Global Bioenergy Partnership

Fostering sustainable bioenergy deployment – The Environmental Pillar

The Brazilian Environmental Legislation and the GBEP Sustainable Environmental Indicators

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The Eight Indicators

1. Life-cycle GHG emissions
2. Soil quality
3. Harvest levels of wood resources
4. Emissions of non-GHG air pollutants, including air toxics
5. Water use and efficiency
6. Water quality
7. Biological diversity in the landscape
8. Land use and land-use change related to bioenergy feedstock production
Looking to those indicators, what Brazilian Environmental Legislation has in order to contribute to their achievement?

I will not make a direct relation between each indicator and the legislation, but only show acts and their instruments and some information from studies, which have relation with biofuels’ sustainability.
Brazilian Environmental Legislation

- **Forest Law**: Almost\(^1\) all rural properties in Brazil must have:

  1. **Areas of permanent preservation**:  
     - Objectives: protection of water resources, landscape, geological stability, biodiversity, genetic stream, soil and the human being.
     - Definition:
       - The edge of any body of water, and its width depends on the body of water’s characteristics and wide;
       - Plateaus, slopes etc.

\(^1\) Some exceptions to small properties
Brazilian Environmental Legislation

2. **Legal reserves:**

   - Objectives: assurance of the sustainable use of natural resources, support the conservation and the rehabilitation of ecological processes and biodiversity conservation.

   - Definition:
     
     - In the Legal Amazon Forest:
       
       - Tropical forest = 80% of the total area.
       
       - Savanna formation = 35% of the total area.

     - In other areas = 20% of the total area.
Brazilian Environmental Legislation

- **Water Resources Policy:**

  - Instruments important to the environmental sustainability of crop’s cultivation and the industrial processes:

    ✓ **Authorization to withdraw water** - maintain the quality and the availability of water, guarantee multiple uses of water, etc.

    ✓ **Water basin plans** - planning the use of water resources, in order to maintain the quality of all bodies of water.
Brazilian Environmental Legislation

- **National Environmental Policy:**
  - Instruments that can contribute to the environmental sustainability of biofuels:

  - **Environmental Licensing System:**
    - Enterprises or activities that have potential to be pollutant (generate negative impacts in the environment) have to obtain an environmental license:
      - It is obtained through the assessment of potential environmental impacts (water, soil, air, vegetation, fauna, people), and
      - Proposition of measures to minimize or avoid negative impacts.
National Climate Change Policy:

- How it can contribute to the environmental sustainability of biofuels:

  Voluntary targets:

  - Reduction of GHG emissions between 36.1% and 38.9%, considering the 2020 projection of emission.

Energy sector - between 6.1% and 7.7% (or 166 and 207 MtCO2eq).

Actions: Energy efficiency; increase the use of biofuels and the offer of hydropower, and stimulate alternative sources of energy.
Brazilian Environmental Legislation

- **Instruments:**
  - Energy Sectorial Plan – in order to achieve targets established in the Plan: The expansion of areas to increase the production of sugarcane has to be in existing degraded areas (8 to 13 M ha).
  - Information, inventories, assessments, and other studies of emissions of GHG.
  - Environmental impacts assessment of micro and macroclimate.
Brazilian Environmental Legislation

- **Agro Ecological Zoning:**
  
  - Establishment of areas that have aptitude or not for the cultivation of an energy crop.

  - Sugarcane - the main constrains are:
    
    - The Amazon Forest and the Pantanal ecosystem;
    - Areas formally recognized as important to biodiversity preservation (by the Ministry of Environment);
    - Areas where mechanization is not feasible; and
    - Agro climatic characteristics.
Agro Ecological Zoning - Sugarcane

~10 Million ha Planted Area 2012
Agro Ecological Zoning – Oil Palm

- **232.8 million ha of land** – climatic & soil aptitude for oil palm cultivation;
- **Excluded**: all areas covered with native vegetation, under protection (conservation units, national, state and municipal parks), indigenous people’s land and fragile ecosystems; as well as areas that suffered human impact after 2008;
- **Cultivation allowed in 31.8 million ha** – 13.7% of land with climatic & soil aptitude – 3.7% of the Brazilian territory;
- **Management level B – Preferential area in the AML**: 73.374 Km² or 7.334.426 ha (or the equivalent to 58% of the area cultivated today in Malaysia & Indonesia).

[Map of Agro Ecological Zoning with images of AL, BA, PE, SE, ES, RJ]
# Low Carbon Agriculture Plan

## Programa ABC
Metas de redução de emissões de CO₂

<table>
<thead>
<tr>
<th>Práticas Agrícolas</th>
<th>Compromisso (aumento de área)</th>
<th>Potencial de mitigação (milhões de t. de CO₂)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recuperação de Pastagens Degradadas</td>
<td>15,0 milhões ha</td>
<td>83 a 104</td>
</tr>
<tr>
<td>Integração Lavoura-Pecuária-Floresta</td>
<td>4,0 milhões ha</td>
<td>18 a 22</td>
</tr>
<tr>
<td>Sistema Plantio Direto</td>
<td>8,0 milhões ha</td>
<td>16 a 20</td>
</tr>
<tr>
<td>Fixação Biológica de Nitrogênio</td>
<td>5,5 milhões ha</td>
<td>10</td>
</tr>
<tr>
<td>Florestas Plantadas</td>
<td>3,0 milhões ha</td>
<td>-</td>
</tr>
<tr>
<td>Tratamento de Dejetos Animais</td>
<td>4,4 milhões m³</td>
<td>6,9</td>
</tr>
</tbody>
</table>

Fonte: Ministério da Agricultura
Cropping System – No Till Farming

- 75% reduction in soil erosion.
- 69% reduction in nutrient lixiviation.
- Reduction in CO₂ emission.
- Reduction diesel consumption.
- More efficient use of inputs.
- Better water retention.
Crop Livestock Forest Integration - CLFI

“Agricultural intensification and expansion with mitigation of environmental impact”
Important information about Brazilian biofuels:

- **Energy balance:**
  - According to OCDE, 2009, the Brazilian ethanol made by sugar cane has the better relation in terms of GHG emissions if compared with fossil fuels due to:
    - The high yield per hectare (it can get even higher), and
    - Its energy balance – relation between energy production and energy used into the production cycle = 8.9 to 1 (Macedo, 2007).
  - Brazilian biodiesel made by soybean (80%) has an energy balance = 3 to 1. Its use in diesel in a percentage of 5% resulted in an emission reduction of 5.8 MtCO$_2$ in 2010 (EPE).
  - Soybean moratorium in Amazon was signed with government and the private sector in 2006 and renovated this year.
Last considerations

- Brazilian environmental legislation has instruments looking for sustainable development that has been applied in current days;
- Instruments showed here suits with biofuels production and contribute to meet environmental indicators defined by GBEP; and
- Having a legal framework to deal with biofuels sustainability is essential, and Brazil can contribute to other countries in this area.