Licensing Process in producer countries of sugarcane

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1. Introduction

Biofuels are important alternatives for energy supply mainly as a renewable source over fossil fuels consumption, with a potential role in reducing GHG emissions. Ethanol from sugarcane is one of the most promising biofuels. Moreover, sugarcane agroindustry produces a growing range of other end-use products and intermediate feedstocks besides ethanol itself (BNDES; CGEE, 2008), such as sugar and energy.

World's sugarcane crops have been growing significantly, mainly in tropical zones (Table 1). This expansion raises the question about how to consider factors involved in your production and their potential environmental impacts. According to Rigotto (2003), environmental licensing is an initiative to control and mitigate these impacts, regulating social and environmental conflicts.

Table 1. Sugarcane largest producer countries (2010).

Rank	Area	Production (millions of tonnes)
1	Brazil	>719
2	India	>277
3	China	>111
4	Thailand	>68
5	Mexico	>50
6	Pakistan	>49
7	Australia	>31
8	Argentina	>29
9	Philippines	>34
10	Indonesia	>27

Source: FAOSTAT, 2010.

In this scenario of impacts prediction for environmental licensing, Environmental Impact Assessment (EIA) is a systematic process which analyzes environmental consequences of development actions previously (GLASSON et al., 2005). It is a legal requirement used in several countries for project assessments whose can significantly affect the environment (SÁNCHEZ; MORRISON-SAUNDERS, 2011). The worldwide demand of ethanol as a renewable source and the international discussion about the sector impacts are growing, so it is necessary that the EIA process analyzes impacts before decision-making and so the agroindustrial sugarcane projects could be increasingly efficient in its role for contributing to sustainability (GLASSON et al., 2005; SÁNCHEZ, 2008).

Thus, this paper compares and discusses differences in environmental licensing process for sugarcane-related activities in countries that are important producers: Brazil, world's largest producer; India, second world's largest producer; and Colombia, third South American producer. Furthermore, changes and improvements are addressed for each country analyzed so that licensing process can be optimized. The methodology approach used was based on bibliographic review of

scientific journals and documental searches of laws and regulations, enabling comparisons and discussions in this theme.

2. Environmental Licensing Processes

2.1 Brazil

In Brazil, despite some regional regulations in Rio de Janeiro and Minas Gerais states in the 1970's, the environmental licensing has been recognized as part of national environmental legislation since 1981, with National Environmental Policy establishment (BRAZIL, 1981). After that, National Environmental Council (CONAMA) issued two resolutions to regulate impact assessment (IA) systems. The first of these regulations (CONAMA, 1986) links EIA with licensing process at project level and the second one (CONAMA, 1997) points Environmental Impact Statement (EIS) as the core analysis for environmental licensing.

To be efficient, licensing process depends on institutional and technical capacities of environmental agencies. Given that each federal unit in Brazil is capable to elaborate its own EIA procedures, it is noticed that regional differences in social and economic conditions can affect environmental policies and practices. In other words, process and decision-making are influenced by these local features (GLASSON; SALVADOR, 2000).

In 2006, São Paulo state – the largest sugarcane producer state in the country (over 60% of total production) – through the Environmental Secretary, considering EIS as the basis for decision-making at project level, established procedures and criteria for environmental licensing in sugarcane sector (SÃO PAULO, 2006). Two years later, the Agroenvironmental Zoning for sugarcane sector represented an innovation when considering suitability/susceptibility of areas in the licensing process (SÃO PAULO, 2008a, 2008b). In São Paulo, Minas Gerais (2nd largest producer) and Paraná (3rd largest producer) states, EIA process can be simplified by a Preliminary Environmental Report (PER) presentation when the environmental impacts are considered not sufficiently significant, based mainly in crushing capacity of industries.

Projects or activities whose impacts extend beyond state borders or affect federal watersheds are submitted to national agency, so called Brazilian Institute for Environment and Renewable Natural Resources (IBAMA). This can be seen in a positive way for states that have difficulties or a lack of conditions for the development of impact assessment, or in a negative way by causing conflicts between environmental agencies due to overlapping autonomy (GLASSON; SALVADOR, 2000).

2.2 India

Ethanol production in India is not so competitive at international levels. It has a two fold higher cost than Brazilian ethanol because its production are based in rudimentary practices with low yield per acre, lack of irrigation and fertilization, depletion of ground water resources and excessive dependence on the monsoons, which can be fickle and unreliable (GONSALVES, 2006). Nevertheless, it is the second largest sugarcane worldwide producer, mainly for sugar production.

