultivation was approximately 64 million hectares (ha), of which soybean occupied an area of approximately 22 million ha, followed by corn (14.1 million ha), sugar cane (8.6 million ha) and beans (4.2 million ha). Tables 1 and 2, respectively, show changes in the area under cultivation and productivity for the most important crops in the country for the period of 2000/01–2008/09 and within-country variation among the country's major agricultural states. In this period, productivity improved significantly for corn (from 2.9 to 3.6 tons/ha), sugar cane (from 69 to 79 tons/ha), rice (from 3.2 to 4.3 tons/ha) and wheat (from 1.1 to 2.5 tons/ha), while it remained the same for soybean, cassava and beans in the last decade.

**Table 1: Brazil's major crops, 2000/01–2008/09 harvests (production in millions of tons; area under cultivation in millions of ha; productivity in tons/ha)**

Crop	Soy			Corn			Sugar cane			Bean			Rice			Cassava			Wheat		
	Prod.	Area	Pdty	Prod.	Area	Pdty	Prod.	Area	Pdty	Prod.	Area	Pdty	Prod.	Area	Pdty	Prod.	Area	Pdty	Prod.	Area	Pdty
Harvest																					
2000/01							344	5.0	69	2.6	3.9	0.7	10.4	3.2	3.2	22.6	1.7	13.5	1.7	1.5	1.1
2001/02	42	16	2.6	35.3	12.3	2.9	364	5.1	71	3.0	4.3	0.7	10.6	3.2	3.3	23.1	1.7	13.8	3.2	1.7	1.9
2002/03	52	18	2.8	47.4	13.2	3.6	396	5.4	74	3.2	4.4	0.7	10.4	3.2	3.3	22.0	1.6	13.4	2.9	2.1	1.4
2003/04	50	21	2.3	42.1	12.8	3.3	415	5.6	74	3.0	4.3	0.7	13.0	3.7	3.5	23.9	1.8	13.6	5.9	2.5	2.4
2004/05	52	23	2.2	35.0	12.2	2.9	423	5.8	73	3.0	3.9	0.8	13.4	3.9	3.4	25.9	1.9	13.6	5.8	2.8	2.1
2005/06	55	23	2.4	42.5	13.0	3.3	455	6.2	74	3.5	4.2	0.8	11.7	3.0	3.9	26.7	1.9	14.0	4.9	2.4	2.1
2006/07	58	21	2.8	51.4	14.1	3.7	516	6.7	77	3.3	4.1	0.8	11.3	3.0	3.8	26.9	1.9	14.1	2.2	1.8	1.3
2007/08	60	21	2.8	58.7	14.8	4.0	649	8.1	80	3.5	4.0	0.9	12.1	2.9	4.2	26.3	1.9	14.2	4.1	1.9	2.2
2008/09	57	22	2.6	50.3	14.1	3.6	687	8.6	79	3.5	4.2	0.8	12.6	2.9	4.3	26.3	1.9	13.9	6.0	2.4	2.5

Prod. = production; Pdty = productivity.

Source: AgraFNP (2010a) and authors' analysis

**Table 2: Brazil's production (million tons) per major agricultural state and harvested area (million ha), 2001 & 2008 harvests**

Production	RS		PR		SP		MG		GO		MS		MT	
	2001	2008	2001	2008	2001	2008	2001	2008	2001	2008	2001	2008	2001	2008
Soy	5.6	7.8	9.5	11.9	1.6	1.4	1.9	2.5	5.4	6.5	4.6	4.6	11.7	17.8
Corn	3.9	5.3	9.4	15.4	3.9	4.7	4.8	6.6	3.4	5.0	1.3	3.5	2.2	7.8
Sugar cane	1.1	1.4	28.1	51.2	212.7	390.2	18.2	47.9	11.7	33.1	8.6	21.4	12.6	15.8
Bean	0.1	0.1	0.6	0.8	0.3	0.3	0.5	0.6	0.2	0.2	0.0	0.0	0.0	0.1
Rice	5.5	7.4	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	1.2	0.7
Cassava	1.3	1.3	3.6	3.3	1.0	1.0	0.8	0.9	0.2	0.5	0.6	0.6	0.4	0.6
Wheat	0.9	1.7	0.6	1.9	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	-	-

Area	RS		PR		SP		MG		GO		MS		MT	
	2001	2008	2001	2008	2001	2008	2001	2008	2001	2008	2001	2008	2001	2008
Soy	3.31	3.83	3.29	3.98	0.58	0.53	0.72	0.87	1.90	2.18	1.19	1.73	3.85	5.68
Corn	1.46	1.39	2.49	2.98	1.08	0.97	1.20	1.34	0.75	0.90	0.48	0.99	0.74	1.83
Sugar cane	0.03	0.04	0.36	0.59	2.66	4.54	0.28	0.61	0.15	0.40	0.11	0.25	0.18	0.22
Bean	0.16	0.10	0.53	0.50	0.22	0.18	0.43	0.42	0.53	0.10	0.02	0.02	0.03	0.09
Rice	0.99	1.07	0.08	0.05	0.04	0.02	0.10	0.07	0.11	0.09	0.05	0.04	0.44	0.24
Cassava	0.09	0.08	0.17	0.14	0.04	0.04	0.06	0.06	0.02	0.03	0.03	0.03	0.03	0.04
Wheat	0.56	0.85	0.78	0.82	0.02	0.04	0.01	0.01	0.01	0.01	0.06	0.03	-	-

RS = Rio Grande do Sul; PR = Paraná; SP = São Paulo; MG = Minas Gerais; GO = Goiás; MS = Mato Grosso do Sul; MT = Mato Grosso.

Source: AgraFNP (2010a) and authors' analysis

## 2.2 Brazil's trade market share of major food commodities

In the period 1998–2007 Brazil's commodity imports decreased for dry beans (from 211.03 to 96.27 kilotons), maize (from 1,728.90 to 1,095.54 kilotons), rice (from 1,513.30 to 720.77 kilotons), soybeans (from 828.23 to 97.93 kilotons) and refined sugar (from 0.05 to 0.04 kilotons). Only wheat imports increased (from 6,395.49 to 6,638.02 kilotons), although not significantly. Tables 3 and 4, respectively, show the imports and exports of the most important crops in the country for the period 1998–2007. Cassava was not included in the analysis since its trade values were not significant, as it is typically consumed locally.

