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COMBATING DEFORESTATION IN THE BRAZILIAN AMAZON: OPTIONS FOR NATIONAL AND GLOBAL GOVERNANCE

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ABSTRACT

Deforestation in the Brazilian Amazon has decreased over the last years but there are still several illegal activities pushing it forward. The Brazilian government is taking a prominent role in regard to reducing its greenhouse gas emissions (GHG) by voluntarily committing to GHG reductions. As GHG emissions from deforestation account for 60% of total Brazilian emission, the government has promoted several policies in this regard. Those policies are discussed in order to access its effectiveness to control the deforestation drivers over time. It is shown that some of those policies were able to reduce the deforestation; however, there are some indirect relationships that those policies could not capture. It is also highlighted some options that could improve those deforestation policies.

Keywords: Deforestation, Policies, Brazilian Amazon, Indirect Land Use Change

JEL codes: Q01 Sustainable Development, Q15 Land Ownership and Tenure • Land Reform • Land Use • Irrigation • Agriculture and Environment, Q34 Natural Resources and Domestic and International Conflicts.

1. INTRODUCTION

There is already a consensus in the scientific community that the greenhouse effect keeps the Earth warmer than it would be otherwise (IPCC et al. 1990; UNFCCC 2015). The Intergovernmental Panel on Climate Change (IPCC) presented a report showing that the resulting emissions from human activities have been increasing the atmospheric concentrations of

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greenhouse gases (GHG). One of the main drivers for that is deforestation, which accounts for approximately 17% of anthropogenic GHG emissions according to the IPCC (IPCC 2007).

Brazil is the second most forested country in the world, with nearly 54% of its land territory covered by forest (Serviço Florestal Brasileiro 2013). The Amazon forest is the biggest forest in Brazil, covering 71% of that territory. Currently, Brazil is also a major food producer, and its relevance is expected to grow due to an increasing global demand for food as the world's population continues to grow.

To meet the growing demand for food, producers need to increase the area planted, increase productivity, and reduce post-harvest losses or a combination of these strategies. In the current context, there is a clear preference for production increase through continued yields gains. However, deforestation still exists. According to Figure 1, during the last five years (2010-2014) Brazil experienced a deforestation average of 5.7 thousands of km^2 per year in the Legal Amazon region (INPE 2015).

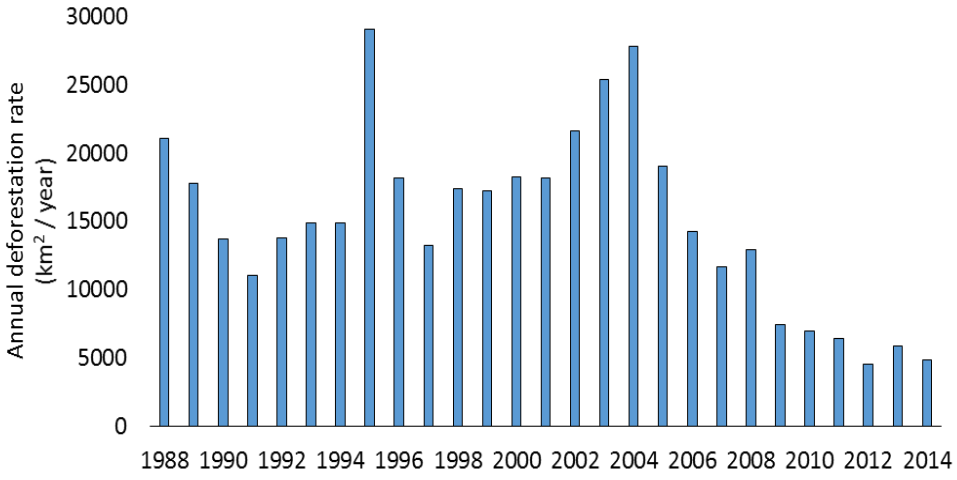

Figure 1: Annual deforestation rate (INPE, 2015)

The objective of this study is to analyze future deforestation process in Brazil to assess its main drivers and to characterize the existing political actions and agreements. The study is organized as follows. First, the discussion about the drivers that have pushed deforestation in the past in Brazil is presented. This then leads to our review about the national and international options that are available to cope with deforestation. Finally, the policy measures that are currently being implemented are discussed.

