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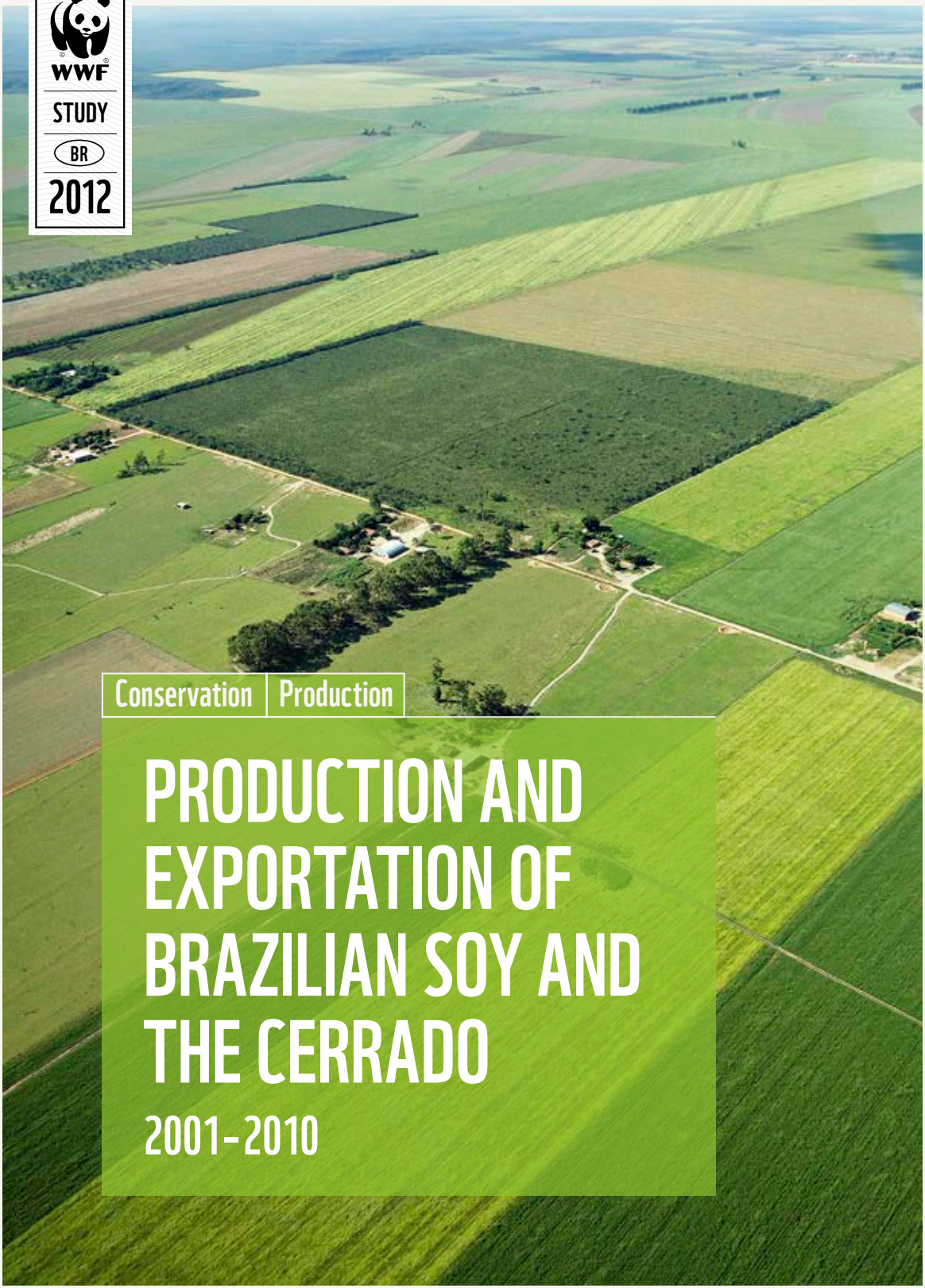
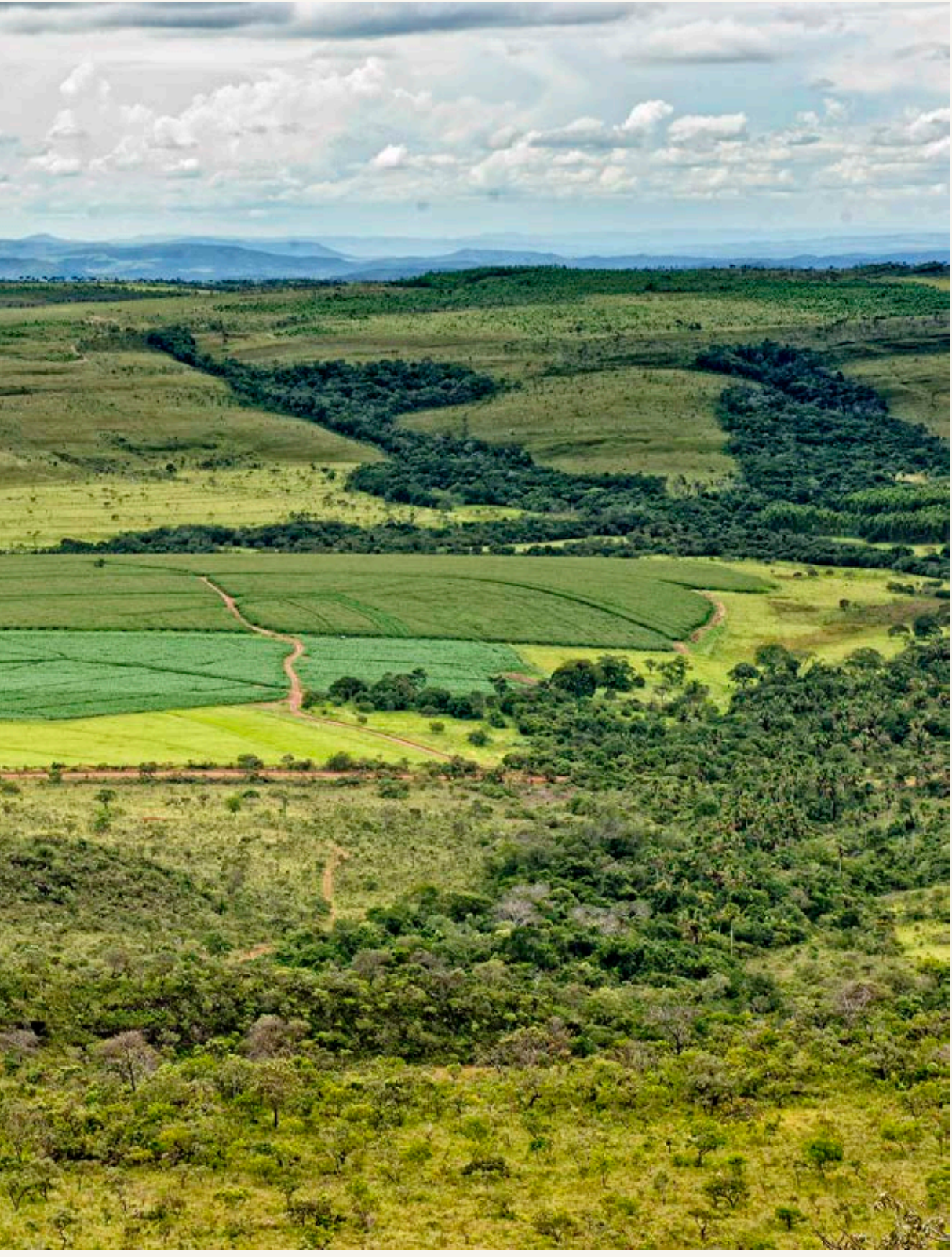
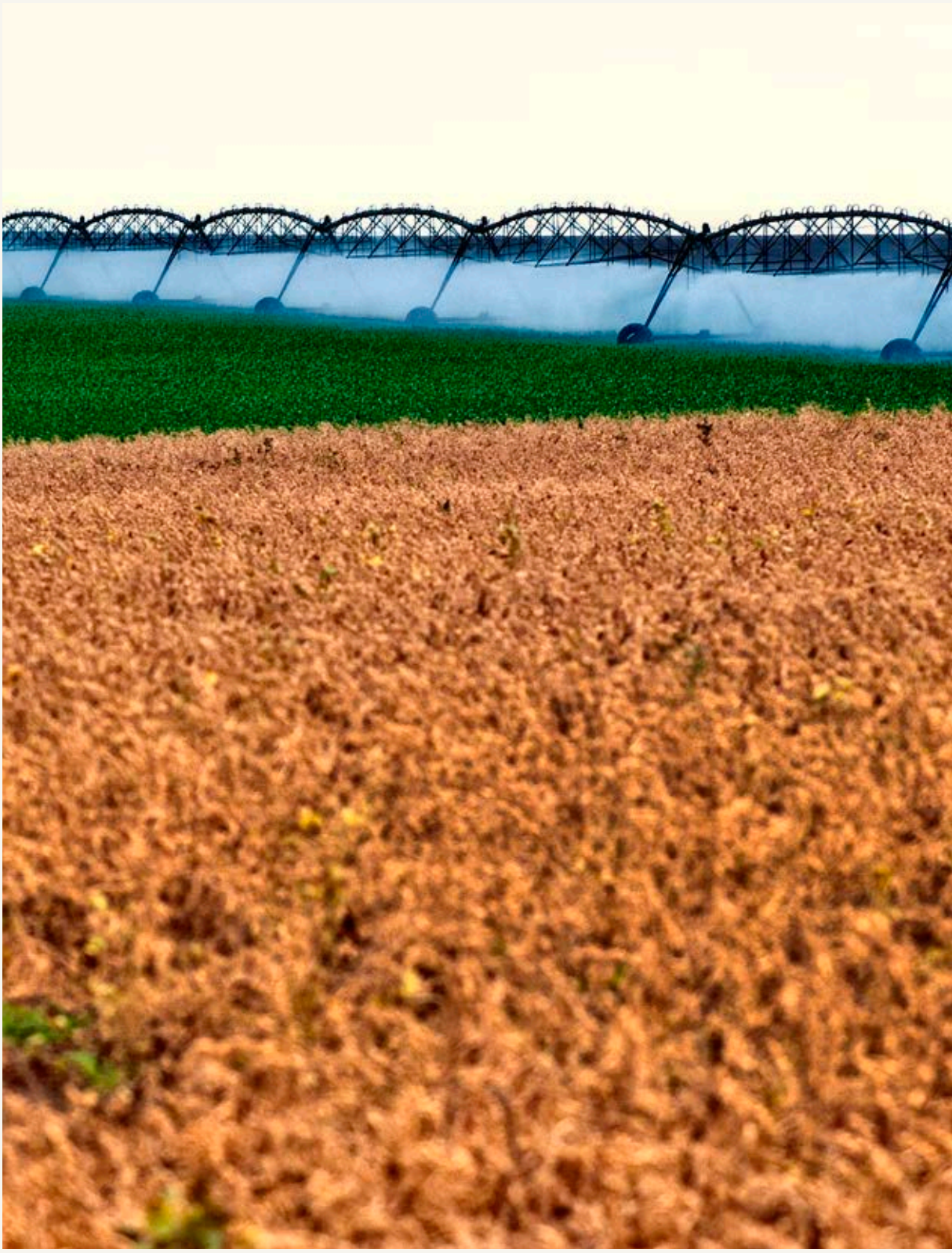