The global market share values of Brazilian imports for the same period decreased for dry beans (from 10.82 to 3.25 percent), maize (from 2.38 to 1.02 percent), rice (from 6.1 to 2.39 percent), soybeans (from 2.15 to 0.13 percent), refined sugar (from 0.0003 to 0.0002 percent) and wheat (from 6.03 to 5.57 percent).

In the same period, exports increased for dry beans (from 1.85 to 30.85 kilotons), maize (from 7.17 to 10,933.46 kilotons), rice (from 6.61 to 201.48 kilotons), soybeans (from 9,274.75 to 23,733.78 kilotons), refined sugar (from 3,575.27 to 6,915.80 kilotons) and wheat (from 4.19 to 104.48 kilotons).

The market share values of Brazilian exports for this period also increased for dry beans (from 0.08 to 1.04 percent), maize (from 0.01 to 9.97 percent), paddy rice (from 0.006 to 0.007 percent), soybeans (from 24.41 to 31.90 percent), refined sugar (from 19.90 to 29.95 percent) and wheat (from 0.004 to 0.079 percent).

**Table 3: Major Brazilian crop imports, 1998–2007 (imports in kilotons; global market share in %)**

		Dry beans	Maize	Rice*	Soybeans	Sugar refined	Wheat
1998	kilotons	211.03	1,728.90	1,513.30	828.23	0.05	6,395.49
	% share	10.82%	2.38%	6.10%	2.15%	0.00%	6.03%
1999	kilotons	92.81	822.15	1,207.42	582.03	0.03	6,891.01
	% share	4.87%	1.05%	4.41%	1.39%	0.00%	6.11%
2000	kilotons	79.53	1,771.19	729.66	807.40	0.02	7,523.01
	% share	4.22%	2.16%	3.21%	1.67%	0.00%	6.43%
2001	kilotons	130.26	624.36	776.29	849.58	0.01	7,016.33
	% share	5.92%	0.76%	3.32%	1.48%	0.00%	6.22%
2002	kilotons	82.30	345.26	639.33	1,045.20	0.02	6,572.24
	% share	3.44%	0.39%	2.39%	1.84%	0.00%	5.44%
2003	kilotons	103.28	797.67	1,239.76	1,189.23	0.00	6,611.94
	% share	3.53%	0.89%	4.71%	1.81%	0.00%	5.99%
2004	kilotons	79.19	330.49	927.26	348.31	0.13	4,847.81
	% share	3.25%	0.40%	3.40%	0.60%	0.00%	4.16%
2005	kilotons	100.70	597.03	532.50	367.75	0.01	4,988.14
	% share	4.06%	0.68%	2.02%	0.55%	0.00%	4.13%
2006	kilotons	70.06	956.40	652.93	48.86	0.02	6,530.50
	% share	2.46%	1.01%	2.25%	0.07%	0.00%	5.26%
2007	kilotons	96.27	1,095.54	720.77	97.93	0.04	6,638.02
	% share	3.25%	1.02%	2.39%	0.13%	0.00%	5.57%
CAGR	kilotons	-7.55%	-4.46%	-7.15%	-19.23%	-2.63%	0.37%
	% share	-11.33%	-8.12%	-8.94%	-24.46%	-3.97%	-0.79%

\* Rice includes broken, husked, milled and paddy rice.  
CAGR = compound annual growth rate.

Source: FAO (2009) and author's analysis

In light of these figures, Brazil played a significant role in the world commodities trade in this period; for example, in 2007 exporting maize (10,933.46 kilotons and 9.97 percent of market share), refined sugar (6,915.80 kilotons and 29.95 percent of market share) and soybeans (23,733.78 kilotons and 31.90 percent of market share), while importing maize (1,095.54 kilotons and 1.02 percent of market share) and wheat (6,638.02 kilotons and 5.57 percent of market share).

In terms of share growth, maize showed a compound annual growth rate for imports from 1998 to 2007 of 108.12 percent. The increase can be explained by factors such as a favourable exchange rate, record harvests and low domestic prices from 2001 onwards (IEA, 2003).

Rice and beans play a very important role in the Brazilian population's diet, but they are not as significant as other crops in the country's trade statistics (720 kilotons of rice imports and 201 kilotons of exports in 2007), reinforcing two issues mentioned previously: food security in Brazil is not significantly associated with the trade in major food commodities aimed at foreign markets.

**Table 4: Major Brazilian crop exports, 1998–2007 (imports in kilotons; global market share in %)**

		Dry beans	Maize	Rice*	Soybeans	Sugar refined	Wheat
1998	kilotons	1.85	7.17	6.61	9,274.75	3,575.27	4.19
	% share	0.08%	0.01%	0.02%	24.41%	19.90%	0.004%
1999	kilotons	2.54	7.52	47.67	8,917.21	4,273.26	1.63
	% share	0.10%	0.01%	0.19%	22.13%	23.83%	0.001%
2000	kilotons	4.78	6.70	26.41	11,517.26	2,158.35	0.97
	% share	0.18%	0.01%	0.11%	24.31%	12.54%	0.001%
2001	kilotons	2.32	5,628.98	22.13	15,675.54	4,083.34	0.84
	% share	0.08%	6.72%	0.08%	27.52%	22.32%	0.001%
2002	kilotons	16.20	2,746.99	29.96	15,970.00	5,724.01	1.03
	% share	0.48%	3.14%	0.11%	29.23%	27.23%	0.001%
2003	kilotons	2.69	3,566.23	19.44	19,890.47	4,560.73	50.31
	% share	0.08%	3.93%	0.07%	30.58%	22.30%	0.046%
2004	kilotons	2.00	5,031.00	36.74	19,247.69	6,198.18	1,323.43
	% share	0.07%	6.08%	0.13%	33.39%	29.27%	1.113%
2005	kilotons	2.29	1,070.02	272.32	22,435.07	6,568.08	156.57
	% share	0.09%	1.18%	0.91%	34.31%	26.68%	0.130%
2006	kilotons	7.77	3,938.00	290.17	24,957.98	6,063.24	652.10
	% share	0.27%	4.13%	0.94%	36.77%	25.11%	0.516%
2007	kilotons	30.85	10,933.46	201.48	23,733.78	6,915.80	104.48
	% share	1.04%	9.97%	0.60%	31.90%	29.95%	0.079%
CAGR	kilotons	32.53%	108.12%	40.73%	9.85%	6.82%	37.95%
	% share	29.77%	100.65%	38.63%	2.71%	4.17%	35.30%

\* Rice includes broken, husked, milled and paddy rice.  
CAGR = compound annual growth rate.