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2. MAIN DEFORESTATION DRIVERS IN BRAZILIAN AMAZON

To comprehend the deforestation process in the Brazilian Amazon we need to go beyond the traditional view of direct impact (i.e.: logging, mining, infrastructure building) because some of the main drivers occur in an indirect way, as will be presented further. Thus, it is important to have a holistic approach to understand what was happening in the Brazilian economy during this period. The analysis start with the decades of 1960`s and 70`s. During this period, Brazil was under an authoritarian military dictatorship, which ended in March 15, 1985.

History of deforestation

During the Brazilian military government, national security was one of the government's main concern and a major demand was to fill the demographic gaps facing the country with the population concentrated in the coast, mostly in the southeast. During the sixties and seventies, the government offered many types of assistance through public policies supporting the migratory flow to the Midwest. One of those policies was the "*II Plano Nacional de Desenvolvimento*" (Second National Development Plan) – II PND (1975-1979), which had as its main objective the expansion of the agricultural frontier in the country.

The migration process was accelerated by the construction of *Brasília*, the new capital of Brazil in 1956. This brought more investments in infrastructure and the development of new road networks linking this region with the main national centers (Farias and Zamberlan 2014).

The exhaustion of available land for agricultural use in the South and Southeast and the need to increase agricultural productivity moved production to new areas, resulting in agricultural expansion (Oliveira 2002).

The agricultural expansion occurred via deforestation, followed by the establishment of livestock in the Midwest. Looking to the evolution of the land use change in the Legal Amazon region (area which covers nine states in Brazil that belongs to the Amazon Basin and present Amazonian vegetation), Margulis (2003) showed that the area of planted pastures tripled from 1975 to 1995.

In addition to the land use change, the evolution of cattle ranching in the Amazon also caused further deforestation. The increase in beef production in the Amazon region accounted for most of the beef growth industry in the whole country, which also suggests an expansion of the cattle frontier to the north region (Margulis 2003). This same author showed (via a regression analysis) that the increase of one unit of animal unit per hectare meant an average increase of 1.2 percentage points in the county deforestation rate (from 1970 to 1995).

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As land prices were relatively low in this period, cattle ranching was implemented in an extensive way. In 1995, the planted pastures constituted about 70% of deforested areas. However, this had a very low yield and was only viable due to its large scale and to government subsidies (Margulis 2003). The soybean production showed a very slow growth in the Midwest region during this period. Meanwhile, it was expanding in the south. During the sixties and seventies soybean production expanded mostly in the south due, mainly due to the favorable weather (during that time the seed varieties were imported from the USA and were better adapted to the south conditions). Government incentives to liming, soil fertility and tax incentives for wheat (as the farmers grew both wheat and soybean in the south, the soybean also profited from these incentives) and high prices on international markets also helped the expansion of soybean production in the south.

Indirect land use change

The expansion of a particular land-use may affect deforestation in two ways: directly by forest clearing for this purpose or indirectly by the displacement of other land-use activities from non-forest areas towards the forest frontier (Andrade de Sá, Palmer and di Falco 2013). Therefore, this new deforestation driver is different from the former because its impact is not straightforward. It is called indirect land use change, which is defined by Richards *et al.* (2014) as "*a land use change in one location that is responsive to a land use change in another, potentially distant location*". In such situations, deforestation in one place can be motivated by a different event far away, which is difficult to measure (Arima et al. 2011).

The indirect land-use change usually materializes through a mechanism called displacement effect, which can happen in two ways: from the demand side, via an increase in the activity returns; or from the supply side through the spatial reallocation of capital from a periphery of an agricultural region to far away (usually a forested region) (Richards et al. 2014). These authors also suggested a new mechanism that can work as a deforestation driver, the land appreciation effect. They found a positive relationship of cropland value with deforestation in Mato Grosso, Brazil.

