



Soy Cultivation in South America

OSAS

OBSERVATORIO
SOCIOAMBIENTAL
DE LA SOJA

www.observatoriosoja.org

The expansion of soy bean

Soy cultivation has shown an increasing expansion throughout Argentina, Brazil, Bolivia and Paraguay, in the last decade. This remarkable increase is explained by its economical importance in the region, and as a consequence, it is difficult to regulate its progress and attenuate its potential socio-environmental impacts.

In 2012, in these 4 countries the area cultivated with soy reached 47 million ha. Brazil and Argentina have the highest average increase rate per year (936,000 and 878,000 ha, respectively.) These numbers represent almost twice the deforested area in the Amazon in 2012.

In Argentina, soy cultivation went from representing 10.6% of the agricultural production in 1980/81 to more than 50% in 2012/2013, generating important economical benefits. In Argentina, Bolivia, Brazil and Paraguay the soy cultivated area represents more than 50% of the total area cultivated with the major crops and the percentage increase of the production in the last decade represented between 28 and 100%.

PERCENTAGE OF THE SOY CULTIVATED AREA IN RELATION TO THE AREA CULTIVATED WITH THE MAIN 5 CROPS IN EACH COUNTRY AND PERCENTAGE INCREASE OF THE PRODUCTION (IN TONS) IN THE LAST 10 YEARS. ¹

COUNTRY	AREA CULTIVATED WITH SOY	INCREASE OF THE PRODUCTION
Argentina	63 %	64 %
Bolivia	52 %	28 %
Brasil	56 %	49 %
Paraguay	66 %	101 %

The expansion of soy monoculture is in detriment of other land uses, with a clear increasing trend and without a land use planning

