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NEW BRAZILIAN FOREST CODE: CHANGES AND PROSPECTS

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ABSTRACT
Brazil adopted a new forest code in 2012 within environmentalists and farmers conflicts. However, specialists show that the new forest code may be more lenient with the rules to protect permanent preservation areas and legal reserves. Thus, this work aims to evaluate main changes brought by new forest code and the future impact of these new rules on farms and the environment. We conclude that new forest code may have serious consequences for environment and human life.

Keywords: Brazil; Ew forest code; Egriculture.

NOVO CÓDIGO FLORESTAL BRASILEIRO: MUDANÇAS E PERSPECTIVAS

RESUMO
O Brasil adotou o novo código florestal em 2012 em um ambiente marcado por confrontos entre ambientalistas e ruralistas. Além disso, especialsitas indicam que o novo código pode estar mais leniente com as regras de proteção de áreas de preservação permanente e reservas legais. Nesse sentifo, o objetivo do presente trabalho foi avaliar as principais mudanças executadas pelo novo código e os provávies impactos futuros dessas novas regras sobre produtores rurais e o meio ambiente. Como resultado principal, observa-se que o novo código florestal, na forma como foi reestruturado, pode trazer sérias consequencias para o meio ambiente e para a vida humana.

Palavras-chave: Brasil; Novo Código Florestal; Agricultura.

JEL: Q20, Q23, Q28.

1 INTRODUCTION

Brazil is a big country with more than 8 million km^2, 27 states, 5,565 cities and many biomes such as Amazon, Cerrado, Caatinga, Pantanal and Atlantic Forest [1]. Government protects biomes by law with a set of these rules and duties, for example permanent preservation area (APPs) and legal reserves. On the other hand, Brazil is an agrarian country and needs increasingly of agricultural land, although the good productivity levels. This conflict between agricultural and environment economy is

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historic. First Brazilian Forest Code was created in 1934 and, since highly, environmentalists and farmers disagreed with government proposals [2].

In order to try solve this problems, Brazilian government created new forest code in 2012 with new definition for APPs, legal reserves, river slopes areas, mountain area, and regularized Brazilian small farms [3]. APPs is a covered area by native vegetation that preserve water resources, landscape, geological stability and biodiversity, soil protection and ensure farmers well-being [4].

According to national council for environment, APPs are forests and other forms of natural vegetation located along rivers or watercourse, hills, mountains, dunes and mangroves [5]. Legal reserve area locates in rural property, ensures economic use of natural resources as conservation of ecological processes, and protects biodiversity and native flora [6].

Moreover, legal reserves also contribute to maintaining climatic and ecological balance as natural pest control, pollination, humidification and wind protection. In addition, it avoids forest fragments isolation, reduces impact on landscape that has a priceless value to agriculture. Farmers increase agricultural productivity if they preserve environmental areas. For example, to soybean crop, they increase around 50% production with pollination help. To coffee crop around 40%, apple crop around 42% and orange crop around 35% [7].

New forest code also provides rules for sustainable management, referring about rational use of nature to obtain economic, social and environmental benefits [8]. Thus, new forest code is a mechanism to support ecosystem management like multiple use of wood, multiple crops production and flora byproducts [9].

In this paper, we evaluate changes brought by new forest code and its future impact for society and environment. The remainder of the paper is organized as follows. Section 2 briefly describes evolution of environmental laws in Brazil. Section 3 details Brazilian new forest code and compares changing across time and last section presents the conclusion, limitations and opportunities for future research.

2 FOREST LAWS EVOLUTION IN BRAZIL

Brazilian forest law began with wood exploitation at colonization period. In this period, Brazil was politically dependent on Portugal until its independence declaration in 1822. Therefore, Afonso IV from Portugal deliberated in 1393 cutting of Brazilian

trees until 1799, when he prohibited trees cutting without authorities' permission. After Brazilian independence, in 1829, government banned trees cutting on public land without permission and has required individual's licenses to cut Brazilian wood [10].

