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Conservation | Sustainability | Climate Change

Soya and the Cerrado:

Brazil's forgotten jewel

Soya and the Cerrado: Brazil's forgotten jewel

Contents

FOREWORD

WWF is the leading independent authority on protecting the natural world. We're here to tackle the most important environmental challenges facing the planet, helping people and nature to thrive. To make things happen, we work with business, communities and government in over 100 countries – protecting precious wild places, preventing dangerous climate change and inspiring people to use their fair share of natural resources.

That's why we care about the welfare of the Cerrado and the impact of our activities upon its natural resources. The Brazilian Cerrado is a vast mosaic of contrasting landscapes that makes it the most biodiverse savannah region on the planet. It is undoubtedly one of the world's great natural assets. Yet this extraordinary area is facing destruction on a huge scale due to the rapid expansion of beef, soya and other crops.

Soya is grown to meet a growing global demand for animal feed and vegetable oil. The UK is a significant user of South American soya, especially in feed for poultry, pigs and dairy cattle.

In 2006 WWF supported a moratorium on soya produced in recently deforested areas of the Cerrado's giant neighbour, the Brazilian Amazon. When we started talking to businesses which use soya in the UK, they were unaware that, despite the moratorium, soya expansion was still a live issue in several other regions including the Cerrado.

This report is intended to bring wide attention to what is happening to the Cerrado and other areas, and it outlines potential ways to help alleviate the habitat destruction that is taking place.

Concern about these issues is why we became a founder member of the Roundtable on Responsible Soy (RTRS) – an international initiative that promotes best practices in soya production. Since 2006 we have worked assiduously within the RTRS to ensure the inclusion of robust standards to prevent deforestation related to soya, to respect land tenure claims and to ensure fair working conditions for local people as well as enabling the availability of non-GM soya certified by the RTRS.

In 2010, RTRS members reached a welcome consensus and certification of soya production is now under way. We not only expect the standards and production processes to continually improve, but also that the RTRS will guide producers and the industry on a sustainability journey.

WWF has a track record of developing initiatives such as the RTRS – we helped set up the Forest Stewardship Council, the Roundtable on Sustainable Palm Oil and the Marine Stewardship Council, for example. All are now effective organisations providing credibility, accountability and transparency in the supply chain. They work across frontiers and truly tackle global problems.

The RTRS is an important initiative, but it's not the only one we need. Several strategies, such as effective law enforcement, land use planning and tackling livestock consumption have been put forward in the UK and elsewhere as ways of dealing with the impacts of soya production. This report also seeks to explain how we see them all contributing to the same goal.

WWF-UK calls on all soya stakeholders – producers, buyers, investors, growers and end users – to contribute to this common goal. We encourage businesses in the UK to

commit themselves to sourcing 100% RTRS-certified soya and to start buying it as it becomes available.

The impacts on the ground are a shared responsibility of all stakeholders in the soya supply chain and each one has a role to play. It is time to turn words into practice.

Isabella Vitali
Senior Policy Officer - Livestock and Soya
WWF-UK

EXECUTIVE SUMMARY

Demand for soya beans and soya products has risen dramatically in recent decades. In just 15 years, production of the crop has doubled, and the land used to grow soya worldwide now covers an area almost the size of Egypt.

The predominant use of the crop is to make soya meal, a major source of protein in livestock feed, especially for poultry, pigs and dairy cattle. The expansion of soya planting has largely been driven by rising consumption of meat, and there is also a significant market for soya oil for use in food, biodiesel and other products.

Around two-thirds of soya products are traded. Imports are dominated by China and the European Union (approximately 37% and 28% of global soya imports respectively). Chinese soya bean imports are projected to rise some 50% by 2020.

Although the United States remains the largest exporter of soya beans and products, recent and projected export growth is concentrated in South America: in particular, in Brazil, Argentina, Paraguay and Bolivia. The UK imports more than 70% of its soya directly from Argentina and Brazil.

Despite significant improvements in productivity, a rapidly growing land area is being planted with soya to meet demand. In Brazil alone, this area is nearly the size of the entire United Kingdom.

The export earnings from soya have come at a cost to the ecosystems in which it has been planted. For example, soya expansion has been a significant factor in conversion of the Brazilian Cerrado or savannah, a biodiversity hotspot larger than Mexico. A recent survey suggested that nearly half the original vegetation cover had been lost by 2008, and that it is disappearing considerably faster than the Amazon forest.

The further rapid loss of remaining areas of Cerrado is of global concern because:

- The carbon dioxide (CO_2) emissions associated with recent conversion of the Cerrado, estimated by the Brazilian government to be more than half the total emissions from the UK for 2009, probably already exceeded those from Amazon deforestation;

- The exceptional biodiversity, including more than 11,000 vascular plant species of which nearly half are found nowhere else, represents an irreplaceable global genetic resource. Many Cerrado species are very local in their ranges, and are therefore at high risk of extinction unless a far greater area is effectively protected than at present.

- The Cerrado is a vital source of fresh water for a significant part of Brazil and neighbouring countries, accounting for more than 70% of water in three major hydrological basins, as well as in part of the Amazon.

- The native vegetation, fauna and landscapes of the Cerrado are of great cultural importance to a wide range of indigenous and traditional communities, and offer valuable opportunities for tourism and recreation.

The UK is a significant user of South American soya, especially in feed for poultry, pigs and dairy cattle. Imports into the UK require an area almost the size of Yorkshire to be planted with soya overseas, in order to meet demand. British food producers, retailers and consumers have an opportunity and a responsibility to use their buying and eating choices to help reduce the pressures on ecosystems such as the Cerrado.

A variety of measures and changes have been proposed that could help diminish the current negative impact of UK and European soya demand. They include:

- *Improving soya production practices* through certification under credible, multi-stakeholder schemes such as the Round Table for Responsible Soy (RTRS - see box on page 25), as supported by WWF.

- *Reducing meat consumption and wasteful use, as promoted by WWF-UK.* Desirable for a number of reasons including public health and cutting greenhouse gas emissions, it would also lower demand for imported protein sources such as soya in animal feed.

- *Using locally-grown crops to provide alternative sources of protein in livestock feed.* Legume crops, for example, could replace at least some of the protein currently provided by soya, although nutritional challenges remain especially for pigs and poultry.

- *Changing regulations that currently ban the use of waste products in livestock feed.* For example, the EU is reviewing the ban on using processed animal protein (PAP) in the feed of omnivore species (poultry and pig), introduced after the BSE outbreak in cattle due to concerns about cross-contamination. Lifting this ban would re-introduce an alternative to soya imports, but it would be necessary to overcome issues of public acceptability, as well as the cost of ensuring that herbivore livestock are not fed animal remains and that no livestock is fed the remains of its own species.

- *Sourcing soya from a wider variety of countries to reduce the pressure on South American ecosystems*. Options for alternative sources are, however, limited and systems such as traceability and certification would need to be in place to ensure that this does not simply displace the problem to other regions.

Undoubtedly some or all of these measures will prove sound, necessary and feasible which is why WWF is exploring many of them. They could help reduce the pressure for more soya expansion in South America, while providing other benefits to the European food system. However, they will not individually produce change at the scale and pace needed to prevent significant further destruction of South American ecosystems.

For the foreseeable future, the UK and the EU will still need to import soya. It is therefore crucial to engage consumers and producers of soya in practical and pragmatic steps to minimise the negative impacts of its production. Even if it were practical, complete withdrawal of European buyers from the South American soya market would remove their ability to influence production practices for the better, and China would become even more dominant as the world's biggest soya importer.

RTRS provides a tool for rewarding producers who respect agreed norms for improving environmental and social practices. Sourcing of UK soya from certified RTRS sources, in conjunction with similar moves in other countries, would represent a powerful market pressure to support South American efforts to safeguard biodiversity and reduce emissions from land use change. RTRS certification is available for all types of soya, in order to have maximum impact. However, a non-GM module is also provided, and the standard is compatible with all production methods.

WWF does not propose RTRS as a 'silver bullet' solution to the problems currently associated with soya expansion. However, if strongly supported, continuously improved and combined with other measures outlined above, it could be a pragmatic and effective mechanism for helping meet today's market demands while preserving vital ecosystems for future generations.