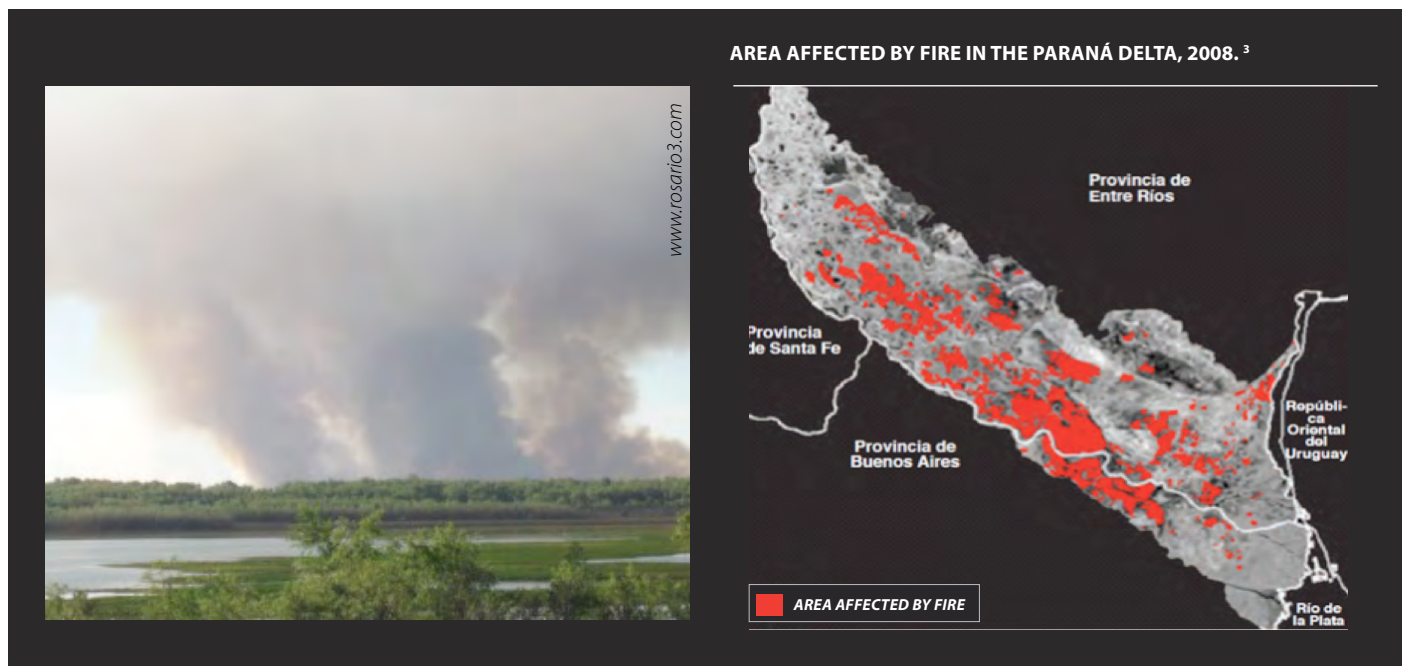
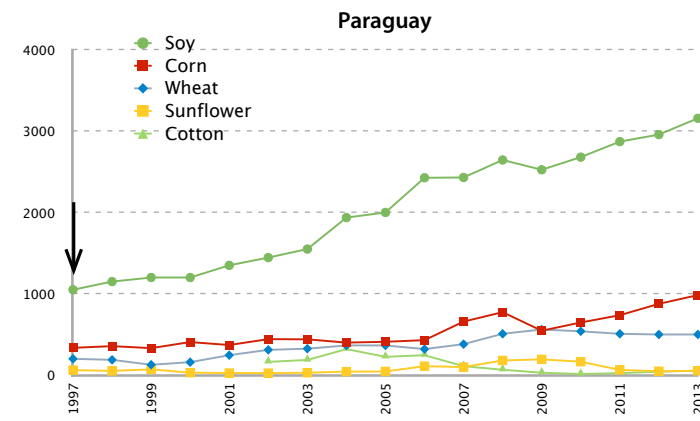
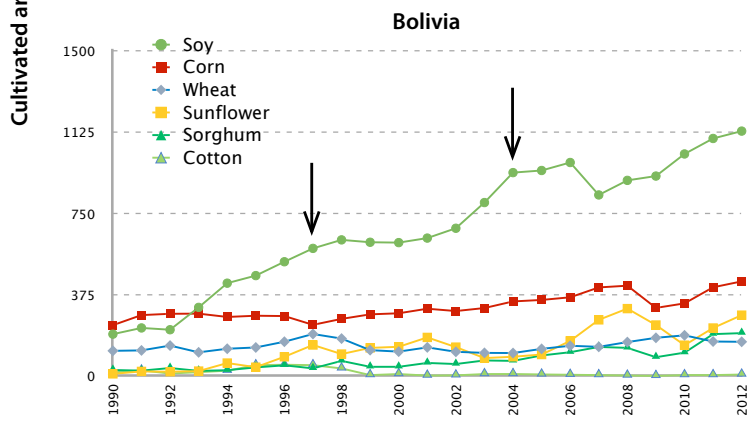
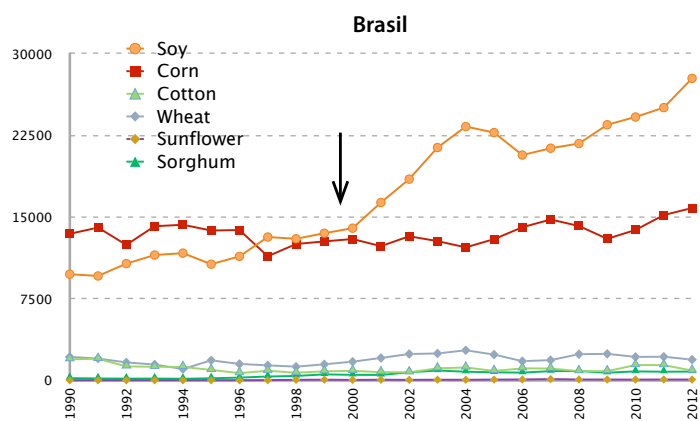
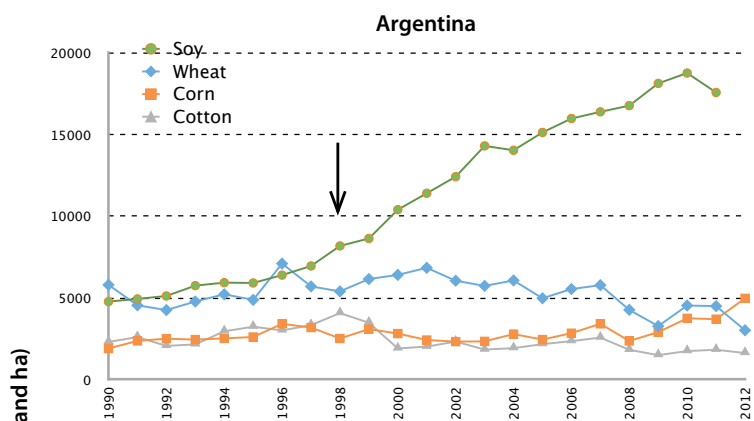
In the late 90's the soy cultivated area in Argentina increased significantly in relation to other crops. This increase of the area cultivated with soy also modified the livestock activity, with different trends in different provinces. The main soy-producing provinces ("núcleo sojero") showed a decrease in livestock activity during the last 5 years, while the provinces of the semi-arid region, in the center of the country, presented an increase in both livestock activity and in the area cultivated with soy. This change in land use basically represents deforestation (3,700,000 ha were deforested between 2001-2012 in this region).