Conservation | Production

PRODUCTION AND EXPORTATION OF BRAZILIAN SOY AND THE CERRADO

2001-2010





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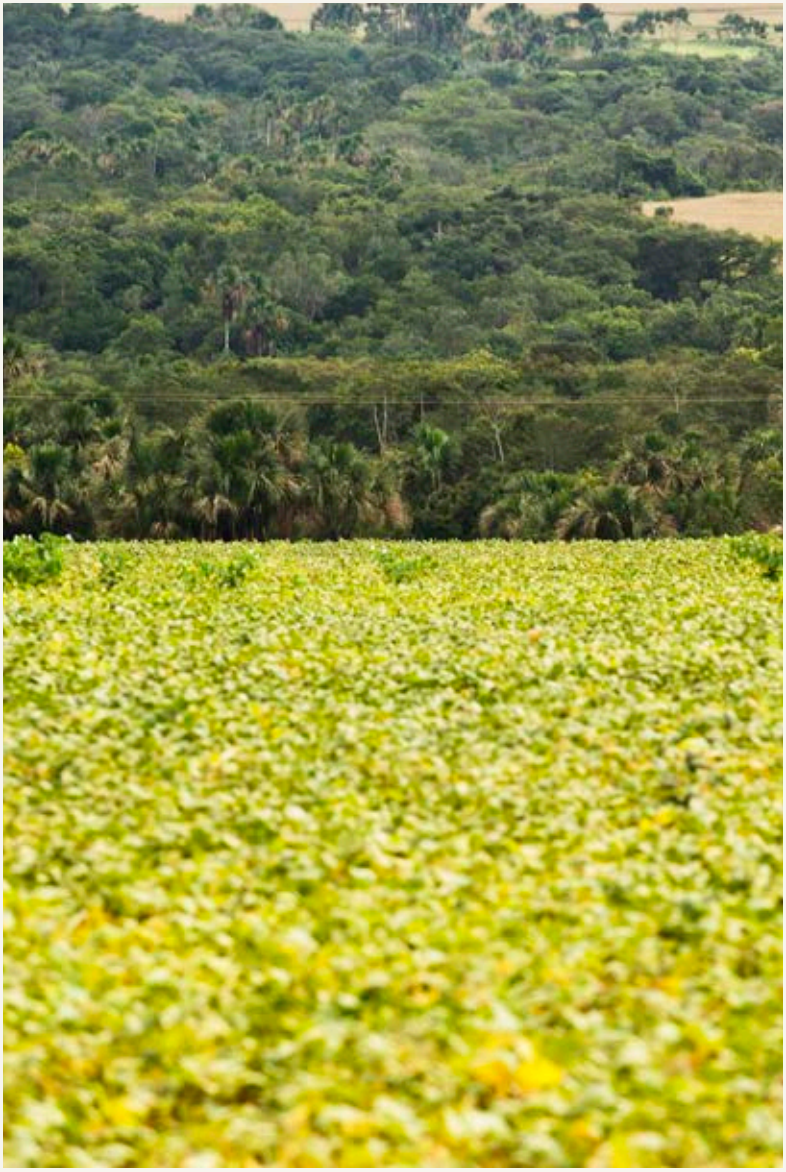


One of the great challenges for the survival Brazilian agriculture is to strike an effective balance between production and conservation.