THE BIG PICTURE: SOYA IN WORLD MARKETS

Originating in east Asia, the soya bean (*Glycine max*) has become one of the world's most important commercial crops. Originally valued mainly for its oil and use in human food as an alternative protein source to meat, since the 1970s increased soya cultivation has been driven by meat production itself – through its widespread use as an ingredient of livestock feed.[1] 80% of soy is used for animal feed worldwide.[2]

Certain factors additional to increased meat demand have led soya to become an increasingly popular source of protein for livestock, especially for poultry and pigs. For example, the European Union's ban on the use of processed animal protein (PAP) in feed rations, following the BSE outbreak, removed the protein equivalent of some 3.7m tonnes of soya beans, and EU soya imports saw a spike in the years following the ban in 2000.[3]

The growth of the soya business over time has been dramatic. Between 1961 and 2009, global soya bean production expanded nearly tenfold, and it has doubled since the mid-1990s (Figure 1).[4]

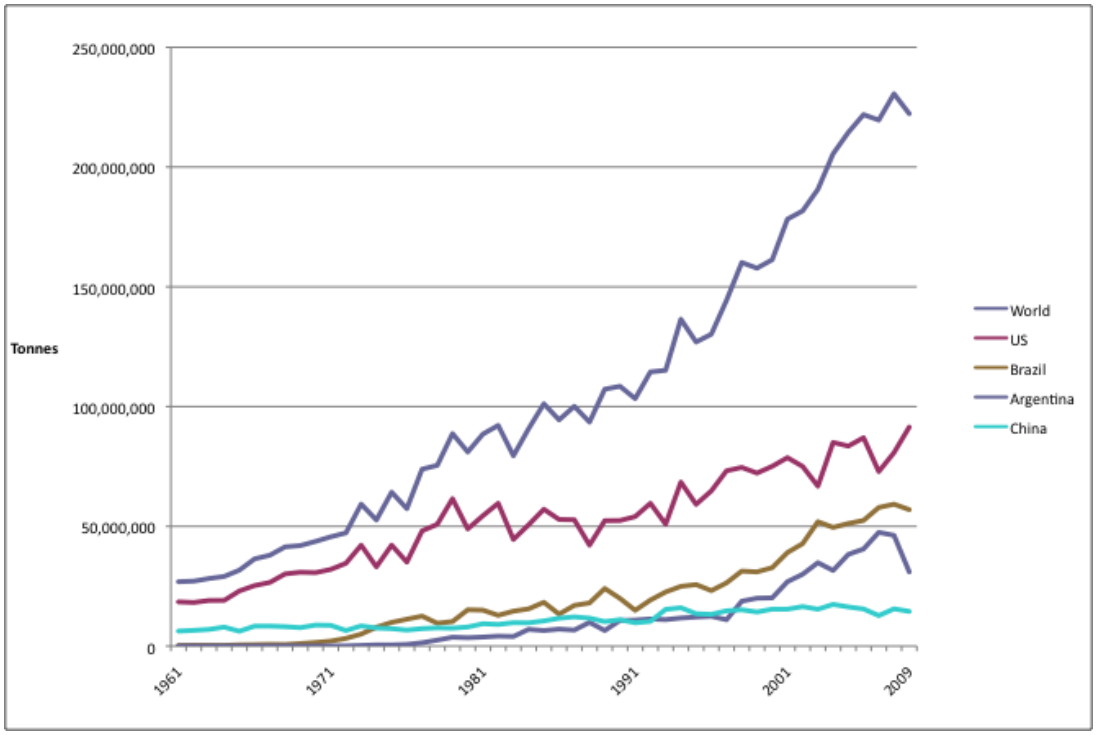


Figure 1. Soya bean production 1961-2009. *Source*: FAOSTAT

Due to improved productivity, the area used to harvest soya beans has grown at a somewhat slower rate than production. It has increased around fourfold since 1961, and doubled since 1980. Still, the current area planted with soya worldwide adds up to nearly one million square kilometres, almost the size of Egypt.[5] In addition, incremental gains in productivity are very low nowadays in Brazil, Argentina, Paraguay, Canada and the US. Only a few producing regions such as India still have room for considerably improving yields. Therefore, increases in demand in the future are more likely to be met by expansion in harvested area, rather than increased productivity.

Of some 255m tonnes of soya beans produced worldwide in the year to February 2011, around two thirds are traded on world markets.[6] Global trade in soya beans and soya products has risen rapidly since the early 1990s, and has surpassed not only wheat – the traditional leader in the agricultural commodity trade – but also total coarse grains (corn, barley, sorghum, rye, oats, millet, and mixed grains).[7]

The scale and direction of these trade flows creates a shared responsibility between the countries where soya planting is expanding, and those importing countries whose demand is driving the increased production, causing impacts of concern to the whole planet.

In 2010, more than 93% of global soya exports came from just four countries: the US, Brazil, Argentina and Paraguay. Imports were somewhat less concentrated, but still dominated by two principal buyers: China and the European Union (37% and 28% respectively).[8] (Figures 2-9)

GLOBAL SOYA EXPORTS

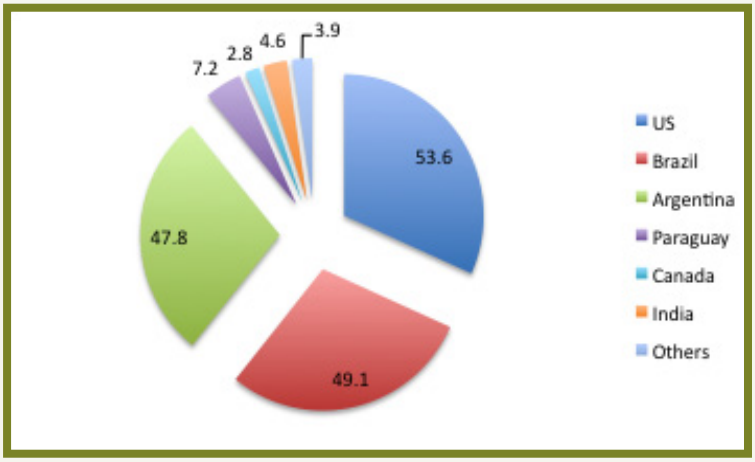


Fig 2:
TOTAL SOYA EXPORTS, 2010
(MILLIONS OF TONNES,
SOYA BEAN EQUIVALENT)

Note: Aggregated from soya bean exports and soya meal exports using a multiplier of 1.24 to obtain soya bean equivalent. This may involve some double counting of beans exported, crushed and re-exported as meal. Soya oil is not included.

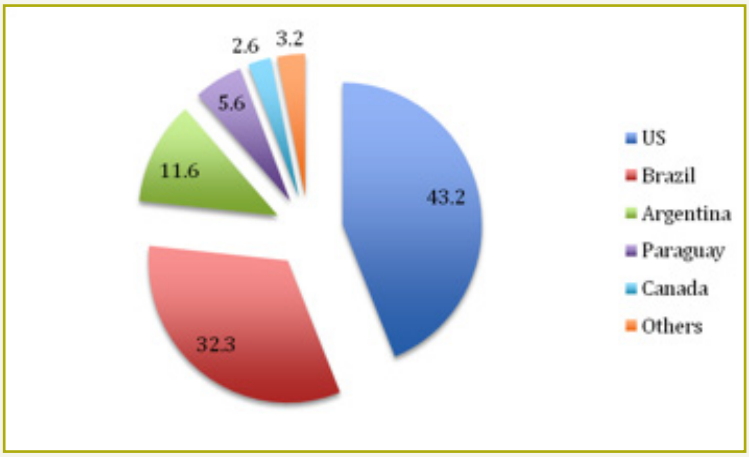


Fig 3:
SOYA BEAN EXPORTS, 2010
(MILLIONS OF TONNES)

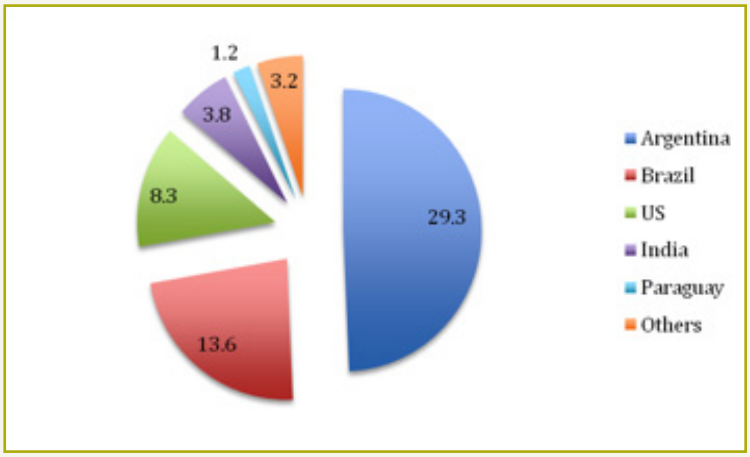


Fig 4:
SOYA MEAL EXPORTS, 2010
(MILLIONS OF TONNES)

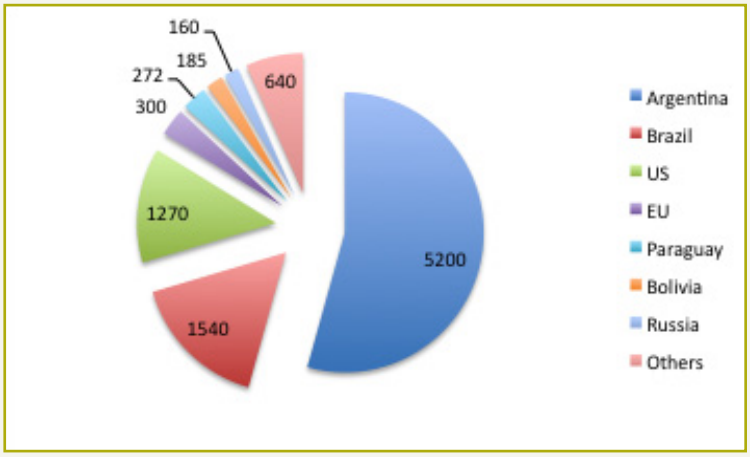
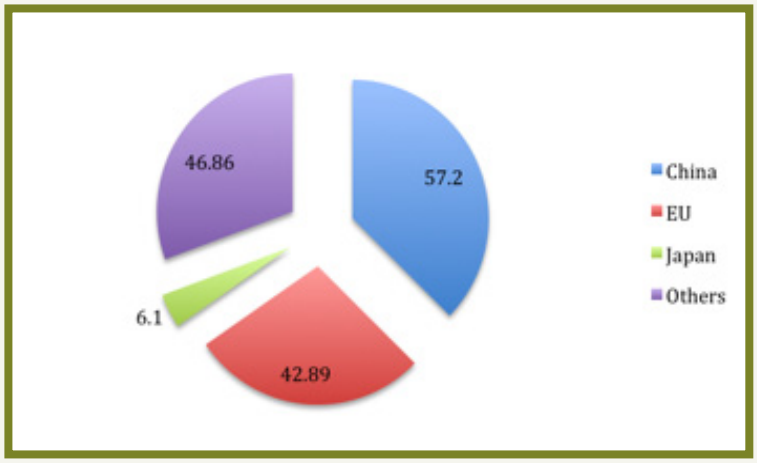