Furthermore, in the Pampas region an important part of the cattle stock was moved towards the wetlands of the Paraná Delta. The significant increase in the stocking density on this ecosystem, which is not suitable for agriculture and livestock on a large scale, resulted in overgrazing, soil erosion and biological and chemical pollution of water bodies, together with the intensification of fire management practices. In 2008 the fires burned 207,000 ha in the Paraná Delta. As a consequence, the ability to buffer floods was temporarily lost and we estimate that it will take about 11 years to recover the stored Carbon that was lost during these fires.



¹ y 2 - Ministerio de Agricultura, Ganadería y Pesca (Argentina); Instituto nacional de Estadística, encuesta nacional agropecuaria (Bolivia); Companhia Nacional de Abastecimento (Brasil); Ministerio de Agricultura y Ganadería del Gobierno Nacional (Paraguay).

SOY AND MAIN CROPS CULTIVATED AREA (IN THOUSAND OF HECTARES) BY COUNTRY. THE ARROWS INDICATE THE ENTRY OF GM SOYBEAN. ²



3 • Stamati et al. 2008. Evaluación de la superficie afectada por los incendios ocurridos en el Delta del río Paraná en abril de 2008. Reunión Argentina de Ecología.

The soy monoculture model promotes the inappropriate use of agrochemicals with health and environmental consequences

Soy cultivation in the region is closely related to the use of agrochemicals, especially glyphosate. While the technological package produced significant benefits in the overall yields (output per unit area), the usage of agrochemicals has become extensive given the expansion of the cultivated area. This warns about the impacts on the population's health and the ecosystems.

Currently, in South America 15 liters of glyphosate are applied, on average, per hectare per year. In Argentina, this number corresponds to 12 liters and, in many cases, it is "enhanced" with other herbicides such as graminicides or hormonal herbicides. This contrasts with the 3 liters/ha used during 1996/97 before the introduction of the RR soy. In Bolivia, the most significant increase occurred among the fertilizers (in 2013 the volume imported was 4 times higher than the one registered in 2000).