Source: FAO (2009) and authors' analysis

### 2.3 Trends in the Brazilian population's food consumption patterns

According to Buainain and Da Silveira (2002), the calories available for daily consumption are, on average, sufficient to feed all Brazilians. The main issue is that extreme social and economic inequalities combined with household wastage/losses can reduce this amount to an unacceptably low value. This mainly affects poor people, who often simply cannot afford to buy sufficient food. Buainain and Da Silveira (2002) say:

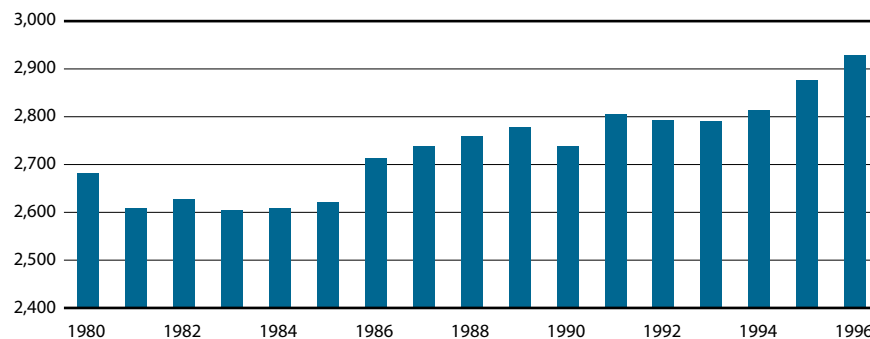
A cursory analysis of the Brazilian food balance sheets shows several interesting facts. Food consumption in Brazil is changing, and the pattern of change is clearly perceptible. The average energy supply grew from 2,408 calories per day in 1970 to 2,938 in 1996, increasing at an annual rate of 0.77 percent .... This suggests a steady improvement in nutritional status for the average Brazilian. Mean individual requirements (account taken of gender-age composition) are about 2,200 calories/day, and the average supply in 1970 (only 2,408 calories) would seem insufficient once thought is given to household losses (some 10%) and inequalities between lower and higher income groups. A supply of 2,938 calories per day would seem safer (though of course a significant proportion of Brazilians is still unable to meet their needs).

Buainain and Da Silveira (2002) continue that food-energy consumption seems to converge towards the rate of population growth. Generally, Brazilians have started having a more diverse diet that includes more daily fat and protein consumption and a new mix of fruits and vegetables:

Even in the presence of a better distribution of income, and consequently lower malnutrition at the bottom, average apparent consumption would not grow by much. With population growing at about 1.5% per year in the coming decades, calorie consumption would not grow faster than 1.9% per year. The rate of increase in calorie consumption per person would tend to diminish over time, possibly reaching very low values in 20 years. However, as per capita income grows food-consumption patterns change. In the case of Brazil between 1970 and 1996, whilst energy intake grew by 22%, and protein consumption correspondingly increased by 22.7%, fat consumption went from 46.1 to 81.5 grams per day, increasing by 76.7% in the same period. In protein consumption the composition of the protein mix varied significantly. The following table shows changes in some selected items between 1970 and 1996. The most striking increases in per capita domestic demand are undoubtedly those of poultry, beer, vegetable oil and milk. Also beef consumption has been on the rise, as well as vegetables and fruit other than citrus and banana. In fact, banana consumption has sharply diminished; intensive use of this product is typical of the traditional (mainly rural) Brazilian diet where it plays a significant role as a source of energy along with cassava, beans and rice.

Some food products have increased their part in the Brazilians' diet as a consequence of increased income and social changes associated with the process of urbanization. Food consumption habits in urban and rural regions are very different and notable differences exist among social groups in Brazil. For example, wheat consumption jumped from 36 kg/year in 1970 to 45–49 kg/year in 1980–96, while cassava consumption nearly halved from 98 to 50 kg/year. According Buainain and Da Silveira (2002), the rapid change of the urban–rural proportion in the Brazilian population, with the urban population already accounting for 80 percent of the total, is the main driver of these changes. However, this phenomenon might have less importance in the future.

Figure 2: Evolution of daily calories consumption by individuals in Brazil, 1980–96 (calories/day)



Source: Buainain and Da Silveira (2002)

## 2.4 Government policies and food security

The Brazilian government uses a guaranteed minimum price policy to stimulate agriculture. For example, in the 2007/08 harvest season, farmers facing several cost increases needed support policies to increase production or to reduce their loss of profit. In the first quarter of 2008, government was worried that increasing costs and growing world demand would put pressure on food prices, some of which were very important for Brazilians' diet and the country's agribusiness, such as rice, beans and maize. For example, the guaranteed minimum price of a 50 kg sack of rice was raised from BRL 22.00 to BRL 25.80 in the southern states of Santa Catarina and Rio Grande do Sul—typical rice producers—an increase of 17.27 percent. The price of a 60 kg sack of beans was raised from BRL 48.42 to BRL 80.00, an increase of 65.22 percent. The price of a sack of maize in South, Southeast, Mato Grosso and Goiás provinces and the Federal District was raised from BRL 14.00 to BRL 16.50, a 17.86 percent increase.

### 2.4.1 Agricultural programs and policies on food security: The Guaranteed Price Policy

The Guaranteed Price Policy is the main Brazilian agricultural policy for achieving food security and is aimed at small and medium-sized farmers. The primary idea of this policy is to ensure that purchase prices at least cover production costs, plus a certain level of profits. The government buys surplus crops, paying higher prices than those in the market. This mechanism reduces risks for crop producers during the harvest and is an important mechanism to reduce the price volatility that is intrinsic to the agricultural sector. When prices fall below the minimum level established by government, measures are taken such as buying crop surpluses from small farmers, prices equalization and financing the building up of stocks of selected crops. The minimum guaranteed price for crops considered to be regional and summer harvests is defined by government. This policy is aimed at achieving economic growth, increasing farmers' income and increasing the competitiveness of crop exports, when applicable.