Fig 5:
SOYA OIL EXPORTS, 2010
(THOUSANDS OF TONNES)

SOURCE: USDA

GLOBAL SOYA IMPORTS

Fig 6:
TOTAL SOYA IMPORTS, 2010
(MILLIONS OF TONNES,
SOYA BEAN EQUIVALENT)



Note: Aggregated from soya bean imports and soya meal imports using a multiplier of 1.24 to obtain soya bean equivalent. This may involve some double counting of beans exported, crushed and re-exported as meal. Soya oil is not included.

Fig 7:
SOYA BEAN IMPORTS, 2010
(MILLIONS OF TONNES)

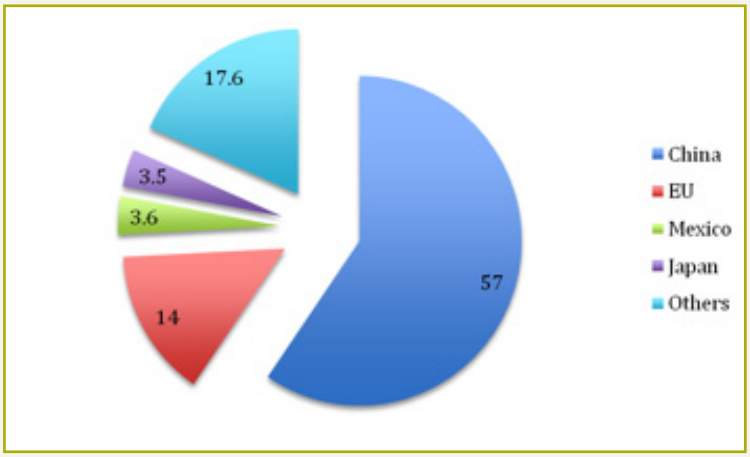


Fig 8:
SOYA MEAL IMPORTS, 2010
(MILLIONS OF TONNES)

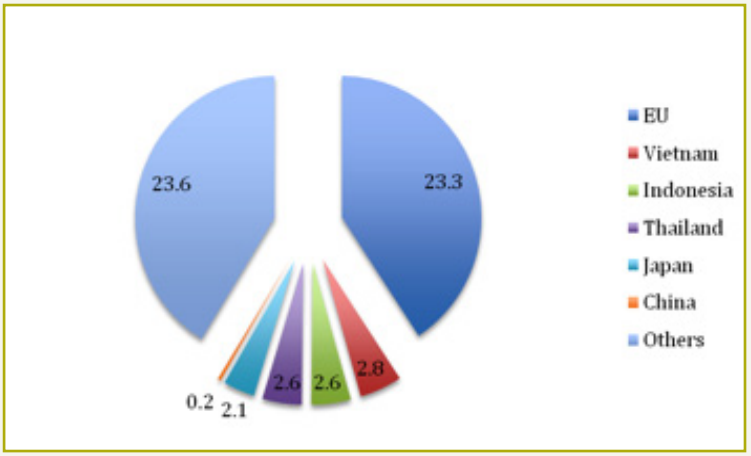
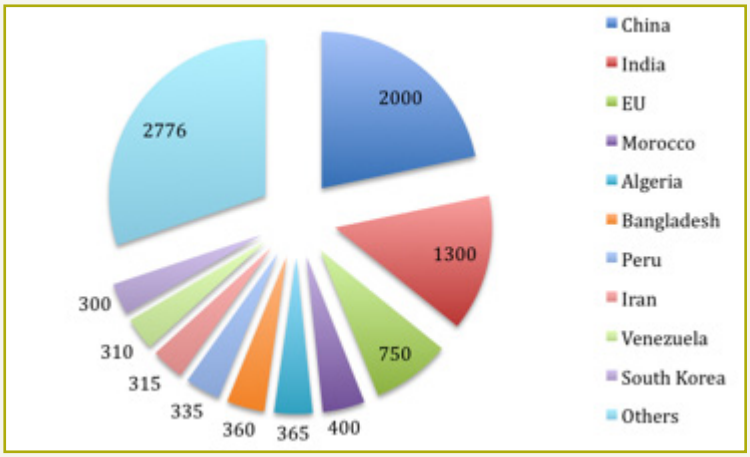


Fig 9:
SOYA OIL IMPORTS, 2010
(THOUSANDS OF TONNES)



SOURCE: USDA

China has been growing soya for 5,000 years, but with little scope for expanding cropland to meet increasing demand for livestock feed, the country now is by far the largest importer of whole soya beans. However, the EU imports much more processed soya meal, putting it in a prominent second place in terms of total soya imports.

Recent projections for the soya trade to 2020 indicate a strengthening of existing trends. China is expected to become even more dominant in driving demand, with soya imports increasing by some 50%. (Figure 10) The relative position of the United States is projected to decline, with strong export growth from Argentina, Brazil, Paraguay and Bolivia. [9] (Figure 11)

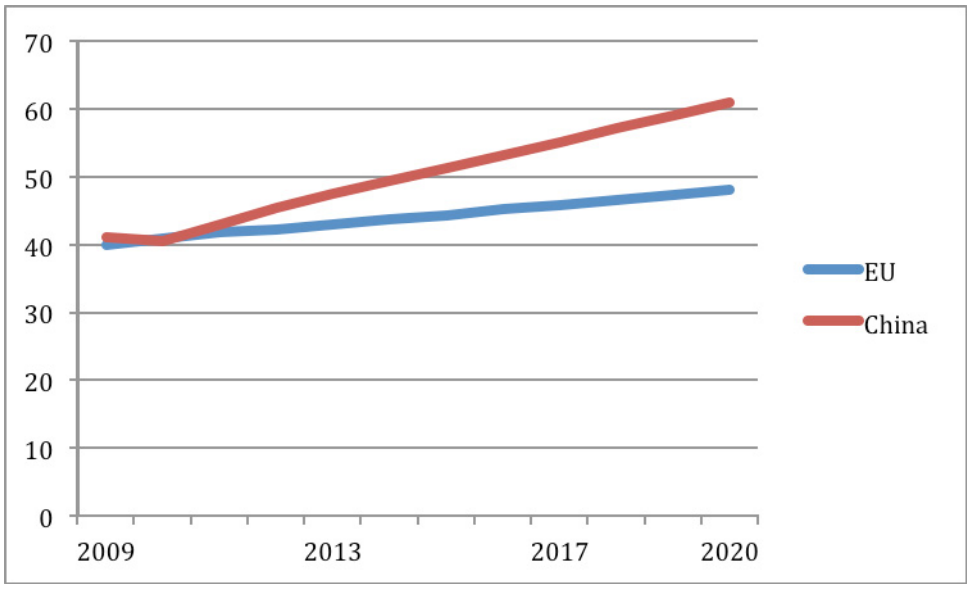


Figure 10. Projected soya imports to 2020 (millions of tonnes soya bean equivalent). Aggregated soya beans and meal from USDA projections.[10]

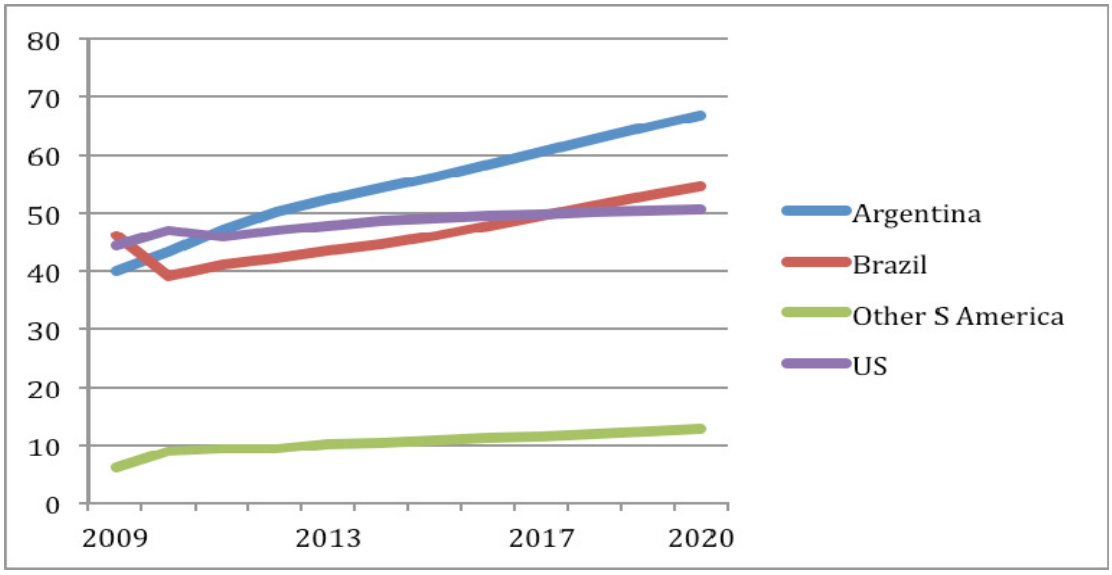


Figure 11. Projected soya exports to 2020 (millions of tonnes soya bean equivalent). Aggregated soya beans and meal from USDA projections.