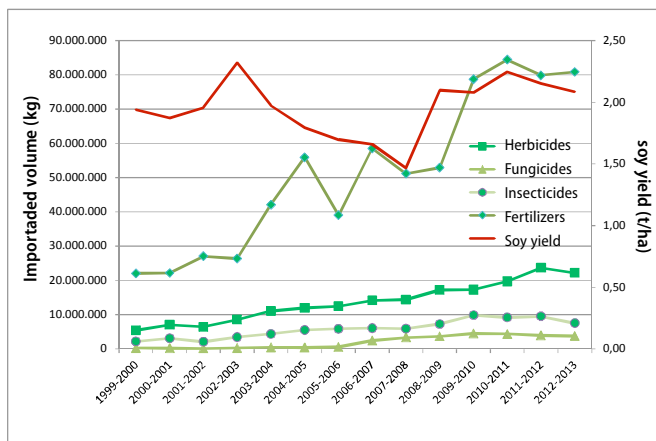
This potential problem is even more serious considering that as a response to the development of weed resistance, the enterprises focus on creating new transgenic crops tolerant to even more powerful herbicides, which are harmful to the health and the environment.

In areas with intensive soy cultivation, wetlands are directly affected by the use of agrochemicals, being the runoff one of the main sources of nonpoint pollution of watercourses. In Argentina, the presence of highly toxic pesticides such as chlorpyrifos, cypermethrin and endosulfan were found in sediments, suspended particles and water. This is a serious problem because wetlands provide water for the agricultural production itself.

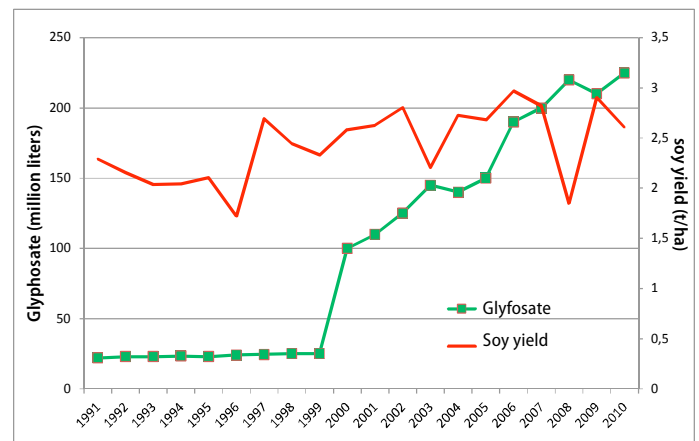
The generalized use of agrochemicals that the current soy production model promotes in the region generates great controversy in the society. In the OSAS region several groups claim the occurrence of impacts on human health and the environment. This controversy led numerous prestigious institutions to currently conduct scientific studies about the potential impacts of widely used herbicides such as glyphosate.



IMPORTED VOLUME (IN KG) OF HERBICIDES, FUNGICIDES, INSECTICIDES AND FERTILIZERS PER YEAR IN BOLIVIA (MAIN AXIS) AND SOY YIELD (IN T/HA) (SECONDARY AXIS).⁴