INTRODUCTION

"Excess and lack are equally wrong"

CONFUCIUS

Soy production in Brazil began in the states of the southern region of Brazil and in the 1970s it began a vigorous expansion towards the middle-west of the country with its Cerrado savannahs and climate and land relief highly favorable for the crop. However the same Cerrado is home to ecologically sensitive regions rich in biodiversity. Soy is used to produce edible oils and other food products and in the production of animal feed and, more recently, biofuels.

The intensification of soy growing has been marked by the large size of the production areas offering economy of scale but often achieved by buying up smaller properties. The whole expansion process involves much land speculation and occupation of new areas which are deforested and prepared for planting crops.

In Piaui, illegal registration and possession of lands has been intensifying at least since 2003. The actions carried out with the connivance of land registry offices and even judges, benefit businessmen, big ranchers , businessmen and politicians. In January2012 the Courts put an embargo on 5 thousand square kilometres of land in the south of that state (four times the size of the municipal area of Rio de Janeiro) because they have allegedly been the target of such actions.

One of the long standing characteristics of the Cerrado is the strong concentration of ownership of the land in the hands of a powerful few. Even the impacts of modernization and the expansion of agriculture and livestock activities have made little difference to the structure and patterns of land tenure.

According to Federal Government data, the Cerrado lost 6,469 Km^2 of its native vegetation from August 2009 to July 2010, an area greater than that of the Federal District and proof of a

deforestation rate far higher than in the Amazon or the Atlantic Forest formation. Even though the rate was actually 15% lower than in the preceding period of 2008 and 2009 (7,637 Km2), is most intense in the areas of expansion into the states of Maranhão, Piauí, Tocantins, Mato Grosso and Bahia, spreading into the central and northern parts of the remaining stands of the Cerrado.

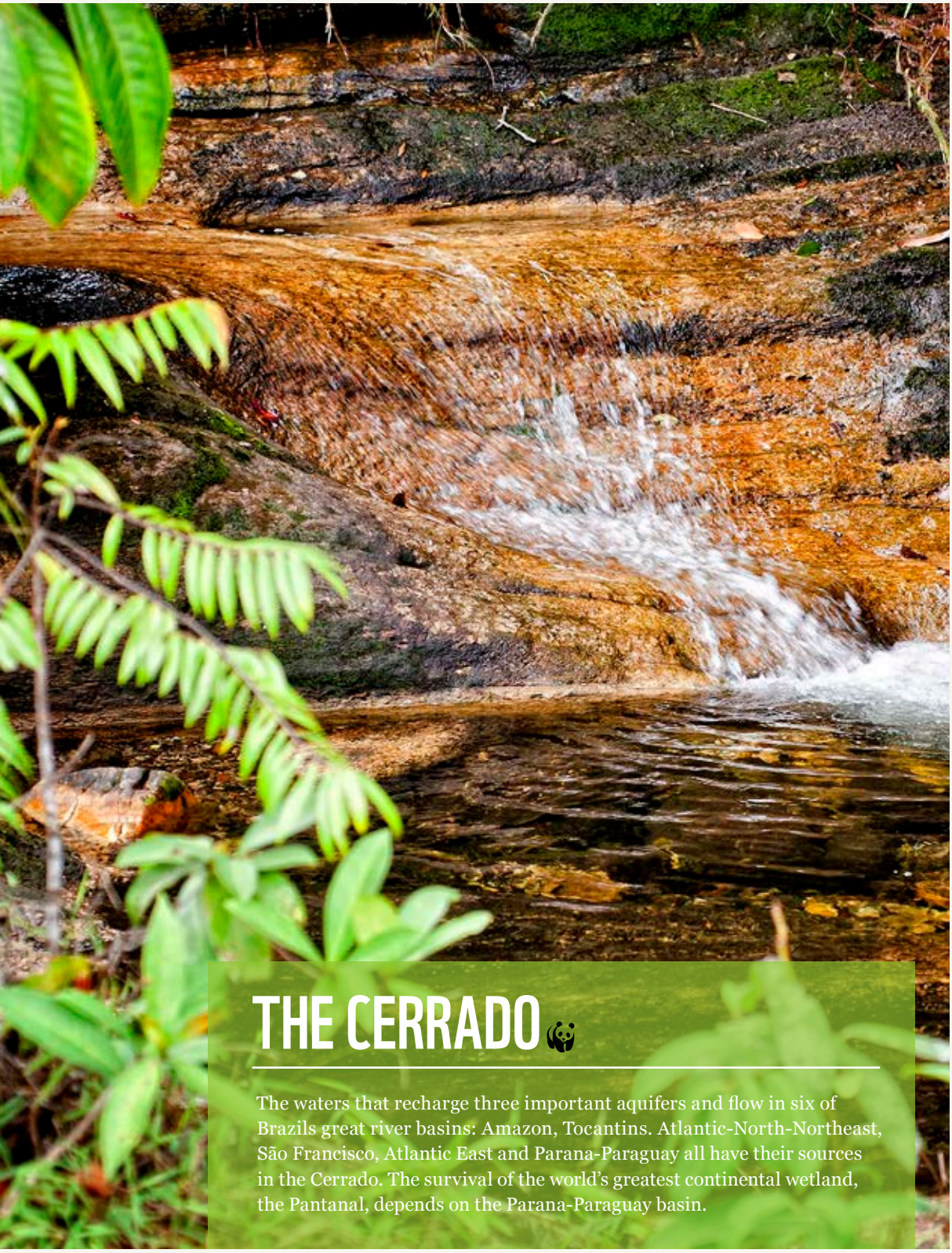
6.469

SQUARE KILOMETRES OF NATIVE VEGETATION WERE LOST IN THE CERRADO, JUST FROM AUGUST 2009 TO JULY 2010

Given this new reality on the production side and the outreach of Brazilian exportations of oil-bearing grains to globalised markets and their increasingly strict demands for production associated to economic and socio-environmental sustainability, growing and selling certified soy could prove to be one of the best means of keeping the gateways to overseas trade open.