These figures point to a compelling overall picture: the growing demand for soya-based protein from China and the EU is driving expansion in those countries with

abundant land available to convert to soya – and that essentially means a continued dramatic increase in the planted area of soya in South America, since productivity levels are already very high in the region. The whole world needs to be concerned about the consequences and to take whatever steps are possible to keep those impacts to a minimum.

SOYA IN THE UK

British soya consumption, principally through livestock feed, relies on a considerable area overseas being planted with the crop.

Britain imported 858,000 tonnes of soya beans, 2.29m tonnes of soya meal and 108,000 tonnes of soya oil in 2010.[11] Together, Brazil and Argentina account for some 70% of soya imports. In fact, these two countries are likely to be the origin of a larger proportion of soya in the UK, since a further 18% is imported via other EU countries, principally the Netherlands (Figures 12 and 13).[12]

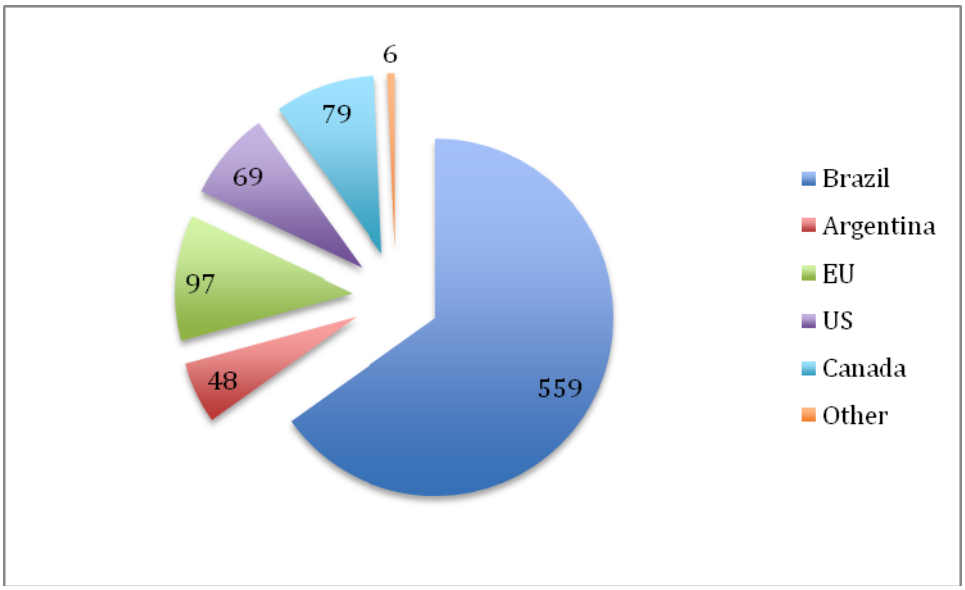


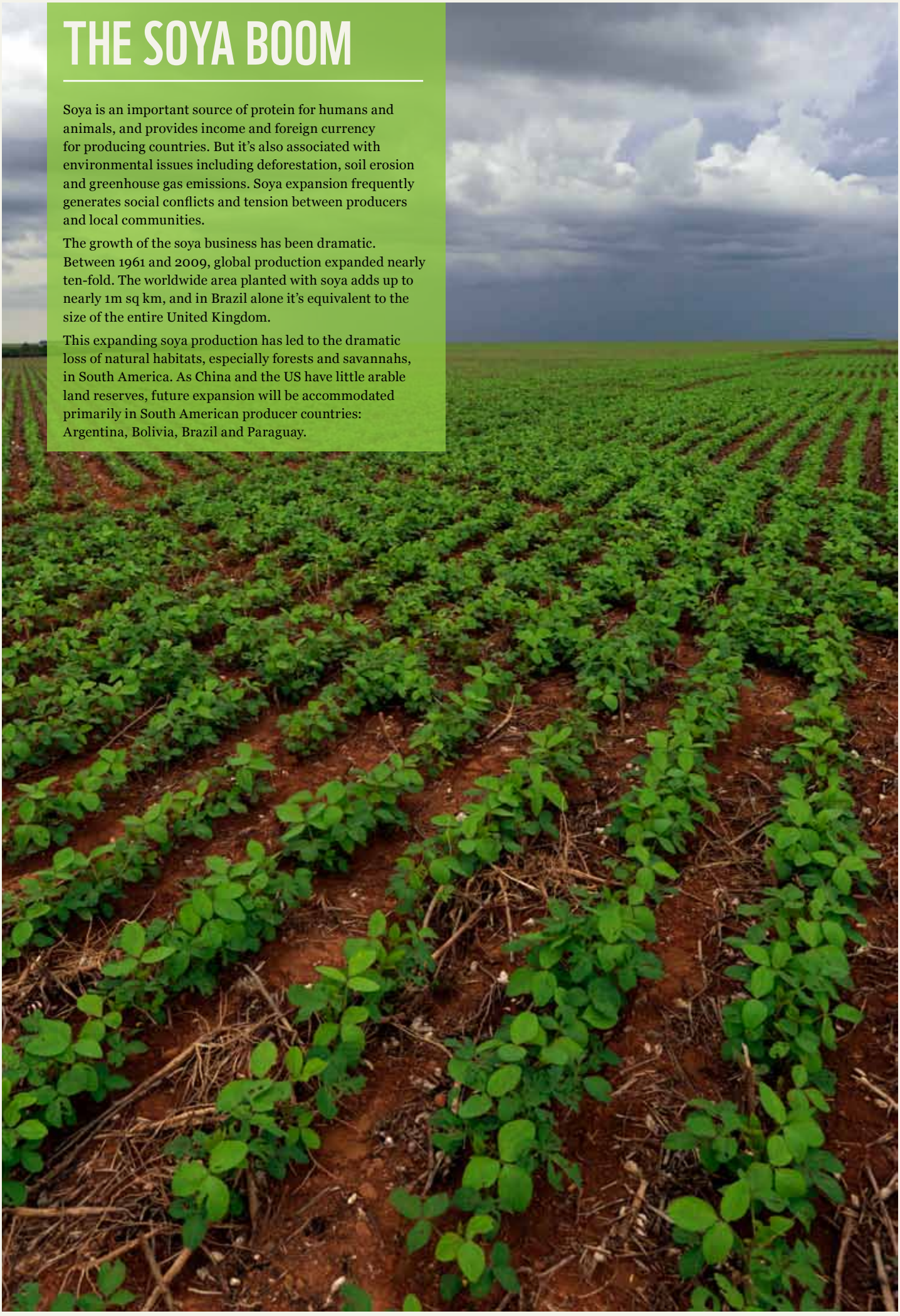
Figure 12. UK soya bean imports, 2010 (thousands of tonnes). *Source*: UK Trade Information (HMRC)

THE SOYA BOOM

Soya is an important source of protein for humans and animals, and provides income and foreign currency for producing countries. But it's also associated with environmental issues including deforestation, soil erosion and greenhouse gas emissions. Soya expansion frequently generates social conflicts and tension between producers and local communities.

The growth of the soya business has been dramatic. Between 1961 and 2009, global production expanded nearly ten-fold. The worldwide area planted with soya adds up to nearly 1m sq km, and in Brazil alone it's equivalent to the size of the entire United Kingdom.

This expanding soya production has led to the dramatic loss of natural habitats, especially forests and savannahs, in South America. As China and the US have little arable land reserves, future expansion will be accommodated primarily in South American producer countries: Argentina, Bolivia, Brazil and Paraguay.