The EIA in India became mandatory by Notification S.O. 60 (MoEF, 1994), answering the requirements of Environmental Protection Act (1986). Its implementation aims to reach common objectives of IA processes which prevents and reduces negative impacts of new proposals.

The process starts with project presentation to Impact Assessment Agency (IAA), mostly for environmental clearance (EC) request. EIS is made by the proponent (based on Appendix II – S. O.

1533) and submitted to Ministry of Environmental and Forests (MoEF) – the central agency for licensing process – which can be advised by an experts comittee of environmental issues (MURTHY; PATRA, 2005, PANIGRAHI;AMIRAPU, 2012). For details see Board 1.

Notification S.O. 60 presented only the main projects that need to be environmentally evaluated. Facing that, a new Notification (S.O. 1533, 2006) has been established and divided projects by typology into two categories (A and B categories) according to extent of impacts through human and environmental health (MoEF, 1994 -*Schedule I;* MoEF, 2006 - *Schedule*).

Category A must require a prior EC for central government, represented by MoEF, based on Expert Appraisal Committee (EAC) recommendations. Category B is evaluated at state level by State Environmental Impact Assessment Authority (SEIAA) and its State Expert Appraisal Committee (SEAC). The largest sugarcane producer states in India are Uttar Pradesh (most of 40% of total sugarcane area) and Maharashtra (almost 20%) and there is no specific legislation at state level for sugarcane sector, being the SEIAA of these states responsible for smaller projects (less than 30,000 L/day of cane juice for distilleries or 5,000t of cane crushed/day for sugar industry).

According to the latest notification, activities from category B can be considered as category A when General Conditions are applied. These conditions include project location in the whole or in part within 10 km from the boundary of: (i) Protected Areas notified under the Wild Life (Protection) Act, 1972, (ii) Critically Polluted areas as notified by the Central Pollution Control Board from time to time, (iii) Notified Eco-sensitive areas, (iv) inter-State boundaries and international boundaries.

2.3 Colombia

Likewise in Brazil and India, in the third largest sugarcane producer in South America EIA is the most discussed tool for impacts prediction in the sugarcane sector. Its legal framework derived from international conventions (TORO et al., 2010) and previous national policies, such as Natural Resources Code (COLOMBIA, 1975) which established the licensing requirement for activities that cause environmental impacts.

According to Toro et al. (2010), National Law 99 was the first law to specifically incorporate EIS in Colombian legal code (COLOMBIA, 1993). Since then, either EIA or EIS has changed many times, reducing in a half the activities that require\ environmental licensing and simplifying rules for IA. From 21 sectors/activities listed, sugarcane sector fits in "manufacturing of basic chemicals" (alcohol manufacture).

For all sectors, including sugarcane industry, EIS is the main tool for decision-making at projects level and the main requirement for obtaining environmental licensing. Procedures are similar to other countries, nevertheless EIA system in Colombia needs a previous Environmental Diagnosis Alternatives (EDA) for some activities (according to environmental authority), which intend to set up geographic areas for locational alternatives based on social and environmental features. Guidelines for impacts prediction are given by terms of reference (ToR) and are usually the same for all activities under licensing requirement (TORO et al., 2010).

Environmental license is issued by Department of Environment, Housing and Land Development, Autonomous Regional Bodies and Sustainable Development Organizations or by Municipalities with a population over 1 million inhabitants. This decision will be made according to sector and size of the activity (COLOMBIA, 2010).

3. Discussion

In order to compare the environmental licensing processes among the sugar cane producer countries it was developed a descriptive framework for identifying common and divergent characteristics related to environmental licensing processes.

Board 1. Comparison of Environmental Licensing processes in Brazil, India and Colombia for sugarcane sector.

Licensing process Characteristics	**BRAZIL**	**INDIA**	**COLOMBIA**
1. Licensing Body	Brazilian Institute for Environment and Renewable Natural Resources (IBAMA) State Environmental Agency Municipal Environmental Agency	Ministry of Envrionment and Forests (MoEF) State Environmental Impact Assessment Authority (SEIAA)	Department of Environment, Housing and Land Development Autonomous Regional Bodies Sustainable Development Organizations Municipalities (> 1mi inhabitants)
2. Decision-making process	Decentralized	Decentralized	Decentralized
3. Licensing stages	1) Application for environmental license by proponent (Work Plan) 2) Analysis of the Work Plan by environmental agency and elaboration of ToR 3.a) EIS (significant deterioration) 3.b) PER (actual or potential degradation 4) Public Hearing (if requested) 5) Technical conclusive feedback by environmental agency 6) Approval or denial of license (installation, production and operation)	1) Application for environmental clearance by proponent, according to guidelines 2) Elaboration of ToR (based on proponent application) 3) Public Hearing (when required 4) Documents and reports analysis 5) Approval or denial of environmental clearance	1) Application by proponent 2) Requirement or not by environmental agency of EDA 3) EIS elaboation 4) Procedure initiation certificate 5) Information fulfillment certificate 6) Approval or denial of license
4. Environmental Statements elaboration	Proponent	Proponent	Proponent
5. Types of environmental studies	EIS and PER are the main environmental studies. It still exists specific reports according to activity.	EIS	Environmental Diagnosis Alternatives (EDA) EIS
6. Public participation	It can occur during all process according to requirements of public authorities, civil society or proponent	After EIS elaboration Category A and B1 activities (with some exceptions)	Just for black people or native indians which have their properties affected by proposals

Brazil has many advantages for sugarcane expansion, due to its large territory, geographic location, abundance of water resources and sunlight (MARTINELLI; FILOSO, 2008). Therefore, concerns about this expansion and its implications to environment are increasing in the country. Environmental licensing is one tool which is the basis for decision-making at project level (BRAZIL, 2007), and thus for activities related to sugarcane production.

For Brazil, it is necessary to emphasize that EIA is not the only tool for environmental control in sugarcane sector. In São Paulo state, the industry and the government have signed a protocol which determines new goals for reducing sector impacts, such as ending burn practices. Furthermore, the implementation of Agroenvironmental Zoning is a tool for assisting these processes. On the other hand, less restrictive regulations such as PER's presentations have been replacing a full EIS requirement for project environmental licensing, what can be considered unconstitutional since it is not in accordance with federal laws (GALLARDO; BOND 2011).

About India, it presents a well-based legal and institutional framework for EIA. The last notification (2006) about this issue sought to address the shortcomings of 1994's notification, categorizing activities and decentralizing the process. They became more dynamic and less time-consuming. However, this may result in impairment of efficiency and transparency in licensing procedures due to some weaknesses, such as drawbacks in screening and scoping phases, insufficient database, deficiency in monitoring and public participation and also lack of expertise (PANIGRAHI; AMIRAPU, 2012, PALIWAL, 2006, MURTHY; PATRA, 2005). In addition, agricultural activities of the sector, based on monocultures, are not regulated by laws enforcement (MURTHY; PATRA, 2005), which are limited to industrial plants based on unit's milling capacity (MoEF, 2006 - *Schedule*).

In Colombia, current legislation undermines effectiveness of EIA procedures due to the limited range of scoping, absence of screening and methodologies for reaching desirable impacts prediction, evaluation and monitoring. As seen for other countries analyzed in this paper (check Board 1 for details), environmental licensing includes only industrial activities assessment and public participation is very restricted (TORO et al., 2010). However, despite these weaknesses, it's noteworthy that EDA requirement, even before the beginning of the environmental studies, is an interesting initiative of the Colombian legislation for impact assessments.

4. Conclusions

Each country has its own peculiarities for licensing new project proposals and fragilities are common for all of them. At first, EIA as auxiliary tool and the licensing process are limited as environmental impacts predictors because they are applied at project levels. Therefore, EIA has been applied at limited geographic scales, and consequently it is not capable to consider large magnitude impacts, such as GHG emissions, food security or land use changing (GALLARDO; BOND, 2011).

Moreover, these countries do not have material and human settings to adequately deal with their environmental problems. These points reflect the environmental policies and practices, in their nature and effectiveness depending on region, state or country (Glossom , 2000). An example is the Environmental Licensing in São Paulo state in Brazil. Kirchhoff et al. (2007) claim that by using PERs for decision making on the implementation and expansion of enterprises, disregarding to address issues of location and alternatives comparison. Risk assessments are also not considered in the initial stages of evaluation.

Environmental licensing process in Colombia still has weaknesses, despite its strengths as specific legal framework, administrative structure and a prior EDA request. This is due to deficiencies in EIA systems, including implementation, monitoring and control (TORO et al., 2010). But comparing to India, in terms of total production, it's disturbing that the second largest world producer doesn't have specific regulations for the sector. Total production in country increased over 70% during 2009/10 and 2010/2011seasons. As seen for Brazil, the expansion of crops must be better evaluated, predicting and avoiding future environmental impacts in agricultural activities of the sector.

Despite these commonalities, Brazil seems to have greater advance in environmental licensing process for sugarcane sector in comparison with India and Colombia, with specific legislation at federal, state and municipal level. This defines the country as a possible reference for sector's development concerned with social and environmental aspects. Nevertheless, other aspects of environmental tools applied for licensing must be assessed.

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