In that sense WWF-Brazil has produced this publication to shed alight on the dimensions of soy and soy derivatives production and exportation and to stimulate and invigorate a process of debate and actions among those involved in this production-trade chain with a special focus on:

- stimulating governments and markets to adopt measures to enhance the sector's level of sustainability;
- expanding the sectors capacity to understand and implement processes directed at achieving sustainability;
- add information in WWF Network initiatives that will foster the development of processes designed to obtain more sustainable patterns of soy and soy derivatives production and trading.



THE CERRADO

The waters that recharge three important aquifers and flow in six of Brazils great river basins: Amazon, Tocantins. Atlantic-North-Northeast, São Francisco, Atlantic East and Parana-Paraguay all have their sources in the Cerrado. The survival of the world's greatest continental wetland, the Pantanal, depends on the Parana-Paraguay basin.

OCCUPATION OF THE CERRADO

The area occupied by the Cerrado savannah formation, 2,036,448 square kilometres, is equivalent to 23.92 % of Brazil's entire land surface. It is as about the same as Spain, France, Italy and the United Kingdom added together. It measures 1.2 thousand kilometres from east to west and over a thousand from north to south and is situated right in the middle of Brazil.

Those continental dimensions mean that the Cerrado is the second largest vegetation formation in South America and covers parts of some and all of others lof the 10 Brazilian states where it is found as well as the Federal District. It is only surpassed in by the Amazon forest. There are also patches of Cerrado formation in the states of Roraima, Amapa Amazonas and Para (in the middle of Caatinga, Atlantic Forest and Amazon formations),and parts of it extend into Bolivia and Paraguay

Thanks to the development model politically determined for theis region in the 1950s and the fact that six out of every ten hectares of its area are suitable for mechanised agriculture, over 40%of its original vegetation – about 850 thousand square kilometres – have been occupied by pastures and commercial crop farming.

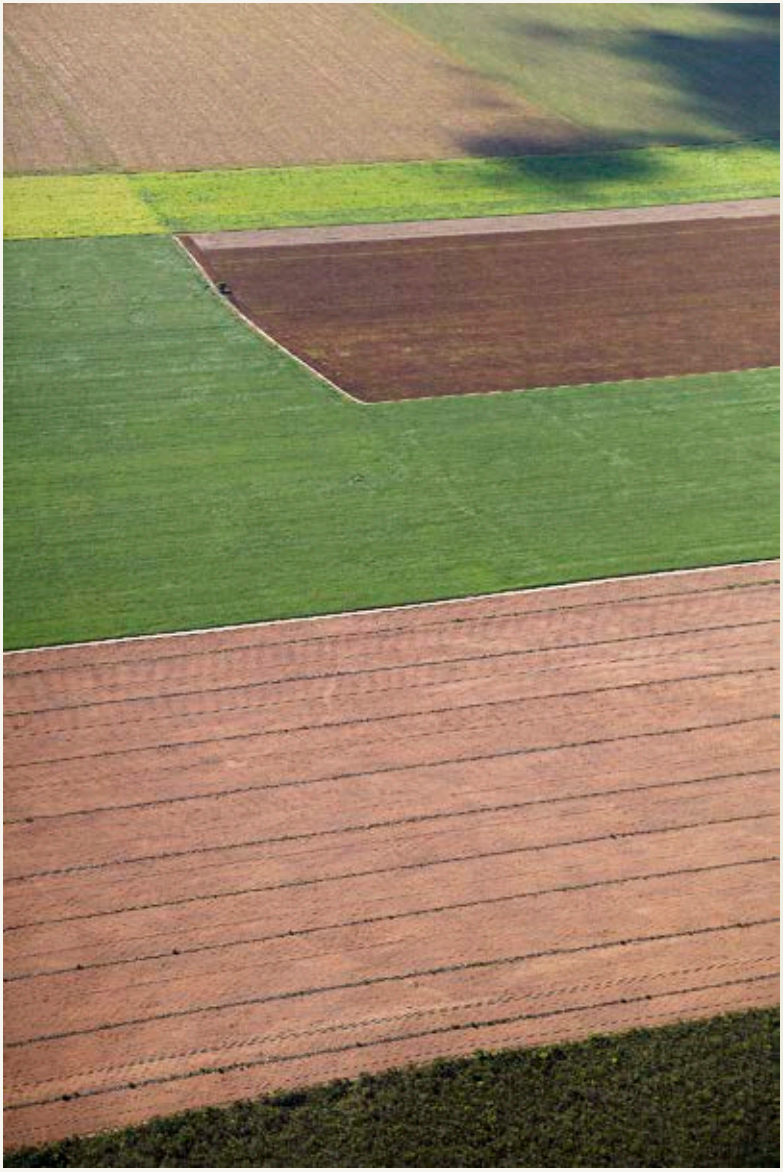
40%

OF THE ORIGINAL CERRADO VEGETATION HAS HAD TO MAKE WAY FOR PLANTED PASTURES AND COMMERCIAL CROPS

EIn many regions, particularly in the central and southern parts the native vegetation has disappeared altogether even from the edges of the water courses and streams in flagrant defiance of the federal environmental legislation. The destruction and alteration of habitats is largely responsible for the heavy loss of biodiversity.

To complicate matters even further, half of te 10 million ton s of charcoal produced annually in Brazil comes from native Cerrado vegetation. that is a poor way to treat an environment that is acknowledged to be the savanna richer in living species than any other savannah formation in the world. Furthermore it is one of Brazil's greatest sources of water. Humans have been living here, according to the remains that have been found, for at least 12 thousand years. All that unique richness is trodden under when agro-industry based on vast mechanized monocultures moves on into regions formerly, wild sequestered and remote.

Only 20% of the Cerrado area can now be considered to still exist in an un-fragmented state unlike the majority of the highly fragmented remaining stands. In such areas and in the few protected areas as well as in indigenous lands, it is still possible to appreciate the peculiar vegetation typified by low trees with twisted branches and trunks and thick leaves scattered out on a carpet of grasses and herbaceous vegetation.