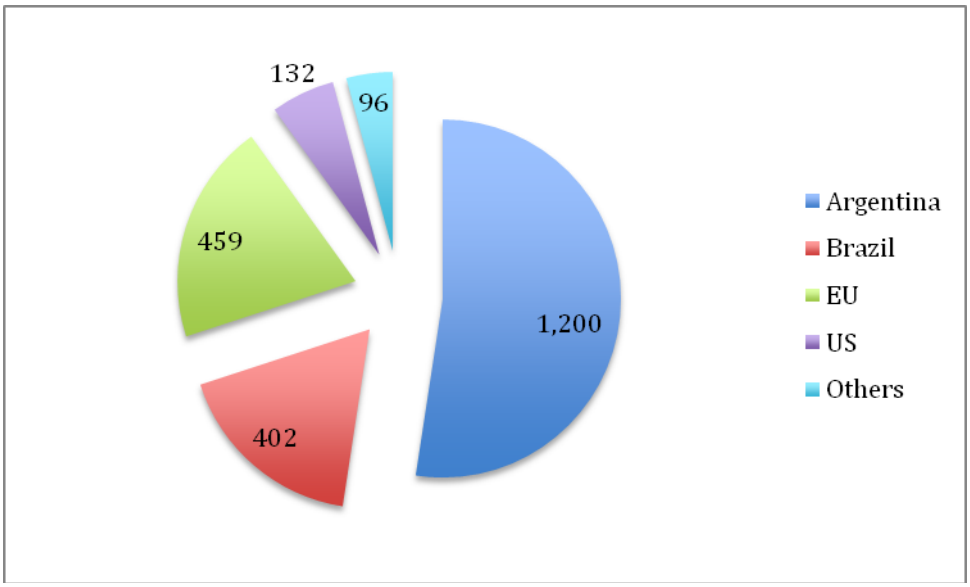


Figure 13. UK soya meal imports, 2010 (thousands of tonnes). *Source*: UK Trade Information (HMRC)

The combined imports of soya meal and whole beans into the UK during 2010 amounted to the equivalent of about 3.7 m tonnes of soya beans. Assuming productivity of nearly 3 tonnes per hectare (the rate currently being achieved on average in Brazil), British consumption requires an area almost the size of Yorkshire to be planted with soya.[13]

It can be estimated that poultry feed in 2010 used something over 1m tonnes of soya meal, approximately half of the entire annual imports to the UK.[14] Dairy cattle and pig rations are each likely to account for about one-third of the quantity of soya fed to poultry, while beef cattle use a somewhat smaller proportion as their diets are mainly grass and grain based.[15]

These figures suggest that poultry meat in particular accounts for a very large part of UK soya consumption. Few consumers would be aware that the British chicken they buy requires large areas of South American land to be planted with soya in order for it to reach the supermarket or butcher's shelf. Because soya is not an ingredient, but rather an 'embedded' element of the meat product, there is no requirement to provide information about this aspect of its footprint. That does not make the impact of livestock feed production, explored in the next section, any less real.

SOYA IN SOUTH AMERICA: OVERVIEW

Soya expansion in South America has been largely concentrated in four countries: Brazil, Argentina, Paraguay and Bolivia. The combined area planted with soya in these countries increased two-and-a-half times in 20 years, from 17m hectares in 1988 to 42m in 2008.[16] (Figure 14)

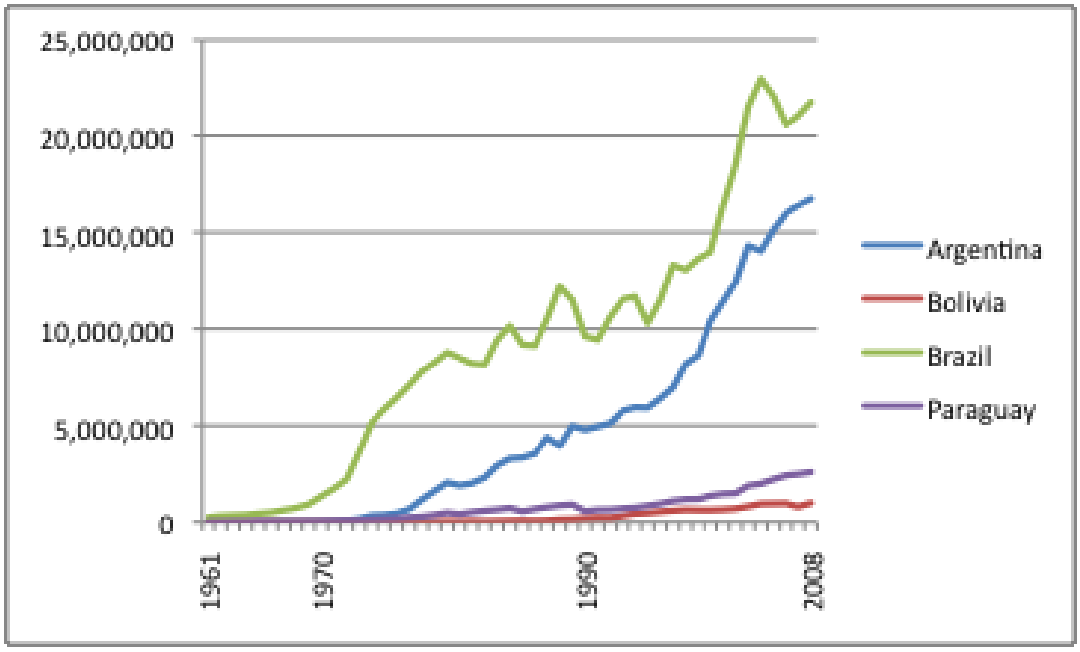


Figure 14. Planted area of soya, S. America (hectares), 1961-2008. *Source*: FAOSTAT

The expansion has moved agricultural production into a wide range of previously uncultivated ecosystems, as well as displacing other activities, especially cattle grazing, into forests and other natural areas. For the purposes of illustration, this report focuses on soya's impact on one major frontier – the Brazilian Cerrado. The same issues, however, apply to many other landscapes.

In ***Argentina***, soya has expanded especially rapidly since 1996, nearly tripling the area harvested from around 6m hectares to 16.7m hectares in 2008.[17] Environmental NGOs have become increasingly concerned about the impact of this expansion on two ecosystems in particular: the ***Chaco*** dry forests in the north of the country, and the slope of the ***Yungas*** cloud forests in the Andes foothills.[18] Deforestation in these regions has exceeded 2m hectares in the last decade. Both areas are highly biodiverse, with numerous endemic and endangered species, and are critical for water resources and carbon stocks. Soya has also expanded in multicultural regions with indigenous and peasant communities threatened by agribusiness expansion in their territories.

Despite its relatively small size, ***Paraguay*** has contributed significantly to South American soya production since the 1980s. The land planted with soya more than doubled in the past decade, reaching nearly 2.5m hectares by 2008, and it is now the country's major export commodity.[19] Planting has been concentrated in the ***Interior Atlantic Forest*** region in the east of the country, and this extremely diverse forest ecosystem, part of a biodiversity hotspot, has been reduced to small fragments. Expansion of soya in Paraguay has been associated with numerous conflicts, often violent, between plantation owners, a large proportion of them from Brazil, and peasant farmers displaced from their land. [20]

A more recent player in the large-scale production of soya, ***Bolivia*** has also seen rapid expansion, with the area planted increasing around tenfold in the past 20 years, reaching nearly 1m hectares by 2008. Development of the crop has been concentrated in the lowland Santa Cruz province, and has been associated with

destruction of the ***Gran Chaco*** wooded savannahs, the ***Chiquitano*** dry forests, the advance of the agricultural frontier into Bolivia's portion of the ***Amazon*** rainforest.[21]

Brazil has seen by far the largest expansion of soya bean planting in South America. The area covered by soya plantations in Brazil is now just about the size of the entire United Kingdom (24.1m hectares). It has more than doubled in the past 15 years[22]. Apart from impacts on the ***Cerrado*** detailed in the following pages, soya was a major driver of deforestation of the ***Interior Atlantic Forest*** in the south of the country from the 1960s onwards.[23] While international concern has focused on the impact of soya expansion into the Brazilian ***Amazon,*** the amounts grown in rainforest areas have been relatively small, with a larger impact likely to have been generated indirectly through displacement of cattle from former pasture areas. A voluntary moratorium on the sourcing of soya products from recently-deforested areas, introduced in 2006, is held to have been effective in halting the expansion of the crop into the Brazilian Amazon.[24]

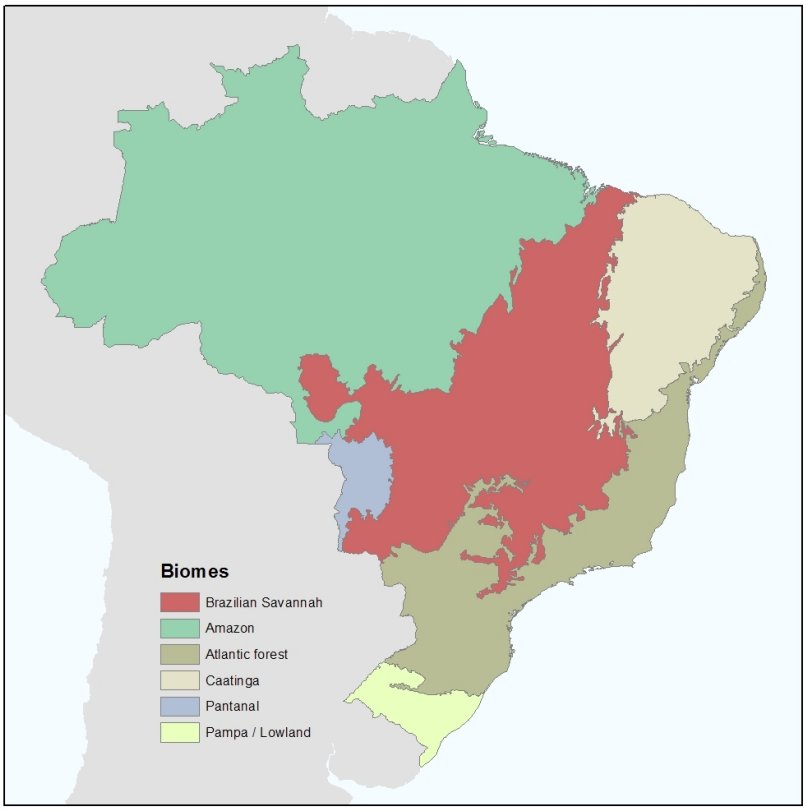


Figure 15. The Cerrado in relation to the other biomes of Brazil. *Source*: IBGE, WWF-Brazil

BRAZIL'S FORGOTTEN SAVANNAH

The beautiful Cerrado savannah once covered nearly a quarter of Brazil – 5% of life on Earth is found here, yet most people in the UK have never heard of it.