GLYPHOSATE (IN MILLION LITERS) AND SOY YIELD(T/HA) IN ARGENTINA.⁵



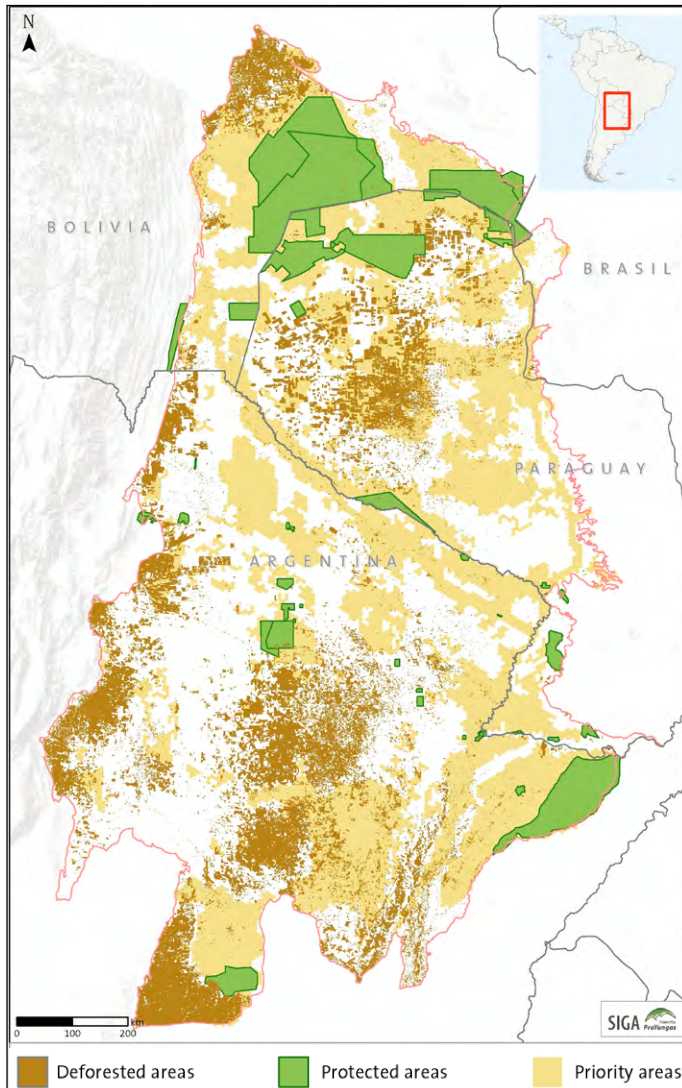
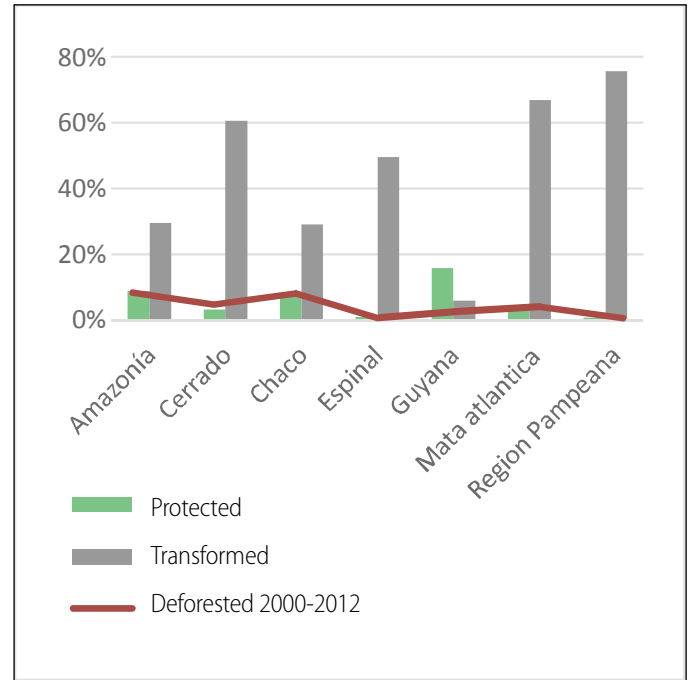
4 • Instituto Nacional de Estadísticas (INE) (Bolivia) - 5 • Cámara de sanidad Agropecuaria y Fertilizantes (CASAFE)-Argentina

The expansion of soy cultivation is the driving force of degradation and loss of native ecosystems

The Amazon and Chaco ecoregions, which currently have 30% of their original area deforested, are under great transformation pressure. This situation is contrasted with a general low protection level of these ecosystems.

From these two ecoregions, the Gran Chaco Americano is best represented in the work area of the OSAS. In 2013 changes in land use were detected in 502,308 ha, which are equivalent to a deforestation rate of 1376 ha/day. Paraguay and Argentina hold the largest area of the ecoregion, with the lowest percentage under protection. This situation affects the protection of the biodiversity and the maintenance of the ecosystem goods and services associated with this environment..