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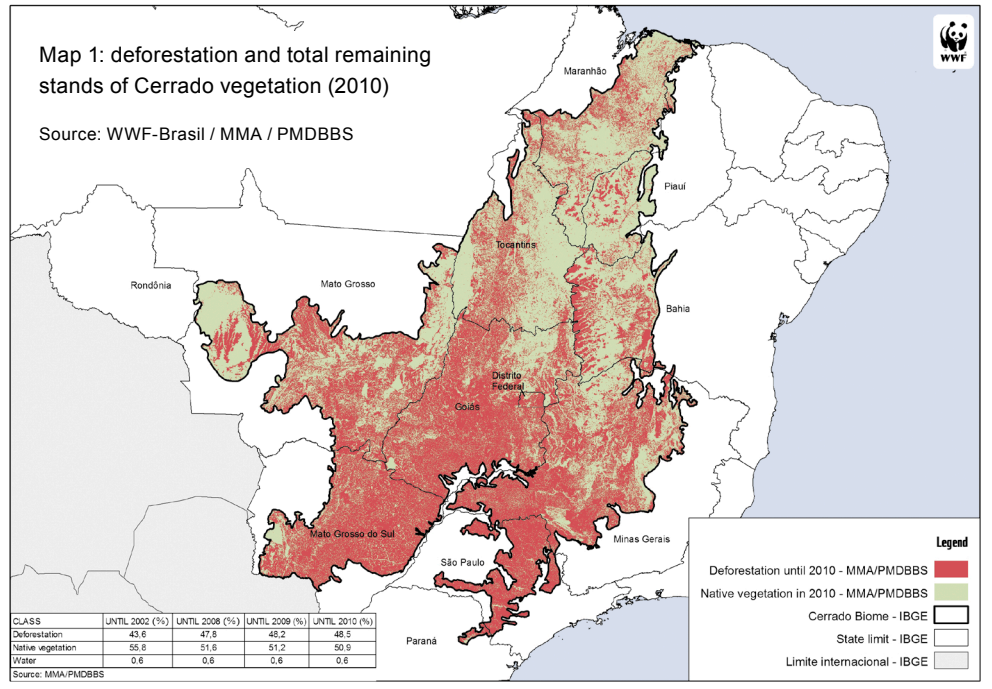
Soy bean fields with the crop at different stages of development, planted on a plateau in the state of Minas Gerais



CLASS	UNTIL 2002 (%)	UNTIL 2008 (%)	UNTIL 2009 (%)	UNTIL 2010 (%)
Deforestation	43.6	47.8	48.2	48.5
Native vegetation	55.8	51.6	51.2	50.9
Water	0.6	0.6	0.6	0.6

Source: MMA/PMDBBS

SOY AND THE CERRADO

Currently the Cerrado answers for four out of every ten head of cattle in the Brazilian herd and one quarter of all Brazilian grain production , especially soy bean (*Glycine max (L.) Merrill*). There are also considerable areas under cotton, sugarcane, Eucalyptus, and maize, all produced in alignment with the directives of the so-called 'Green Revolution' – huge areas of single crop cultivation, highly mechanised farming and intense use of chemical fertilizers, pesticides and herbicides. The intensive use of technology and the rapid production cycles have led many large farms to become more like factories.

The importance of producing and exporting commodities has grown enormously in Brazil over the last 15 years. Their participation in overseas sales was steady at levels from 37 to 40% up until 2008 when but they rose to 43% and on up to 49% in 2009 and 51% in 2010. That upward surge led Brazil to achieve a participation of almost 5% in the total exports of primary commodities worldwide (2010).

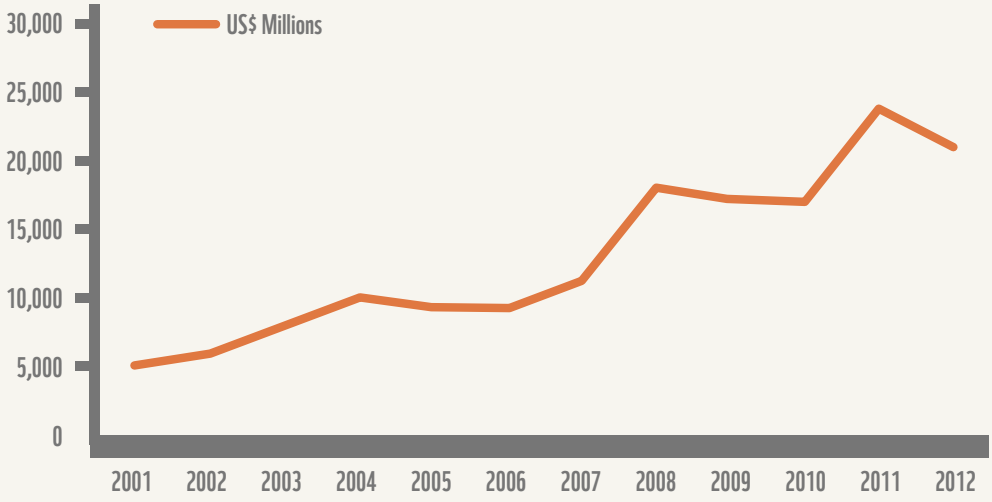
The soy bean complex is responsible for 9% of Brazil's exports and were worth US$ 17.115 billion in 2010 as compared to US$ 5.297 billion in 2001, an enormous increase of 227% over the period. This kind of return has placed Brazil in third place in the world ranking of agricultural exports surpassed only by the United States and the European Union.

Graph 1: Grain soy exports from 2001 to 2010.

Exports include grain soy, soy meal and soy oil. The data for 2011 and 2012 are estimates.

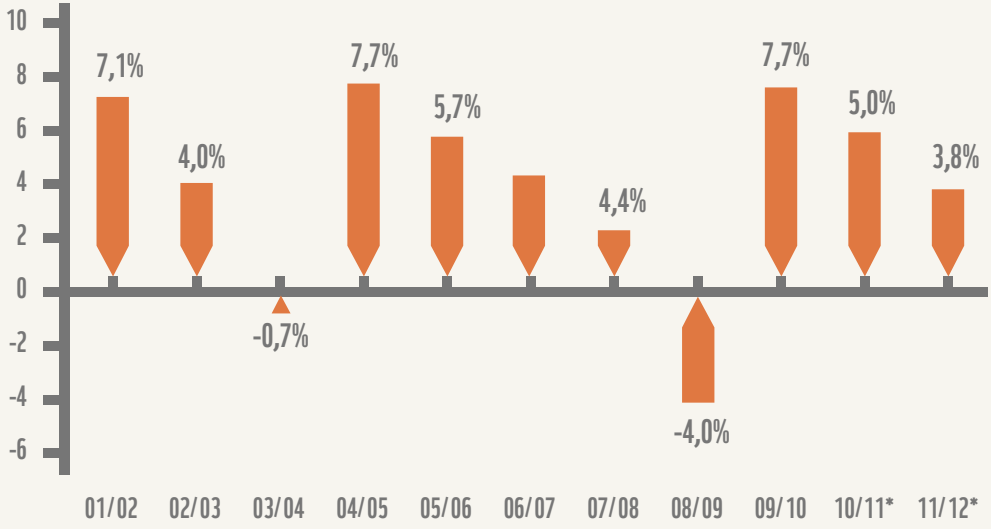
Source: Abiove / WWF-Brasil

The soy plant is originally from China but today it is being grown on over 120 million hectares of land around the world. It takes its place alongside wheat, rice and maize as today's most widely planted crops. The first records of soy being grown in Brazil date back 1900 and 1901 when the first seeds were distributed in São Paulo and in Rio Grande do Sul. It is the crop that has expanded production most rapidly over the last thirty years and currently the area under soy cultivation is half the entire area dedicated to grain crops in Brazil.