It is home to a multitude of wildlife including the threatened three-banded armadillo, giant anteater and maned wolf. Not to mention more than 11,000 plants, nearly half of which are endemic.

These are directly threatened by expanding soya and other agricultural production. Roughly half the Cerrado savannah in Brazil has already been destroyed, and it's now disappearing faster than the Amazon rainforest.

Loss of the Cerrado is of global concern not only because of its significant contribution to the world's biodiversity, but also because of its importance in terms of climate change. CO_2 emissions associated with the conversion of the Cerrado are more than half the total emissions of the UK and probably already exceed those from Amazon deforestation.

THE CERRADO: ROOF OF A CONTINENT

Much less well known than its giant neighbour, the Amazon, the Brazilian Cerrado or woodland-savannah is an extraordinary ecosystem worthy of global attention, especially in view of the intense pressure it has suffered and continues to suffer.

Originally covering an area larger than Mexico, more than 2m sq km, the Cerrado is an extremely diverse landscape occupying the entire central part of Brazil, thought to be a remnant of the ancient continent that existed at the time of the dinosaurs, before the separation of South America and Africa.[25]

Most of the Cerrado is located on the high plateau of the continent. The ecosystem is characterised by a pronounced dry period, between May and September. This leads to fire-prone conditions in the drought season to which vegetation has adapted over millions of years.[26]

Under the umbrella term Cerrado, the region actually consists of a rich mosaic of contrasting landscapes that makes this the most biodiverse savannah region on the planet. No fewer than 11 different categories of landscape have been defined, including three types of forest; four varieties of 'true' savannah with shrubs and sparse, twisted trees; and three separate kinds of grassland.[27]

The diversity of landscapes leads to a diversity of plantlife that qualifies the Cerrado to be one of the planet's biodiversity hotspots, when combined with the threats which it is facing. A recent checklist of vascular (i.e. flowering) plants in the biome identified more than 11,000 species, of which around 44% are endemic – that is, they appear nowhere else in the world. The Cerrado is estimated to contain some 5% of the entire Earth's biodiversity.[28]

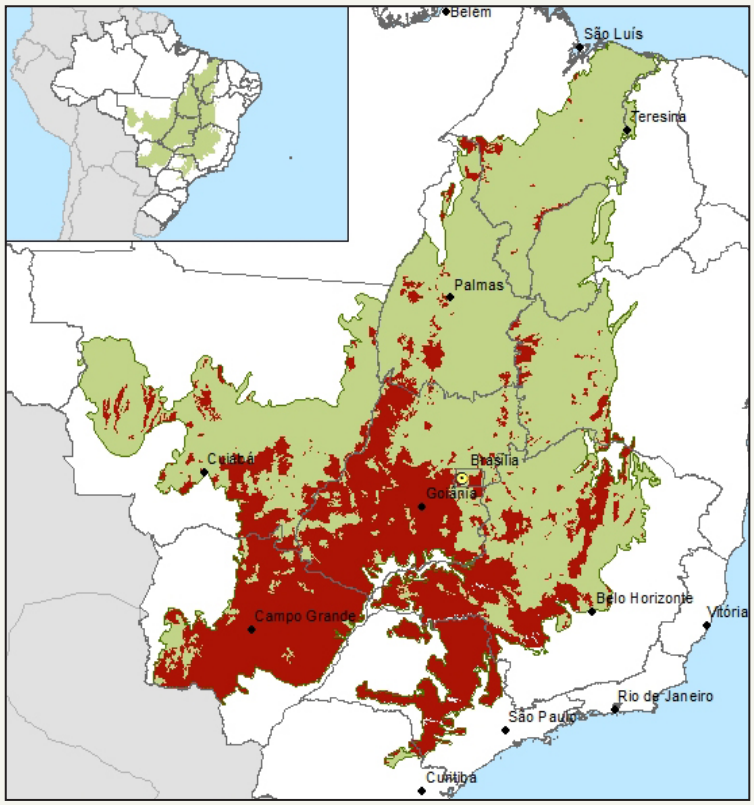
The plant biodiversity and its long adaptation to adverse conditions make Cerrado vegetation of great interest and potential high value for a wide range of human uses, including for medicines, novel food and potentially even crops better suited to future conditions under climate change.[29]

Among the charismatic mammal species to be found in the Cerrado are the giant anteater, giant armadillo, maned wolf and jaguar. More than 800 bird species occur in the biome[30] – emblematic birds include the Toco toucan, the rhea or South American ostrich, and various species of macaw.

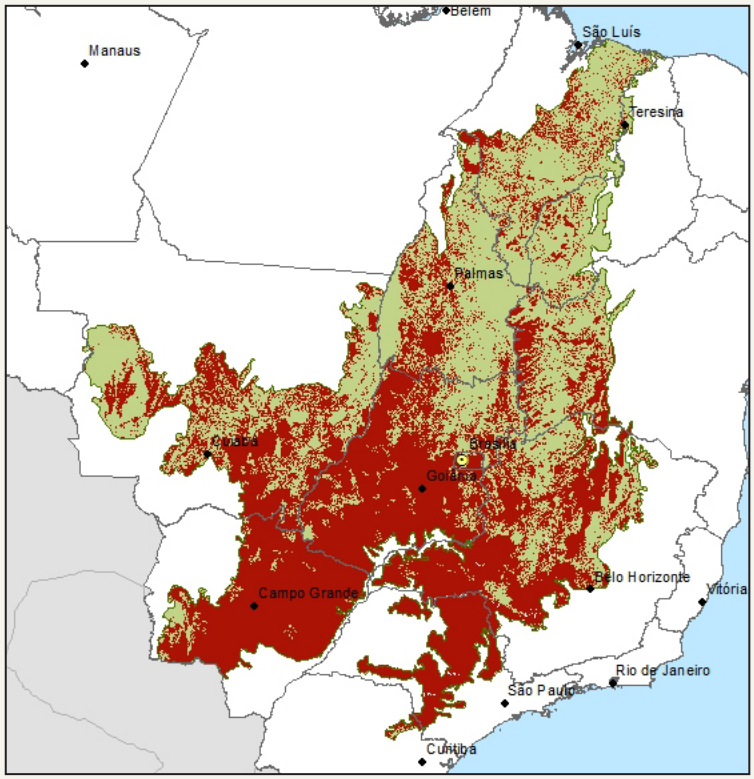
Apart from the great biodiversity, the Cerrado's position on the high plateau of the continent gives it an important role in safeguarding the water resources of a large part of Brazil and neighbouring countries. This has given it the nickname 'Brazil's water tank': of 12 hydrological regions in the country, six have sources in the Cerrado. In the case of three major river basins – the Tocantins/Araguaia, São Francisco and Paraná-Paraguay (La Plata) – more than 70% of the water resources originate in the Cerrado. Although the Amazon River itself starts in the Andes, some 4% of the water in the Amazon basin flows from tributaries originating in the Cerrado.[31]

The Cerrado also has global importance because of the large stock of carbon stored in its vegetation and soil. Although it would appear to be much sparser than the well-

CERRADO DEFORESTATION



CERRADO DEFORESTATION IN 2002



CERRADO DEFORESTATION IN 2008

Figure 17. Remaining natural vegetation of the Cerrado in 2002 and 2008.
Source of data: MMA & IBGE

- National Capital (IBGE)
- State Capitals (IBGE)
- Cerrado Biome (IBGE)
- Anthropic area (MMA)
- Remaining vegetation (MMA)
- State Limit (IBGE)
- International Limit (ESRI)

Period	Deforestation km²	Rate %
Until 2002	890636	43
2002-2008	85074	4
Total	975711	47

0 250 500 1,000 km

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known carbon store of the Amazon, the Cerrado has been described as a forest standing on its head, with about 70% of biomass underground.[32] Recent studies suggest the carbon stock of trees, bushes, litter, roots and soil may be nearly double the figure given by the Intergovernmental Panel on Climate Change (2000), at some 265 tonnes of carbon per hectare.[33]

Finally, the Cerrado and its flora and fauna have nurtured human cultures for some 12,000 years (Figure 16). A wide variety of indigenous people and traditional communities relies on the nature and landscapes of the biome to define their lives and livelihoods. The region today is populated by diverse groups including remnants of escaped slave communities (quilombolas), small-scale livestock farmers adapted to the particular Cerrado landscapes known as *gerais*, communities specialising in the breaking of *babaçu* palm nuts, and many others. Government data has shown that the rate of Cerrado deforestation in indigenous territories is less than one fifth that of protected areas as a whole, suggesting that maintaining cultural diversity is closely linked to biodiversity conservation.[34]

Figure 16. This rock painting in the Peruaçu Caves National Park, Minas Gerais state, is one of the earliest signs of human settlement of the Cerrado, dating back some 12,000 years. The region includes more than 80 archaeological sites in the transition zone between the Cerrado and the semi-arid Caatinga biomes. The park is being organised to begin welcoming visitors from the end of 2012. *Photo credit*: Aldem Bourscheit Cezarino/WWF Brazil

THE CERRADO: EN ROUTE TO DESTRUCTION?

