Report of GHG Emissions Calculation

AGROTOR. S.A. PALM OIL MILL
2017
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1. INTRODUCTION

We are pleased to present the report of the calculation of the Carbon Footprint of the Agrotor Mill / Grupo Jaremar, corresponding to the year 2017, demonstrating our commitment in the fulfillment of the RSPO requirements and the fight against climate change.

The execution of this calculation has been a challenge, since it has required the involvement of several departments of the Agroindustrial Division for the collection of the information that has been fed to the Palm GHG calculator. Throughout this report, an outline of the issues related to the carbon footprint, climate change, greenhouse gases, PALM GHG methodology and the results obtained from Agrotor S.A in the stages of cultivation and process for the year 2017.

2. SCOPE OF REPORT OF CARBON FOOTPRINT CALCULATION.

The scope of this report is the carbon footprint product of the crude palm oil produced by AGROTOR. **1 MT of crude palm oil** is taken as a functional unit for the study.

The calculation has been carried out using an approach as indicated by the PALM GHG of the established palm crop to the finished product, as well as the fixation of CO₂ by the biomass. In the study carried out, direct, indirect and other indirect emissions were considered. To carry out the study of the carbon footprint, the entire palm oil value chain has been studied, carrying out the study in two main stages, within which the GHG emissions associated with the categories with greater relevance have been studied:

- Cultivation of African palm.
- Processing of the fruit of the palm to obtain crude oil.

Regarding these activities, a contribution of emissions has been obtained described in the following graph:

Year 2017

**Emmissions**
3. METHODOLOGY USED

The calculation of the greenhouse gas emissions of the Jaremar Group (Agrotor and its Supply Base) was made using the Palm GHG calculator, version 3.0.1, which is supported by the GEI/RSPO Technical Team.

4. RESULTS OF GHG EMISSIONS

4.1 Emissions and Sinks From Plantations

This analysis includes the following categories:

- Conversion of the land
- Fertilizers
- Emissions of N$_2$O
- Fuel consumption
- Peat oxidation
- Crop Sequestration
- Conservation areas
As it is observed, the source or category of CO\textsubscript{2} that contributes the most to the emissions is the land conversion. This function of the tool takes into account the previous use of the land in which there are currently oil palm plantations.

The most influential CO\textsubscript{2} sink is the absorption of CO\textsubscript{2} by the same plantations, in this case -73906.3 Tm CO\textsubscript{2} eq in the year. This value is more negative than the previous year since this is influenced by the age of the plantations.

With respect to the emission from fertilizers it is observed an increase of 203.86 of CO\textsubscript{2} eq and a decrease of 627.99 t CO\textsubscript{2} eq from the emissions of N\textsubscript{2}O.

A source is represented by a positive quantity while a sink by a negative value.

### 4.2 Emissions and Sinks From Milling Process

In the same way, the sources and sinks of CO\textsubscript{2} during production are divided as follows:

- Effluent of extractor
- Fuel consumption in the mill
- Use of the external electrical network
- Export of energy to the external power grid
- Sale of almond husk
- Sale of empty bunches

4.2.1 Table 2017

<table>
<thead>
<tr>
<th>Description</th>
<th>tCO2</th>
<th>tCO2e/t FFB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emissions Sources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POME</td>
<td>19497.04</td>
<td>0.1</td>
</tr>
<tr>
<td>Fuel Consumption</td>
<td>306.82</td>
<td>0</td>
</tr>
<tr>
<td>Grid Electricity Utilisation</td>
<td>270.16</td>
<td>0</td>
</tr>
<tr>
<td>Credits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export of Excess Electricity to Housing &amp; Grid</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sale Of PKS</td>
<td>-6634.28</td>
<td>-0.03</td>
</tr>
<tr>
<td>Sale Of EFB</td>
<td>-1987.73</td>
<td>-0.01</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11253.26</td>
<td>0.06</td>
</tr>
</tbody>
</table>