DEFORESTED AND PROTECTED AREAS IN THE ECOREGIONS OF THE SOUTHERN CONE. ⁶



TRANSFORMATION AND PROTECTION PERCENTAGES IN THE GRAN CHACO AMERICANO IN ARGENTINA, BOLIVIA AND PARAGUAY. ⁷

GRAN CHACO AMERICANO			
	AREA (MILL. HA.)	TRANSFORMED	PROTECTED
Argentina	51	21%	3%
Bolivia	12	12%	35%
Paraguay	27	13%	8%

⁶ • Limite ecoregiones: Provincias Biogeográficas de América del Sur, según Cabrera y Willink (1980); Transformado 2000: Eva et al. 2004; Transformado 2000-2012: Hansen et al. 2013. - ⁷ • Fundación ProYungas 2012 - ⁸ • The Nature Conservancy 2005; Fundación ProYungas 2012

LOCATION OF ECOLOGICAL CORRIDORS IN ARGENTINE CHACO. 9



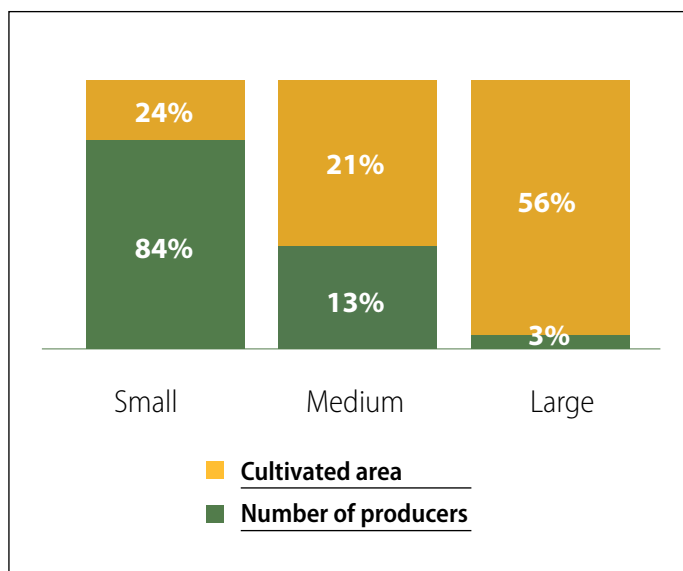
In the case of wetlands, there are no studies at a regional scale, as there are for forests, since its monitoring is much more complex. However, there are several studies at smaller scale that report the loss or degradation of these ecosystems. For instance, in Cordoba province, one of the main soy productive areas of Argentina, the Saladillo Wetlands have become the discharge area of all the drainage systems of the region. Due to its canalization during the last decades to make land suitable for agriculture, the wetland area was reduced by 69% and the number of lakes by 19%¹⁰. The consequences were loss of wetland connectivity, reduction of species richness and abundance, and land salinization due to inadequate use of agrochemicals and salt-winds.

The expansion of soy cultivation generates changes in land tenure

The change in the magnitude of the expansion of soy cultivation in South America has undeniable social consequences. Most of the soy cultivation is produced on a large scale and is carried out by agribusiness enterprises oriented to global markets. These enterprises manage large properties, they often rent properties and equipment, outsource the productive activities and, in some cases, transcend the borders of a country (e.g. producers from Brazil rent properties in the Paraguayan Chaco).

The concentration of land is clearly documented in the department of Santa Cruz, Bolivia, where only 3% of the producers control 56% of the cultivated area. Furthermore, in the case of Bolivia 68% of the soy producers are foreigners.