Although its importance and value is increasingly being recognised by public authorities and sections of society in Brazil, the Cerrado has suffered and continues to suffer from the view that it is essentially wasteland or 'empty' space, ripe for improvement or development.

The large-scale conversion of Cerrado landscapes to intensive human uses has its origins in the period between the 1930s and the 1950s known as the 'March to the West', during which Brazilian governments adopted specific policies encouraging people to occupy and develop the interior of the vast country to prove its modernity and boost agricultural production. The project included building the ultra-modern capital Brasilia in the late 1950s, carved out of the heart of the Cerrado in an audacious display of mankind's mastery over nature.[35]

The process of Cerrado land conversion accelerated in the mid-1960s when agronomists supported by the Brazilian government developed new techniques of growing crops in the soil that had hitherto been thought unsuitable for large-scale commercial plantations, due to high acidity and toxic levels of aluminium.

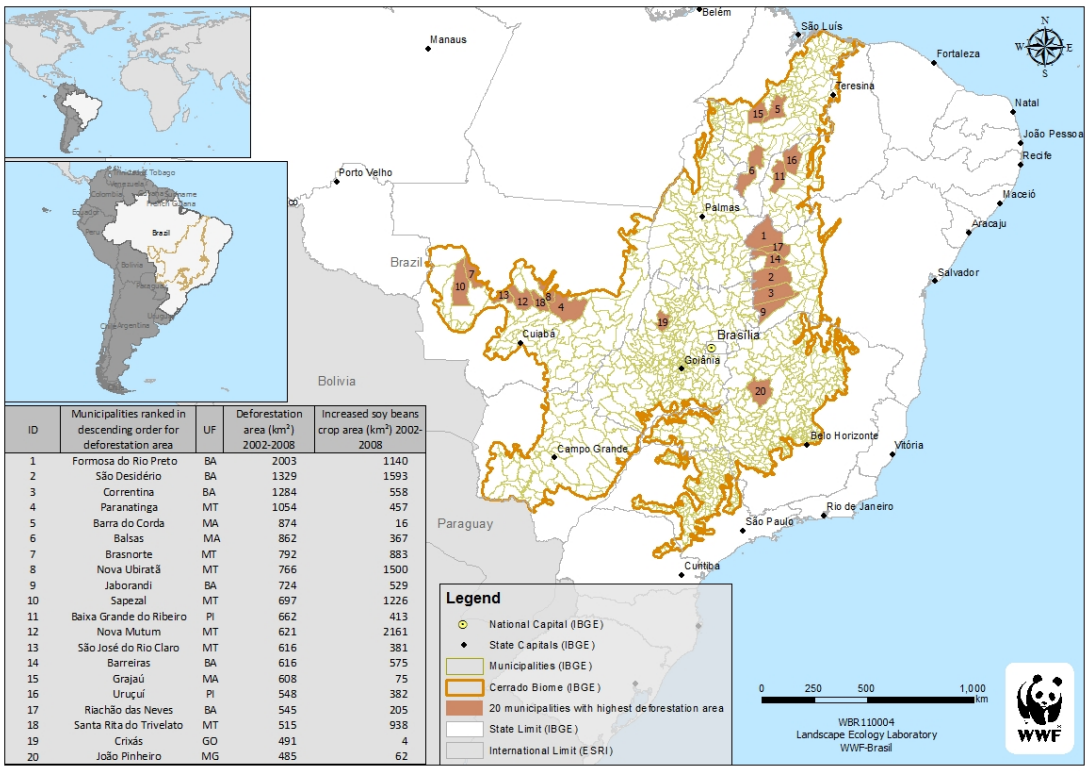
The years of agricultural development that followed resulted in the relentless removal of natural vegetation that is graphically illustrated in Figure 17 (see below). The first official government survey of the state of the biome, using satellite imagery, found that by 2008, some 47% of the natural vegetation of the Cerrado had been lost.[36] As the maps clearly show, the destruction has moved into new regions in the past decade: where the earlier expansion of agriculture had mainly been in the south, more recent conversion has moved into the north of the biome, especially in areas of transition with the Amazon where the rich biodiversity is still largely unstudied.[37]

By comparing land cover shown in images from 2002 and 2008, the survey estimated that average deforestation of the Cerrado ran at a little over 14,000 sq km per year. This is approximately double the area being lost from the Amazon forest in the most recent satellite surveys, following the success in bringing down deforestation there since the peak of 2003-04.[38]

The Brazilian government's own figures suggest that the recent loss of Cerrado land may have accounted for more carbon dioxide emissions than from deforestation of the Brazilian Amazon. Land-use change in the Cerrado is estimated to cause more than 275m tonnes of CO_2 emissions per year from 2002-08, more than half the total current emissions of the United Kingdom.[39]

The most recent figures suggest that the pace of Cerrado destruction may be slowing. The Brazilian government estimates that in 2008-09, around 7,600 sq km were lost, just over half the average for 2002-08. However, the latest survey also shows continuing high rates of loss in the frontier areas associated with current expansion of soya, such as the northern state of Maranhão where 1.1% of the total Cerrado vegetation was lost in a single year.[40]

The strong link between soya expansion and this continued loss of the Cerrado is suggested in Figure 18. It can be seen that the municipalities with the highest recent rates of deforestation, concentrated in those new frontier areas to the north of the biome, also have strikingly high levels of new soya plantations.



ID	Municipalities ranked in descending order for deforestation area	UF	Deforestation area (km²) 2002-2008	Increased soy beans crop area (km²) 2002-2008
1	Formosa do Rio Preto	BA	2003	1140
2	São Desidério	BA	1329	1593
3	Correntina	BA	1284	558
4	Paranatinga	MT	1054	457
5	Barra do Corda	MA	874	16
6	Balsas	MA	862	367
7	Brasnorte	MT	792	883
8	Nova Ubiratã	MT	766	1500
9	Jaborandi	BA	724	529
10	Sapezal	MT	697	1226
11	Baixa Grande do Ribeiro	PI	662	413
12	Nova Mutum	MT	621	2161
13	São José do Rio Claro	MT	616	381
14	Barreiras	BA	616	575
15	Grajaú	MA	608	75
16	Uruçuí	PI	548	382
17	Riachão das Neves	BA	545	205
18	Santa Rita do Trivelato	MT	515	938
19	Crixás	GO	491	4
20	João Pinheiro	MG	485	62

Figure 18. Soya planting increases in municipalities with the highest rates of Cerrado conversion. *Sources of data*: MMA, IBGE

Figures from some parts of the biome show dramatic rates of soya expansion. For example, the western part of the state of Bahia saw a near-tripling of the area planted with soya between 1992 and 2010, from 380,000 hectares to more than 1m.[41] In another example, the Alta Parnaiba region in the south of Piaui state saw a six-fold increase in soya planted area between 1993 and 2002.[42]

Soya is by no means the only driver of destruction of the Cerrado. The expansion of cattle pastures, widespread use of native tree species to make charcoal for steelmaking, and the boom in sugarcane plantations to produce ethanol, each have played an important role.[43]

Nevertheless, from the point of view of the British consumer and businesses, the close link between UK food consumption and the relentless pressure on this and other ecosystems create both responsibility and opportunity. The responsibility to consider the impacts of what we produce, sell and eat; and the opportunity to influence things for the better. The question is, how?

SEEKING SOLUTIONS

Clearly, the easing of pressure on the Cerrado will involve a wide range of measures taken both within Brazil and in places such as the UK where the issues of footprint and influence can be addressed.

In Brazil, urgent priority must be given to increasing the number and size of ***protected areas*** in the Cerrado. Currently, less than 3% of the land area is strictly protected for nature. A larger area, some 8%, is designated as protected under a looser category known as an environmental protection area, but the Brazilian government's own report acknowledges that more than 4,000 sq km of these areas were deforested between 2002 and 2008.[44]

Apart from government protected areas, the ***Brazilian Forest Code***, progressive legislation which prescribes the need for in-farm set-asides, determines that up to 30% of the native vegetation in farms in the Cerrado must be preserved. However, few producers comply with it and there is a strong pressure to reduce this percentage and forgive producers that are not compliant with the law.

In addition to enforcing the current Forest Code, ***integrated land use planning*** should be applied to reconcile cattle ranching, soya plantations and other crops, with biodiversity conservation, and to ***support sustainable livelihood programmes*** that enable local communities to capture value from Cerrado biodiversity. Providing the right set of market and policy incentives for producers to conform with such planning is also crucial.

The question arises whether a ***moratorium*** along the lines of the one established in the Amazon, agreeing to boycott any soya grown in recently-cleared areas of Cerrado, would be desirable or practical. The fact is that, unlike in the Amazon, a large amount of soya has already been planted in the Cerrado, and there is no equivalent system of real-time monitoring of deforestation. This makes it difficult to tell which product would or would not come from newly deforested areas, without a full traceability system and farm by farm verification. In addition, there would be a risk of simply displacing soya production to other regions such as the Chaco.