The minimum price guaranteed is aimed at reducing or transferring to the wider society the uncertainty over prices faced by small-scale farmers. When fixed properly, minimum prices correctly anticipate market prices for producers, reducing the level of uncertainty for both producers and consumers and allowing the better allocation of productive resources (De Aguiar & Pinho, 1998). Guaranteed minimum prices policies directly influence producers' decisions on setting a targeted output for the next season, thus affecting the usage and intensity of production factors. Farmers take minimum price into account to decide on which crops they should plant. But they can also opt for the alternative of trading in the Stock and Futures Markets to protect themselves against future drops in price. The policy in theory guarantees a minimum return on the harvest, but this minimum price is not always enough to cover production costs.

During the food crisis, the government's minimum prices were adjusted as production costs of important crops increased and effectively eliminated or reduced profits for producers and/or impacted the final prices to consumers. In this context, the government presented the 2008/09 harvest plan, which contained changes in minimum prices of various products in order to adapt Brazilian production policy to commodity prices prevailing in the international markets.

### 2.4.2 Additional food policies

Due to the nutritional deficiencies of the poorest segments of the population and the country's social inequities, successive Brazilian governments have implemented a range of food assistance, anti-poverty, and welfare programs and other social policies over the past 50 years. These programs have concentrated



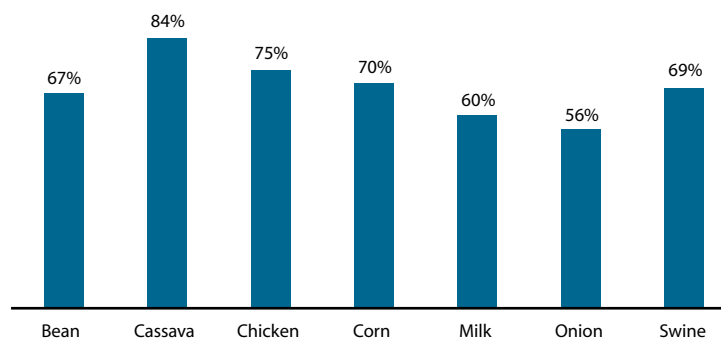
on investment in human resources and social assistance (pensions, health care, education, housing and basic sanitation), and programs to combat poverty (social welfare, programs to support peasant agriculture, agrarian reform, rural development and direct income transfers). During the 1990s (the so-called ‘reform decade’) various programs were implemented. From 1996 to 1999, government policies led to the formulation of the Alvorada project for poverty reduction in less-developed cities, the development of the Community Solidarity Program and the incorporation of the Bolsa-Escola project (a school fund project) as federal programs.

In January 2003, newly elected President Lula and his team of economic advisers launched Brazil’s Zero Hunger Program (‘Programa Fome Zero’), which constitutes the core of the social agenda of his administration. The program comprises 60 different initiatives with a goal of providing food access to 11.4 million families (or roughly 50 million people) within five years. The program is supported by agrarian reforms, producer incentives and the enactment of minimum agricultural income policies.

At the peak of the global food prices crisis, the Brazilian government’s first response was the creation of the More Food Program (Programa Mais Alimento) by the Ministry of Agrarian Development (MDA), a program intended to equip, organize and strengthen small farms and counter the global food crisis and the recent increase in prices of agricultural commodities worldwide. There were great expectations for this program, since the government believed it would form one of the pillars of the country’s attempts to try to withstand the crisis.

The MDA and the government hoped that this policy would achieve 18 million tons per year of excess production, focusing mainly on products that comprise the main Brazilian food basket (‘*cesta básica*’): rice, beans, milk, wheat, coffee, fruit, poultry, onions, cassava and maize. A credit line of up to BRL 100,000 per farmer was established that could benefit nearly one million farmers by the year 2010. The advantage of this benefit to producers is clear: since approximately 70 percent of food arriving at Brazilian tables originates in family/subsistence farming (see Figure 3, which covers both the domestic and foreign markets).

Figure 3: Participation of family/subsistence farming in Brazilian food production, 2006



Source: IBGE (2006)

A fuller description of all major government programs and policies on food and agriculture appears in the Annex to this report.

### 3. Additional food security drivers

In addition to the main issues presented above, several other drivers should be considered when assessing the complexities of the issues affecting Brazil's food security, such as land use changes, competition for land and costs associated with food production, especially fertilizers and other agricultural inputs. These issues are discussed below.

#### 3.1 Biofuels demand and land use changes

In Brazil, the recent growth of biofuels production has raised concerns about its sustainability, particularly the expansion of sugar cane production. It has been suggested that sugar cane cultivation increases Amazon deforestation and also reduces areas available for the production of other important foods such as rice, beans and maize. Addressing these concerns, the Brazilian government carried out a study in 2009 as part of the Agroecological Sugar Cane Zoning initiative to map out which areas are more conducive to sugar cane production. The initiative also prohibits cultivation of the Amazon forest, Pantanal and other protected areas, thus reducing the direct impacts of biofuel production on these ecosystems.

#### 3.2 Competition for land use

Table 5 shows that Brazil has approximately 340 million hectares of arable land, of which less than 1 percent is used for sugar cane production, but almost 3 percent for soybean production and almost 40 percent for pasture. If proper development and law enforcement policies were put in place, such as land use zoning, increased agriculture productivity in Brazil might simultaneously reduce the pressure to develop new land areas for agricultural production and increase the amount of food produced without negative impacts on the environment or food security. By increasing mechanization and the use of fertilizers, large monoculture farms are producing more food, supplying internal needs at a higher productivity rate per hectare and thus contributing to global trade.

**Table 5: Brazil's land area and its uses**

Land area in Brazil	Land (M-ha)	% of total land	% arable land
Brazil	850		
Preserved areas and other uses*	510 (60%)		
Arable land	340 (40%)		
Cultivated land: all crops	63.1	7.40%	18.60%
Soybeans	20.6	2.40%	6.10%
Corn	14	1.60%	4.10%
Sugar cane	7.8	0.90%	2.30%
Oranges	0.9	0.10%	0.30%
Pastures	200	23.50%	58.80%
Available land (ag. livestock)	77	9.10%	22.60%

\* These areas include the Amazon rainforest, protected areas, conservation and reforestation areas, cities and towns, lakes, and rivers.