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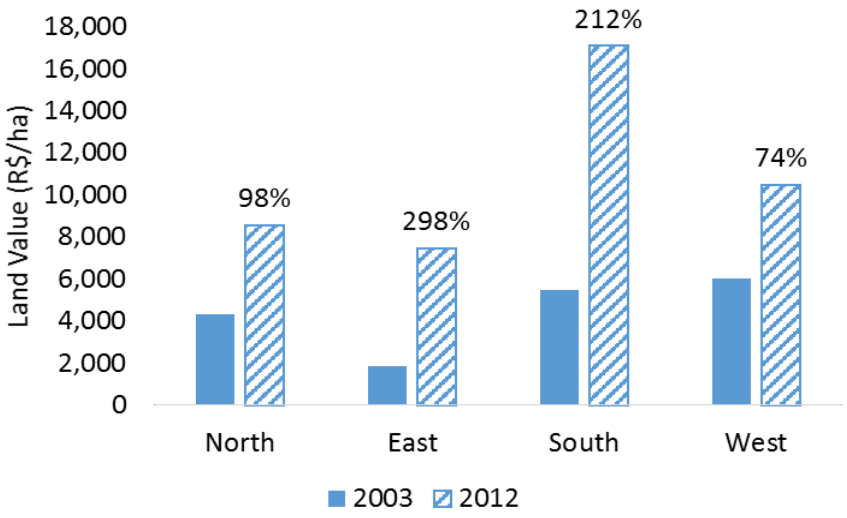

Figure 2: Land appreciation on agriculture land in Mato Grosso

The first indirect land use change (ILUC) was due to sugarcane expansion in the state São Paulo. During the late 1970`s, during the military regime, the Brazilian government was concerned about reducing its dependency on imported oil. They launched a public program called *Pró-Álcool*, which focused on substituting petrol fuels to bioethanol fuel. The program increased bioethanol demand (and, consequently, sugarcane production) by creating fuel blending mandates and by distributing subsidies to expand sugar cane production, distilleries and research on new varieties (Andrade de Sá et al. 2013).

Andrade de Sá *et al.* (2013) empirically assess the ILUC effects of this sugarcane in São Paulo on forest conversion decision in Brazilian Amazon. The results suggest a positive relationship between sugarcane expansion and deforestation, supporting the hypothesis about the substitution of cattle ranching from the Midwest and Southwest region towards the Amazon, as a result of sugarcane expansion.

After the sugarcane expansion cycle that started on the seventies, Brazil experienced a second cycle of soybean expansion during the 1980`s and 90`s, but now in the Midwest. The main drivers for that expansion were the construction of new access routes (with the help of *Brasília* construction, as discussed earlier), tax incentives, favorable topography and new advances in the research (discover of new soybean variables) (Embrapa Soja 2004).

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This expansion in soybean production to the Midwest also brought indirect land use change. To statistically measure this effect, Arima *et al.* (2011) developed a spatial regression model capable of linking the expansion of agricultural activities to pasture conversions on distant, forest frontiers. The result showed that the ILUC effect is significant and of considerable magnitude (a 10% reduction of soybean would have decreased deforestation by 40%). Richards *et al.* (2014) also analyzed the ILUC effect of soybean in the Brazilian Amazon by using a spatial-Durbin model that enabled the explicit representation of distal impacts on land change. Their first result showed that 32% of deforestation is attributable indirectly to soybean production. They also found that land appreciation in agricultural regions has replaced farm expansions as a source of indirect land use change.

The high return of the agricultural activities increases the capital availability and the expected potential rent value of the agricultural land. This land price increase raises the land value in nearby areas, leading to a price increase in an alternative land (i.e.: pasture and forest). This will raise the incentives of landowners to clear their forested properties or to sell their land and move far way, re-establishing their operations in forest areas (Richards et al. 2014).

'Grilagem' activities and the properties rights

Behind all those drivers there is one very important factor, called *Grilagem de Terras*, which refers to illegal occupancy of land property. In the Amazon Region most lands are still owned by the federal government. These lands that were sub-used only by natives and Indigenous peoples started to be sold to new investors in the 1970`s and 80`s. Therefore, in most cases, these practices were done in an illegal way. Some of those practice were: sale the same plot for more than one buyer; sale of public land without the proper process; forgery, falsifying or tampering of property titles and the land demarcation in a much greater extent than it was originally acquired (Loureiro and Pinto 2005).

Another problem is that sometimes the local registry office was set on fire and all the land properties documents were lost, because they are not connected to others offices and most of the documents are only found in paper form. According to Sant`Anna and Young (2010), the poor definition of property rights in the Amazon region is deeply associated with the deforestation process (Sant'Anna and Young 2010). This uncertainty about the properties rights encourages the *grilagem* process. The first step in this process is the deforestation, because they need to signalize that they have occupied that amount of land. After the logging, they implement another activity, usually the cattle breeding, in order to try to legitimize their land ownership over the next years.

After this process, with the land registry on their hands, they finally can sell the land in order to receive the profit of the *grilagem* (Instituto de Pesquisa Ambiental da Amazônia 2006).

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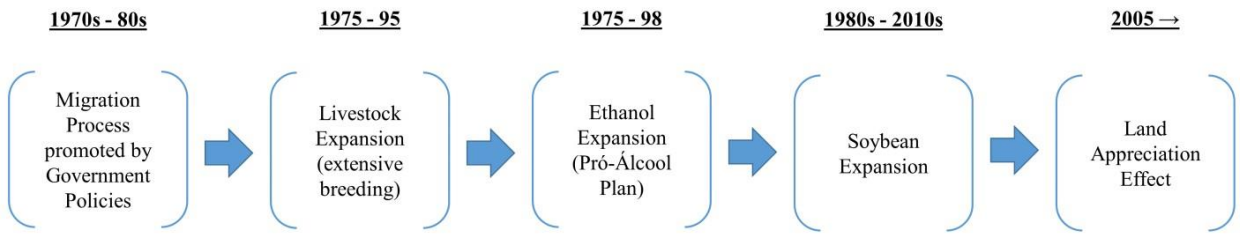

Figure 3: Time line of deforestation drivers by indirect land use change in Brazilian Amazon

As it can be seen in Figure 3, the deforestation in the Brazilian Amazon had different drivers over the years through different economics process over the entire country. It is very important to perceive this as a dynamic process that changes and are interconnected. Therefore, the policy making process need to follow a holistic approach/view, in order to capture specificities of each region and macroeconomic context.

3. OPTIONS FOR NATIONAL AND GLOBAL GOVERNANCE

It is widely accepted in the scientific community and in society as a whole that global warming is a major concern. The United Framework Convention on Climate Change (UNFCCC) is an international environmental treaty which objectives to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system"(UNFCCC 2015). Several countries have ratified the Convention and meet every year in the Conference of the Parties (COP) to discuss mechanisms to reduce global warming.

As deforestation is one of the main sources of anthropogenic GHG emissions, it has been a very debated topic during the COP`s meetings and several countries already started to implemented some measures to reduce it. In the next two sections, it will be presented some of those actions, presenting the Brazilian action in the next section and the national ones in the subsequent section.

3.1 Options for national governance

Throughout the 2000s, the Brazilian federal government implemented several policies in order to inhibit forest deforestation. The main policies are: strengthening monitoring and law enforcement; expanding protected territory; and adopting a conditional rural credit policy (Assunção, Gandour and Rocha 2015).

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The first policy turning point was the *Plano de Ação para a Prevenção e Controle do Desmatamento na Amazônia Legal* – PPCDAM (Action Plan for the Prevention and Control of Deforestation in the Legal Amazon), which is the main tool from the Brazilian government to combat deforestation. The plan was launched in 2004 and introduced a new approach to deal with deforestation based on integrated action and participation of the highest levels of the federal government, which had not previously been tried (IPAM 2009; Assunção et al. 2015). One of its pillars is a bold satellite monitoring system that subsidizes surveillance operations in the Amazon (MMA 2014; INPE 2015; MCT 2015). This system is carried out by the National Institute for Space Research and is due by three different instruments: PRODES (Amazon Deforestation Calculation Program), DETER (System for Deforestation Detection in Real Time) and DEGRAD (Mapping of Forest Deterioration in the Brazilian Amazon).

PRODES is one of the most advanced programs in the world for the identification and quantification of deforestation processes in forest areas. From the use of satellite images, the annual rates of deforestation are estimated from the increments of deforestation identified in each satellite image covering the Legal Amazon. Additionally, the DETER operates throughout the year and serves to warn of new deforestation focus, allowing for immediate government action against the loggers. The DEGRAD system also is done once a year and it is designed to map areas in the process of deforestation where forest cover has not been fully removed. This system uses the same images from PRODES but run through a different approach/algorithm, where the main goal is to follow up the regeneration process of deforested areas already identified by the PRODES system in order to check if it is in a regeneration path or still suffering any degradation process.

The cooperation between different levels of government departments increased the intensity of the monitoring activities. The main cooperation was between INPE and IBAMA, which allowed the implementation of innovative procedures and techniques for monitoring, environmental control, and territorial management. In 2005 IBAMA also launched a special program focusing on improving the qualification of its personnel which also allowed a more active Amazon monitoring and law enforcement (IPAM 2009; Assunção et al. 2015).

In 2010 the government announced a similar plan for the Cerrado conservation, one of the most threatened biome in Brazil, which is called *Plano de Ação para Prevenção e Controle do Desmatamento e das Queimadas no Cerrado* – PPCerrado (Action Plan for Prevention and Control of Deforestation and Fires in the Cerrado). The plan calls for 151 actions to reduce the vegetation loss and create alternative protection and sustainable use of natural resources of this biome.

Another landscape monitoring is done by a non-governmental entity called IMAZON - *Instituto do Homem e Meio Ambiente da Amazônia*, which is a non-profit research institution classified as a Civil Society Public Interest Organization (OSCIP), whose mission is to promote sustainable

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development in the Amazon (IMAZON 2015). This system is called *Sistema de Alerta de Desmatamento* (SAD) and, although it uses the same satellite image from DETER, it adopts a different approach which allows the identification of deforestation in areas above 10 or 12 hectares (while DETER used above 25 hectares - but nowadays 6.25 ha) and avoid the cloud cover (a major issue in DETER). Despite suffering criticism from the federal government, the SAD is adopted by different levels of government as well as civil society organizations.

The second policy turning point was in 2008 with the introduction of three new policy rules. The first one was the approval of a new rule by the Brazilian National Monetary Council (CMN) including environmental conditions for landing credit to the Amazon biome. This policy increases the difficulty in obtaining funds for producers who deforest illegally (IBAMA 2015). In addition, the credit release should also observe the recommendations and restrictions of the *Zoneamento Ecológico-Econômico*, which is a government instrument for organization of the territory.

The second policy was the passing of a Presidential Decree (6.312) in December of 2007, which established the legal basis of the identification of municipalities with high rates of deforestation and the application of differentiated actions towards them. The municipalities identified in that list were subjected to more rigorous environmental monitoring and law enforcement. Any Legal Amazon municipality could be added to that list of "priority municipalities" and the exiting was conditioned upon a significant reduction of deforestation (Assunção et al. 2015).

The approval of the Presidential Decree (6.514) was the third policy. This policy established the guidelines to the federal administrative process in regard to investigate and penalize environmental violations, allowing them to be completed quickly. These measures brought greater robustness and regulatory stability to these administrative processes (Assunção et al. 2015).

Parallel to the PPCDAm's efforts, the creation of protected areas (*Unidades de Concervação* - UC) gained momentum in the mid-2000s (Assunção et al. 2015). According to Soares-Filho (2010), in 2009 around 54% of the remaining forest of Brazilian Amazon was under the protection of UC. Those authors analyzed the effect of the Brazilian Amazon PAs on deforestation and found that they showed an inhibitory effect. Therefore, effectively implemented PAs in zones under threat offers high payoffs for reducing carbon emissions (Soares-Filho et al. 2010). Another advantage of the UCs is that they reduce the pressure for the *grilagem* activities as it reduces the uncertainty about the properties rights. By changing the land status from government land to UC, the government reduces the land offer (withdraws it from the market) and reduces the expectation of improper appropriation of land (the main driver of the *grilagem*).

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An initiative to reduce deforestation rates in the Amazon biome, which started without the government initiative, was the Soy Moratorium. It was the first voluntary zero deforestation agreement in the tropics, which stated in July 2006. Pressured by the environmental groups, retailers, nongovernmental organizations and Brazil's overseas customers, Brazilian Vegetable Oil Industries Association (ABIOVE) and the National Grain Exporters Association (ANEC) – which accounts for more than 90% of the soybean commercialization in the country – announced the signing of the Soy Moratorium. This agreement committed this major soybean companies not to purchase or trade soybean produced in areas deforested areas after 24th July 2006 in the Amazon biome (Rudorff et al. 2011; Rudorff et al. 2012; Gibbs et al. 2015). In 2008 the Brazilian government also ratified the agreement.

Since 2006 the Soy Moratorium has been renewed and some studies have analyzed its effectiveness (Rudorff et al. 2011; Rudorff et al. 2012; Gibbs et al. 2015). According to Gibbs et al. (2015), in the two years preceding the agreement, approximately 30% of the soybean expansion was made by deforestation while after the agreement its dramatically decreased to 1%. Another study showed that, in the fourth year of monitoring, the soybean area represented 0.39% of the of the total deforested area during the moratorium (Rudorff et al. 2012).

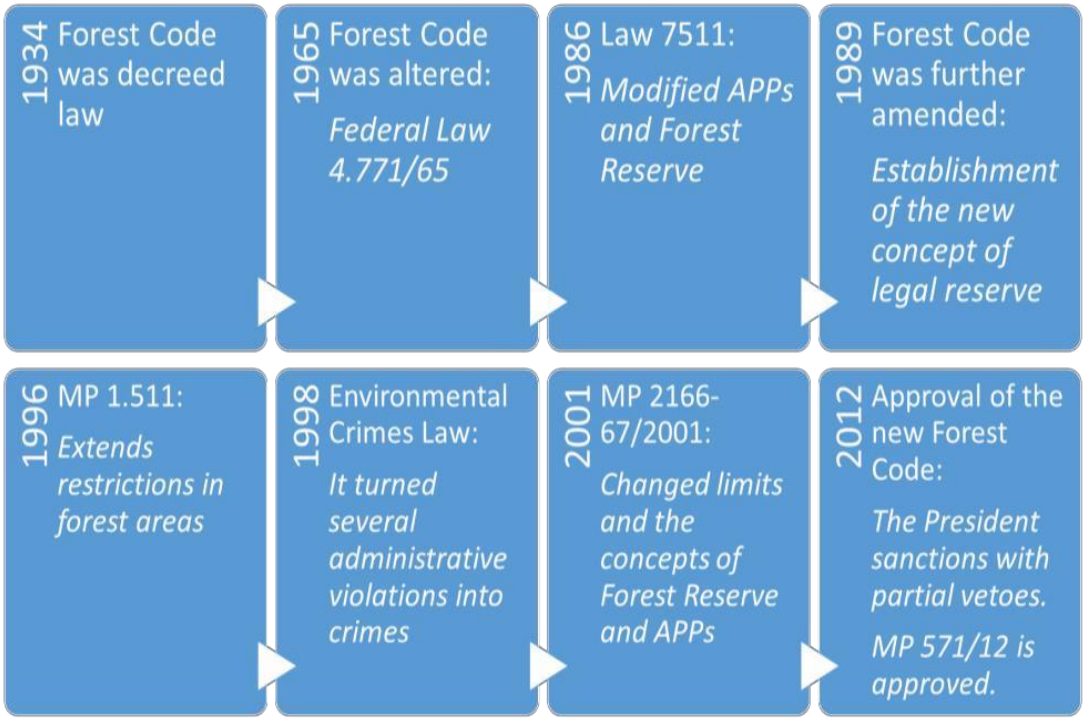

Figure 4: History of Brazilian environmental legislation[1]

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During the history, the Brazilian Government has changed the environmental legislation several times. It has been in a constant process of improvement in order to capture macroeconomic context of each different point in time, as it can be observed in Figure 4. Although the pursuit to control the deforestation and improve forest conservation lead to intense reformulation of environmental policies, these continuous changes also create an environment of uncertainty for farmers and the private sector. Further information about the government policies presented in this section can be obtained in Table A1, which presents a summary of all those government policies, their aims and instruments.

3.2 Options for global governance

As the emissions of greenhouse gas from deforestation and forest degradation accounts for nearly 20% of global GEE, this topic has been widely discussed in international debates on climate change (i.e.: COP – Conference of the Parties). It is already understood that the forest will only be kept standing when the earnings with its conservation becomes higher than the potential gain to its conversion for other purposes. In this sense, the most powerful economic mechanism for conservation of large amounts of forests may be based on the environmental services provided by standing forest (i.e.: Amazon Fund for Forest Conservation and Climate Protection) (Galvão, Lourenço and Moutinho 2011).

This topic was in debate in several occasions but in different approaches (ie: COP-9 in Italy, COP-11 in Montreal and COP-12 in Nairobi. One of the main ideas was that tropical countries are responsible for stabilizing the world climate through its forests and thus the costs to keep them standing should be shared by all. The concept of Reducing emissions from deforestation and forest degradation (REDD) was introduced in 2005 and stands for a mechanism for mitigating climate change through reducing net emissions of greenhouse gases through enhanced forest management in developing countries.

This concept has been expanded to REDD+ where 'plus' denotes the conservation of forests, enhancement of forest carbon stocks and sustainable management of forests. This new mechanism will provide positive incentives to developing countries who take one or more of the following actions to mitigate climate change: (a) Reducing emissions from deforestation; (b) Reducing emissions from forest degradation; (c) Conservation of forest carbon stocks; (d) Sustainable management of forest; and (e) Enhancement of forest carbon stocks.

[1] **MP** = "*Medida Provisória*" - provisional regulation; **APPs** = "*Área de Preservação Permanente*" - Permanent Preservation Area

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Venter and Koh (2012) review the main opportunities and challenges for REDD+ implementation. According to these authors, REDD+ is currently the most promising mechanism driving the tropical forest conservation due to its ability to harness funds and to use them in a more effective way. However, to emerge as an important policy to truly change the reality worldwide, it needs to present low transactions costs and high volume carbon markets or funds in order to fulfill its goals (Venter and Koh 2012).

Another subject that the global governance should address is the Indirect Land Use Change (ILUC). As it was showed above, a major share of deforestation can be explained by ILUC (in Brazil firstly by sugarcane and by soybean in the recent years). As ILUC might occur in a neighboring area or even in another country hundreds of miles away, its causes and consequences can be difficult to identify, measure and address. On the other hand, it is already a concern for some countries and there are, already, some policies that try to address it.

The most well-known case is biofuel production. When biofuels are produced on existing agricultural land, the demand for food production still remains, and therefore, it may lead to someone producing more food and feed somewhere else (European Commission 2012). Thus, this might led to conversion of forest to agriculture land, therefore, to a release of substantial amount of CO_2 emissions.

The European Commission has been working to address ILUC in Biofuel production. The main goal of those new rules is to make biofuels used in the European Union (EU) more sustainable, helping them to reduce further GHG emissions and encourage greater market penetration of advanced biofuels. Some of the actions that they have been addressing are: (a) including ILUC factors in the official reports by fuel suppliers and Member States; (b) providing incentives for biofuels with no or low indirect land use change emissions (second and third generation – advanced biofuels) and (3) limiting the amount of biofuels that can compete with food production (mainly first generation – conventional biofuels) (European Commission 2012).

4. FURTHER DISCUSSIONS

It is very important to consider Brazilian history in order to fully understand the deforestation process in the Brazilian Amazon because the deforestation process is dynamic and its drivers changes over time.

One of the main deforestation drivers nowadays is the soybean expansion in the Savanna and Amazon region. Some policies already tried to deal with that like the Soy Moratorium – which started from nongovernmental organizations and civil society organizations and, later on, received government support. However, as discussed above, the major amount of deforestation through soybean production does not come in a direct way, but in an indirect way (through ILUC effects).

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In this sense, it is very important for Brazilian policymakers to comprehend how this process works to properly incorporate it in their policies, in order to mitigate effectively those drivers.

Another factor that is not easy to be seen because it is hidden, with an indirect effect, is the property right issue. The Brazilian Government does not have an integrated system to properly manage the registry offices. Therefore, on those more remote areas, there is no certainty about the property rights (it is common to farms has more than one owner). Another issue is that a large amount of land is still Government property. Those two factors together encourage the *grilagem* activities (illegal occupancy of land property), the main driver for Amazon deforestation nowadays. Thus, modifying the incentive framework concerning land tenure could help reducing deforestation. This could be accomplish by (a) land regularization policy; (b) establishment of an allocation policy for all public lands; (c) establishment of a unique system for property titles; (d) effective surveillance for property registry offices and; (e) data crossing between land agencies at the three levels of government.

The Brazilian government has been applying several different policies over the past year and they have been mostly successful, managing to dramatically reduce the deforestation rates. However, deforestation still remain and there are still several illegal activities pushing it forward. Law enforcement has been improving over the last years due to the use of satellite images and government agencies collaboration but, yet, it is not sufficient to cover the whole Amazon territory due to its vast land size and to restricted resources from those surveillance agencies.

Some deforestation drivers are linked with the macroeconomics conditions. It was shown that the deforestation has a positive relationship with land value (through the land appreciation effect), to the exchange rate (exchange rate depreciation increases the local commodity prices) and to the commodities prices (if crop or pasture profitability rises landowners will have a greater incentive to clear their forested properties). In this sense, it is important to develop economy based on forest resources in a way to sustainable explore the environmental services such as maintenance of biodiversity, water cycling and carbon stocks that the Amazonian forest produce.

The international community also plays an important role in the Amazon Forest Conservation. There are several of countries that had been used their native forest in order to their own national development. As the Amazon Forest offers several of environmental services to the world, it is very important that those who benefits from its services also engage on its preservation. Another fact is that the world population increase has been pressuring the world demand for food and Brazil has been supplying a major share on that. Therefore, in order avoid food production pushing the deforestation in the Amazon region, it is important that those countries (high food demanding) also contribute to the preservation of the Amazon forest. One example is the Amazon Fund (Fundo da Amazônia), which is a mechanism proposed by the Brazilian government at the

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COP-12 aiming to reduce greenhouse gas emissions from deforestation and forest degradation (REDD) by voluntary contribution of developing countries. On March, 2009, the Amazon Fund received its first donation of $ 110 million from the Norway Government (MMA 2008).

In order to properly address the Amazon deforestation issue, the Brazilian government should modify its approach, considering some new aspects/issues that are already discussed in the literature or in others countries. Some of those are relatively easy to accomplish but others are challenging and, thus, the Brazilian government should conduct its policy wisely in order to achieve its goals to reduce GHG emissions and deforestation rates.

5. APPENDIX

Table A1. Brazilian policies to reduce deforestation

Policy	Aim	Instruments
PPCDAm	Combat deforestation on Amazon Region	Satellite monitoring system and New Management Approach
PPCerrado	Combat deforestation on Cerrado Region	Monitoring and Control; Protected areas and regional land planning; and Promotion of sustainable activities
SAD (non-government policy)	Monitoring deforestation in the Amazon Region	Satellite monitoring system
CMN (Resolução nº 3,545)	Combat deforestation on Amazon Region	Environmental conditions for landing credit to the Amazon biome
Presidential Decree (nº 6.312)	Monitoring and law enforcement	Application of differentiated actions towards municipalities with high rates of deforestation
National System of Units of Conservation	Sustainable development and land conservation	Establishment of Conservation Units
Soy Moratorium	Combat deforestation on Amazon Region	Agreement to not purchase soy grown on lands deforested after July 2006 in the Brazilian Amazon

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