Of the total annual soy and soy derivates production, 40% of the whole grains are exported, half of the soy meal and 30% of the extracted soy oil. The increase in exports of soy is closely linked to the increase in the global consumption of 'animal protein', in the form of meat from pigs, poultry and cattle, largely raised on diets with a high soy meal content. That, however is not the only reason.

It should be remembered that in Europe the demand for soy was strongly leveraged by the outbreaks of Encefalopatia Espongiforme Bovina, or 'Mad Cow Disease' that occurred from the mid-1980s on and led to a ban on using viscera and bones as components of animal feed. Chinma consolidated its role as the biggest importer of Brazilian soy after it formalized its adherence to the World Trade Organization in 2001.



Graph 2: Evolution of world consumption of soy in comparison with each preceding year.

Source: USDA / Informa Economics FNP / WWF-Brasil

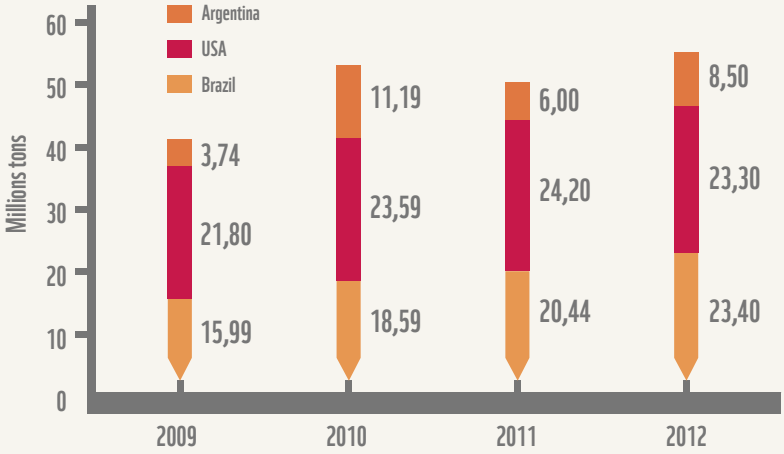
That makes soy, especially widely grown in Brazil's middle-western and southern regions, one of Brazil's most outstanding of Brazilian agriculture and in the country's balance of payments. In the Cerrado part of the huge increase in soy production has been obtained through a huge increase in the yield per hectare which is among the highest in the world.. That has been the rsult of the vastly improved technology and management practices developed by the Brazilian Agricultural Research Corporation – Embrapa and by the sector itself.

Current costs associated to soy production in the Cerrado are about half those prevailing in the United States. Brazilian industry transforms about 31 million tons of soy a year producing 5.8 million tons of edible oil and 23.5 million tons of soy meal part of which is destined for Brazilian meat, milk and egg production. Soy is also one of the alternatives for use in producing biodiesel.

Graph 3: Chinese import soybean according to origin

China's importation of Brazilian soy is continuously increasing

Source: USDA and Informa Economics FNP



EXPANSION OF THE CROPS

From the mid-1970s to 2009 soy production in Brazil jumped from a little over 12 million tons a year to 58 million tons a year with gains in productivity at the rate of 3.2% a year. Over that same period the area of land under soy rose from 6.9 to 21.5 million hectares. In Mato Grosso state for example the increase in production registered since 1990 is to the order of 600%

Alongside extensive cattle ranching in which the grazing land supports one head of cattle per hectare mechanises soy farming shares the role of major driver behind the expansion of the agricultural production frontier over the face of the Cerrado. The states of Mato Grosso, Goias, Parana and Rio Grande do Sul produce 82% of Brazilian soy. However, production is now beginning to advance into the region known as Mapitoba, lying in parts of the states of Maranhão, Tocantins, Piaui and Bahia, which is already contributing 1u3% of total national production. The increase in areas under soy is also taking place through the conversion of grazing land for that purpose.

According to a list published by the Brazilian government in 2012, 53 municipalities are the sirte of 45% of the deforestation and destruction registered in Cerradoareas in recent years. Those municipalities are concentrated precisely in the states of Maranhão, Bahia, Tocantins and Piauí in that order.

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In Brazil the area under soy is expected to increase by 5.3 million hectares in the coming decade to a total area of 30 million hectares.

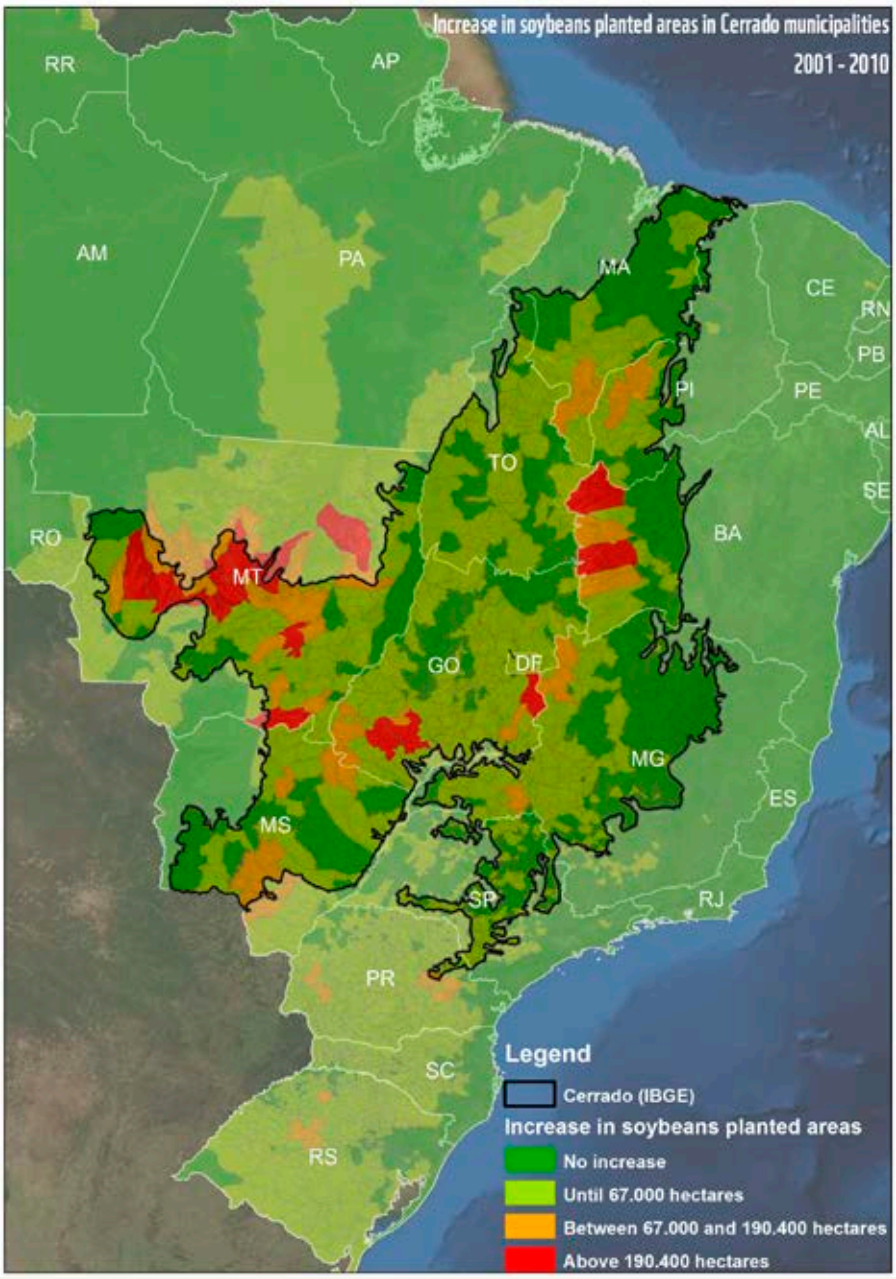
Maranhão and Piauí were responsible for the greatest expanses of deforestation in the Cerrado from2009 to 2010 when it lost altogether, 6.4 thousand square kilometers over the period. Cropp and Cattle farming and the production of charcoal to feed the steel mills continue to be the main causes of deforestation but close behind them comes disorderly development in urban areas.