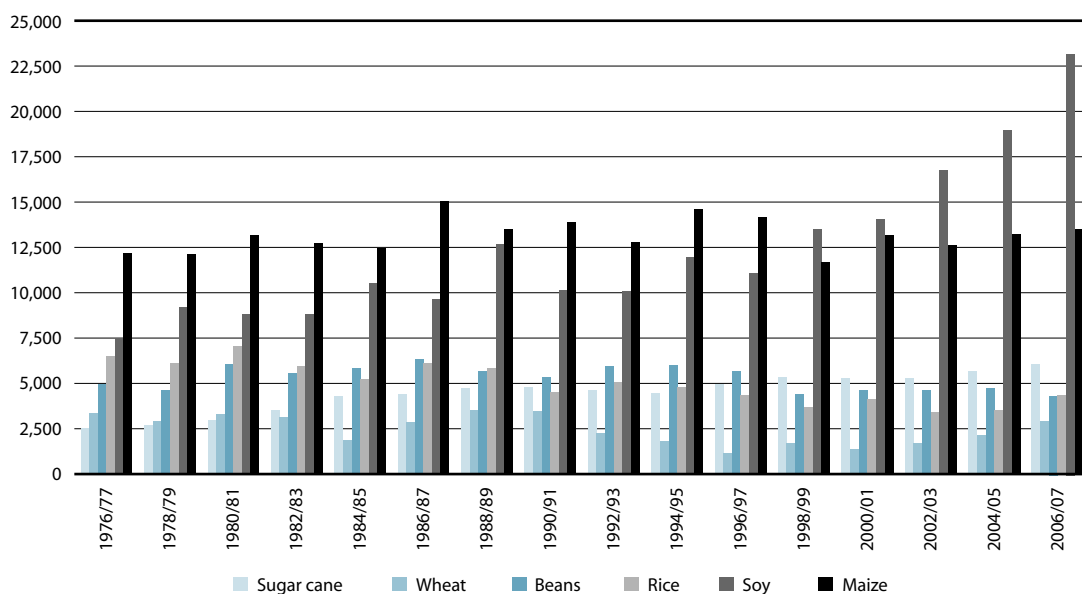
Source: Authors' analysis of data supplied by Instituto Brasileiro de Geografia e Estatística, Companhia Nacional de Abastecimento & União da Indústria da Cana de Açúcar

The growing demand for ethanol has increased the area of sugar cane under cultivation. Despite the government's efforts to monitor the dynamics of the evolving use of sugar cane to produce ethanol, these

initiatives are not sufficient to permit a detailed analysis of the impacts of sugar cane cultivation at the local level in terms of precisely describing the dynamics of crops changes, and the possible direct and indirect impacts on food prices and supply, and thus on global trade levels.

According to a study of the impacts of the sugar cane agribusiness in Brazil (IBASE 2008), changes in the total areas harvested of some crops does not mean that production has been reduced. Until 2006, growing productivity in the production of the main staple foods in Brazil more than compensated for the reduced area under cultivation (specifically of rice and beans). This production increment is also associated with increasing fertilizer usage, which between 1998 and 2007 grew by 68 percent, reaching 24.6 million tons and increasing Brazilian imports of fertilizers to about 17.5 million tons in 2007. This has meant that crops like beans that once were almost exclusive to small family farms are now being produced in the centre-west region in large, irrigated monoculture farms.

**Figure 4: Evolution of areas of staple crops under cultivation, 1976/77–2006/07 (1,000 ha)**



Source: IBASE (2008)

The total area of rice, beans and cotton harvested in the 2008 harvesting season showed a reduction when compared to the previous season (see Table 6). This was a small reduction at the country level, but possibly a significant one at the regional level. Some states might have become dependent on other states for their rice supplies or needed to import rice from overseas, although such a short period of analysis might result in misleading conclusions, and an assessment of long-term trends is required for an in-depth analysis.

**Table 6: Variations in the harvested area of staple crops in Brazil and some centre-south states between the 2007 and 2008 seasons**

Crop		Brazil	PR	SP	MG	GO	MS	MT
Sugar cane	Variation (ha)	964,182	108,502	433,400	124,662	144,880	68,423	32,901
	Variation %	11.5	20.1	9	19.2	36.2	35.7	14
Rice	Variation (ha)	-36,475	-7,480	-2,000	-18,629	-24,460	-7,109	-35,920
	Variation %	-1.3	-13.8	-8.1	-21.7	-20.6	-16.7	-13
Beans	Variation (ha)	-26,466	-62,955	-13,850	26,041	-28,620	-3,189	46,622
	Variation %	0.7	-11.1	-7.2	6.6	-23	-15.5	108.5
Cassava	Variation (ha)	228,765	66,308	-15,710	4,172	80,820	-1,483	-5,706
	Variation %	2.4	5.1	-2.2	0.3	14.7	-1.5	-3.1
Maize	Variation (ha)	689,971	188,891	8,390	13,382	71,280	123,994	197,677
	Variation %	4.9	6.8	0.9	1	8.6	14.3	12.1
Soy	Variation (ha)	696,553	-30,130	700	-15,730	11,240	14,000	587,508
	Variation %	3.4	-0.8	0.1	-1.8	0.5	0.8	11.6
Cotton	Variation (ha)	-54,499	-5,789	-19,380	-9,627	-10,770	-2,180	-21,252
	Variation %	-4.8	-47.2	-53.7	-31.7	-13	-4.7	-3.9

PR = Paraná; SP = São Paulo; MG = Minas Gerais; GO = Goiás; MS = Mato Grosso do Sul; MT = Mato Grosso.

Source: IBASE (2008)

### 3.3 Fertilizers and inputs

Perhaps the greatest reason for the rise of food prices in the period 2006–08, besides the increase in food demand due to population growth and, more importantly, increases in the incomes of consumers, was the price of fertilizers, especially in Brazil. As Brazil is one of the world's largest producers of agricultural commodities, the use of fertilizers is significant and has a considerable effect on the cost of production.

According to AgraFNP (2009), Brazilian demand for the raw materials used to produce fertilizers grew around 6.6 percent per year between 2000 and 2008, making Brazil the country with the largest growth during the analyzed period. However, as Brazil does not produce sufficient raw materials, the only alternative is importing what is required. Table 7 gives the proportion of imported raw materials for the Brazilian domestic fertilizer market over the last 20 years.

**Table 7: The proportion of raw materials imported for Brazilian fertilizer production, 1990–2010 (%)**

Year	Imported raw materials (%)
1990	36
2000	60
2003	64
2004	72
2005	67
2006	66
2007	73
2010 (forecast)	80

Source: AgraFNP (2009)

Fertilizer producers could in theory directly import the raw materials they require. However, for market reasons, this activity is controlled by large companies in the sector and the production chain is therefore limited to three companies, which account for 50 percent of Brazilian imports of potassium chloride

(AgraFNP, 2009). Also, if a company decides to import its own raw materials, only bulk buying permits gains of scale, stable supplies, better planning and dilution of risks. Table 8 shows Brazilian participation in world demand for the raw materials needed to produce fertilizers and the country's dependency on foreign markets and prices.