First Brazilian forest code was drawn in 1934. At this time, Brazilian economic based on coffee expansion whose began a big deforestation to increase Brazilian agricultural production. Because of that, Brazilian government created law number 23.793/34 that forced landowners to keep 25% of original forest in property area [11]. However, forest code did not control on which part of forestland should be preserved, only the guarantee protection of native forest no matter species or trees varieties [12]. Thus, first forest code was a little interventional instrument, without efficacy to solve serious issues about legal forests protection [13].

Brazilian government imposed a new forest code in September 1965, which changed concept of Permanent Preservation Area and created Legal Reserve (50% to Amazon region and 20% to other regions). Although, in this period, military government that aimed commanded Brazilian develop plans to start Amazon "integration" with rest of Brazilian. Then, military government did a lot of projects of infrastructure and incentives of settlement, which increased pressure of natural resources on the region.

In 1967, government put a series of legislative acts with objective to develop and occupy Amazon region known as "Amazonia operation" [14]. The incentives was since tax-free and subsidized credits to road expansion and expansion of agricultural frontier into Amazon forest. Therefore, new forest code did not represent a real deforestation detention. Between 1970s and 1980s, Amazon experienced large deforestation rates and establishment many cattle farms [14].

3 CHANGES AND PROSPECTS OF NEW FOREST CODE

Brazil designed new forest code in 1999 as result as controversy among "large farmers" and "environmentalists". On July 2008, Brazilian president signed the law no. 6514 about environmental crimes and in May 2012, he established Brazilian new forest code. In order to integrate environmental information of rural properties, Brazilian forest code created the rural environmental record (CAR)[4] that is mandatory

[4] National electronic public record.

for all rural properties. CAR is important to combat deforestation and control and monitor environmental plan.

Despite some progress, Brazilian forest code generated discontent among environmentalists and their supporters to decrease environmental protection. New forest code reduced the Permanent Preservation Areas (APP) from rivers margin and streams. This reduction may be responsible to increase the number of cases at property damage and human risk because it increases possibility of rivers margin occupation (Figure 1). New forest code also reduced APP from tops mountains tops and hills.

Figure 1 - Permanent preservation area (APP) and close to river constructions.

Source: [15].

Again, we can see Brazilian forest code relaxing some previous standards. Figure 2 shows on left an area that was preserved by native forest and after rockslide vegetation lives in area was reduced.

Figure 2 - A permanent preservation area and area near the hill constructions

Source: [17].

Table 1 summarizes main changes at Brazilian forest code. Regarding the changes of forest code, some authors highlight relevant aspects about consequences that these new rules can bring to society as a whole.

Researchers found that new forest code in urban areas was negligent in many cases like the urban perimeter of channeled rivers. They also raises questions about streets and avenues already paved along rivers and occupations already consolidated over watercourses. They suggested, for urban areas, Brazilian forest code defines only principles and some parameters for unconsolidated areas and leave for municipal authorities to define limits and parameters for risk areas and APPs occupations [18].

Therefore, the new forest code has been greater attention to changes regarding the use and occupation of cities, given the risk of natural disasters. Thus, activities proper planning in states or in cities with respect to APP and other protected areas are essential to reduce natural disasters [19].

Another point to be highlighted is the need to expand environmental issue debate and incorporate other elements that are important to discussion. Like forest integration with other elements of the ecosystem preservation of riparian forests for ecosystems balance, rational use of pesticides and fertilizers, disposal of sewage and waste, control of soil erosion and reduction of greenhouse gases emission need to be debated and included at Brazilian forest code [20].

Table 1 - Main changes at Brazilian forest code

Themes	1965 Forest Code	2012 Forest Code
Legal Reserve	Area: Amazon (free region for exploration): 80%; Cerrado: 35% and other regions and biomes: 20%. Calculation: statutory reserves without APPs. Registration: Register Office.	Area: Amazon (free region for exploration): 80%; Cerrado: 35% and other regions and biomes: 20%. Calculation: includes APPs. Farms with four fiscal modules[5] do not need reconstruct legal reserve. Registration: not need. Permission economic exploitation: permission of National System of Environmental (Sisnama).
Permanent Preservation Area	Calculation: Native vegetation from riverbanks, lakes and springs. Economic activities: Floodplains, wetlands, slopes forests, mountaintops and areas above 1800 meters cannot be exploited.	Calculation: Native vegetation from riverbanks, lakes and springs, having regular water level as parameter. Economic activities: Floodplains, wetlands, slopes forests, mountaintops and areas above 1800 meters may be used for certain economic activities.
Riparian	River's margin: Until 10 meters: 30 meters of riparian Between 10 and 50 meters: 50 meters of riparian Between 50 and 200 meters: 100 meters of riparian Between 200 and 600 meters: 200 meters of riparian Bigger than 600 meters: 500 meters of riparian Vegetation remove: Requires the federal authorization for suppress native vegetation in APPs.	River's margin: Until 10 meters: 30 meters riparian rivers of up to 10 feet wide is required, when consolidated in APP of up to 10 meters wide river area reduces the width of the forest to 15 meters. Between 10 and 50 meters: 50 meters of riparian Between 50 and 200 meters: 100 meters of riparian Between 200 and 600 meters: 200 meters of riparian Bigger than 600 meters: 500 meters of riparian Vegetation remove: Until 2008, they allow vegetation remove in APPs and consolidated activities, provided by agroforestry activities, ecotourism and rural tourism. Brazilian authorities may permit other activities in APPs through the Environmental Adjustment Program (PRA).
Consolidated rural area	Does not include the concept of consolidated rural area.	Establishes the concept of consolidated rural areas: Farms up to four fiscal modules do not need restore native vegetation.
Penalty	Three months to one year of reclusion and a fine from 1 to 100 times the minimum wage.	Exempts landowners of fines and penalties for irregular use of protected areas until July 22, 2008.

Source: [21], [22]. Developed by authors.

[5]A fiscal module is an agrarian unit used in each municipality in Brazil, defined according to the terms of article 50, section 2, of Law No. 6,746 of December 10, 1979.

4 AMAZON CASE

Amazon is the world's largest tropical moist forest contiguous block, which 7.413.827 km². Table 2 shows the Amazon forest division among Latin American countries. Brazilian Amazon is the largest with 67,9% of total area, followed by Bolivia (9,8%), Peru (8,8%) and Colombia. Despite the lower representation of Guyana and Venezuela in Amazon total, Amazon area is national importance, present in all territories of these countries.

Table 2 - Amazon land area per country

Country	Size of the country (km²)	Size of the Amazon political area (km²)	Regional importance of national Amazon (%)	National importance of Amazon (%)
Bolivia	1.098.581	724.000	9,8	65,9
Brazil	8.514.876	5.034.740	67,9	59,1
Colombia	1.141.748	477.274	6,4	41,8
Ecuador	283.561	115.613	1,6	40,8
Guyana	214.960	214.960	2,9	100
Peru	1.285.216	651.440	8,8	50,7
Suriname	142.800	142.800	1,9	100
Venezuela	916.445	53.000	0,7	5,8
TOTAL	13.598.187	7.413.827	100	-

Source: [23] .Adapted by authors.

Amazon accounts for 65,9% of the Bolivian territory and its main sources of deforestation is the agricultural expansion (cattle ranching, soybeans sorghum, sunflowers, and illicit crops). Other problem is the mining. During the 1980s, some legal instruments concerning environmental management in the mining sector were promulgate, without concrete institutional effect. Only in 1992 was created a Environmental Law (law nº 1.333) with the objective of protecting and preserving the environment and natural resources, regulating human actions in relation to nature and promoting sustainable development with the aim of improving the quality of life of the population. [24], [25]

Amazon represents 50,7% of the Peruvian territory and its main sources of deforestation are the agricultural expansion (cattle ranching, soybeans and shifting cultivation) and logging. Other problem in Peruvian Amazon is the mining. In 1990, the Environmental and Natural Resources Code (IDLE No. 613) was promulgated, the first attempt to institute a legal and institutional system that promotes the

preservation of the environment, later modified through a series of private investment promotion laws, which eliminated what they considered excessive severity in the Code. In 2005, the General Environmental Law, Law No. 28611, repealed Environmental Code. To revive the economy and leverage decelerated investments in mining and fossil fuels, Peru approved a controversial law that overthrows many of its environmental protections. Law nº 30.230 reduces most of the fines for environmental damage and allows the mining and exploitation of fossil fuels in many protected areas. This law violates environmental and social norms, and fails to promote long-term sustainable development through responsible investments. [26], [27]

Amazon accounts for 41,8% of the Colombian territory and its main sources of deforestation are the agricultural expansion (cattle ranching, soybeans and illicit crops) and infrastructure extension was approved the national code of renewable and nonrenewable natural resources and protection of the environment that still today (Law 2.811). Amazon represents 100% of the Guyana territory in which only 2,3% are protected in conservation concessions, and main deforestation source is logging.

Amazon accounts 40,8 % of Ecuador territory and its main sources of deforestation are cattle ranching, oil exploitation, logging and infrastructure extension. In turn, Suriname presents Amazon forest in 100% of its territory with logging as a deforestation source. Amazon represents 100% of the Venezuela territory in which main deforestation sources are cattle ranching, logging, mining and oil exploitation.

Thus, Table 3 shows the environmental laws evolution in Amazonian countries. Brazil was the first country to create an environmental law in 1934, and the country with the newest legislation is the Ecuador, which passed its first law in 1999. It should be noted that, with the exception of Brazil, the laws in force and the first laws are guidelines on the environment and natural resources. Legal definitions and penalties are defined in other legal instruments, with specific laws for different natural resources. In this sense, the New Brazilian Forest Code is a legal framework, since it is a unified law, with legal definitions and penalties instituted, which makes Brazilian legislation more transparent more applicable and easier to disseminate information to population.

Despite the controversies, the New Brazilian Forest Code is an improvement compared to other Amazonian countries, and demonstrates the need for greater engagement of these countries for the Amazon preservation.

Table 3 - Environmental laws in Amazonian countries

Country	First law		In force law	
	Year	Number	Year	Number
Bolivia	1980	many legal instruments	1992	Law nº 1.333
Brazil	1934	5.034.740	2012	Law nº 12.654
Colombia	1974	Law nº 2.811	1974	Law nº 2.811
Ecuador	1999	Law nº 37	1999	Law nº 37
Guyana	1996	Act 11	1996	Act 11
Peru	1990	IDLE nº. 613	2005	Law nº 28.611
Suriname	1954	Law 26	1954	Law 26
Venezuela	1976	Law nº 31.004	2006	Law nº 5.833

Source: Developed by authors.

5 CONCLUSIONS

Brazil adopted a new forest code was in 2012, but we are still in transition between the new code and the previous code. Thus, we proposed to identify changes between the two forest code. The new forest code shows more lenient rules than previous code, despite intense discussion and action by environmentalists concerned about the Amazon deforestation. As a country with strong agriculture activity, Brazil should be more aware of environmental issues, correct soil management and conservation of forests and water.

We also noticed scientific knowledge absence to sustain main change's code of permanent preservation areas and legal reserves, which, in most cases, are the same for all biomes, disregarding peculiarities of Brazilian regions.

Regarding the prospects of Brazilian forest code are noticed many questions about actual new forest code effectiveness. There was low political involvement at the design of code process and knowing of institutional practices adequatibility. A good forest code need to a slow process and combination between awareness and education.

We considered two relevant aspects of legal rules. First, amnesty given farmers who did have irregular activities until 2008 works against farmers who fulfilled law, as

a disincentive for them to suit to new forest code. Second, excess of rules in the Brazilian legal framework, a phenomenon called “legislative inflation", produce a sense of impunity; because it is impossible to monitor the roll society. This discourages population to remain within the law.

Finally, we highlight showed in 2013 the natural disasters in Espírito Santo, Minas Gerais and Rio de Janeiro states due to storms, which repeated every year. These catastrophes are a negative indicator of standards relaxation from new forest code in riparian areas and slopes.

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