Official data show that areas under soy and sugarcane are liable to increase by another 7.4 million hectares in the coming decade when the production of this oil-bearing grain is expected to reach the mark of 86.5 million tons. That will represent additional 17.8 million tons in relation to what Brazil is expected produce in the 2010/11 harvest.

In the course of the decade the area under cultivation is expected to increase by 5.3 million and reach the figure of 30 million hectares, maintaining its productivity levels at the current level of 2.8 tons per hectare . Domestic consumption of uncrushed soy bean will be somewhere around 45 million tons accounting for 52.7% as it is an essential component of animal feeds and so indirectly, increasingly present in human nutrition.

Other crops are not expected to alter greatly in the next few years but some expansion is expected to occur in Cerrado areas in the Mapitoba region where the land prices are much lower than Mato Grosso for example.

The forecast for soy exports is that by 2020/2021 they will have risen by 11.7 million tons over the volume registered for 2010/11 and attain the mark of 40.7 million tons.



Map 2: Over the last decade, soy plantations expanded in all regions of the Cerrado but especially in Maranhão, Piauí, Bahia, Tocantins and Mato Grosso.

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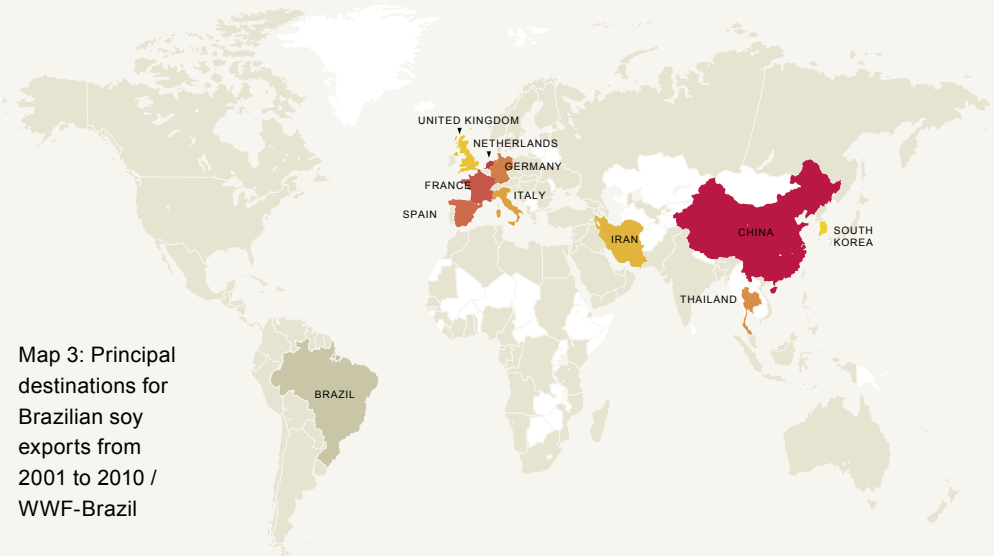
Young soy growing on plateau land in the state of Mato Grosso

EXPORTS AND PRODUCTION IN THE CERRADO

A review WWF-Brazil made of Federal Government data revealed that seven out of ten countries in the world have purchased soy or soy derivatives produced in Brazil over the last ten years. Those that have not include some countries in the Middle East, Eastern Europe and Africa.

Not one of them, however, has purchased as much as China. It is followed in decreasing order by the Netherlands, France, Spain, Germany, Thailand, Holland , It aly, Iran, the United Kingdom, and South Korea (Map 3). Together those countries disbursed US$ 89 billion to purchase 301 million tons in the period from 2001 to 2010, that is to say, 80% of the soy traded by Brazil over the same period.



Map 3: Principal destinations for Brazilian soy exports from 2001 to 2010 / WWF-Brazil

	TONS	US$
China	98,907,080	33,599,277,875
Netherlands	65,448,248	17,170,371,666
France	30,549,888	7,778,987,206
Spain	23,028,136	6,725,953,868
Germany	21,853,188	5,866,961,323
Thailand	14,037,242	4,225,031,152
Italy	13,868,538	3,805,024,420
Iran	12,567,558	4,345,441,426
United Kingdom	10,652,569	2,904,311,847
South Korea	10,626,975	2,901,376,733

Other countries which imported soybeans in the period

Countries that did not purchase soy from Brazil in the period

Source: Conab, AliceWeb and IBGE

BRAZILIAN SOY AND SOY DERIVATIVES INCLUDE:

- Powdered soy protein , dry weight protein content ≥90%;
- Soy seed for planting;
- Other forms of grain soy ground or not;
- Meal or pellets of residue after oil extraction;
- Other low grade solid residues after oil extraction;
- Soy meal;
- Soy oil, unrefined, degummed or not;
- Refined soy oil in containers with capacity ≤ 5 L;
- Refined soy oil in containers with capacity > 5L;
- Other oils extracted from soy;
- Prepared soy sauces, packaging in units, weight ≤ 1 kg;
- Other prepared soy sauces;
- Preparations with ractopam chlorohydrate (feeds).

Soy production in the period 2001 to 2010 was concentrated in those states with areas of Cerrado or in areas of transition between the Amazon and Atlantic Forest (Chart 2). The main ports for embarking soy exports are Paranaguá (Parana state), Santos (Sao Paulo state), Rio Grande (Rio Grande do Sul states), Vitória (Espirito Santo state), Manaus (Amazonas state), São Francisco do Sul (Santa Catarina state), São Luís (Maranhao state), Ilhéus (Bahia state), and, in the last few years, Santarém (Para state).