4.2.2 Table 2016

<table>
<thead>
<tr>
<th>Description</th>
<th>tCO2</th>
<th>tCO2e/t FFB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emissions Sources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POME</td>
<td>15265.86</td>
<td>0.07</td>
</tr>
<tr>
<td>Fuel Consumption</td>
<td>294.34</td>
<td>0</td>
</tr>
<tr>
<td>Grid Electricity Utilisation</td>
<td>789.14</td>
<td>0</td>
</tr>
<tr>
<td>Credits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Export of Excess Electricity to Housing &amp; Grid</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sale Of PKS</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sale Of EFB</td>
<td>-3965.73</td>
<td>-0.02</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12383.61</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Emissions from the effluent are increased by 4231.98 t CO$_2$-e due to the volume of the same. The fuel consumption shows increases in the emission in 12.48 t CO$_2$-e. The last source of emissions is the energy consumption of the national network in which emissions were reduced by 518.98 t CO$_2$-e.

The sale of biomass is a sink in the case of Agrotor since a part is sold for the generation of electricity. In this year, fiber and husk was sold, which generated a sink of 8821.56 t CO$_2$-e. The sale of husk had not been considered the previous year.

5. RESULTS OBTAINED FOLLOWING RSPO METHODOLOGY

The net GHG Emissions of crude palm oil produced in Agrotor can be seen in the following graph:
5.1 Graph 2017

The sources of CO$_2$ are represented by the blue columns while the sinks by the green color. In both years the most representative source of emissions is the land conversion followed by the effluent. The heaviest sink would be the carbon fixation by the crop.

As can be seen in both graphs in both years, the net result is represented as a sink, which indicates that more CO$_2$ is fixed than what is produced, closing the year 2017 with -1702.2 t CO$_2$-eq.

2017  -1702.2 t CO$_2$-eq.

Which is summarized in the following table based on a metric ton of product.
6. STRATEGIES AND IMPROVEMENT PLANS

The following table shows the actions that are currently executed and that have a direct impact on emissions. With the controls shown, immediate decisions are made regarding the indicators to reduce the final impacts and thus contribute to the non-impact of climate change.

<table>
<thead>
<tr>
<th>Area</th>
<th>Strategy</th>
<th>Action</th>
<th>Control</th>
<th>Responsible</th>
<th>Frequency</th>
</tr>
</thead>
</table>
| Plantations   | Reduction in Fertilizer Consumption | - Soil Analysis 
- Foliar Analysis 
- Efficient use treated effluents as irrigation water | - Fertilization Program. 
- Records of Application 
- Training | Agricultural Manager and Support Staff | Annual |
|               | Improvement of Yields            | - Good farming practices 
- Use of Improved Genetic Material | - Production records by batch 
- Charge collection 
- Integrated pest management 
- Riego / Fertiriego | Agricultural Manager and Support Staff | Weekly/ monthly |
|               | Reduction in Fuel Use            | - Measuring equipment 
- Results by Tm 
- Maintenance | - Consumption Records 
- Indicators | Plant Manager and Support Staff | Weekly/ monthly |
| Extraction    | Reduction of energy consumption | - Plan of Consumption 
- Daily measurement | - Indicators 
- Maximum Demand 
- Power Factor 
- Green Factor | Plant Manager and Head of Mechanics and Electricity | Weekly/ monthly |
|               | Fuel Consumption Reduction      | - Efficiency of Generation | - Maintenance of boilers and turbines | Plant Manager and Support Staff | Weekly/ monthly |
|               | Increase of yields               | - Control of losses 
- Maintain optimal yields (productivity, extraction.) | - Maintenance of equipment 
- Loss tracking 
- Track to productivity | Plant Manager and Support Staff | Weekly/ monthly |
|               | Methane capture                  | - Substitution of fossil fuel with methane | - Use of methane for steam production 
- Use of methane in electricity production | Head of Biogas | Weekly/ monthly |