**Table 8: Brazil's share of global demand for nitrogen, phosphorus and potassium, 2008 (%)**

Nitrogen	Participation (%)	Phosphorus	Participation (%)	Potassium	Participation (%)
China	30	China	37	China	23
India	14	India	14	European Union	17
U.S.	12	U.S.	11	Brazil	13
Pakistan	3	Brazil	8	India	9
Brazil	2	Australia	3	France	3

Source: AgraFNP (2009)

Table 9 shows that Brazil is one of world's largest importers of the inputs used to produce fertilizers.

**Table 9: Brazil's share in global imports of nitrogen, phosphorus and potassium, 2008 (%)**

Nitrogen	(%)	Phosphorus	(%)	Potassium	(%)
U.S.	24	India	24	U.S.	19
India	10	Brazil	7	China	18
Turkey	5	U.S.	4	Brazil	14
France	4	Pakistan	3	India	9
Brazil	4	Mexico	3	Malaysia	4

Source: AgraFNP (2009)

Brazil's consumption of fertilizers has grown significantly from 12 million tons in 1994 to 25 million tons in 2007. However, this demand has shown some changes, for various reasons. The key ones were:

- farmers' capitalization and their capacity to obtain credit;
- the degree of technology used in production;
- the increase in the harvest area and the characteristics of newly cultivated soils;
- national agricultural policies; and
- changes in the exchange rate (prices on the international market are calculated in U.S. dollars).

Increases in the price of fertilizers have a direct impact on the cost of production, since they are the most relevant production input. The issue of fertilizer is a strategic concern for government in the context of the global food crisis and the security of the country's agricultural production because of Brazil's high dependency on foreign markets and foreign prices; its over-reliance on a small number of suppliers of local inputs, which can thus dictate raw materials prices, trade volumes and availability; increases in prices; and the fact that fertilizer costs form such a large part of production costs. Thus, the solution to this issue depends on solving many critical problems, a number of which are directly related to fertilizer imports, especially taxes on imports.

To try to prevent the spread of the food crisis, another government measure was a cut in the tariffs on fertilizer inputs imported from the Southern Common Market (MERCOSUR), particularly Argentina.

All such measures were related to MERCOSUR's Common External Tariff (TEC). Specific types of fertilizers were placed on the MERCOSUR TEC exception list and import tariffs for these products were decreased to zero.

Another approach was that of investment in infrastructure in Brazil itself for the production of fertilizer inputs. The government encouraged Vale and Petrobras to invest in research and technology development aimed at medium- and long-term exploration for deposits of several key minerals used to make fertilizer. It is thought Brazil has deposits that could make it virtually self-sufficient, except for potassium.

But even if the country were not self-sufficient in terms of these inputs, reducing the quantity of imports of such products would reduce spending on agricultural commodities. It would also reduce food prices for consumers and boost the competitiveness of farmers.

There is a direct correlation between fertilizer prices and oil prices, because oil is a raw material for production of nitrogen. Appreciation of the oil price therefore increases the production costs of nitrogen, one of the constituents of fertilizer. The price of oil has had another type of influence on world agriculture: the use of fossil fuels increases global warming, which in turn increases demand for renewable low-carbon fuels. This creates a greater interest in bioenergy, such as that produced from soybeans, corn and sugar cane. Thus, we might expect an expansion of the harvested area in the future, and thus higher consumption of fertilizers.

Besides the logistics issues, the fertilizer trade also faces several protectionist barriers established by producers. China, a major producer of fertilizers, raised the export tax on the raw materials for fertilizers by up to 135 percent in April 2008 in order to avoid a possible domestic shortage, causing prices in the international market to rise even more.

## 4. Conclusion

An assessment of the impacts of the policies adopted by the Brazilian government to deal with the 2006–08 global food price crisis shows that the crisis did not profoundly affect either Brazilian consumers or the country's trade performance.

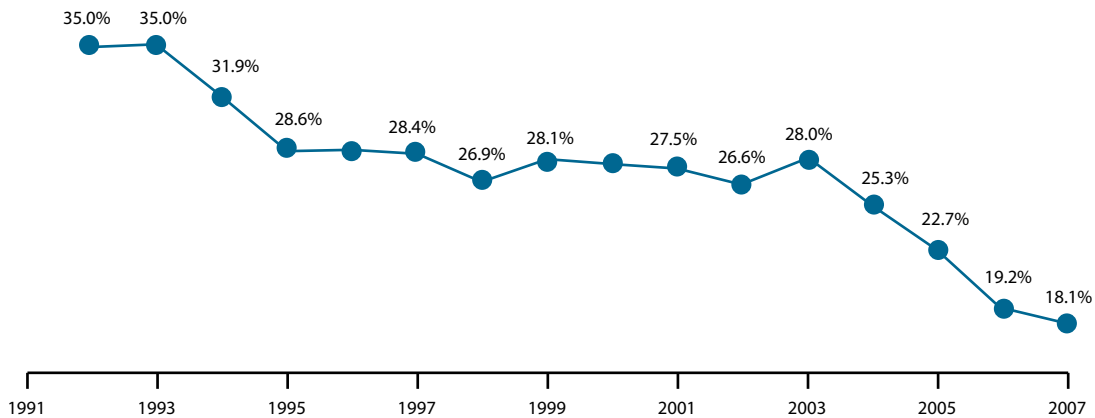
Brazil is a major food producer and sells a considerable share of its production in its domestic market, which allowed the government to put an array of policies in place to buffer Brazilians against the crisis and stimulate the domestic agricultural trade.

Moreover, during the last two decades there has been a considerable decrease in the percentage of the population living below the poverty line (defined as those with a monthly household income of below BRL 125). This means that a larger portion of the population has access to consumer goods, including food products.