DISTRIBUTION OF SMALL (0-50 HA), MEDIUM (50-500 HA) AND LARGE PRODUCERS (> 500 HA) IN THE DEPARTMENT OF SANTA CRUZ, BOLIVIA. 11



In Argentina, more than 50% of the soy production in 2010 was controlled by 2.6% of the producers¹². This land concentration occurred both in the Pampas region as well as in the soy expansion region. Between 1988 and 2002 there was an increase in the average size of the establishments that went from 375 to 776 ha in the Pampas region and a decrease in the percentage of smallholders (less than 200 ha) that went from representing 12% of the cultivated area to approximately 8%.

9 • Secretaria de Ambiente y Desarrollo Sustentable de la Nación 2014 (SAyDS) (Argentina) - 10 • Brandolin et al. 2013). - 11 • Cámara Agropecuaria del Oriente (CAO) y Asociación de Productores de Oleaginosas y Trigo (ANAPO) (Bolivia).

NUMBER OF AGRICULTURAL AND LIVESTOCK EXPLOITATIONS IN THE PAMPA PROVINCES.¹³

ha	1988		2002	
	# producers	area	# producers	area
< 25	31105	366	17034	204
25-100	53268	3237	33496	2056
100-200	35846	5278	24294	3608
200-1000	53210	22890	44330	20094
1000-2500	9735	14992	10294	15969
> 2500	4308	23709	4664	26440
	187472	70472	134112	68371

In the semiarid region in northwestern and central Argentina, the social impact of the soy production system was more abrupt than in the Pampas region, since in this area small producers predominated and there were almost no medium-size producers. In many cases, subsistence economies with a strong support in the gathering (e.g. firewood) and use (extensive livestock farming) of forest products are significantly affected by change in land tenure.

Certification is an option towards responsible soy production

While there are other standards, the Round Table on Responsible Soy (RTRS) stands out as the best Voluntary Standard System (VSS) for the soy chain. Its basic condition as Multi-stakeholder VSS provides a higher level of reliability than any other system based on private property companies or industry associations.

The participation of civil society organizations has promoted the creation of working groups that deal with relevant topics such as the use of agrochemicals. Wetland International Argentina participated in the Pesticide working group that generated recommendations that were incorporated to RTRS standard.

Despite the difficulties of a reluctant market to commit to buy large volumes of certified soy and the lack of clear goals from the governments of the European countries that buy soy, the RTRS is still the best tool to reduce the negative environmental and social impacts in soy-producer countries.

So far, there are only 401,405 ha under RTRS certification in the OSAS region, which represent 853,644 tons of soy. This means that less than 1% of the soy produced is under the RTRS certification standard. This could only be reverted through a greater commitment from the governments and the main buying companies.

However, these certification mechanisms will have to work together with other systems that will enable to move towards good agricultural practices and land use planning in critical areas of high biological diversity, where there are peasant and native populations, with a strong dynamic in the expansion of the agricultural and livestock frontier, where the classical certification systems generally avoid getting involved.

AREA UNDER RTRS CERTIFICATION STANDARD IN 2013 AND PERCENTAGE INCREASE BETWEEN 2011-2013.¹⁴

	CERTIFIED HA. IN 2013	%	INCREASE 11-13
Argentina	155,681	0.8 %	58.7 %
Brasil	269,834	1.0 %	71.6 %
Paraguay	22,081	0.9 %	87.5 %
Total	447,596	0.9 %	

PRODUCERS UNDER RTRS CERTIFICATION STANDARD.¹³



12 • Federación Agraria Argentina 2011. - 13 • Piñeiro Villareal 2005 (fuente: censo Nacional Agropecuario) - 14 • <http://www.responsiblesoy.org/>

This publication is based on the work performed by the Observatorio Socio-Ambiental de la Soja (OSAS), space for dialogue, data collection and analysis formed by organizations from Argentina, Bolivia, Brazil and Paraguay and under the support of the Ecosystem Alliance Programme.

OSAS

OBSERVATORIO
SOCIOAMBIENTAL
DE LA SOJA

www.observatoriosoja.org



Under the support of:

