

Executive Summary

Soybean production has been expanding in Brazil at a rapid pace in the last 10 years, promoting a new dynamic of land use and generating important economic benefits. Meanwhile, there is a strong international concern about negative social and environmental impacts, especially related to deforestation and biodiversity conservation. Sustainable expansion of soybeans depends on the sector's capacity of achieving minimum, manageable and verifiable deforestation, full management of other environmental and social impacts, and high level of legal compliance with respect to Brazilian legislations.

Brazil has a complex legal framework for environmental conservation based on the Constitution principle to an ecologically balanced environment, which creates a common duty for the State to conserve nature for present and future generations. The National Policy on the Environment, the Environmental Crimes Law and the National System of Conservation Units (SNUC) are important elements of the national structure, guiding state regulations and environmental public policies.

Besides, different from other countries, Brazil has made the choice of placing conservation in private properties at the center of its environmental regulations by establishing the Forest Code. This means that there are more mandatory protected area within private properties than in Conservation Units, such as parks and other modalities owned and managed by State, despite the fact that in some biomes the amount of land under the management of the State is very high.

The Forest Code establishes that each and every farm within the country has the duty to set aside natural vegetation for fragile areas, called Permanent Preservation Areas – APPs (areas along rivers and watercourses; slopes, mangroves and other sensitive areas) and the Legal Reserve Areas (a percentage of the farm, ranging from 20 to 80%, depending on the region). These two key obligations have different degrees of compliance within the country and their restoration and enforcement were in the center of the Forest Code reform in 2012. Moreover, the Forest Code established a Rural Environmental Registry (CAR) as a tool to monitor farm level native conservation obligations. The CAR is only the first step, given that it will trigger the implementation of the Environmental Compliance Program (PRA), also mandatory under the Code.

At the state level, the Economic and Ecological Zoning – ZEE is a territorial planning instrument for guiding public policies. ZEE is a tool used to define different categories of land use by taking into account environmental constraints and economic and social priorities. The competence to develop ZEEs is shared between the Union, States and Municipalities, and it is developed in a participatory manner together with academia, the private sector and governmental bodies.

The Legal Amazon region has an Ecological-Economic Macro-zoning that was approved in 2010 for orienting and connecting state ZEEs. The state ZEEs, which are produced in high resolution scales, play an important role in guiding public policies related to deforestation control, environmental and native vegetation suppression licensing, water resources, and

biodiversity conservation. The ZEEs can work as an important strategic land use planning policy used, for instance, to map and prioritize areas for biodiversity conservation, defining new protected areas and ecological corridors. Considering that just a few states approved ZEEs, the new Forest Code established a deadline of five years for their development and approval, which means that all Brazilian states will be forced to have ZEEs in place until 2017.

Under this legal framework, 65% of the Brazilian territory (554 Mha) is covered by natural vegetation, comprising protected areas in the form of Conservation Units (144 Mha), indigenous areas (104 Mha), APPs and Legal Reserves (274 Mha) and remaining vegetation, mainly public areas. Agriculture land use covers 30% of the country and is divided between pastureland (198 Mha or 23%) and crops (60 Mha or 7%). A considerable share of the pastureland is in different stages of native vegetation restoration (23 Mha in the Amazon Biome).

Manageable deforestation driven by the expansion of agriculture, combined with restoration of the Forest Code debts can deliver net deforestation trends and land use dynamic in Brazil. More than power and political disputes, this dynamic should be guided by land use planning and management, using available tools, such as the CAR and the ZEEs.

Soybean is one of the most important agriculture value chains in Brazil and its global demand is expected to increase 35% until 2030. Brazil is expected to supply 40% of the world's increase in exports. Projections indicate that soybeans area in Brazil will expand 8.8 million ha in the next 10 years, 2.7 in the Amazon and 4.4 in the Cerrado. While the Soy Moratorium and other commitments have been indicating that soybean expansion in the Amazon will mostly take place over pastures, soybean production is likely to convert new areas in the Cerrado. There are no reasons to believe that these conversions will not follow all legal constraints – conserving APPs, Legal Reserves and other protected areas.

Expected conversions for agriculture uses as a whole are not triggering Brazilian commitments to cut deforestation and, therefore, reduction of greenhouse gas emissions associated to it. Considering the ZEE and CAR tools, the soybean expansion process has all the conditions to cause minimum environmental impacts.

Soybean expansion has also been causing social and environmental impacts. Jobs and income generation along the value chain are the most evident economic impacts. In 2009, the cultivation of soybeans directly generated 265,000 jobs and these workers had, on average, six years of education, which is double the average of workers in traditional crops such as cassava, maize and rice. The average monthly income of R\$1,246 was much higher than in other crops and twice the minimum wage.

Employment in Brazil is regulated by strict labor laws, which include several social securities, which the soybean sector is fully compliant with. Despite isolated cases, slavery-like work conditions are not found in soybean farms. The main concern for producers is compliance of health and safety conditions at work required by the Regulatory Norm - NR 31, from the Ministry of Labor and Employment. The Norm establishes several specific technical requirements for meal and sanitary areas, lodging, living area, bathrooms, storage and use

of pesticides. These obligations require infrastructure adaptations that have proved to be very difficult and expensive to implement. Depending on the complexity of the obligations, the deadlines for compliance vary from 90 days to two years. Some obligations must be reported and applied in a year-by-year basis. Adaptations in soybean farms are in course with the aim of fully complying with this norm.

In addition, the soybean sector faces challenges for establishing good relationships with local communities in some expansion areas in the Amazon and in the Cerrado. Job opportunities for local people are challenging, considering the general low educational and qualification levels and weak connections with modern agriculture in these regions. The ability of soybean producers and local communities to establish positive and effective dialogues is a key element for local development, unlocking potentials and avoiding disputes. Although there are isolated good examples, it is still a challenge to be better addressed by the soybean sector. State and local governments have important roles to play in this field, as well as the scientific community in order to support evidence-based policies.

The picture of achievements and challenges in the Brazilian soybean sector, as well as the shared interest in the value chain to achieve legal compliance in the producing sector, with different degrees of complexity and diverse stakeholders' participation, calls for a continuous improvement approach. Certification schemes requiring beyond the law obligations and establishing yes/no entry rules will likely succeed only for niches. Alternatively, an inclusive step-wise approach can support to leverage mainstream sustainable production.

Good social and environmental governance is crucial for agriculture sustainability in Brazil. Law enforcement associated to credible systems to monitor the process of producers to become legally compliant, land use strategies, and dialogues with different stakeholders have been improving, contributing to a positive scenario. Correct management instruments and accurate and transparent information are available to support sustainable expansion of soybeans. The way these resources will be used, combining demands from different stakeholders, will shape soybean contribution to sustainable development in Brazil. The soybean value chain in Brazil is undoubtedly prepared to owning its specific manner to sustainable production.

With this picture in mind, the Whitepaper is part of the *Learning Journey on Sustainable Soy*. It's underlying principle is to gather reliable data and information, join key stakeholders, travel to the most representative producing regions in the country (states of Paraná, Pará, Mato Grosso and Bahia) and promote a high level Workshop with the aim of building a sound vision about what is sustainable soy in Brazil.

Introduction

Soybean production is a key activity in Brazil. From the 2011/2012 harvest to the 2012/2013 harvest, the production is estimated to increase from 62.38 MT to 82.15 MT of soybean. Land use projections estimate a demand of up to 5.4 Mha of land to different products until 2022, while soybean production will increase to 111.0 MT in 2020/2021.

These economic figures must be seen in parallel to environmental and social regulations for the agricultural production. Deforestation, biodiversity loss, soil conservation, labor rights, compliance with the new Forest Code and different regulations are part of the sustainable agenda for soybeans in Brazil.

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The Whitepaper is an open document that will be carried out in a collaborative and transparent way by all the stakeholders involved in the Learning Journey and in the Workshop that will take place in São Paulo, on November 7th and 8th of 2013.

To this end, the Version Zero of the Whitepaper is divided into the following chapters, with answers to 27 questions:

- 1. Brazilian environmental and labor regulations and adoption of sustainable practices in agriculture.
- 2. The new Forest Code and its implementation.
- 3. Deforestation trends in the Amazon Rainforest and other sensitive biomes.
- 4. Is Soybean production a major threat to biodiversity?
- 5. How does Brazilian agriculture contribute to impacts on rural employment, small farms and on the future of local communities?
- 6. Does the objective to increase yields lead to soil impoverishment, water contamination and local pollution?
- 7. Transparency and Sustainability.

After the field trips and the Workshop, the Whitepaper will be reviewed aiming to address the discussions, the shared views, criticisms and possible conclusions and recommendations to build upon responsible indicators for soy production. The final document will serve as a constructive tool to build a sound and reliable base to define what is sustainable soy in Brazil.

Chapter 1 – Brazilian environmental and labor regulations and adoption sustainable practices in agriculture

1. Is the Brazilian environmental regulation efficient to protect forests and natural heritage? What are the main achievements and challenges for the sustainable development of the Brazilian agriculture?

Yes, Brazilian environmental regulations are efficient in promoting forest conservation and natural heritage. There are different regulations aiming to deal with deforestation, land use, biodiversity conservation and other environmental aspects.

The Decree 23793, from 1934, approved the first Forest Code¹ establishing rules aimed at conserving natural vegetation. One of the obligations was to preserve protective forests, with the objective of conserving water resources and soil, protecting landscape and species of the indigenous fauna. Moreover, farmers were not allowed to convert more than 75% of the forested area, maintaining 25% of the existing natural vegetation. The government was responsible for restoring cleared areas, specially the protective forests, and farmers would receive a compensation for that.

In 1965 the Law 4771 established the regulation that became know as the Forest Code², with provisions that created the Permanent Preservation Areas (hereinafter APPs, known as "Áreas de Preservação Permanente") with the aim to protect riparian areas, wetlands, mountains, slopes and other sensitive areas that are essential to safeguard biodiversity, water, landscape, geological stability, and soil protection, as well as to facilitate gene flow and ensure the well-being of human populations.

Moreover, it established the obligation to maintain at least 20% of the existing natural vegetation on farms in the South, East and the Center-West regions and of 50% in the North region and the North of the Center-West region.

In 1981, the National Policy on the Environment³ was approved, based on the principles of ecological balance, rational use of soil, water and air, planning and monitoring environmental resources control over potential pollutant activities, restoration of degraded areas, conservation of biodiversity and environmental education. This policy set out the basis for the new regulations inspired by the environmental debates launched in 1972, and afterwards by the United Nations Conference on Environment and development, the Rio 92.

The Brazilian Constitution of 1988 recognized that everyone has the right to an ecologically balanced environment, which creates a common duty to conserve nature for present and future generations. This principle became the foundation for environmental regulations in Brazil.4

The Forest Code has undergone several modifications since 1965. In 1986, the limits for the APPs were expanded, changing the requirements of minimum protection for riparian areas from 5 to 30 meters in each side of the rivers, among other requirements. In 1989, the Law 7803 created the concept of Legal Reserve Areas, and established the obligation to register

¹ Decree 23793, January 23rd, 1934. Forest Code.
² Law 4771, September 15th, 1965. Forest Code.
³ Law 6938, August 31st, 1981. The National Policy on the Environment.

⁴ Article 225 from the 1988 Constitution states: "All have the right to an ecologically balanced environment, which is an asset of common use and essential to a healthy quality of life, and both the Government and the community shall have the duty to defend and preserve it for present and future generations".

those areas in the civil registry of properties. Only in 1989 the obligation to maintain 20% of each farm in all of the Cerrado was approved. Before that provision, the law obliged farmers to maintain 50% in the North of the Center-West region (Amazon) and 20% in the South part of the Center-West region.

The obligation to restore the Legal Reserve was approved in 1991. Then in 1996, a new amendment to the Forest Code established the obligation to maintain at least 80% of the remaining vegetation of farms, and maintaining the 50% minimum limit to the Legal Reserve in the North. This rule created a conflict for farms with more that 50% of forested area.⁵

With the approval of the Environmental Crimes Law in 1998, ⁶ which transformed administrative penalties into environmental crimes, the pressure to comply with the APPs and Legal Reserve criteria was enforced. At this point, the deforestation rates in the Amazon were escalating, surpassing 1,700,00 ha, and in the year 2000 another modification was approved, changing the Legal Reserve in the Amazon from 50% to 80%, and in the part North of the Cerrados from 20% to 35% of the farm's area.

From 1996 to 2001, seven different Provisionary Measures changed the Forest Code and where reedited more than 70 times. The Decrees 6514 and 6686 from 2008 established heavy sanctions for those not complying with the APPs and Legal Reserve criteria.

Table 1: Forest Code Timeline

Forest Code from 1934	 Conservation of at least 25% of the existing natural vegetation; Conservation of protective forests (with no minimum requirements); No obligation to restore.
Forest Code from 1965	 APPs aiming to protect riparian areas, slopes and other sensitive areas; APPs in riparian areas: minimum of 5 meters in each side of the river and maximum of 100 meters; Conservation of at least 20% of the existing natural vegetation on farms in the South, East and the Center-West and of 50% in the North region and the North of the Center-West region.
Law 7511 from 1986	 APPs in riparian areas: minimum of 30 meters in each side of the river and maximum depending on the distance between the margins of rivers with more than 200 meters;
Law 7803 from 1989 MPs 1511/1996, MPs 1605/1997, MPs 1736/1998, MPs 1885/1999 to MP 1956- 49 from April 2000)	 APPs in riparian areas: minimum of 30 and maximum of 500 meters; Created the concept of Legal Reserve and the obligation to register those areas in the civil registry of properties; Legal Reserve criteria: 20% of each farm in the Cerrado; 50% of each farm in the North region and the North of the Center-West region; from 1996 onwards, this limit changed to 80%; 20% of each farm in the rest of the country;
Law 8171 from 1991 (Agriculture Policy Law)	Created the obligation to restore the Legal Reserve Areas.
MPs 1956-50 from 2000 to 2166-67 from 2001	 Established new Legal Reserve criteria: 80% of forest area in the Legal Amazon; 35% in the Cerrados situated on the Legal Amazon; 20% in forested areas or other types of natural vegetation; Defined the environmental functions of the Legal Reserve.

⁵ BRAZIL. Provisionary Measure 1511-1, August 22nd, 1996.

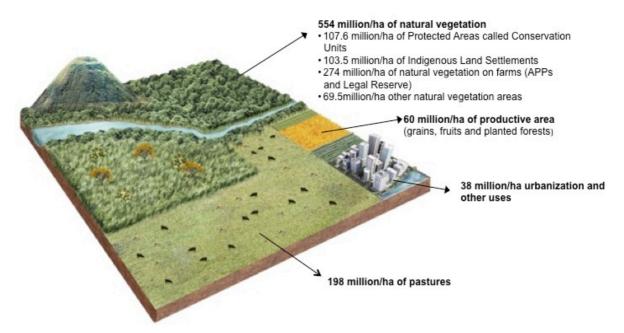
⁶ BRAZIL. Law 9605, February 12th, 1998. Environmental Crimes Law.

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Sources: Decree 23793, January 23rd, 1934; Law 4771, September 15th, 1965; Law 7511 from 1986; Law 7803, July 18th, 1989. Provisionary Measures 1511/1996, 1605/1997, 1736/1998, 1885/1999, 1956/2000 and 2166/2001. Notes: MP means Provisionary Measures; Legal Amazon is different from the Amazon Biome; the Legal Amazon was established by the Decree 35600 from 1953 and then by the Law 5173 from 1966 with the purpose to organize and promote the development of the regions. It comprises 50% of Brazil's territory and 10 states (Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia, Roraima), the State of Maranhão (West of the meridian 44 ° W) and Tocantins and Goiás (regions on the North side of parallel 13° S).

In parallel, it is extremely important to mention the Law 9985 from 2000, which established the National System of Nature Conservation Units (SNUC), regulated by the Decree 4340 from 2002, creating different categories of protected areas, known as Conservation Units of Integral Protection and Sustainable Use. The key target of this system is to promote the conservation of biodiversity and other environmental goods, aiming to safeguard the sustainable development based on the use of natural resources (Question 2 will address the Conservation Units agenda).

Figure 1: Land Use in Brazil



Sources: Ministry of Environment (MMA); IBGE – PAM (2010) and Agricultural Census (2006); INPE – TerraClass; *Agricultural Land Use and Expansion Model Brazil* - AgLUE-BR (Gerd Sparovek, ESALQ-USP). Notes 1) The data on Conservation Units exclude the areas called Environmental Protection Areas (APAs); 2) The APPs data include natural vegetation along rivers, hills and top of hills; 3) The data for other natural vegetation areas include Quilombola's areas, public forests non settled and other remaining natural vegetation areas.

The main challenges to improve agriculture sustainability while addressing biodiversity conservation depend on different targets. The compliance agenda under the New Forest Code is one of these challenges, as it will be explained in detail in Question 5. The ability to create incentives for the restoration of APPs and Legal Reserve, for implementing payment for environmental services and promoting the restoration of degraded areas and pastures are also extremely important tasks. Moreover, the effective management of Conservation Units and the establishment of new protected areas where there is low conservation can promote real biodiversity gains. These elements will be discussed in detail in the Whitepaper.

2. What is the Brazilian regulation for protected areas and how the agricultural sector is affected by it?

Under the National System of Nature Conservation Units (SNUC), created in the year 2000,⁷ there are 144 Mha of protected areas divided in sustainable use and integral protection categories. In the Amazon, 26.2% of the biome is protected through these areas; in the Caatinga 7.4%; in the Mata Atlântica 8.9%; in the Cerrado 8.2%; in the Pantanal 4.6% and in the Pampa 2.7%. Brazil has 16.9% of its territory composed by protected areas from Conservation Units categories.⁸

The agricultural sector can be directly affected by the creation of Conservation Units when an area is expropriated by the government for biodiversity conservation or landscape preservation. When this happens, the issue of expropriation can be a burden considering the expropriation prices and even the lack of payment by the government in many cases. In fact, that is the main concern when a private area is to be appointed as a Conservation Unit.⁹

These areas are important to maintain biodiversity and landscape, but the lack of implementation of management plans, the establishment of committees to handle the Conservation Units and the lack of workers are some critical problems affecting the Conservation Units.

A study published by WWF-Brazil in 2007, using the Rapid Assessment and Prioritization of Protected Areas Management – RAPPAM methodology evaluated 246 Conservation Units, and concluded that only 13% had high management effectiveness, 36 % were average and 51% were considered to have low effectiveness. National Parks, which should be open for visitation and research, ranked third in the analysis. ¹⁰ In the updated study, *The Management Effectiveness of Brazilian Federal Protected Areas: Results of 2010*, the overall rating for medium management effectiveness was 48%. ¹¹

Moreover, a study published in 2011 by the Amazon Institute of People and the Environment (Imazon) and the Socio-Environmental Institute (ISA) shows that in the Amazon 50% of protected areas have no management plan approved and 45% have no management council.

The ability to establish robust management plans, necessary to deliver and promote biodiversity conservation is a key challenge for the effective implementation of Conservation Units. By doing so, the creation of new areas, especially where there are less protected areas of this category, would prioritize projects and the conservation of areas in sensitive regions.

⁸ Excluding the Environmental Protection Areas – APAs, there are 107,6 million ha of protected areas. More information can be found at the Brazilian Ministry of Environment, 2013. National Registry of Protected Areas. Available at www.mma.gov.br/cadastro-uc.

⁷ BRAZIL. Law 9985, July 18th, 2000. National System of Nature Conservation Units - SNUC.

⁹ The lack of payment in case of expropriation is a challenge for the regularization of Conservation Units. The Instituto Chico Mendes de Conservação da Biodiversidade – ICMBio estimates that 19,5 Mha of Conservation Units are pending the expropriation payments. Considering the government value to the land it represents up to 13 billion USD, while considering the market value, those areas would achieve up to 53 billion USD. Sources: INCRA - Instituto Nacional de Colonização e Reforma Agrária; Agrianual 2013.

WWF. Management Effectiveness of Brazil's Federal Protected Areas. Brasilia, 2007. Available at http://assets.wwf.org.br/downloads/rappam_ingles.pdf.
 WWF. Management Effectiveness of Brazil's Federal Protected Areas: Results of 2010. Brasilia, 2012.

[&]quot;WWF. Management Effectiveness of Brazil's Federal Protected Areas: Results of 2010. Brasilia, 2012. Available http://d3nehc6yl9qzo4.cloudfront.net/downloads/rappam_management_effectiveness_of_brazilian_federal_protected areas 2010 results.pdf

Since the Conservation Units must serve exclusively for conservation purposes, agricultural areas in the surroundings have to follow specific rules in order to minimize negative impacts. Any activity in a 10 km radius of the area must go through a licensing process at the environmental authorities.

The existence of buffer zones in the surroundings areas (excluding in the Environmental Protection Area - APAs and the Private Reserves of Natural Heritage) is one of the measures. The creation of corridors linking natural vegetation areas of farms and the Conservation Units is another action that would possibly be enhanced through the compliance agenda of the new Forest Code.

The cultivation of GM varieties has strict rules when carried out in the surroundings of Conservation Units. The management plan of the area, which should be approved five years after its creation, can include detailed requirements for the cultivation of GMs, questioning, for example: i) the record of the occurrence of direct ancestors and wild relatives; ii) the characteristics of reproduction, dispersion and survival of genetically modified organisms; iii) the reproductive isolation of genetically modified organisms relative to its direct ancestors and wild relatives; iv) risk situations genetically modified organism can pose to biodiversity.

The lack of clarity about rules for activities in the buffer zones within 10km can be a constraint to farmers with activities in these areas. Considering the lack of management plans, and the need to obtain the environmental authority's approval for any activity varies among states, it is not clear which activities and management practices would be allowed and forbidden.

3. What are the main differences in environmental regulations for agriculture – including water and soil conservation – in the United States, Argentina, India, China and Brazil?

The main law related environmental conservation, involving water, soil and natural vegetation in Brazil is the Forest Code. The key obligations related to water and soil protection in Brazil are delivered through the existence of natural vegetation along riparian areas, slopes, mountains and other sensitive areas, known as Permanent Preservation Areas - APPs. The farmers are also obliged to maintain Legal Reserve Areas with natural vegetation for conservation purposes (more details about the Forest Code obligations are presented in Question 5).

It is important to highlight that up to 65% of the Brazilian territory (554 Mha) is composed by natural vegetation comprising protected areas in the form of Conservation Units, indigenous areas, APPs, Legal Reserve Areas and remaining vegetation areas, mainly public areas (as presented in Figure 1 above). 12

There are regulations at the state level aiming to promote soil conservation, with requirements to avoid erosion, protection water sources and encourage the proper use of soil. State authorities are responsible for the supervision, application of fines and other administrative issues related to soil conservation. The Producer of Water Program, from the

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¹² It is possible to find data indicating that Brazil has 61% or 62% of natural vegetation. The main reason for differences between sources is the lack of APPs and Legal Reserve data. We used the study carried out by Professor Gerd Sparovek from the University of São Paulo as a basis, and considered the most updated data about Conservation Units from the Ministry of Environment. Moreover, agriculture and pasture areas based on the IBGE Census from 2006 are not updated. We prefer to use different sources aiming to present the best available information.

National Water Agency, provides support and payment for environmental services to producers that conserve water and spring water on their farm.

Different countries have regulations aiming to conserve forests and to promote reforestation and forest plantations. In the United States, for example, farmers may maintain natural vegetation under the Conservation Reserve Program (CRP) – set aside areas - for periods ranging from 10 to 15 years, and they receive payments from the government and can explore the area for tourism, fishing and hunting. After the contracted period, farmers can choose to convert the vegetation or to continue conserving. There are up to 10.8 Mha under CRP, and up to 770,000 ha of additional area registered in 2013.

In addition, there is the Conservation Stewardship Program, which rewards producers for conservation, and the Wildlife Habitat Incentive Program, which provides cost share assistance for farmers that carry out wildlife conservation. With the Agricultural Water Enhancement Program, farmers can have financial and technical assistance to conserve ground and surface water and improve water quality.

In China, the Agriculture Law of the People's Republic of China requires that the development of agriculture and the rural economy must be in line with the rational use and protection of the natural resources such as land, water, soil, forests, grasslands and wildlife. The government should take measures to improve the comprehensive rehabilitation of small river basins and to prevent and control soil erosion. The State promotes the compulsory tree planting in the whole country, the protection of forestland and forests and the prevention of forest fires. Farmers who restore land based on plans approved by the State Council shall receive subsidies from the State.

Table 1 below shows the percentage of forest by country, which depends on different policies related to natural forest conservation and management, reforestation and also on incentives for commercial forest plantations. In China, for example, forests designated for production of wood, fiber, bio-energy and/or non-wood forest products represents 41% of the total forested area, in India 25% and in the US 30%.

Table 2: Land and forest are in selected countries.

				Forest within Protected Areas		Primary designated function					
Country	Land Area (1,000 ha)	Forest (1,000 ha)	Country Area	Land Area (1,000 ha)	% of forest area	Production	Protection of soil and water	Conservation of biodiversity	Social services	Multiple uses	None or unknown
China	942,530	206,861	22%	24,671	12%	41%	29%	4%	2%	24%	0%
India	297,319	68,434	23%	19,774	29%	25%	16%	29%	0%	30%	0%
US	916,193	304,022	33%	30,225	10%	30%	0%	25%	0%	46%	0%
Argentina	273,669	29,400	11%	1,160	4%	5%	0%	4%	0%	9%	83%
Brazil	851,487	554,000	65%	144,053	17%	7%	8%	9%	23%	4%	49%

Sources: The Global Forest Resources Assessment 2010, FAO. Data for Brazil from the Ministry of Environment (MMA), IBGE – PAM (2010) and Agricultural Census (2006), INPE – TerraClas, Agricultural Land Use and Expansion Model Brazil - AgLUE-BR (Gerd Sparovek, ESALQ-USP). Notes: Primary designated function: The primary function or management objective assigned to a management unit either by legal prescription, documented decision of the landowner/manager, or evidence provided by documented studies of forest management practices and customary use. Protected areas: Areas especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means. Production: Forest area designated primarily for protection of wood, fiber, bioenergy and/or non-wood forest products. Protection of soil land water: Forest area designated primarily for protection of soil and water. Conservation of biological diversity. Includes but is not limited to areas designated for biodiversity conservation within the protected areas. Social services: Forest area designated primarily for more than one purpose and where none of these alone is considered as the predominant designated function.

4. Labor conditions are a key element of social sustainability. What are the main labor requirements that soybean producers must comply with in Brazil and in key producing countries?

The key legal instruments regulating rural labor in Brazil are the Law 5889 from 1973, the Decree 73626 from 1974, in a supplementary approach the Consolidation of Labor Laws, and the Regulatory Norm - NR 31, from the Ministry of Labor and Employment, which establishes multiple obligations related to health and safety at work in agriculture, livestock, forestry, aquaculture, forest and industrial explorations and agricultural establishments.

The freedom of association in unions is a founding principle of the labor law in Brazil. There are rural unions around the country, representing workers and employers. The right to negotiate different issues based on the Constitutional rights is a common practice that changes from state to state. The table below summarizes the basic rights of rural employees.

Table 3: Labor rights of rural employees in Brazil

- a. Admission medical exam:
- b. Wage (normally based on collective agreement; in its absence the minimum wage of the state);
- c. Journey of 8 hours per day (44 hours per week; 220 hours per month);
- d. Paid weekly rest;
- e. Intervals of at least 1 hour between journeys higher than 6 hours;
- f. Interval of at least 11 hours for resting between 2 journeys;
- g. 30 days of paid vacation (at least 20 days; 10 days the worker can choose to receive in cash payment) and vacation bonus of 1/3 based on the monthly wage; h. Government Severance Indemnity Fund for Employees – FGTS;¹³
- i. Social Security contributions; 14
- j. 13th salary;
- k. Family-wage:15
- I. Additional of 25% for night work (between 9 PM to 5 AM for workers in agriculture and 8 PM to 4 AM for workers in livestock production);
- m. Additional of 50% per extra hour (or more depending of collective agreement), and maximum of 2 extra hours per day;
- n. Additional for insalubrious work when attested by technical report;
- o. Minimum age of 16 years, or 14 years if the work involves a learning/capacity activity;
- p. Minimum age of 18 years for work considered insalubrious:
- q. Workers younger than 18 years are not allowed for night work.

¹³ The Government Severance Indemnity Fund for Employees system ("Fundo de Garantia por Tempo de Serviço - FGTS") was established in 1966 aiming to protect workers in cases of dismissal for no fair reason. Every month the employer must deposit 8% of the employee's monthly salary into an account managed by the Federal Savings Bank ("Caixa Econômica Federal"). In case of dismissal without a fair cause, the employer is obliged to pay a penalty fine of 40% based on the total amount deposited during the contract period. The deposits are adjusted for inflation, and the employee is entitled to withdraw the balance in several situations, including: dismissal without a cause (for any reason other than those listed as just causes in the Law); expiry of a fixed-term contract; termination due to force majeure; termination by mutual agreement; death of the employer; retirement; when the worker or his/her dependent suffers from cancer or is HIV positive; in order to purchase a house, to settle or amortize the debt or payment of part of a housing loan installments. More information can be found in the

Law 8036/1990.

14 Social Security contributions are made under the National Institute of Social Security – INSS, based on 8% to 11% depending upon the wage and the type of work. There are different rules to calculate the time until the retirement and the value of the payments. It is important to highlight that during the period of work, employees can have benefits in cases of health support, family wage, accident support, pension for death paid to the dependent and other benefits. Additional information can be found in the Normative Instruction INSS 45/2010 and Normative Instruction INSS 70/2013.

¹⁵ Family-wage is a benefit paid to the employee, based on the number of sons until the age of fourteen or disabled of any age. The Inter-ministerial Ordinance 15/2013 established the amount of R\$ 33.16 for workers with a wage not higher than R\$ 646.55 and R\$ 23.36 to workers with month wages higher that R\$ 646.55 and equal or less to R\$ 971.78.

Sources: Law 5889/1973 (Rural Labor); Decree 73626/1974; Decree Law 5452/1943, Consolidation of Labor Laws; Constitution of the Republic Federation of Brazil, 1988; Law 5889/1973. NR 31; Law 8036/1990; Normative Instruction INSS 45/2010 and Normative Instruction INSS 70/2013; Inter-ministerial Ordinance 15/2013.

It is important to mention that the concession of house and basic infrastructure are not considered part of the wage. In fact, such practice is prohibited, and is closely related to the avoidance of slavery-alike labor, which is condemned, as well as child labor.

Additionally, it is extremely relevant to mention that the NR 31¹⁶ creates several obligations aiming to preserve health and safety conditions at work. Depending on the complexity of the obligations, the deadlines for compliance vary from 90 days to two years. Some obligations must be reported and applied in a year-by-year basis. Some of the general rules employers must follow are:

- 1. Ensure appropriate working conditions, hygiene and comfort according to the each activity;
- 2. Carry out risk assessments for safety and health of workers and adopt preventive and protective measures to ensure that all activities, workplaces, machinery, equipment, tools and processes are safe and in compliance with safety and health standards;
- 3. Promote improvements in the environment and working conditions, so as to maintain the level of safety and health for workers;
- 4. Comply with and enforce the laws and regulations on safety and health at work;
- 5. Examine causes of accidents and diseases resulting from work, aiming to prevent and eliminate the possibility of new records;
- 6. Ensure the dissemination of rights, duties and obligations that workers should know about safety and health at work;
- 7. Adopt appropriate procedures in the event of accidents and occupational diseases;
- 8. Inform workers about the risks inherent to the work and the protection measures implemented, including those related to new technologies adopted by the employer;
- 9. Communicate workers about results of medical examinations done at work;
- 10. Adopt measures to assess and manage the risks at the work.

Employers are liable to the compliance of these principles and all technical parameters described by the NR 31. Some of the prescribed rules are extremely detailed, and therefore, it is worth noting:

- 1. Medical exams: before admission, periodic exams, return to work function change dismissal;
- 2. Personal Protective Equipment PPE: the PPEs must be provided by the employer to all their workers, according to the needs of each activity; the employer should quide and require the use of the PPEs;
- 3. Agrochemicals: the application of pesticides is prohibited for pregnant women, children under 18 and workers over 60 years of age; it requires the use of PPEs; handling and exposure can only be performed by trained personnel;
- 4. Transport of workers: the vehicle for transportation must have authorization issued by the traffic authority, the driver must be enabled and identified; during transport, all passengers must be seated and there must be a compartment for holding tools;
- 5. Areas of acquaintanceship: places where the workers have their meals, spends their free hours; the area must guaranteed quality of life, hygiene and social integration. There are a lot of specific technical requirements for the meal and sanitary areas.

The main concerns related to labor compliance relates to overtime working hours during harvest periods; infrastructure adaptations for NR-31 (e.g. lodging, living area, bathrooms,

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¹⁶ BRAZIL. Ordinance 86, March 3rd, 2005.

storage of pesticides), monitoring of employee's use and awareness regarding Personal Protective Equipment. The control of working hours is also a problem depending on the size of the farm and the number of employees. It is possible to say that the labor regulations for rural workers are very strict, demanding a degree of professional involvement with the labor aspects, and an oriented management of all the aspects related to the different rules.

In China, the Agriculture Law of the People's Republic of China, revised in 2012, establishes broad regulations over different aspects aiming to improve China's agriculture, and does not create specific labor requirements. The Circular of the Ministry of Labor on the Issuance of the Interim Provisions Governing Trans-provincial and Floating Employment of Rural Labor Force (LMI No. 458 of 1994), establishes rules about governing employment and recruitment of rural laborers.

There is a regulation assuring five guarantees - food, clothes, room, medical care and funeral grant - for peasants who have no support at young age, at old age or in case of invalidity. There is another regulation aiming to further the development of a labor contract system, comprising rules for recruitment and employment, signing, alteration, termination, and annulment of labor contracts, wages, insurance and other treatment, and organizational efforts and management.

In the US, the Fair Labor Standards Act established requirements for minimum wage, prohibits the employment of children under the age of 16 during school hours and in dangerous jobs. The Federal Equal Employment Opportunity Law prohibits discrimination against employees based on race, color, religion, sex or national origin, protects men and women who perform substantial equal work and prohibit discrimination against individuals with disabilities.

Moreover, the Occupational Safety and Health Administration aims to assure safe and healthful working conditions, there are regulations about hazardous waste and non-hazardous solid waste, training required for the application of pesticides and other aspects.

In India, the main labor regulation in agriculture is the Plantations Labor Act of 1951 and its amendments, which establishes different requirements related to hours of work per week, teenage and child labor, wages, restriction on employment of women and teenagers for handling hazardous chemicals, medical examination of workers, sickness and maternity benefits, facilities and equipment to be provided to the workers engaged in handling pesticides, chemicals and toxic substances.

In parallel to each country's labor regulations, it is important to mention that the characteristics of agriculture in terms of the size of the farms, land availability and ownership, and state control over labor rights are key elements that contribute to how labor issues are implemented.

In summary, it is important to compare the status of ratifications of key International Labor Organization – ILO Conventions on rural work (Table 2).

Table 4: ILO Conventions related to Agriculture Labor and Status of Ratification

ILO Conventions	Brazil	China	India	US
C010 - Minimum Age (Agriculture) Convention, 1921*	No	No	No	No
C011 - Right of Association (Agriculture) Convention, 1921	Yes	Yes	Yes	No
C012 - Workmen's Compensation (Agriculture) Convention, 1921	Yes	No	No	No
C099 - Minimum Wage Fixing Machinery (Agriculture) Convention, 1951	Yes	No	No	No
C110 - Plantations Convention, 1958	Yes	No	No	No
C141 - Rural Workers' Organisations Convention, 1975	Yes	No	Yes	No
C029 - Forced Labour Convention, 1930	Yes	No	Yes	No
C098 - Right to Organise and Collective Bargaining Convention, 1949	Yes	No	No	No
C105 - Abolition of Forced Labour Convention, 1957	Yes	No	Yes	Yes
C138 - Minimum Age Convention, 1973	Yes	Yes	No	No
C141 - Rural Workers' Organisations Convention, 1975	Yes	No	Yes	No
C182 - Worst Forms of Child Labour Convention, 1999	Yes	Yes	No	Yes
C184 - Safety and Health in Agriculture Convention, 2001*	No	No	No	No

Source: International Labor Organization – ILO. * Notwithstanding the fact that some countries that did not ratify some ILO Treaties they can regulate specific rights. The minimum age in Brazil is regulated by the Brazilian Constitution, establishing a minimum of 16 years of age for workers in general and 14 years of age if the work involves a learning/capacity activity. Moreover, Brazil ratified ILO Convention 138 about Minimum Age that is broader that the Convention 10. In the US, for instance, the Fair Labor Standards Act provides some exemptions to child labor. In agriculture, young people of any age may be employed in any occupation in agriculture at a farm owned or operated by their parents or person standing in place of their parents. Only hazardous work is prohibited to young people less than 14 years old. Brazil also did not ratify Convention 184, but has the NR 31 rule establishing different obligations related to health and safety conditions for rural workers.

Chapter 2 – The new Forest Code and its implementation

5. What are the basic obligations under the new Forest Code and what are the impacts on Brazilian agriculture?

The Permanent Preservation Areas – APPs and the Legal Reserve Areas are the two key obligations with conservation purposes adopted by the Forest Code. The timeline of the Forest regulations presented in Table 1 (Question 1) outlined the changes that happened with the APPs and the Legal Reserve since the approval of the first Forest Code in 1934. Having this legal and historical context in mind, the aim is to explain the main obligations of the new Forest Code¹⁷, approved after a long period of discussions from 2008 to 2012.

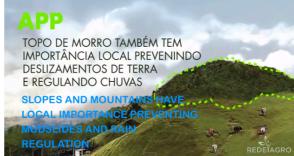
Before discussing the key changes in the new regulation, the figures below highlight the ideas behind the APPs and Legal Reserve Areas. It is interesting to briefly analyzing them before discussing the key changes in the new regulation.

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¹⁷ Law 12651, May 25th, 2012 and Law 12727, October 17th, 2012.

Figure 2: Permanent Preservation Areas and Legal Reserve Areas General Criteria









Source: Video about the New Forest Code elaborated by RedeAgro.

The size of the APPs and the Legal Reserve areas were the most critical aspects of the new Forest Code negotiations until its final approval in 2012 by the Law 12.651 and the Law 12.727, which included the vetoes from the President. This happened because the new regulation approved the so called "Consolidated Areas", which means an APP or Legal Reserve Area that was deforested before July 2008 and was being used for production purposes or was degraded.

In the case of APPs part of the Consolidated Areas would need to be restored, depending on the farms size and specific geographical characteristics. Another part will be suitable for producing activities, since good practices for soil and water conservation are adopted and measures are taken to prevent new deforestation from taking place on the farm. This is one of the greatest differences of the new regulation, creating a flexible alternative for compliance with the Law, without restoring 100% of the area.

During the negotiations of the new law, the key argument to allow the continuation of production in part of these areas was related to the legislation that was in place when the area was converted. Since the Forest Code approved in 1965 went through several modifications, as presented in Table 1 (Question 1), based on different legal instruments (laws, decrees and provisionary measures)¹⁸, the Legal Reserve criteria changed overtime and the rules for APPs were modified in 1986, many legal uncertainties were created and remained until the approval of the new law in 2012.

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¹⁸ This is relevant considering that a provisionary measure is supposed to be adopted as an interim legal instrument, in cases of urgency. Moreover this type of legal instrument is adopted by the Executive Power with no discussion at the Legislative, involving the Congress and the Senate.

The general rules for the APPs are:

- i. Riparian areas: 30 meters on each side of rivers up to 10 meters and up to 500 meters on each side for rivers bigger than 600 meters;
- ii. Areas surrounding lakes and natural ponds of a minimum width of 100 meters in rural areas; if the lake has up to 20 ha, the protected area would have to be 50 meters.
- iii. Areas surrounding fountains and perennial freshwater sources, a minimum of 50 meters:
- iv. Slopes and areas higher than 1800 meters;
- v. Mangroves and other sensitive areas. 19

The Legal Reserve general criteria are: in the Legal Amazon, 80% of the property in forest areas; 35% in Cerrados and 20% in fields; in the other biomes and parts of Brazil 20% of the farm (Figure 2). There are some exceptions, like when a state has Ecological Economic Zoning – ZEE allowing the minimum of 50% in the Amazon biome states, for example.

The biggest difference, comparing with the old Forest Code, is that producers that converted areas before July 2008 will have flexibility to comply with the APPs and the Legal Reserve criteria. Those who deforested after this date will need to follow the strict rules.

Producers that deforested before July 2008 will be able to continue using part of the APPs provided that conservation practices are adopted. The amount of the restoration will rely on factors such as the farm size, the river width, which was a very criticized methodology to deal with the APPs rules at the new law. The restoration must be made with trees adapted to the biome, and, when it is possible, natural revegetation (see question 8).

The restoration of Legal Reserve is a way to comply, but the possibility to compensate, renting or buying forested area in the same biome, rather than in the same state, is an alternative way to conform to the Legal Reserve requirement. This may become an important way to avoid the restoration of productive areas and to promote the conservation of areas that would be eligible for legal conversion. There is criticism about the possibility of crossing state frontiers to compensate, and if this happens, the area must be considered as a priority area for biodiversity.

Another key obligation for farmers will be the Rural Environmental Registry (CAR) that will be a national database with land use and natural vegetation information serving as a basis for monitoring of restoration actions (CAR will be explained in details in Question 6 below). Based on the CAR, producers that are not complying with the rules will need to sign Terms of Agreement containing the obligations they will need to follow to become compliant. If a producer fails to comply with the agreed compromise, he will be illegal.

The need to comply with the new requirements generates a compliance agenda that will naturally rely on producers, but will involve government agencies at the federal, state and municipal levels, cooperatives, rural associations, NGOs, banks and other stakeholders.

6. Does the Rural Environmental Registry (CAR) have a role in changing the environmental compliance process and land use dynamics in the next five years?

The Rural Environmental Registry is a national record of farms (5.2 million properties) comprising information related to location, existence of APPs and Legal Reserve areas,

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¹⁹ Article 4 of Law 12651 and changes approved by Law 12727 from 2012.

degraded areas, production areas and other details related to land use planning on a farm by farm basis. Producers will have two years to register once the CAR is fully operational in a web platform coordinated by the Ministry of Environment in cooperation with environmental authorities at the state level.

Considering that nearly 90% of farmers will have to adopt regularization practices aiming to comply with the new APPs criteria and Legal Reserve limits, the CAR will function as a monitoring system that will support the Environmental Compliance Program (hereinafter PRAs) approved at the federal and state levels.

All farmers must register providing information related to land ownership, productive land, Consolidated Areas being used for production (areas converted until July 2008), the existence of APPs, Legal Reserve, remaining natural vegetation and degraded land. Producers who are not in compliance will have to adhere to the PRAs and sign a Term of Agreement forecasting all of the actions that the producer will need to take. In a case by case basis, this agreement may mean the restoration of APPs and Legal Reserve, the use of Consolidated Areas in light of the conservation requirements, and the compensation of Legal Reserve in other areas in the same biome.

Once the producer agrees with the Terms of Agreement, possible penalties are suspended until he presents proof of compliance over the years. The deadline to restore the Legal Reserve areas, if the producer decides to comply replanting natural vegetation, is 20 years (at least 1/10 of the total area every 2 years).

The location of the Legal Reserve must be proposed by the producer and approved by environmental authorities (except in family agriculture and smaller farms, where the authorities will provide support in defining the Legal Reserve's location). Once an area is registered as Legal Reserve, its destination cannot be changed, because this area will continue to be managed and used for conservation purposes even in the cases where the producers will practice sustainable forest management.

Before the approval of the new law there was the "Programa Mais Ambiente" (More Environment Program), approved in 2009 by the Decree 7029, as a Federal Program aiming to support environmental compliance of farms. The Program was the first to create the Rural Environmental Registry, requiring information from producers about the existence of APPs and Legal Reserve Areas.

One of the reasons why the "Programa Mais Ambiente" did not work is related to the legal uncertainties of the old Forest Code, considering that there were different projects of law being discussed mainly after 2005. Moreover, in 2008 a regulation was approved requiring compliance with the APPs and Legal Reserve requirements and establishing administrative penalties and fines. This generated a lot of pressure to engage the Congress in the discussions of the different proposals to review the Forest Code.

Despite this scenario, it is important to highlight some initiatives underway related to farm registration with environmental compliance purposes. The "Programa Mato Grosso Legal" (Legal Mato Grosso Program), approved in the state of Mato Grosso in 2008, was an effort involving the government, academia, prosecutors, farmers and NGOs. In 2011, the state of Pará created the "Programa Municípios Verdes" (Green Municipalities Program), joining government, producers, NGOs and civil society to control deforestation and promote environmental compliance. The Paragominas case is well known as an achievement, because it was one of the municipalities with high deforestation rates, and today it has left the "deforestation black list" and it has 88% (1.61 million ha) of rural areas registered.

Cases like the "Programa Mato Grosso Legal" and the "Programa Municípios Verdes" tend to be widespread all over Brazil with the CAR and the cooperation between producers, environmental authorities at the federal, state and municipal level, NGOs and different stakeholders involved with the CAR implementation and the compliance process.

The CAR System (called SICAR) is a web based platform < http://www.car.gov.br/> launched by the Ministry of Environment in September 2013. In the state of Rio Grande do Sul it is already possible to register, and it will become available to all states. The Ministry of Environment is integrating existing databases of CAR (like from the states of Mato Grosso, Bahia and Para) and acquiring detailed satellite images from 2008 as a base year. Once the CAR becomes available to all states, the Ministry of Environment will approve a regulation with details about the system, the obligations and the administrative steps farmers will need to follow to get into the CAR System.

The CAR will not only work to monitor compliance with the new Forest Code, but also as a tool to improve land use management - enhancing deforestation control mechanisms, enabling sensitive areas detection, mapping natural vegetation areas with the support of Geographic Information System (GIS) and therefore guiding the restoration of APPs and Legal Reserve Areas. The CAR has the potential to become a strong land use management tool, used at the beginning, to track the compliance process of farms considering the New Forest Code, but even more, to improve public policies towards reducing deforestation, landscape planning, connecting natural vegetation areas and promoting responsible agricultural production and conservation.

One of the obligations that reinforces the need to enroll in the CAR establishes that on May 2016, banks will not be allow to grant agricultural credit to producers that are not registered in the CAR.²⁰

7. Do the Ecological and Economic Zoning (ZEEs) policies adopted by some states in Brazil enhance sustainability indicators of agricultural production?

The scope for Ecological and Economic Zoning (hereinafter ZEEs) comes from the idea of land use planning and management. Based on the National Policy on the Environment (1981) and, more specifically, the Decree 4297 from 2002, the ZEEs must be created as an instrument for territorial planning with the objective of supporting public policies ensuring environmental quality of water, soil and biodiversity conservation, and promote sustainable development and the improvement of living conditions, and to be used as an environmental licensing toll.

The task to develop ZEEs is shared between the Union, States and Municipalities, but the Federal government has the attribution of developing ZEEs at the national and regional scale, while states must elaborate ZEEs at the state level, and cities must develop local plans observing the state and national ZEEs.

The Legal Amazon region has an Ecological-Economic Macrozoning approved in 2010 connecting state ZEEs (Acre, Amapá, Amazonas, Pará, Rondônia and Roraima) with the main purpose of enhancing public policies towards the sustainable development of the region.

The ZEEs play an important role in the debate of sustainable agriculture since it structures public policies related to deforestation control (like the case of the Plan for Prevention and

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²⁰ Article 78 of the Law 12651, included by the Law 12727 from 2012.

Control of Deforestation in the Legal Amazon and the Action Plan for Prevention and Control of Deforestation and Burning in the Cerrados), licensing, water use and other issues.

Therefore, the enforcement of environmental policies contributes to the level of compliance of agricultural producers and different sectors using land. It is relevant to mention that in parallel to the ZEEs, there are some Agro-ecological Zonings in some states, such as Tocantins, Pernambuco, Santa Catarina and Sergipe. Moreover, the Ministry of Agriculture approved the Sugarcane Agroecological Zoning in 2009 and the Palm Agroecological Zoning in 2010, which help to guide the activities of the sectors.

The ZEEs work as important strategic land use planning policies, used, for example, to map and prioritize the conservation of important areas to biodiversity and defining appropriate areas for agriculture, livestock and forest management, based on soil, rainfall, and lack of protected areas. The maps below reflect different land uses and the relevance of the ZEE for the state of Acre is related to protected areas.

Figure 3: Acre ZEE and Land Use Maps used as an Strategic Tool

ESTADO DO ACRE - Vegetação ESTADO DO ACRE - Áreas Protegidas FERU FER

PROTECTED AREAS MAP (including

AGRARIAN REFORM MAP

WATERWAYS MAP

NATUTRAL VEGETATION MAP

ESTADO DO ACRE - Projetos de Assentamento PERU PERU

Intensive Agriculture
Perennial Cultures
Agroforestry practices
Managed Landscape
Flora and Fauna Preservation
No agroforestry availability

Figure 4: Agroforestry Availability in the state of Acre based on the ZEE

Source: Zoneamento Ecológico Econômico do Acre. Available at http://agencia.ac.gov.br/index.php/zee.html

It is important to stress that the new Forest Code establishes 2017 as a deadline for all states do create ZEEs at the state level and approve it. This is a challenging objective considering the depth of a ZEE project, what should be a priority considering the importance of such type of tool as a way to promote land use strategic planning.

8. What are the costs associated with the recovery of converted areas with natural vegetation under the new Forest Code? Is there public support for it?

Under the new law, producers that are not complying with the APPs criteria will need to recover at least part of their APPs, depending on the size of the farms, the actual destination of the areas and when the areas were converted (before or after July 2008). The registration in the CAR will serve as a basis to define the area that will need to be restored.

The Brazilian government does not have the precise area that will be restored, although this would be possible to with the CAR. But there is an important study commissioned by the Secretariat for Strategic Affairs of the Presidency of the Republic (SAE) done by Professor Britaldo Soares from the Federal University of Minas Gerais ²¹ indicating that the environmental debt with the new rules was reduced from 50.6 Mha to 21 Mha with the new Forest Code. The states of São Paulo, Mato Grosso, Pará and Minas Gerais have the highest debt in terms of areas to restore. The study shows that the restoration of APPs would total up to 4.8 Mha, mainly in the Cerrado and the Atlantic Forest biome, while the Legal Reserve liability is up to 16.2 Mha.

On average, it is possible to mention that the costs to restore one hectare can reach US\$5,000. This value may vary based on the biome and the need for seedlings per hectare (from US\$4,000 to 5,000 in the Atlantic Forest, ranging up to US\$6,000 in the Amazon and

²¹ Impacto da Revisão do Código Florestal: como viabilizar o grande desafio adiante? http://www.sae.gov.br/site/wp-content/uploads/Artigo-codigo-florestal.pdf.

the Cerrado), the level of degradation of the area, if there is natural revegetation taking place or even the possibility of spontaneous revegetation.

Moreover, it is worth noting that there are cheaper techniques being adopted in the Cerrado, which can significantly reduce the restoration price from US\$6,000 to 1,600 per ha, using a technique called "Muvuca" that mixes different seeds.

From the government side, it is important to mention that the new Forest Code approved a session related to the development of a program to encourage conservation and restoration by the Federal Government. This program was not approved until now, except for a proposal aiming to support small and family farmers to comply with the new rules and to conserve natural vegetation.

While this Federal program is not in place, there are some initiatives that deserve attention. The Low Carbon Agriculture Plan (ABC Plan), approved under the National Policy on Climate Change, provide up to US\$ 500,000 per producer with the aim to restore APPs and Legal Reserve Areas. Under the "Programa Nacional de Fortalecimento da Agricultura Familiar - PRONAF" (National Program for Strengthening Family Agriculture), small farmers can also obtain credit to restore APPs.

It is also worth mentioning incentive programs at the state level, as in the state of São Paulo and the recently launched "Programa Bioclima" in the state of Paraná. Therefore, it is extremely important to remember that the establishment of incentive programs, with cheaper credit, facilitated access to government procurement, reduction of taxes and other incentive measures can help not only to promote environmental compliance but rather to enhance sustainable agricultural production and conservation practices.

9. Does the new Forest Code help or impair Brazil's commitment to reduce GHGs emissions from deforestation under the United Nations Framework Convention on Climate Change (UNFCCC)?

Assuming that the new Forest Code does not allow additional legal deforestation compared to the old Code, and that every producer that will need to sign a Term of Agreement with obligations for APPs and Legal Reserve restoration or compensation will not be allowed to convert new areas, there is no legal space to increase deforestation at rates that will damage the Brazilian mitigation actions based on reducing deforestation.

The compromise to reduce 80% of the Amazon and 40% of the Cerrado's deforestation, presented at the COP15 of the United Nations Framework Convention on Climate Change in Copenhagen in 2009, was based on the Plan for Prevention and Control of Deforestation in the Legal Amazon (hereinafter PPCDAM), launched in 2004, and the Action Plan for Prevention and Control of Deforestation and Burning in the Cerrados (hereinafter PPCerrado), launched in 2010.

In 2010, the Decree 7390 approved the projections for Brazilian emissions until 2020, up to 3.236~MT of CO_2 equivalent. Emissions from the land use sector (deforestation, degradation and burning) would represent up to 1.404~MT of CO_2 equivalent until 2020, and decreasing deforestation has the potential to reduce up to 669~MT of CO_2 equivalent. Table 3 below explains how the target is calculated, based on a projection of deforestation until 2020.

Table 5: Brazilian deforestation target and GHGs reductions associated

	Deforestation in 2020 (ha)*	Target	Deforestation Reduction until 2020 (ha)	Reduction 2020 complying with	
Amazon	1,953,500	80%	1,562,800	390,700	669 million MT of
Cerrado	1,570,000	40%	628,000	942,000	CO ₂ /eq

Source: Projection of deforestation established by the Decree 7390/2010; Elaboration: Agroicone/Plataformaagro.

This means that to comply with the target, deforestation rates in 2020 must be at most of 390,000 ha in the Amazon and 942,000 ha in the Cerrado. The 2012 figures of the Amazon showed that total deforestation reached 460,000 ha²², and 760,000 ha in the Cerrado between 2011 and 2012²³ (more information in Question 10).

The key concern with the approval of the new Forest Code is that it would allow and even promote higher deforestation rates, damaging the Brazilian commitment. The deforestation data since 2010 reflects a cutback in deforestation trends, showing that in 2010 Brazil accomplished 76.7% of its compromise for the Amazon biome and 60.5% for the Cerrado. It is important to note that these emissions reductions from deforestation are gained by avoiding the conversion of new areas. Therefore, the fact that the new Forest Code recognized consolidated areas (areas converted until July 2008), which reduces the amount of restoration necessary compared to the old law, does not impair the reduction of emissions from deforestation.

Chapter 3 – Deforestation trends in the Amazon Rainforest and other sensitive biomes

10. What is the real trend in Brazilian deforestation rates, and what are the forecasts until to 2020?

Brazilian deforestation has considerably decreased in the last decade, especially in the Amazon. The peak of deforestation in the Amazon was of 2.8 Mha in 2004 – surpassing the size of Ireland in the deforestation total summing 2003, 2004 and 2005 (7,200,000 ha). Last year, Amazon deforestation reached 457,100 ha, the smallest rate in history (database), an 83% decrease from the 2004 peak. Therefore, the Amazon deforestation trend is clearly decreasing over the years (Figure 5).

On the other hand, in the Cerrado, there was a decrease in deforestation after 2005, but the trend inverted in the last two years. Today, Cerrado deforestation is greater than in the Amazon.

²³ Laboratory of Image Processing and Geoprocessing from the Federal University of Goiás – LAPIG.

²² PRODES, National Institute for Space Research – INPE.

²⁴ Ministry of Science and Technology and Innovation. Estimativas anuais de emissões de gases de efeito estufa no Brasil. Brasília. 2013. Available at http://www.mct.gov.br/upd_blob/0226/226591.pdf

3.000.000 Amazon 2.500.000 Cerrado 2.000.000 1.500.000 1.000.000 500.000 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012

Figure 5: Deforestation in Brazilian Amazon and Cerrado (hectares)

Source: INPE-PRODES (Amazon); UFG-LAPIG (Cerrado).

While the past numbers are precise, it is difficult to estimate the future trends in deforestation. The Brazilian Federal Government has committed to decreasing deforestation as part of its voluntary pledge in the UN Climate Change Conference COP15 in 2009. As detailed in guestion 9, Brazil has committed to reducing projected emissions by 36.1% and 38.9% in 2020 and most efforts arise from deforestation. Amazon deforestation must be reduced by 80%, which means a maximum rate of 392,000ha in 2020 25. Cerrado deforestation must be reduced by 40%, which means a maximum rate of 942,000ha in 2020^{26} .

These commitments are very likely to be achieved. Land demand for all agriculture uses is projected to increase 5.4 Mha until 2022, representing 540,000ha per year in the next 10 years²⁷. This number is the net land demand which includes all crops' expansion and the pastureland that will be substituted by crops.

11. What is the difference between legal and illegal deforestation in Brazil?

In order to clear land legally in Brazil, a farmer must ask for a clearing license in the state environmental authority. The authority may issue the license after verifying compliance with the Forest Code. Therefore, even if a farmer clears land up to the limit established by the Forest Code, but with no clearing license, it is considered illegal deforestation.