In addition, in terms of the impacts of inflation on food prices (Figure 6), Brazil performed better than other countries, because it has an environment and a sophisticated economy that allowed it to fulfill domestic demand for food and expand its agricultural trade. During the food price crisis, Brazilians continued to consume at much the same level as previously, stimulated by socioeconomic improvements and higher incomes. At the same time, Brazil has played an important role in global food production and the global commodities trade. Its agricultural expansion during the last two decades has not only

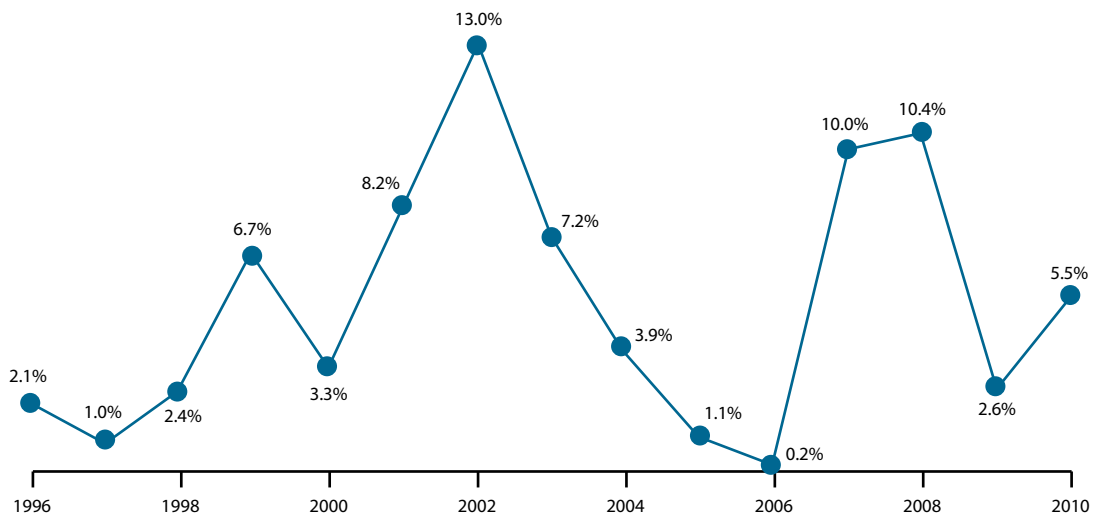
guaranteed increased food supplies to its domestic market, but, significantly, also to the global commodities trade, thus not adding additional pressure to global food prices.

Figure 5: Percentage of the Brazilian population living below the poverty line, 1991–2007



Source: DIAP (2010)

Figure 6: Variations in Brazilian food prices, 1996–2010 (%)



Source: Lacerda & Boteon (2009)

An analysis of complex issues such as food security and trade within and among countries and across regions requires a common and agreed methodological framework in order to draw comparable conclusions and make realistic assessments. This paper is not an exhaustive treatment of these issues as they relate to Brazil, but rather an attempt to raise issues to be considered when designing these frameworks, and, more specifically, to provide a reasonable understanding of the situation in Brazil in terms of food security and the trade in food during the last two decades.

## References

- AgraFNP. 2009. *Anuário agricultura Brasileira*. São Paulo.
- . 2010a. *Anuário agricultura Brasileira*. São Paulo.
- . 2010b. *FNP Notas & Notícias*. <<http://www.agrafnp.com.br>>.
- Buainain, Antônio Márcio & José Maria da Silveira. 2002. 'Structural reforms and food security in Brazil.' IE/UNICAMP discussion document no. 107. São Paulo: IE/UNICAMP.
- De Aguiar, Danilo Rolim & José Benedito Pinho. 1998. *Agronegócio Brasileiro: Desafios e perspectivas*. Brasília: Sociedade Brasileira de Economia e Sociologia Rural.
- DIAP (Departamento de Intersindical de Assessoria Parlamentar). 2010. 'Renda dos pobres cresce 72% entre 2001 e 2008, mostram dados da FGV, february 2010.' <<http://www.diap.org.br/index.php/agencia-diap/12015-renda-dos-pobres-cresce-72-entre-2001-e-2008-mostram-dados-da-fgv>>.
- EC (European Commission). 2010. 'Towards a EU policy framework to assist developing countries addressing agriculture and food security challenges.' Issues papers. Brussels.
- FAO (Food and Agriculture Organization of the United Nations). 2003. 'Food security: Concepts and measurement.' <<http://www.fao.org/docrep/005/y4671e/y4671e06.htm>>.
- . 2009. 'Country profile: Food security indicators: Country: Brazil.' <[http://www.fao.org/fileadmin/templates/ess/documents/food\\_security\\_statistics/country\\_profiles/eng/Brazil\\_E.pdf](http://www.fao.org/fileadmin/templates/ess/documents/food_security_statistics/country_profiles/eng/Brazil_E.pdf)>.
- . n.d. *Food security: World food situation*. Accessed 14 April 2010. <<http://www.fao.org/worldfoodsituation/FoodPricesIndex/en/>>.
- IBASE (Instituto Brasileiro de Análises Sociais e Econômicas). 2008. 'Impactos da indústria canavieira no Brasil.' *Plataforma BNDES Brasil*, November: 9–21.
- IBGE (Instituto Brasileiro de Geografia e Estatística). 2006. *Censo agropecuario Brasileiro, 2006*. Rio de Janeiro.
- IEA (Instituto de Economia Agrícola). 2003. *Brasil: Novo player no mercado internacional de milho*. <<http://www.iea.sp.gov.br/out/verTexto.php?codTexto=872>>.
- Lacerda, Maíra Paes & Margarete Boteon. 2009. *Análise dos preços de fertilizantes no setor Hortifrutícola*. Piracicaba: ESALQ/USP.
- Meade, Birgit, Constanza Valdes & Stacey Rosen. 2004. *Food security assessment: Brazil's food security and food assistance programs to reduce poverty*. May. <<http://www.ers.usda.gov/publications/gfa15/gfa15h.pdf>>.



## **Annex: Major Brazilian government food and agricultural programs, 1994–2010**

### **1994 – School Fund Program**

The School Fund Program (Programa Bolsa Escola) was designed by the mayor of Campinas, José Roberto Magalhães Teixeira, for the provision of scholarships to families with young children and low incomes in order to stimulate regular school attendance. The program was implemented in 2001 on a national scale. It had benefitted more than five million families when in 2003 it was incorporated into the Family Fund Program by Luiz Inácio Lula da Silva, the current president of Brazil.

### **2001 – Food Fund Program**

The Food Fund Program (Programa Bolsa Alimentação) was created on 10 August 2001 with the aim of promoting the health and improving the nutrition of pregnant women, nursing mothers, and children aged between six months to six years by supplementing family income. Individuals at nutritional risk belonging to low-income families who earned less than BRL 140 per capita monthly were potential beneficiaries of the program.

The benefits of the food fund were paid out by the Ministry of Health by means of magnetic card held by the mother or the adult responsible for a particular child. The benefit had a monthly value of BRL 15–45 per family. The program lasted for six months, but it could be extended for a further six-month period if beneficiaries remained at the same poverty level and had fulfilled a series of commitments to their health, such as undergoing pre-natal consultations/care, weighing and vaccinating children regularly, stimulating their physical and psychological development, and receiving guidance on diet and nutritional care.

### **2001 – Gas Assistance Program**

The Gas Assistance Program (Programa Auxílio Gás) was an income distribution program implemented by the Brazilian federal government in 2001 to assist beneficiaries of the Social Protection Network.

The program provided a payment of BRL 15 every two months for families earning half the minimum wage to subsidize the purchase of gas canisters. Studies conducted at the time indicated that many needy families were suffering nutritional problems simply because they were unable to afford the gas needed to cook their food. The program intended to solve this problem. In 2002, it reached the 4.8 million families already served by the School Fund Program and in 2003 it was incorporated into the Family Fund Program.

### **2003 – Zero Hunger Program**

In January 2003 newly elected President Lula and his team of economic advisers launched Brazil's Zero Hunger Program (Programa Fome Zero), which constitutes the core of the social agenda of his administration. The program comprises 60 different initiatives and was intended to provide additional food to 11.4 million families (or roughly 50 million people) within five years.

The program was supported by agrarian reforms, producer incentives and the enactment of minimum agricultural income policies. Other initiatives included the Food Coupon Program (inspired by the U.S. food stamp program), food vouchers to be exchanged at government-licensed food outlets, and food banks that redistributed surplus food from supermarkets and restaurants. Additional initiatives targeted low-income workers, while nutrition programs supplied food to pregnant women, new mothers and babies. The School Meals Program aimed to increase the quality of school meals using regional food resources. Existing school meals programs were expanded to cover siblings of children attending school and were extended into school vacations. Other related initiatives included food and nutrition campaigns to educate the population about healthy eating in order to prevent obesity and malnutrition.

### **2003 – Food Card Program**

The Zero Hunger Program is defined as one of its most urgent strategies in the implementation of the Food Card Program (Programa Cartão Alimentação), which was aimed at fighting hunger and promoting food and nutrition security, understood as the guarantee of daily human access to food in sufficient quantities and of the required quality.

To implement the program and the other activities of the Zero Hunger Program, a partnership among the federal, state and local governments was essential. A food card was given to people with a family income per capita of less than half of the minimum wage. The card was intended to increase the financial resources of people facing food insecurity by giving BRL 50 per month to each family for a period of up to six months, extendable for a further two periods of six months. The holder of the magnetic card used to access these funds was preferably the woman who cared for the family.

The aim was to transform the living conditions of families by reducing their risk of experiencing food insecurity. Initially the program was mainly focused on the populations of cities identified as being in crisis. Later, the card was issued to families that collected garbage on rubbish dumps as a means of livelihood, mainly landless families, Maroon communities and indigenous people.

### **2003 – Family Fund Program**

In the fall of 2003, the government merged all the existing income-transfer programs which up to that point had been administered by four different ministries—into one major program called the Family Fund Program (Programa Bolsa Família), which had a budget of BRL 5.3 billion (about USD 1.5 billion) in 2004.

This program was intended to provide direct income, under certain conditions, to families facing poverty (defined as those with a monthly income per person of BRL 70–140) and extreme poverty (those with a monthly income per person of less than BRL 70).

The program included the Zero Hunger Program, which has already been discussed above, and had three essential aims:

1. to promote the immediate relief of poverty through the direct transfer of income to families;
2. to strengthen the exercise of basic social rights in the areas of health and education, thus enabling families to break the cycle of intergenerational poverty; and

3. to coordinate complementary programs designed to develop families so that they overcame their vulnerability and poverty. Examples of supplementary programs included programs to generate jobs and income, teach adult literacy, and provide civil registration and the acquisition of other key documents.

### 2003 – Food Purchase Program

The Food Purchase Program (Programa de Aquisição de Alimentos) aimed to support small-scale farmers and involved the distribution of agricultural products to people facing food insecurity and the formation of strategic stocks of tools that enabled the restructuring and development of small-scale farmers. It was initiated each year when farm produce was sold after the harvest in order to cover farmers' costs (including the hiring of farm employees) and give them a fair profit, thus guaranteeing sufficient financial resources for the survival of their families with dignity.

Another objective of the program was to encourage the recovery and preservation of agro-biodiversity in different regions of the country by providing incentives for the work of organizations that supported and assisted small-scale farmers. In this sense, systems for the sustainable management of cultivation were encouraged in order to develop the plant species characteristic of each region.

The foods purchased directly from farmers or their associations and cooperatives formed part of governmental stocks from which food was donated to people facing food insecurity and inadequate nutrition who were being assisted by local social programs. Purchases were made directly by the National Provision Company (Companhia Nacional de Abastecimento), taking regional characteristics and local market conditions into account.

By ensuring that the production of small-scale farmers was purchased, the government gave them security and encouraged them to produce more good-quality food. The program therefore significantly improved the standard of living of the farmers and their families and promoted sustainable development in the areas that were assisted. By promoting the purchase of household production, agricultural activity became much more stable and was thus able to generate employment and income for producers on their own land, which encouraged them to stay on the land and not move to the already overcrowded cities to seek employment.

By storing food in public stocks the government sought to contain the rise in domestic food prices. To ensure the purchase and replenishment of stocks, the government held auctions before the planting season in order to signal to farmers the selling price they would receive for certain products, thus giving them more security. In addition to rebuilding depleted stocks, this measure aimed to ensure that crops would be sold at prices compatible with their production costs. A lack of sufficient public stocks would prevent the government from intervening more effectively in the market to curb the scale of food price increases, and this program was designed to avoid such a situation.

### 2008 – More Food Program

At the peak of the 2006–08 global food prices crisis the Brazilian government's first response was the creation of the More Food Program (Programa Mais Alimento) run by the MDA, which was designed to equip, organize and strengthen small-scale farms and thus counter the global food crisis and the recent worldwide increases in the prices of agricultural commodities. This program has already been discussed in section 2.4.2, above.