In the UK, and elsewhere in Europe, a number of measures have been put forward that could reduce the negative impacts of current soya consumption, helping to ease pressure on the Cerrado and other South American ecosystems. It is not within the scope of this report to evaluate them fully, but they are listed to illustrate the range of options being considered by businesses, policy-makers and NGOs.

Reduction of meat and dairy consumption and wasteful use could reduce the number of livestock and therefore the demand for imported protein feedstuffs such as soya. WWF-UK has called for business, government and consumers to reduce their consumption of livestock by 15%-20% by 2020 while the recently published Livewell report[45] defines a sustainable diet as one that contains meat and dairy but in moderation. As well as taking pressure off ecosystems such as the Cerrado, a dietary change of this sort would have many additional benefits, including better health and helping the UK to meet its targets for reducing greenhouse gas emissions.

SOYA AND LIVESTOCK

The soya crop is primarily used to make meal, a major source of protein in livestock feed, especially for poultry and pigs. Around 80% of the crop is fed to the animals we eat. The expansion of soya bean planting has, therefore, largely been driven by our rising consumption of meat.

Imports of soya are dominated by the European Union and China, which are driving expansion in countries with available land, primarily in South America. The scale and pace of destruction is such that we need to act fast to address the problem – not least by introducing measures to reduce livestock consumption and improving current soya production practices.

Alternative protein crops, suitable for cultivation in the UK and Europe, could reduce reliance on imported soya meal for the protein needs of livestock. Crops such as field beans, peas and lupins have been considered as alternatives to soya and could be promoted with policies and incentives. Growing them in rotation with other crops would have added advantages, such as fixing nitrogen in the soil. However, the particular nutritional advantages of soya means that such crops may not be suitable as a complete replacement, especially for poultry and pigs. Also, widespread planting of such crops could increase the need to import cereals, and have other environmental impacts and land-use implications yet to be fully understood. [46]

Lifting regulatory bans on using waste products in animal feed would re-introduce previously available protein sources whose removal has substantially increased dependency on imported soya. In particular, the European Commission is currently considering whether to relax the complete ban on the use of processed animal proteins (PAP) in livestock feed, introduced in 2000 after the BSE crisis. The proposal is that while the ban would remain in place for cattle and sheep (herbivore species), feed for omnivore species (pig and poultry) could include PAP guaranteed not to come from the same species (i.e. avoiding the pathogen transmission which spread BSE in cattle). The National Farmers' Union and British Meat Processors' Association favour lifting the ban, but consumer groups argue for great caution before it is eased.[47] In addition, some groups including the organic standards body the Soil Association have called for a review of the current EU ban on using pigswill, introduced after the outbreak of Foot and Mouth Disease in the UK in 2001.[48]

Sourcing soya from regions other than South America may seem a tempting solution for companies concerned about the impact of their purchasing and associated reputational risks. However, other producing countries such as the US, Canada, India and China have restricted potential to increase exports due to land use limitations, climate and increased domestic consumption. Options for alternative sources are therefore limited. In any case, soya from other regions should also be required to be certified using credible sustainability criteria, to avoid the risk that current problems would simply be displaced and others could be created.

Undoubtedly some or all of these measures will prove sound, necessary and feasible. They could help reduce the pressure for more soya expansion in South America, while providing other benefits to the European food system. However, they will not in themselves produce change at the scale and pace needed to prevent significant further destruction of South American ecosystems.

For the foreseeable future, the UK and the EU will still need to import soya. It is therefore crucial to engage consumers and producers of soya in practical and pragmatic steps to minimise the negative impacts of its production.

Even if it were practical, complete withdrawal of European buyers from the South American soya market would not necessarily be desirable. China would continue to import ever-greater quantities of soya to meet its demands, and Europe would have lost its ability to influence production practices for the better.

Certification of soya under credible, multi-stakeholder schemes provides an additional tool, with which soya consumers can help reward producers who respect agreed norms for improving environmental and social practices. WWF believes the new certification standard launched by the Round Table on Responsible Soy (RTRS, see box below) represents an important opportunity to exert this influence.

What is RTRS?

The RTRS is an international, multi-stakeholder initiative founded in 2006 that promotes best practices in the production of soya, through the commitment of the main stakeholders of the soya value chain and through a global standard for certification of soya production.

WWF is one of its founding members, and today the RTRS has more than 140 members from around 20 countries, including producers of all scales, investors, traders, processors, retailers and NGOs.

Since its establishment, RTRS members have worked on developing a set of standards to which soya farmers must adhere in order to receive certification. The major requirements are to halt conversion of native forests and areas with high conservation value, to promote best management practices, to ensure fair working conditions and to respect land tenure claims.

The principles and criteria of RTRS were field tested to obtain feedback from different scales of producers from different countries in 224,000 hectares and some 650,000 tonnes of soya. In June 2010, at the annual general assembly meeting in Brazil, the standard was approved. National interpretations of the standard are being drawn up by local working groups for Argentina, Brazil, Paraguay, India, and Bolivia.

The RTRS certification system is now live for the first time.

More information: RTRS website www.responsiblesoy.org

It should not, however, be seen as a fix-all solution but one that can be used in conjunction with some or all of the measures outlined in this section. However, at the moment RTRS is the only scheme of its kind – global, multi-stakeholder and independently certified – that has the potential to shift soya production for the better. All possible measures will need to be deployed in order to deal with the scale of the problems presented by soya expansion.

By supporting the new certification and ensuring that all soya used is RTRS-certified (for suggested steps in achieving this, see Figure 19 below), British businesses and consumers will be ensuring that:

- The soya is sourced from farms that comply with existing environmental legislation, adhere to decent conditions of employment and respect the land tenure claims of local communities.

- The soya is not produced from areas converted to cropland from native forests (this would, for example, exclude planting in the Amazon and forested parts of the Cerrado).

- The soya is not sourced from areas of high conservation value converted to cropland. Maps are being drawn up to make it clear which areas are suitable and which are not. In the meantime, existing official maps of conservation value will be used, and where these are not available, an independent third party assessment of the conservation value of the area must be carried out before planting on uncultivated land.

These criteria, supported by all the major soya trading groups and many other businesses in the supply chain, as well as NGOs , could lead to much more rational future production of soya that avoids the kind of destruction that has taken place in the past. It will only work, however, if there is significant buy-in to the standard from consumer countries including the UK. If followed in other countries, adoption of a policy of buying 100% RTRS-certified soya would represent a major market pressure to improve production practices.

Some groups have questioned why the RTRS accepts genetically-modified soya as being defined as 'responsible'. In applying the precautionary principle, WWF believes that GM crops should not be released into the wider environment until ecological and social interactions are fully researched and safeguards put in place, and we will continue to support a moratorium on the use and release of GMOs in crops until identified risks are acceptably low and safeguards put in place. We do not believe that GMOs will be a 'silver bullet' in solving issues around global food security.

However, the fact is that many GM crops have already been released and are widely used – 77% of global soya production is GM. This is a reality that has to be faced. If we want to curb the key negative impacts of mainstream soya production, such as the startling destruction of the Cerrado, it is necessary to engage with key soya producers, regardless of production system.

To exclude GM soya from RTRS certification would be to exclude a very large proportion of existing South American soya from this form of positive incentive to improve practices and crucially to miss the opportunity to shift the mass of soya production from 'business as usual' to a higher standard and on to the path of continuous improvement. It is important to point out, moreover, that RTRS also has a non-GM module, which makes it possible to identify soya that is compliant with RTRS practices and is also non-GM.

In summary, the RTRS provides an opportunity for British food producers, retailers and consumers to acknowledge and tackle part of their footprint of which few of us are aware: the link between the animals we eat and the irreplaceable ecosystems that are being cleared in order to feed us. It represents a pragmatic and effective

mechanism for meeting today's market demands while preserving vital ecosystems for future generations.

Figure 19. Suggested sequence for companies to commit to RTRS purchasing.

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[9] USDA (Feb 2010).

[10] Aggregated soya bean and soya meal import figures from USDA (Feb 2010), using multiplier of 1.24 to obtain soya bean equivalents.

[11] All data referring to UK imports are derived from HMRC UK Trade Info tables available at www.uktradeinfo.com/index.cfm

[12] Percentage figures aggregated from UK Trade Info soya bean and soya meal import figures, the latter expressed in terms of soya bean equivalent using a multiplier of 1.24.

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[33] PPCerrado, p50.

[34] PPCerrado, p26 and p27, Table 9. Deforestation 2002-08 was 0.49% in indigenous territories, and 2.75% in protected areas. Deforestation of PAs was highest in environmental protection areas or APAs where sustainable economic activity is allowed, but even national and state parks saw deforestation rates only slightly lower than in indigenous territories (.48% and .46% respectively).

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[36] PPCerrado, p20.

[37] See for example discovery of a new species of climbing rat in Rocha et al, Small mammals of the mid-Araguaia River in central Brazil, with the description of a new species of climbing rat Zootaxa 2789: 1–34 (2011)

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Soya and the Cerrado in numbers

80%

The proportion of soya used to feed livestock.

5%

The amount of the life on earth found in the Cerrado alone.

250 MILLION

tonnes of CO_2 emissions per year from conversion of the Cerrado – these are more than half the UK's total emissions.

10X

global soya production has increased 10-fold since 1961.

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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