Given the approval of the new Forest Code, and the compliance agenda that will take place after the Rural Environmental Registry (CAR) comes into force, any deforestation license will only be possible after the farmer proves the compliance with the APPs and the Legal Reserve Areas.

²⁵ PPCDAM. Plan for Prevention and Control of Deforestation in the Legal Amazon. Available at: http://www.mma.gov.br/florestas/controle-e-preven%C3%A7%C3%A3o-do-desmatamento/plano-de-preven%C3%A7%C3%A3o-do-desmatamento/plano-de-preven%C3%A7%C3%A3o-do-desmatamento/plano-de-preven%C3%A7%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-de-p

a%C3%A7%C3%A3o-para-amaz%C3%B4nia-ppcdam

PPCERRADO. Action Plan for Prevention and Control of Deforestation and Burning in the Cerrados. Available http://www.mma.gov.br/florestas/controle-e-preven%C3%A7%C3%A3o-do-desmatamento/plano-de-preven%C3%A7%C3%A3o-do-desmatamento/plano-de-preven%C3%A7%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-desmatamento/plano-de-preven%C3%A3o-do-de-preven a%C3%A7%C3%A3o-para-cerrado-%E2%80%93-ppcerrado
27 Updated projection based on data from the Outlook Brazil FIESP/ICONE (2012).

Thus far, there is no national database of the clearing license issued by state environmental authorities, meaning that it is not possible to estimate the percentage of legal and illegal deforestation within the total number. The situation is expected to improve with the implementation of the CAR since all farms' land use information will be entered in a national database.

One important point that deserves attention is the bureaucracy of the current system associated to the issuing of deforestation licenses in all Brazilian states, which is based on the original Forest Code. The processes are complicated, very time and money consuming and, therefore, most small and medium farmers cannot afford it. This situation implies that only large farmers (or those very capitalized) can enter in this process, making the case for perverse incentives against small farmers in new agriculture frontiers. The new Forest Code took this situation into account and established simplified processes and easier rules for small farmers (see the Forest Code description in Question 5).

12. What will be the dynamic of land competition and pasture substitution in the coming years in Brazil?

Brazilian Agriculture will continue to expand over the next decades, considering the growing demand for food, fuel and fibers. Demand for oilseeds, particularly soybeans, is expected to grow by 35% until 2030 and Brazil is expected to supply 40% of the world's increase in imports²⁸. In addition to a growing agriculture demand, forest conservation and restoration are also becoming more and more relevant for society, thus land competition will become increasingly strong in Brazil.

Projections indicate crops expansion will take place mainly over pastureland due to legal restrictions to deforestation, which have been increasingly enforced (see the Forest Code description in Question 5), as can be seen in Figure 6. The growing price of land is putting pressure on livestock production to be less land intensive and release significant area for both crops and forest recovery.

In areas where pastureland is suitable for high yield crop production, livestock is becoming more intensive; cattle herd is being raised in smaller areas or is being transferred for other regions. Soybean expansion over pastureland will take place primary on areas highly suitable for agriculture and not on degraded pastures as it has been discussed by the media and even some specialists²⁹.

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²⁸ OECD-FAO. Agricultural Outlook, 2010.

²⁹ http://www.soybeansandcorn.com/Brazil-Land-Utilization

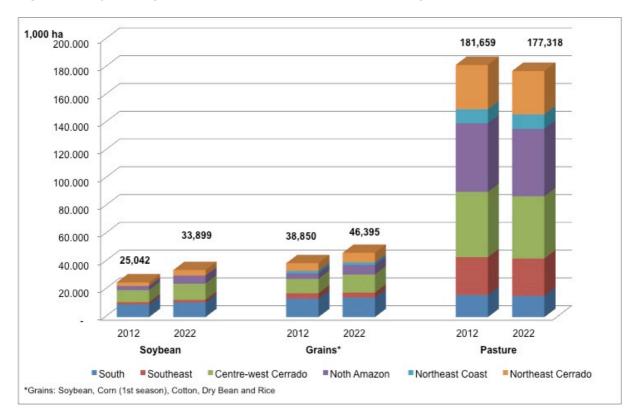


Figure 6: Soybean, grains and pasture area in Brazilian regions in 2012 and 2022.

Source: Updated data from Outlook Brazil 2022 - Agribusiness Projections. ICONE/FIESP, 2012.

It is important to make reference to the concept of zero net deforestation, which is under discussion and construction in Brazil. Different than the demand for zero deforestation, which contradicts the Forest Code, the concept calls for deforestation at a lower rate than reforestation and even recovery of areas on a secondary stage of revegetation. It is still not clear if the concept would be applied at national, state or biome level and how the metrics necessary would be developed, measured and monitored. At national level, it would not be difficult to achieve zero net deforestation: projections indicate a demand of 5.4 Mha for new agriculture areas, while just the restoration area required for the compliance with APPs is of 4.8 Mha, as explained in Question 9.

A deep debate and research on this topic is necessary, in order to assess if the legal obligations for restoration and forest recovery in the country surpass legal deforestation in the near future. The ultimate goal would be to minimize the impact of new legal deforestation and to build sound policies and strategies towards biodiversity conservation.

13. Will soybean production require the conversion of new areas in the coming years? To what extent? Is there any measure to mitigate these impacts?

Projections indicate soybean production will require the conversion of new areas mostly in the Cerrados and at significantly lower rates than occurred over the Amazon in the past decades. It is estimated that the soybean area will grow 8.7 Mha until 2022 and that around 340 thousand hectares of such expansion will take place over natural vegetation, out of which 70% will be in the Cerrado (detailed numbers in Question 16)³⁰.

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³⁰ Updated data from Outlook Brazil 2022 – Agribusiness Projections. ICONE/FIESP, 2012.

There are several measures to mitigate deforestation impacts due to soybean expansion, in addition to following the strict environmental regulation, especially the Forest Code. With the regularization agenda, the restoration of APPs areas should occur, while the compensation of Legal Reserve by producers that had deforested and will maintain new areas can be considered an important way to help eliminating new deforestation and mitigating impacts of agricultural expansion.

The most important measure is guaranteeing that the conversion will take place in high yield areas, making the case for a high economic return – and therefore a smaller environmental impact per unit of soybean production. In this sense, many governmental regulations take this issue into account such as the Ecological and Economic Zoning – ZEEs (see Question 22 for more information about ZEEs) and state licensing systems.

The Soy Moratorium is an important initiative led by the industry (ABIOVE and ANEC) to guarantee that soybean production was not converting forest in the Amazon. Traders have compromised to not buying soybeans in areas cleared after 2006 in a partnership commitment that includes NGOs (Greenpeace, The Nature Conservancy, IPAM, WWF-Brasil, Conservação Internacional) and the Federal Government (Ministry of Environment – MMA and Banco do Brasil). The monitoring system based on GIS techniques is conducted by the National Institute of Spatial Research – INPE and a private company (Geoambiente) and the new soybeans areas detected are reported to the industry.

There was just 1,400 ha of soybean in cleared areas in the 2007/08 harvest, representing less than 1% of total deforestation in the monitored area that year. This number increased by 30%, reaching 18,410 ha in 2010/11. It still represents a low number and denotes 0.53% of deforestation areas. The reasons for the increase are the facts that the monitoring systems have improved, soybeans prices were good, and total deforestation in the monitored area decreased (from 271 to 62 thousand ha). Considering all five years monitored by the Soy Moratorium, it was concluded that soybeans were not playing a significant role in the deforestation of the Amazon since it represented 3% of the deforestation in the producing municipalities and 0.4% of the deforested area in the Amazon Biome as a whole.³¹

Chapter 4 – Is Soybean production a major threat to biodiversity?

14. Are soybean producers addressing biodiversity conservation in rural properties?

Yes, Brazilian soybean producers are addressing biodiversity conservation within their farms. The Brazilian agriculture has a peculiar difference when compared to most countries in the case of conserving natural vegetation. The Permanent Preservation Areas (APPs) and the Legal Reserve areas in farms, estimated in 274 Mha (Professor Gerd Sparovek, ESALQ/USP)³², are protected areas mandated by the Forest Code that seek to preserve and conserve biological diversity resources, protecting water, soil and other environmental services.

³² Sparovek, G.; Barreto, A.; Klug, I.; Papp, L.; Lino, J. A revisão do Código Florestal brasileiro. Novos Estudos, 89, março 2011, 181-205.

Moratória da Soja – 5º Ano de Mapeamento e Monitoramento do Plantio do Plantio de Soja no Bioma Amazônia (2012). Available at: http://www.greenpeace.org/brasil/Global/brasil/documentos/2012/Monitoring%20report_Soya%20Moratorium%202012.pdf

Those areas are private areas that have specific management: the APPs cannot be used for productive activities because they are environmentally sensitive areas, and are geographically determined by the existence of a river, a hill, the top of a hill or a mangrove area. The areas of Legal Reserve may be managed in some cases where sustainability criteria are adopted.

The ecological importance of APPs means that the conservation of these areas are key, not only do address biodiversity and generate environmental goods, but also to the own benefit of the rural properties.

Despite the criticisms over the new Forest Code, it is correct to expect that the compliance agenda will generate restoration of areas of high importance for biodiversity, like the APPs. The possible restoration of up to 4.8 million ha of APPs³³ will generate a conservation agenda and, beyond bringing environmental benefits to the farm (soil and water conservations, for example), it will increase the protection of relevant areas. It is also relevant to quote the passive of 21 Mha of Legal Reserve can generate restoration and the compensation of areas that would be legally converted.

In September 2013, the "Comissão Nacional de Biodiversidade – CONABIO" (National Commission on Biodiversity) from the Ministry of Environment, approved the Resolution 6 about Brazil's National Targets for Biodiversity until 2020. This goal relates to the Convention on Biological Diversity agenda, and more specifically the Aichi Biodiversity Targets approved in 2010 under this Convention. Each country is supposed to approve its own targets based on the Aichi Targets, and to seek its implementation until 2020.

Target 11 include the general scope for protected areas, establishing that until 2020, each country should have at least 17% of its territory conserved. In 2006 Brazil adopted a target to achieve 30% of the Amazon and 10% of each biome protected as Conservation Units.³⁴ The new target for 2020 reflects a commitment to have 30% of the Amazon biome and 17% of the other biomes protected. The key difference from the first to the new target is that until 2020, APPs, Legal Reserve and Indigenous Areas will be eligible to count for the goal.

It is important to highlight that in Brazil, target 11 for protected areas will be considered by biomes, and Brazilian farms will help the country to comply with this target. This will work as an initial step towards the recognition of natural vegetation areas in the farms and its role in addressing important biodiversity services.

Currently, Brazil has 16.9% of protected areas just as Conservation Units, representing 144 Mha of protected areas. The estimates for APPs and Legal Reserve show that conservation of natural vegetation in farms represents 29% of Brazil's territory.³⁵

Available

at

³³ SAE, http://www.sae.gov.br/site/wp-content/uploads/Artigo-codigo-florestal.pdf.
34 Resolução 3/2006, CONABIO>
http://www.mma.gov.br/estruturas/conabio/_arquivos/resolucaoconabio03_15.pdf.

Table 6: Protected Areas in Brazil: Conservation Units, Indigenous Lands, Permanent Preservation Areas and Legal Reserve Areas

	Biome Area (hectares)	Regularized Indigenous Lands (TIs)	Conservation Units (UCs) including Environmental Protection Areas	APPs	Legal Reserve (LR)	TIs + UCs + APPs + LR	(TIs + UCs + APPs + LR)/Biome
Amazon	419,694,300	98,237,521	110,025,100	22,500,821	120,481,835	351,245,277	84%
Caatinga	84,445,300	216,682	6,259,200	9,138,606	13,832,346	29,446,834	35%
Cerrado	203,644,800	4,381,042	16,738,100	15,812,509	41,261,472	78,193,123	38%
Atlantic Forest	111,018,200	105,197	9,853,700	6,094,727	12,893,087	28,946,711	26%
Pampa	17,649,600	62,887	482,600	1,600,042	2,661,825	4,807,354	27%
Pantanal	15,035,500	599,44	695,000	1,977,574	2,780,307	5,452,881	36%
Total	851,487,700	104,563,761	144,053,700	57,124,280	193,910,872	499,652,613	59%

Sources: Ministry of Environment; The Brazilian Institute of Geography and Statistics (IBGE); Gerd Sparovek, 2011. Notes: For the APPs only riparian areas were considered; Conservation Units include also the Environmental Protection Areas. TIs – regularized indigenous lands; UCs - Conservation Units; APAs – Environmental Protection Areas; APPs – Permanent Preservation Areas; RL – Legal Reserve Areas.

Although APPs and Legal Reserve areas are not protected in the scope of the National System of Conservation Units (SNUC), their role as relevant areas for biodiversity conservation is undeniable. The National Protected Areas Strategic Plan (PNAP) itself recognizes the role of APPs and Legal Reserve Areas as fundamental in the conservation of biodiversity and as integrative elements of the landscape.

Considering the existing Conservation Units, Indigenous Lands, APPs and Legal Reserve Areas, Brazil exceeds the 17% target of protected areas in each biome, even in the most critical ones like the Atlantic Forest. The fact that APPs and Legal Reserve cannot only connect bigger protected areas, but can promote conservation in regions with less Conservation Units is relevant and would be an important issue that the registration of farms in the CAR and the compliance agenda would help to spur.

15. How does "High Conservation Value Areas" (HCVA) relate to other environmentally protected areas in Brazil?

The concept behind the recognition of areas of high biodiversity is to enable appropriate policies, strengthening the conservation of biodiversity and its values. The recognition of protected areas, managed to promote biodiversity conservation and reduce biodiversity loss in Brazil is reached through different means.

In 2007, the Ministry of Environment approved the Priority Areas for Conservation, Sustainable Use and Sharing of Benefits of the Brazilian Biodiversity, an extensive mapping effort. These maps, which should be reviewed in periods of five years, are used as a basis to create Conservation Units and plan conservation strategies linked to policies such as

deforestation control, mitigation and adaptation actions in the context of the National Policy on Climate Change, among others.

Additionally, the Ecological and Economic Zoning (ZEEs) policies approved by the Federal and State governments are essential parameters to highlight important areas for biodiversity. Considering that ZEEs work as a tool to guide different types of policies and strategies towards sustainable land use management, it is important to look at it when dealing with conservation of biodiversity.

Considering the existence of 144 Mha of protected areas under Conservation Units, APPs and Legal Reserve Areas, and stressing the contribution that indigenous areas can have to biodiversity conservation, it is worth noting that Brazil addresses biodiversity conservation in multiple ways. This point is especially relevant in areas with fewer Conservation Units, such as the Atlantic Forest and the Cerrado biomes.

The importance of creating protected areas in regions with small percentages of Conservation Units can be, to some extent, supported by the presence of protected natural vegetation on farms and indigenous areas. This does not mean that no more public protected areas must be established. Using a complementary principle, it means that biodiversity sustainability in Brazil relies on different approaches that are essential to further improve biodiversity gains in all regions. In fact this is the underlying principle of the National Strategic Plan for Protected Areas - PNAP that must guide Brazil's policies about biological diversity conservation.

Brazil's attempts to reduce deforestation and promote a compliance agenda under the new Forest Code are essential policy tools that can deliver positive outcomes in terms of biodiversity conservation and reduction of biodiversity loss. The Reducing Emissions from Deforestation and Forest Degradation – REDD plus decisions at the United Nations Framework Convention on Climate Change and the debate about a REDD plus regulation in Brazil, can help to promote forest conservation.

Associated to the establishment of regulations related to payment for environmental services, like the "Programa Bioclima" in the state of Paraná, and the approval of incentives to restore APPs and Legal Reserve Areas, and to support the maintenance of these areas, it will be possible to enhance the conservation of high biodiversity value areas. The Amazon Fund, for instance, raised US\$ 611 million aiming to prevent, monitor and combat deforestation, as well as to promote the preservation and sustainable use of forests in the Amazon Biome. 36

Chapter 5 - How does Brazilian agriculture contribute to impact on rural employment, small farms and on the future of local communities?

16. What are the key characteristics of soybean production in the main producing regions related to the size of the farms, adoption of technology, economies of scale, production capacity and ability to expand in a sustainable manner?

The main soybean producing regions in Brazil are the South (Rio Grande do Sul and Paraná states), Center-West (especially Mato Grosso state) and the new agriculture frontier MAPITOBA (Maranhão, Piauí, Tocantins and Bahia states). Mato Grosso is the top producting state and it encompasses both Cerrado and Amazon biomes. Therefore, it makes

More information about the Amazon Fund can be found at http://www.amazonfund.gov.br/FundoAmazonia/fam/site en .

sense to divide the state in two different regions: the northern area is North Amazon and the mid and southern area is Center-West Cerrado (Figure 3). Production also takes place in other states in the North (Pará and Rondônia), typically Amazon area, although it is not significant for the national production – these other states represent around 1% of Brazilian area and production.

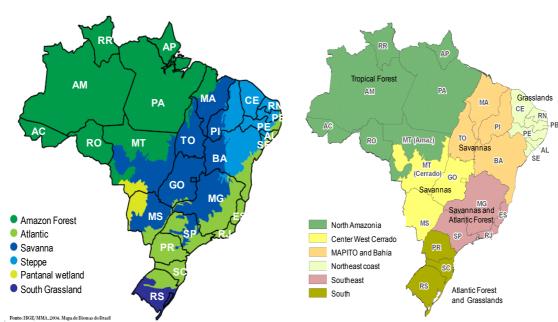


Figure 7: Brazilian biomes (A) and Brazilian Agriculture Regions (B).

Source: A) IBGE/MMA; B) Outlook Brasil 2022, FIESP/ICONE (2012).

Farmers in the South are smaller, generally organized in cooperatives and with better access to infrastructure (input and output markets, storage, transport). The Center-West was the frontier region in the 80s and 90s, where farmers from the South migrated to searching for land suitable for soybean production, supported by several government programs.

The lack of access to public services, infrastructure and labor, combined with a high supply of arable land, made the case for soybean expansion by larger farmers up to the north, in the Center-West, North Amazon and, in the last and next decade, in MAPITOBA. In these regions, economies of scale are even more important to deal with frontier challenges and complex regulatory processes.

Environmental concerns within the country and abroad have slowed soybean expansion in the Brazilian Amazon. Requirements from traders and final soybean buyers programs such as the Soy Moratorium may help to define the possibility of sustainable expansion in the North Amazon. Projections indicate that soybean expansion will take place mostly in the Cerrado, where production will increase by 33% and 57% in Center-West Cerrado and MAPITOBA, respectively.

Taking into consideration the expansion pattern seen in the past, soybean expansion is expected to take place primarily over pastures and other crops (96% of total area expansion).

Table 7: Characteristics of soybean production in Brazilian regions.

	South	Center-West Cerrado	MAPITOBA	North Amazon	Brazil
Average farm size (ha)	35	501	1,269	135	
Production capacity in 2012 (1,000 MT)	18,553	26,391	7,479	9,303	66,383
Production capacity in 2012 (1,000 ha)	9,106	8,790	2,568	2,971	25,042
Expansion on natural vegetation 2012-22 (1,000 ha)	5	65	175	94	340
Expansion on pastures and crops 2012-22 (1,000 ha)	1,481	2,869	1,286	2,641	8,517
Total soybean expansion 2012-22 (1,000 ha)	1,486	2,934	1,461	2,735	8,857
Soybean expansion (key message)	Consolidated area	Expansion area, especially in Mato Grosso	Most important expansion area	Expansion area, especially in Mato Grosso	

Sources: Production Capacity: (CONAB, 2012); Soybean expansion is calculated by Agroicone based on FIESP/ICONE (2012) and NASSAR, A.M. et al (2011).

Notes: Average farm size on South and Center West regions are specifically for soy (ZANON, R.S. et al, 2010). Average farm size for MAPITOBA region is for grains (THE ECONOMIST, 2013). North Amazon region average farm size is based on IBGE Census 2006 (not specifically for soybean).

In terms of technology adoption, soybean production is very homogeneous, which means that the majority of farmers use the same high-level technology package. The basic package includes modern and expensive machinery, no-till system, GMO seeds, and specialized fertilizers and agrochemicals. Differences among regions occur due to variations in soil, climate and incidence of pests.

17. Are large soybean production systems a threat to local communities and small farmers?

Large systems are the most efficient mode of soybean production, since they present considerable economies of scale - meaning the production cost per unit is considerably lower in large production areas. As in any soybean production system, labor necessity is relatively low, but very qualified. The income and jobs generated along the value chain are the most obvious positive effects, although it is difficult to precisely quantify these numbers (see available numbers in Table 8, Question 20).

It is also usual for large soybean farmers to engage in the development of infrastructure in previously isolated areas. Construction and maintenance of roads, water and energy supply are the most common benefits soybean farmers provide for local communities especially in the Center-West, North and MAPITOBA regions. Yet a comprehensive assessment of these positive impacts was not carried out and is highly recommended.

It is worth mentioning that soybean areas are expanding in MAPITOBA over the upland plateaus while the small farmers are mainly located in lowlands along the rivers. The establishment of soybean, grains and other crops in the uplands plateaus requires the adoption of high technology management practices due to the fact that soils are poor and must be "built".

Negative impacts may also take place such as higher land prices and social conflicts and disputes. The quick and unplanned development process led by soybean production change local cultures with possible negative consequences of overuse of public services and infrastructure, such as roads, schools, and health services. The pressure over these services, as well as natural resources may lead to an increase of criminality. Local communities and government bodies usually demand soybean farmers and companies to take measures to mitigate these negative impacts. Due to the fact that large farmers and companies usually adopt more professional management, they are likely to better answer to local communities' demands. More research on this topic is recommended, for both assessment of negative impacts as well as the measures taken by actors and regions for dealing with them.

Management of social and environmental impacts also features economies of scale and thus large farmers can better address these concerns. Considering the establishment of large farms, mainly run by companies and investment funds, openness and transparency of their activities are fundamental for their implementation in new areas of Brazil. Their ability to manage social and environmental issues in a transparent manner is crucial for their business. Family-based business and other traditional agriculture companies may take advantage of this new trend.

Furthermore, there are many examples of large soybean farmers and companies that apply high conservation standards over their natural forest areas. Some of the practices in place are: forest areas larger than the required for the Forest Code, monitoring of fauna and flora, environmental education programs, fire prevention plans among others. The obligations under the Forest Code to maintain (or reforest) conservations areas in all farms, regardless of their size, generate economic and ecological challenges. Good maintenance of small plots of conservation areas present high costs per ha and, therefore, large farms or forest offset arrangements show cost effectiveness.

18. What actions can support the participation of small farmers and local communities in the producing sites?

Small soybean farmers can be business competitive by using high level technologies and by engaging in cooperatives and other farmer associations. This is the model for soybean production in the state of Paraná, for instance.

The high technology production package includes mechanization of all management practices (sowing, spraying, harvesting) and therefore soybean production requires a small amount of labor. Yet there are many services along the soybean value chain that require workers with different educational levels and types of skills. Local communities can take advantage of these job opportunities, especially if governmental bodies and business organizations support training and capacity building efforts.

There are several good examples of training and capacity buildings initiatives and programs, private and governmental, varying from local to national-wide, short-term to long-term. The National Rural Learning Service – SENAR is a para-state institution linked to the official agriculture union system that provides professional training for rural workers and it is the biggest organization in this field in Brazil. Over the past 20 years, SENAR has provided training for 55 million farmers and farm workers³⁷.

³⁷ SENAR – National Rural Learning service. Available at http://www.canaldoprodutor.com.br/internacional/senar.

State and local governments also have an important role in supporting small farmers and local communities in taking advantage of the social and economic benefits that soybean production may create. One good example is the establishment of a graduate campus of the State University of Bahia in Barreiras, an important soybean center, where agriculture courses are included. However, the employment of people from the South and Southeast Regions is very common, due to the facts that educational levels and business skills are higher and that these regions have cultural tights with soybean production – soybean farmers in all Brazilian regions are usually from the South Region. Capacity building and training for local communities in order to work in the services associated to the soybean value chain would be very relevant for quicker improvement of social indicators in producing regions.

The ability of soybean producers and local communities to establish positive and effective dialogues is a key element for local development, unlocking potentials and avoiding disputes. Although there are isolated good examples, it is still a challenge to be better addressed by soybean sector.

19. Are there initiatives promoting fair and decent working conditions beyond the Brazilian law?

There are several initiatives promoting good working conditions in Brazil and many of them are voluntary. In addition to the complex and strong labor legislation and health and security norms, maintaining workers is an increasing challenge in all soybean production regions. Workers able to work in high technology crops such soybeans, especially those with particular skills such as tractor drivers or agrochemicals handlers, are scarce. Hence, farmers need to offer good working conditions (food quality, benefits for children, among others) besides salaries.

Soja Plus is a wide topic program aiming to improve sustainability practices in soybean production. It is a partnership between several farmers' organizations and industries, as well as research and extension organizations. Working closely to farmers in producing regions, it relies on 40 agriculture unions and several local partners. Four thousand farmers and workers took part of the training activities. Soja Plus is the first full comprehensive initiative, covering several sustainability topics including fair and decent work conditions in the soybean sector as a whole. Incentives for the expansion of these types of initiatives are highly recommended, especially for supporting farmers to comply with legal requirements related working conditions and the Forest Code compliance agenda.

Large soybean production groups have several programs for workers and their families. Additionally, private social investment is increasingly becoming part of soybean companies and organizations in Brazil, aiming to collaborate with communities around their area of impact. The social responsibility program of Aprosoja, Agrosolidário, and the André Maggi Foundation, the Cargill Foundation, the Bunge Foundation, among others is worthy of note. It would be important to monitor this trend closely aiming to evaluate its impacts and, possibly, to promote it. Finally, cooperatives, significant soybean producers, crushers and traders, also have important social roles for those associated farmers and employees.

20. Does the soybean sector contribute to local development and better income generation in the main producing regions?

Soybean production significantly contributes to income generation, tax collection, promotion of services and many other social and economic benefits for local people. In 2009, the cultivation of soybeans directly generated 265,000 jobs and these workers had on average

six years of education, which is double the average of workers in traditional crops such as cassava, maize and rice. The average monthly income was of R\$1,246, much higher than in other crops and twice the minimum wage³⁸. Considering the fact that soybean area and prices have strongly increased, those numbers are expected to be higher today.

Table 8: Jobs, years of education and income in soybean and other crops production in Brazil in 2009.

	Number of workers	Average years of formal education	Average montly income	Total montly income
Soybean	264,850	6	1,246	330,003,100
Rice	576,006	3	355	204,424,529
Maize	1,778,096	3	158	280,583,549
Cassava	1,319,483	3	143	189,081,914

Source: PNAD, 2009.

In addition to the jobs in soybeans cultivation, thousands of other are generated along the value chain, directly and indirectly. Production and distribution of inputs, transport, processing and manufacturing of final products all require several and different types of jobs. The agrochemicals industry, for instance, employs 10,000 workers – a quarter of them agronomists – and agrochemicals distribution employs 80,000 workers – half of them specialists and around half are estimated to work for soybeans³⁹. A total number of 1.5 million direct and indirect jobs are estimated to be related to soybean production in Brazil⁴⁰.

The Human Development Index (HDI) estimated by municipality is an evidence of how the regions where soybean production is concentrated are considerably doing better than the rest of the country. HDI varies from 0 to 1; it is based on average per capita income, education level, and life expectancy and therefore it represents a local development proxy. The average HDI of the municipalities producing half of total Brazilian soybean production is of 0.765 while the average HDI of the remaining municipalities is of 0.717⁴¹.

Besides income per capita and HDI, another important indicator for social development is income equality among citizens. The Gini index represents how much equality (0) or inequality (1) a society has in terms of income. Although the Gini index is only slightly higher in soybean municipalities than in the rest of the country, 0.56 and 0.53 respectively, the index is improving quicker in soybean areas. In other words, income inequality has decreased faster from 1990 to 2010 in the main soybean municipalities than in the remaining ones⁴².

In other words, HDI is higher in soybean municipalities but has increased less than in the rest of the country. The Gini index is worse in soybean municipalities but has improved faster than in the rest of the country (Table 5).

³⁸ (PNAD, 2011) IBGE - PNAD, 2011. IBGE. Brazilian Institute of Geography and Statistics. PNAD - National Research of Households. Available at: http://www.ibge.gov.br/home/estatistica/pesquisas/pesquisa_resultados.php?id_pesquisa=40

³⁹ ANDEF (2010). National Association of Plant Defense. Inovação e contribuições para o agronegócio brasileiro. Available

http://www.agricultura.gov.br/arq_editor/file/camaras_setoriais/Oleaginosas_e_biodiesel/9_reuniao/ANDEF.pdf

40 SOJA PLUS (2013). Programa de gestão econômica, social e ambiental da soja brasileira. Available at: http://www.sojaplus.com.br/site/_FILES/Portugues/14062013-175501-31. curso_para_jornalistas_2013 - pdf.pdf

41 PNUD (2011). United Nations Development Programme. Available at: http://www.pnud.org.br/IDH/DH.aspx

⁴² IBGE - PNAD, 2011. IBGE. Brazilian Institute of Geography and Statistics. PNAD - National Research of Households.

Available at:

Table 9: Human Development Index and Gini Index of Soybean Municipalities* and other municipalities in Brazil.

	Human Deve	elopment Index – HDI	Gini Index		
	Value in 2010	Index Growth from 1990 to 2010 (%)	Value in 2010	Index Growth from 1990 to 2010 (%)	
Soybean municipalities	0,765	40%	0,562	-5%	
Other municipalities	0,717	50%	0,531	-2%	

^{* -} Soybean municipalities are those concentrating 50% of Brazilian soybean production. Source: PNUD, 2010 and PNAD, 2011.

Chapter 6 – Does the objective to increase yields lead to soil impoverishment, water contamination and local pollution?

21. Why can the adoption of no till, intercropping, crop-livestock-forestry integration and other good agricultural practices promote the development of a low carbon agriculture in Brazil?

No-till is an extremely efficient soil and water management practice in economic and environmental terms. It was developed with the intention of promoting soil and water conservation and it also reduces greenhouse gas emissions. Due to the fact that soil is not (or little) tilled, organic matter is not released into the atmosphere, avoiding emissions that occur in conventional tillage systems. Around 90% of the soybean area is cultivated using no-till systems in Brazil, which represents around 20 Mha in the 2012/2013 year crop. Considering that one hectare of soybean under a no-till system avoids the emission of 0.5 MT of carbon ⁴³, 10.7 MT of carbon are not emitted due to the use of no-till in soybean production.

Crop-livestock-forestry integration (ILPF) systems are a dynamic land use strategy for the production of grains, animals and wood in the same property. There are different ways and systems being used by producers and developed by researchers for modern farmers in different regions of Brazil. Generally speaking, the area cultivated with grains during the summer is later planted with grass for animal pasture. Forest species of high economic value such as eucalyptus are planted, producing wood and serving as shade for animals. Around 2 Mha are using different systems of ILPF in the country and it is estimated that up to 20 Mha can be converted to the systems in the next 20 years⁴⁴.

The Brazilian Low Carbon Agriculture Plan intends to take advantage of the carbon reduction potential in agriculture practices, using them to achieve the national targets for 2020 established by the National Policy on Climate Change. The increase in no-till system by 8 Mha (under several crops, but especially in soybeans) will contribute to reduce between 16 and 20 MT CO2eq. The expansion of 4Mha in ILPF until 2020 will reduce between 18 and 22 MT CO2 eq.

The cultivation of maize after the harvest of soybean - intercropping – has been increasing in Brazil at a rapid pace. Maize "winter harvest" has almost doubled in the last ten years,

⁴³ Carlos Eduardo P. Cerri1; Gerd Sparovek; Martial Bernoux; Willian E. Easterling; Jerry M. Melillo; Carlos Clemente Cerri. TROPICAL AGRICULTURE AND GLOBAL WARMING: IMPACTS AND MITIGATION OPTIONS. Scientia Agricola, v.64, n.1, p.83-99, January/February 2007.

⁴⁴ EMBRAPA (2013). Agrosustentável. Available at http://www.agrosustentavel.com.br/downloads/iplf.pdf

representing a huge impact on food and feed supply. Cropping a second harvest in the same area represents an economy on land demand and thus pressure for new areas.

It is also important to highlight that soybean can be also an important source of renewable fuel, substituting fossil fuel and thus contributing to climate change mitigation. B100 biodiesel made from soybeans presents a carbon footprint of around 25gCO2e/MJ, which represent 70% reduction of GEE emissions compared with regular diesel.⁴⁵

The Low Carbon Agriculture Plan follows many studies showing the potentials of emissions reduction in the Brazilian agriculture sector. Different from other economy sectors, good management practices in agriculture contribute to both mitigation and adaptation efforts and can even be cost efficient.

22. How much agrochemicals are used in soybean production and what is the impact on the environment? How to use agrochemicals responsibly?

Agrochemicals can be an important tool to combat pests and weed and therefore to guarantee high yields. Like medicines, they must be used carefully, following responsible limits, and following technical (agronomic) indications. In order to use agrochemicals responsibly workers handling with them must understand their use, benefits and associated dangers. Therefore, training these workers handling agrochemicals is crucial, and mandatory by labor regulations. More than one million people were trained by the agrochemicals industries and traders in Brazil in 2008, in a joint effort that spent U\$5.6millions⁴⁶.

Agrochemicals must be part of a broad strategy, known as Integrated Pest Management (IPM), which includes a combination of methods to control pests at an economic and acceptable level. IPM techniques include pest monitoring, rotation of control methods and agrochemicals, aiming to guarantee production at a minimum cost and environmental impact level.

In addition to IPM, there are also specific measures for dealing responsibly with agrochemicals. For instance, the use of personal protective equipment (PPE), including rubber gloves, goggles, respirator and boots, is mandatory for those managing agrochemicals. The use of the correct PPE avoids accidents and intoxication and pesticides industries and traders collaborate in the distribution and dissemination of the correct use and maintenance of PPE.

Agrochemicals are composed of active ingredients – the substance that actually combats the pest or weed – and other components. Depending on the active ingredient, agrochemicals are classified as more or less dangerous to human health and the environment. Brazilian agrochemicals are classified in four categories of toxicity to human health – I is the "extremely toxic" and IV is "slightly toxic" – and four categories of dangerous for the environment – I is "extremely dangerous for the environment" and IV is "slightly dangerous for the environment".

Taking into consideration the average type and quantity of agrochemicals used in soybean production in Brazil, around 80% is slightly (IV) or moderately toxic (III) and 70% is slightly

http://www.agricultura.gov.br/arg_editor/file/camaras_setoriais/Oleaginosas_e_biodiesel/9_reuniao/ANDEF.pdf

⁴⁵ Cerri, D. G. P et al. (coord), 2013. Pegada de Carbono na Produção de Biodiesel de Soja. Report from

DeltaCO2 – Sustentabilidade Ambiental.

46 ANDEF (2010). National Association of Plant Defense. Inovação e contribuições para o agronegócio brasileiro.

Available at:

(IV) or dangerous (III) for the environment (CNA, 2011). These numbers show that the most used agrochemicals in soybeans production have mild negative impacts, if used in a correct manner. It is worth mentioning that the adoption of GMO soybean varieties was responsible for the substitution of more toxic agrochemicals with less toxic ones, which means pesticides to herbicides.

The correct disposal of agrochemicals packages is also part of their responsible use. In Brazil, a not-for-profit association of agrochemicals industries, the National Institute for Processing Empty Containers - INPEV, is responsible for the management of packages and logistic reverse system. INPEV has 355 collection centers where 94% of the agrochemical packages are collected and stored, making Brazil the leader in correctly destined agrochemicals packages, followed by France (77%) and Canada (73%)⁴⁷. Around 8% of the packing are sent to incineration and the rest are recycled and transformed into different plastic products, such as pipes, conduits and packages for other purposes.

23. What is the role of biological nitrogen fixation in Brazilian soybean production compared to the application nitrogen-based fertilizers?

Biological nitrogen fixation (BNF) is a technique that uses the bacteria's capabilities to absorb the nitrogen largely available in the atmosphere and soil - and that plants cannot absorb – transforming it in a format available for plants.

Bacteria inoculants are spread in soybean seeds and used in all 27Mha of the Brazilian production area. In order to obtain a 3,000kg/ha yield, it is necessary to apply 240kg of nitrogen, which represents around 1,000kg of urea per hectare 48 . Brazilian soybean production uses little mineral nitrogen fertilizer – around 10kg/ha while in the United States the average is over 100kg/ha - representing significant economic and environmental benefits. One kilogram of mineral nitrogen fertilizer emits, on average, 10 kilograms of CO_2 equivalent, which means the use of BNF avoids 115 MT of CO_2 eq. per year. An amount of US\$ 7 billion is estimated to be saved by soybean farmers annually due to the use of BNF.

24. GMOs seem to be a trend in the world. How is the biotech regulation and are there best practices for the proper use of these technologies?

The regulation of genetically modified products in Brazil dates back to the 1990 decade, when the first biosafety law was approved and the National Biosafety Technical Commission (CNTBio) was set up in 1995. The first GM event approved by the scientific body was the RR Soybean in 1998, and a long process questioning the safety of the event and the need for environmental impact analysis before its commercial release.

In 2005, the new biosafety law was approved, establishing a new structure for the CTNBio, which is comprised by scientists with human health, animal health, plant health and animal health background, and creating the National Biosafety Council (CNBS) as a higher assistance agency of the President of the Republic for formulating and implementing the National Biosafety Policy.

http://www.infoteca.cnptia.embrapa.br/bitstream/doc/459673/1/circTec35.pdf

⁴⁷ National Institute for Processing Empty Containers - INPEV. Available at: http://www.inpev.org.br/en/campo-limpo-system/index

⁴⁸ Hungria, M.; Campo, R.J.; Mendes, L.C. (2001). Fixação Biológica do Nitrogênio na Cultura da Soja. EMBRAPA SOJA. Londrina. Available at

The CTNBio should analyze research and commercial requests. It should monitor the development and technical-scientific progress related to biosafety, biotechnology, bioethics and related areas, with the aim to increase their capacity for protecting human, animal and plant health and the environment.

Until 2013, Brazil had five soybean events approved, 19 maize, 12 cotton, one bean, 16 vaccines and two microorganisms. The acceptance of GM soybean and maize in Brazil is high, and in 2012 soybean and corn events represented 83% and 65% of the planted area, totaling areas of 20 and 10 Mha, respectively.

It is also important to remember the restrictions to the use of GM events in the 10km surrounding areas of Conservation Units. Currently, stringent criteria can be applicable depending on the management plans of the Conservation Units, in a case-by-case basis.

Chapter 7 - Transparency and Sustainability

25. What are the challenges for the Brazilian soybean industry to certify larger production volumes under sustainability schemes?

The underlying issue related to the possibility of certifying larger volumes of different products relates to the content of the principles and criteria adopted by the certification schemes, which assume legal compliance as a basis, but usually go beyond the law. Another aspect that deserves to be quoted has to do with the process that leads to the adoption of the principles and criteria and the stakeholders that were actually a part of it.

Assuming that compliance with the new Forest Code is a legal matter that depends on the release of the CAR and will take years to be effectively implemented, requiring legal compromise of farmers, but clear involvement of government agencies, rural associations, cooperatives, NGOs and other stakeholders, it seems reasonable to believe that only the compliance with the new Forest Code would be an obstacle to certify larger volumes of soybean in the short term. In this regard it is significant to highlight that the CAR, the Environmental Compliance Programs (PRAs) and the Terms of Compromise that will need to be signed by producers as a binding compromise towards compliance, represent the first major action plan aiming to promote regularization of farms based on a new law that was broadly discussed and negotiated.

Moreover, the beyond law criteria can be a discouragement for producers to certify considering that the environmental and social regulations in Brazil are already strict. The APPs and Legal Reserve obligations are, in fact, important conservation requirements that producers must comply with, generating positive environmental externalities and social goods. The mere fact that these are mandatory cannot be used as an argument to not recognize the environmental value of these obligations.

Any criteria that go beyond the law must be widely discussed with all stakeholders, including a broad representation of producers; otherwise it will naturally be a difficult task to comply with. These kinds of criteria must be linked to continuous improvement approaches aiming to allow the producer to go beyond the law. The discussion about payment for environmental services that happens worldwide and in Brazil is one of the gaps that must be filled with a view to allow the adoption of practices that go beyond the law.

Table 10: Standard Setting Models

Standard Models	Who establish principles, criteria and indicators	Characteristics
UNILATERAL	Established unilaterally, without discussion and validation with the actors who will be required to comply with the principles and criteria	 Low credibility if they are not independently audited (first party certification or self certification versus third party certification or independent); Examples: standards adopted by retailers.
BILATERAL	Countries negotiating standards	 It may be a very unique model based on harmonization of standards; Example: Food Standards Australia New Zealand (FSANZ); a bilateral agreement under the EU Renewable Directive.
SECTORAL	Created by the industry itself or an entity that seeks to show the fulfillment of sustainable practices	 Model developed by a business association that creates standards for the sector and verifies whether stakeholders comply with them; Example: Selo de Pureza da ABIC (Associação Brasileira da Indústria do Café);
INTERNATIONAL ORGANIZATIONS	International Organizations	 International standards for the protection of human, animal and plant life and health; They are recognized by the World Trade Organization - WTO; Examples: World Organization for Animal Health - OIE, Codex Alimentarius Commission, the International Plant Protection Convention - IPPC and the International Organization for Standardization - ISO;
MULTISTAKEHOLDER	Groups with different stakeholders (producers, industry, banks, NGOs) negotiate principles, criteria and indicators having agreed on common rules and the transparency principle as a basis	 Certification based on principles, criteria and indicators created by a group of interested stakeholders, such as NGOs, private sector, banks and civil society; If the initiative has a good governance, the criteria tend to have legitimacy because they were approved in an inclusive process; Audit by independent third party, which ensures credibility; Example: Forest Stewardship Council (FSC); Round Table on Responsible Soy (RTRS); Bonsucro.
MULTISTAKEHOLDER & GOVERNMENT	Standards discussed by different stakeholders and government actors	 Such standards can generate compliance requirements provided by law; Example: SCP Roundtable (European Union).

Elaboration: Agroicone/Plataformaagro.

Considering that compliance with criteria set by a certification scheme requires investments it is important to touch on the issue of the costs of certifying and the uncertainties about a premium on certified products. These aspects are obstacles to a massive certification of commodities, discouraging producers to step into certification processes, even more when other producing countries – competitors - do not have equivalent demands.

The costs for achieving a certification must be minimally addressed by the market, and the debate about a premium is critical to that. Without this, certified commodities will be a niche market, when it could become a mainstream market, assuring that producers will engage and safeguarding a high level of sustainable criteria through a certification scheme.

For soybeans it is important to mention some of the certification schemes like the Round Table on Responsible Soy (RTRS), the GlobalGAP - Global Good Agricultural Practices, the "Rede de Agricultura Sustentável – RAS" (Sustainable Agriculture Network – Rainforest

Alliance Certified). The latter is carried out by Imaflora in Brazil, but it has little possibility to be used in soybeans due to the fact that the standard does not allow GMOs cultivation.

26. In addition to certification schemes, which are alternative sustainability initiatives worldwide and in Brazil? How can they tackle sustainability challenges?

The broad adoption of good agricultural practices requires that local and regional characteristics of the productions systems are taken into account. There is no single way to define sustainable practices in the production of soybeans, sugarcane, cocoa or maize, for instance. There are common principles driving this debate, but the criteria that must be met to assure a minimum sustainability pattern depend on multiple issues, like how stringent countries and states regulations are, specific conditions of the regions, and capacity building needs to allow better practices deployment.

In this sense, it is important to note the Soja Plus Program, conceived to stimulate good agricultural practices, to capacitate rural producers and workers and to promote economic, social and environmental management at the farm level, comprising different producing regions in Brazil. ⁴⁹ The Soja Plus was designed based on a continuous improvement approach, which may further the implementation of social and environmental criteria, highlighting the most difficult issues and allowing actions to overcome it.

Some of the agenda items of the Soja Plus for 2013 involve quality of life at work, best practices for production and services, financial and economic viability of farms, product quality and social responsibility. One of the ways Soja Plus operates is by training farmers to implement environmental and social regulations. Capacity building and awareness raising are critical aspects that must run in parallel, aiming to promote sustainability.

The difference of initiatives like Soja Plus, is their ability to tackle regional concerns and work to solve them, improving sustainability at the local level. Moreover, it continues to address general issues that are fundamental to all producers. Together, the broad principles and criteria, and the specific ones, valuable to different situations, can help to build strong sustainable actions that enhance the balance between social, environmental and economic aspects of the production chain.

Following the continuous improvement approach and the need to address regional challenges, it is relevant to mention the "Soja Mais Verde" initiative from the Mato Grosso State Government, the Association of Soy Producers of the State of Mato Grosso (APROSOJA) and The Nature Conservancy (TNC), in partnership with state majors. The key objective of the initiative is to promote environmental compliance of farms and the restoration of degraded areas. The project aims to map farms from 13 cities located at the Alto Teles Pires region, which represents almost 10% of the soybeans produced in Brazil. ⁵⁰

Another initiative is the "Código de Agricultura Sustentável Unilever" (Sustainble Agriculture Code – SAC), which establishes criteria aiming to assure a sustainable production, based on a continuous improvement approach, comprising issues like agrochemicals and fuel, soil,

The Nature Conservancy – TNC. Soja: Boas Práticas Agrícolas e Certificação Sócio Ambiental, a caminho da sustentabilidade. 2012. Available at http://portugues.tnc.org/nossas-historias/publicacoes/boas-praticas-agricolas-e-certificacao-socioambiental.pdf.

⁴⁹ Soja Plus, available at http://www.sojaplus.org.br/site/index.php .

water, biodiversity, energy, waste, human and social capital, as well as animal welfare, value chain, capacity building and local economy.⁵¹

Initiatives like the Tropical Forest Alliance 2020, a public-private partnership that has the target of handling tropical deforestation related to commodities, can play an important role in promoting a broad debate about sustainability issues. The initiative started with the United States government and the Consumer Goods Forum, a parity-based industry network comprising over 400 retailers, manufacturers, service providers and other stakeholders.

A report by TNC highlights the existence of more than 20 different initiatives, mostly in Brazil, working for the improvement of social, environmental and economic issues of the soybean sector. Programs adopted by NGOs, producers, banks, traders and other stakeholders can deliver sustainability improvements, not necessarily as a certification process, but usually considering the continuous improvement approach. The table below mention the initiatives described in the report:

Table 11: Sustainable Soy Initiatives

	Banco do Brasil	
Financial Mechanisms	Rabobank	
	International Finance Corporation - IFC	
Good Agricultural Practices Programs	Soja Plus Soja Mais Verde Cargill 3S – Soluções para Suprimentos Sustentáveis Sustainable Agriculture Code (Unilever) Programa Soja Livre (Embrapa) Agricultura Sustentável (Bunge) Iniciativa "From Field to Market" (ARES and Embrapa) Programa de Aplicação Responsável (PAR) Programas de Boas Práticas Agrícolas (Emater) Manual de Boas Práticas Agrícolas Socioambientais no Agronegócio – Rabobank Syngenta – Projetos Socioambientais Grupo André Maggi – Sustentabilidade Fiagril – Projetos Socioambientais ADM – Programa Produzindo Certo e outros Compromissos	
Compromises and Agreements	Basel Criteria Initiatief Duurzame Handel – IDH) Soybean Moratorium EU Directive on Renewable Energy Directive	
Certifications Schemes	Round Table on Responsible Soy (RTRS) ProTerra Esquema de Certificação da Sustentabilidade da Câmara Argentina de Biocombustíveis para a União Europeia — Carbio Sustainability Certification Scheme for EU — RED Compliance - CSCS Biomass Biofuels Sustainability Voluntary Scheme — 2BSvs Feed Materials Assurance Scheme - FEMAS Associação Argentina de Produtores de Plantio Direto — Aapresid International Federation of Organic Agriculture Movements — IFOAM Fairtrade IBD-Selo EcoSocial Sustainable Agriculture Network (SAN) — GlobalGAP - Global Good Agricultural Practices Round Table on Sustainable Biofuels (RSB) International Sustainability and Carbon Certification (ISCC) Netherlands Technical Agreement (NTA 8080)	

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Source: The Nature Conservancy – TNC. Soja: Boas Práticas Agrícolas e Certificação Sócio Ambiental, a caminho da sustentabilidade. 2012. Available at http://portugues.tnc.org/nossas-historias/publicacoes/boas-praticas-agricolas-e-certificacao-socioambiental.pdf.

27. How the concepts of continuous improvement and transparency along the value chain could enhance soybean sustainability?

Transparency is an underlying principle, not only for the application of sustainable practices and to reporting, but also for the debate about what should be applied to enhance better practices, responsible behavior and, in the end, to promote sustainability. Based on the premise that the challenges towards sustainable production and consumption depend on multiple actors, transparency becomes a baseline rule that would enable win-win options.

Having the transparency principle as a basis, the concept behind continuous improvement lies on the acceptance that some issues in the sustainability world must be addressed in different stages. Sometimes because it is critical for most producers to apply certain measures immediately or because is not possible to adopt a requirement in the short period considering economic grounds.

The compliance with the new Forest Code is a good example of how the continuous improvement concept is necessary to allow the construction of sustainable paths. When the Ministry of Environment approves the CAR regulation and releases the system for registering, farmers will have two years to register and to start discussing with the environmental authorities the regularization steps that will need to be taken in a farm-by-farm basis. It is not reasonable to argue for an immediate compliance in a short period of time, because this task involves not just the producers, but government agencies, and in some cases, other stakeholders.

The adoption of good agricultural practices is another clear example linked to continuous improvement. It is possible to argue that most producers should start to do crop rotation or even crop and pasture rotation since these practices can promote productivity gains and environmental improvement. However, despite these technologies being well known and easily available, producers must learn how to use and manage the practices, must plan it's adoption and must have resources to do that.

Learning to manage a farm, improve social issues and to create positive externalities from the production are other examples where continuous improvement plays an important role.

Key Conclusions

One of the distinctive elements related to the sustainability of the Brazilian agriculture is the compliance agenda under the new Forest Code. The enforcement of the new regulation gives space, not only for the registration of 5.2 million farms in the Rural Environmental Registry – CAR, creating a detailed database about land use in the farms and working as a tool to monitor compliance, but also to the possibility of restoring Permanent Preservation Areas and Legal Reserves.

Moreover, the Environmental Compliance Programs - PRAs that will be approved at the federal and state levels will guide the legal compliance agenda, having as a basis a new regulation that was widely discussed and negotiated. The new rules, the CAR, the PRAs and the Terms of Agreement signed by each producer that will need to become compliant are unique instruments related to the environmental compliance of Brazilian farms.

This compliance agenda under the new Forest Code is a legal aspect that must be seen in parallel to other environmental regulations related to conservation of biodiversity, Ecological Economic Zoning and climate change, creating the possibility to plan and manage land use and landscape, aiming to improve sustainable development.

Associated with the deforestation reduction, which generates a new land use dynamic based on the ability to intensify livestock production and to release areas to agriculture, the legal deforestation is a key aspect guided, not only by the new Forest Code, but also by the possibility of restoring converted areas, especially in sensitive areas and to maintain forested areas based on the compensation of the Legal Reserve.

The recognition of the APPs and the Legal Reserve's role for biodiversity conservation, which was approved by the Ministry of Environment with the Biodiversity Targets agenda, represent the opportunity to bring value to the natural capital attached to the Brazilian agriculture.

These elements generate the debate about zero net deforestation, an agenda that would become more and more relevant, aiming to balance agricultural production and biodiversity conservation.

The efforts to make the CAR widely adopted and to work with restoration of APPs and Legal Reserves, and also with the compensation of Legal Reserve is a challenging agenda, not only for rural producers, but also for the government, NGOs, banks and other stakeholders.

Moreover, it is essential to mention that the ability to increase the adoption of good agricultural practices, such as restoration of degraded areas, the implementation of low carbon practices, such as no till and biological nitrogen fixation, and the possibility to enhance the application of social and labor requirements are key aspects related to the sustainability of soybean production.

The continuous improvement approach is a key aspect that must be considered when planning and dealing with some aspects related to sustainable indicators of the Brazilian agriculture. Furthermore, the existence of different initiatives aiming to build upon sustainability means that it is crucial to recognize challenges and work to overcome them on a regional basis.

Glossary

Cerrado: It is a Brazilian biome similar to "savanna". The Cerrado itself is varied in form, ranging from dense grassland, usually with a sparse covering of shrubs and small trees, to closed woodland with a canopy height of 12 - 15 meters.

Compensation of Legal Reserve: One way to regularize the Legal Reserve deficit. It can be done by purchasing "Environmental Reserve Quota - CRA", leasing area under environmental serfdom or legal reserve, donating to the government area located within the Conservation Unit or registering another equivalent area and exceeding the Legal Reserve.

Conservation Units: Territorial space and its environmental resources, including jurisdictional waters, with relevant natural characteristics, legally instituted by the Government, with conservation objectives and defined limits, under special scheme of administration, which apply appropriate guarantees of protection.

Consolidated Areas: Rural property area with preexisting anthropic occupation in July 22nd 2008, with buildings, improvements or crop-livestock agroforestry activities.

Environmental Compliance Program – PRAs: regulation that will be approved by the Federal and States governments aiming to set the minimum rules for compliance with the Forest Code requirements (e.g. restoration of PPAs and Legal Reserve; criteria for conservation of soil and water).

Environmental Protection Area – APAs: In general, it is an extensive area, with a certain degree of human occupation, provided with important abiotic, biotic, aesthetic or cultural attributes for life quality and human population's well-being, and basic aims to protect biological diversity, discipline occupation process and ensure sustainable use of natural resources.

Environmental Reserve Quota - CRA: Legal title of area with native vegetation, existing or in recovery process corresponding to the Legal Reserve area voluntarily instituted on vegetation that exceeds the percentage required by the law.

Forest law (New Forest Code): It establishes general rules on the vegetation protection (Permanent Preservation Areas and Legal Reserves), forest exploitation (supply of forest feedstock, control of forest products origin and prevention and control of forest fires) and provides economic and financial instruments for achieving your goals.

Government Severance Indemnity Fund for Employees – FGTS: The Government Severance Indemnity Fund for Employees system ("Fundo de Garantia por Tempo de Serviço – FGTS") was established in 1966 with aiming to protect workers in case of dismissal for no fair reason. Every month the employer must deposit 8% of the employee's monthly salary into an account managed by the Federal Savings Bank ("Caixa Econômica Federal"). In case of dismissal without a fair cause, the employer is obliged to pay a penalty fine of 40% based on the total amount deposited during the contract period. The deposits are adjusted for inflation, and the employee is entitled to withdraw the balance in several situations, including: dismissal without a cause (for any reason other than those listed as just causes in the Law); expiry of a fixed-term contract; termination due to force majeure; termination by mutual agreement; death of the employer; retirement; when the worker or his/her dependent suffers from cancer or is HIV positive; in order to purchase a house, to settle or amortize the debt or payment of part of a housing loan installment. More information can be found in the Law 8036/1990.

GM Events/Products: Refers to the unique DNA recombination (rearrangement of genetic material) event that took place in one plant cell, which was then used to generate entire transgenic plants.

High Conservation Values - HCVs: Biological, ecological, social or cultural values which are considered outstandingly significant or critically important at the national, regional or global level.

Legal Reserve: Area located within a rural property or ownership. It aims to ensure a sustainable economic use of natural resources of rural property, assist the conservation and rehabilitation of ecological processes and promote the biodiversity conservation, as well as shelter and protection of wild fauna and native flora.

Legal Amazon: States of Acre, Pará, Amazonas, Roraima, Rondônia, Amapá, Mato Grosso, Maranhão (regions on west side of meridian 44° W), Tocantins and Goiás (regions on north side of parallel 13° S for the last two states).

Maize "winter harvest" or "second crop": It is defined as rainfed maize grown extemporaneously, from January to April, usually after early cycle soybean.

National System of Nature Conservation Units – SNUC: It is the set of conservation units (federal, state and municipal). They are divided into two groups "Integral Protection Units" which aims to preserve nature, being admitted only the indirect use of its natural resources, except in cases provided for the Law and "Sustainable Use Units" which aims to harmonize nature conservation with sustainable use of a portion of its natural resources.

Permanent Preservation Areas – APPs: Protected area, covered or not by native vegetation. It aims to preserve water resources, landscape, geological stability, biodiversity, facilitate fauna and flora gene flow, protect soil and ensure the human populations well-being.

Priority Areas to Biodiversity: Selected areas to promote, among other things, the recovery of watersheds excessively deforested, creating ecological corridors, conservation of large protected areas and conservation and restoration of ecosystems or species threatened.

Private Reserves of Natural Heritage: It is a conservation unit of the private domain. It aims to conserve biological diversity, saved with perpetuity, through the Term of Agreement recorded in the margin of registration with the Public Registry of Property.

Riparian Areas: It is defined as the part of the landscape adjoining rivers and streams that has a direct influence on the water and aquatic ecosystems within them. It includes the stream banks and a strip of land of variable width along the banks.

Rural Environmental Registry - CAR: It is an electronic public record nationwide, mandatory for all rural properties, which aims to integrate environmental information of rural properties and ownership, composing database for control, monitoring, environmental and economic planning and combating deforestation.

Terms of Agreement: Agreement signed between the producer and the environmental authority establishing the obligations the farmer will need to follow to become compliant with the new Forest Code. The producer will become liable to the obligations.

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