	States	Biogeographical domain	Region
1	Mato Grosso	Amazon, Cerrado, Pantanal	Midwest
2	Paraná	Atlantic Forest, Cerrado	South
3	Rio Grande do Sul	Atlantic Forest	South
4	Goiás	Cerrado, Atlantic Forest	Midwest
5	Mato Grosso do Sul	Cerrado, Pantanal	Midwest
6	Minas Gerais	Atlantic Forest, Cerrado	Southeast
7	Bahia	Caatinga, Cerrado, Atlantic Forest	Northeast
8	São Paulo	Atlantic Forest, Cerrado	Southeast
9	Maranhão	Caatinga, Cerrado, Amazon	Northeast
10	Santa Catarina	Atlantic Forest	South

Chart 1: States and regions where soy production was been concentrated from 2001 to 2010/ WWF-Brazil

* Brazil has five great natural or bio-geographic domains: the Amazon, the Cerrado-Pantanal, the Atlantic Forest, the Caatinga and the Pampas. Within each one there are dozens of biomes. Sets of living beings associated to a determined vegetation formation.

CONCLUSION AND RECOMMENDATIONS

As one of the main suppliers of uncrushed soy and crude soy derivatives on the planet, Brazil has an internal responsibility to ensure that its production takes place in conformity with the labor and environment legislation and externally the opportunity to offer certified products. In that way it can add value to its production and will show that it is meeting sustainability criteria

There is a special need to increase federal state and municipal and private protected area coverage in the Cerrado. Today, less than 3% of the 2 million square kilometres of the most intensely threatened biome on the planet are under any form of effective protections. Furthermore it is both possible and necessary adopt progressively

less aggressive production practices, economizing on natural resource use, reducing greenhouse gas emissions and obtaining gains in productivity, for example.

One way forward defended by WWF-Brazil is the way taken by the Round Table on Responsible Soy –RTRS, na international initiative created in Switzerland in 2006 in a bid to ensure that global production of soy is carried out in a way that is compatible with established standards for reducing socio-environmental impacts and that guarantee or improve the incomes of those that produce it. Its executive secretariat is in Buenos Aires (Argentina).

Adherence to the standards is voluntary and they include directives such as:

responsible expansion of production that does not involve converting areas considered priority for biodiversity conservation;

- complying with the legislation in force and adopting fair trade practices;
- maintaining adequate working conditions and paying fair wages and workers social benefits dues;
- establishing amicable and fair relations with communities especially regarding questions of land tenure;
- adopting good agricultural practices designed to reduce/avoid erosion, rational use and non pollution of water resources, and the reduction of pesticide and herbicide use to a minimum.

150 MIL

HECTARES ARE CERTIFIED TO RTRS STANDARDS IN BRAZIL, ARGENTINA AND PARAGUAY

Thus the round table represents an important step towards a more widespread adoption of good practices and reverting the past situation of deforestation and destruction of forests and savannahs, concentration of land in the hands of the few, expulsion of traditional communities from their land and the destruction of habitats all over the world.

Currently there are almost 150 thousand hectares certified according to RTRS standards in Brazil, Argentina and Paraguay. Of that total, 78,273.4 (53%) are in Brazilian territory. The certified farms are in the states of Bahia, Minas Gerais, Mato Grosso, Mato Grosso do Sul and Goiás.

The RTRS now has over one hundred members including some of the most important representatives of the private sector with interestssuch as millers, farmers, th food industry, financial institutions, retailers, and civil society organisations (social and environmental).

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Four crops are responsible for 75% of all the agro-chemicals consumed in Brazil: soy (45.3%), maize (12.8%),sugarcane (9.5%), cotton (7.8%).

SOY AND PESTICIDE/HERBICIDE CONSUMPTION

Occupying over 24 thousand hectares of land, an similar to the size of the state of São Paulo, soy is one of the great consumers of poisonous chemicals especially glyphosate (roundup), which is used on more than 30 different kinds of crop in Brazil. The average consumption off such agro-chemicals (herbicides, insecticides, fungicides and dessicators) is on average 12 litres per hectare for soy plantations. Because it is planted on such a vast scale this oil bearing crop is the number one consumer of such materials to combat pests and weeds. Expenditure on agro- chemicals can represent as much as a quarter of the operational costs associated to growing soy According the the Brazilian Government's Geography and Statistics Institute (IBGE) in the year it made the survey 80% of agro-chemical consumption and 81% of fertilizer consumption was registered for just six states only – São Paulo, Mato Grosso, Paraná, Rio Grande do Sul, Minas Gerais and Goiás –, and four of them have large Cerrado areas. 70% of the total agro-chemical consumption in Brazil is associated to just four crops: soy (45.3%), maize (12.8%), sugarcane (9.5%) and cotton (7.8%).

Also the purchasers have a fundamental role and need to show their support for the implementation of those criteria.

Paying more for soy produced to RTRS standards. For further information consult www.responsiblesoy.org

Recently a Dutch retailers, traders and industries as well as non governmental organisations associated to the Dutch Sustainable Trade Initiative (IDH, is the Dutch acronym) like WWF announced initial investments of € 7 million to guarantee that by 20015 soy used in the production of meat, dairy products, eggs and other foodstuffs in Holland will be 100% responsible soy. That country is the second largest purchaser of Brazilian soy and soy derivatives after China.

As it advances into the Brazilian interior soy creates an ever increasing demand for land and transport infrastructure and that means it is essential that national policies improvements inn national roadwork systems should be accompanied by policies and concrete actions soften the eventual impacts on the environment possible negative effects of economic growth on socio-environmentally sensitive areas. Similarly, sector based policies and strategies need to prevent its uncontrolled advance into the

country's unique ecosystems. especially the Cerrado, the Pantanal and the Amazon.

Inthat way WWF Brazil hopes that the expansion will take place instead into already degraded areas and

In very specific cases , into areas of lesser socio-environmental importance and also make use of appropriate technology to guarantee that productivity can be maintained as wel, as the integrity of natural resources and processes.

Brazil needs to take sweeping measures to ensure that production in the rural areas has very low impacts on populations and the environment and that the forests and other priority areas for conservation are effectively preserved. There are enough areas available to double agricultural production without any need to unleash any new waves of deforestation.

Considering that the agriculture of today in Brazil occupies a total area of 70 million hectares and that there and that approximately 30% of the 200 million hectares of are degraded pastures then it is perfectly feasible to double the area under agriculture simply by recuperating degraded pastures for agricultural use.

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Facts about the Brazilian Cerrado

RIVER BASINS

Recharges three important aquifers and initiates the flows of six of Brazil's major river basins

40%

of original vegetation destroyed to make way for agriculture and commercial pastures

DEFORESTATION

Deforestation rate higher than Amazon or Atlantic Forest

PROTECTED AREAS

Less than 3% is under any form of effective protection in Protected Areas

LIFE

Protects 5% of all life on the planet and 30% of al Brazilian species

Why we are here
To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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